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Тематика журнала: актуальные вопросы современной экономики и социологии - от теоретических и экспериментальных исследований до непосредственных результатов управленческой и производственной деятельности. Публикации в журнале учитываются как опубликованные работы при защите диссертаций на соискание ученых степеней России и зарубежья.

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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;
- Здравоохранение в обществе.

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Редакционный совет:

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Мирзажанов М.А., кандидат технических наук, доцент,

Муминов У.М., доктор философии по техническим наукам, доцент,

Муминов О.А., доктор философии по техническим наукам (PhD),

Мусаев Б.Б., доктор педагогических наук (DSc), профессор,

Мухаммадиева О.М., кандидат философских наук, доцент,

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Нуридинов Т.К., доктор философии по историческим наукам (PhD), доцент,

Нуриев К.К., доктор технических наук, профессор,

Олимов Ж.Б., доктор философии по историческим наукам (PhD),

Олимова А.А., доктор философии по педагогическим наукам (PhD),

Омонов Ш.Б., кандидат технических наук,

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Расулова Г.А., доктор философии по педагогическим наукам (PhD), доцент,

Рафиков В.А., кандидат технических наук, доктор географических наук, профессор,

Рахимов С.М., доктор философии по педагогическим наукам (PhD),

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Рахматов О., доктор технических наук, профессор,

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Султанов Х.Э.. доктор философии по педагогическим наукам (PhD), профессор,

Султанова С.М., кандидат экономических наук, PhD, профессор,

Тангиров Х.Т., кандидат биологических наук, доцент,

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Отв. ред. А.А. Зарайский
Главный редактор: Тягунова Людмила Анатольевна, кандидат философских наук

Abdullaeva S. B.
assistenti
Samarqand davlat tibbiyot universiteti
Turdiqulova D. S.
talabasi
Samarqand davlat tibbiyot universiteti

ZAMONAVIY AXBOROT TEXNOLOGIYALARI VA PEDAGOGIK DASTURIY VOSITALARNING SHAXSNI SHAKLLANISHDAGI AHAMIYATI

Annotatsiya: *Bugungi kunda jamiyatimizda axborot komunikatsiyalari texnologiyalari hamda pedagogik dasturiy vositalar talabalarning shaxs sifatida shakllanishida muhim omilga aylangan. Axborot texnologiyalari nafaqat bilim berish jarayonini osonlashtirmaydi, balki shaxsning ijtimoiy, ma'naviy, intellektual rivojlanishida yangi imkoniyatlar yaratmoqda. Ushbu maqolada zamonaviy axborot texnologiyalari va pedagogik dasturiy vositalarning shaxs shakllanishidagi roli, afzalliklari va cheklovlari to'g'risidagi ma'lumotlar yoritilgan.*

Kalit so'zlar: *Shaxs, zamonaviy axborot texnologiyalari, pedagogik dasturiy vositalar, ta'lim, tarbiya.*

Abdullaeva S. B.
assistant
Samarkand State Medical University
Turdikulova D. S.
student
Samarkand State Medical University

THE IMPORTANCE OF MODERN INFORMATION TECHNOLOGIES AND PEDAGOGICAL SOFTWARE IN PERSONALITY FORMATION

Abstract: *Today in our society, information and communication technologies, as well as pedagogical software tools, have become an important factor in shaping the personality of students. Information technologies not only facilitate the process of knowledge transfer, but also create new opportunities for the social, spiritual, and intellectual development of a person. This article highlights the role, advantages and limitations of modern information technologies and educational software in personality formation.*

Keywords: *personality, modern information technology, pedagogical software tools, education, upbringing.*

Kirish

Hozirgi globallashuv va raqamli transformatsiya sharoitida jamiyat hayotining barcha sohalari, ayniqsa ta’lim tizimi jadal ravishda o‘zgarib bormoqda. Zamonaviy axborot texnologiyalarining rivojlanishi ta’lim jarayoni mazmuni, shakli va usullariga tubdan ta’sir ko‘rsatib, shaxsni shakllantirishda yangi imkoniyatlar va yondashuvlarni vujudga keltirmoqda. Bugungi kunda ta’lim samaradorligini oshirish, talabalarning mustaqil fikrlashi, ijodiy qobiliyatlari va raqobatbardoshligini rivojlantirish zamonaviy axborot-kommunikatsiya texnologiyalari hamda pedagogik dasturiy vositalar bilan uzviy bog‘liqdir.

Zamonaviy axborot texnologiyalari ta’lim oluvchining bilish faolligini oshirish, o‘quv materialini vizual va interaktiv shaklda taqdim etish, ta’lim jarayonini individuallashtirish hamda differensiatsiyalash imkonini beradi. Ayniqsa, elektron darsliklar, multimedia vositalari, virtual laboratoriyalar, masofaviy ta’lim platformalari va interaktiv dasturlar talabalarning bilim olishga bo‘lgan qiziqishini kuchaytiradi. Bu esa shaxsning faol, mustaqil va ijodiy shakllanishiga xizmat qiladi.

Pedagogik dasturiy vositalar esa o‘qitish jarayonida o‘qituvchi va talaba o‘rtasida samarali muloqotni ta’minlash, ta’lim natijalarini baholash va tahlil qilish, bilimlarni mustahkamlashda muhim ahamiyat kasb etadi. Ushbu vositalar orqali ta’lim oluvchi nafaqat tayyor bilimlarni o‘zlashtiradi, balki axborotni izlash, tahlil qilish, tanqidiy fikrlash va o‘z fikrini asoslab berish ko‘nikmalarini ham shakllantiradi. Natijada ta’lim jarayoni shaxsga yo‘naltirilgan xarakter kasb etadi.

Shuningdek, zamonaviy axborot texnologiyalari shaxsning axborot madaniyatini shakllantirishda muhim omil hisoblanadi. Axborot bilan ishlash, raqamli muhitda xavfsiz harakat qilish, texnologiyalardan maqsadli va samarali foydalanish kabi ko‘nikmalar hozirgi zamon talablariga javob beradigan shaxsni tarbiyalashda alohida ahamiyatga ega. Shu bois, ta’lim tizimida axborot texnologiyalari va pedagogik dasturiy vositalardan oqilona foydalanish masalasi dolzarb vazifalardan biri bo‘lib qolmoqda.

Adabiyotlar tahlili va metodologiyasi

Biz bilamizki, axborot texnologiyalari deganda, ma’lumotlarni yig‘ish, saqlash, uzatish, qayta ishlash mumkin bo‘lgan usullar va vositalar tushuniladi. Ta’lim sohasida esa bu texnologiyalar o‘quv-mashg‘ulot jarayonini yangicha tashkil etish, o‘quvchilarning faolligini oshirish, individuallashtirilgan ta’lim imkoniyatlarini kengaytirish imkonini beradi. Masalan, “Information technologies in education” mavzusidagi materiallarda A.A. Aksyukhin va boshqalar axborot texnologiyalarining ta’limda o‘rni «zarur, shart» ekanligini ta’kidlaydilar. O‘zbekistonda ham raqamli texnologiyalar orqali ta’lim jarayonining raqamlashtirilishi va talabalarga onlayn-platformalar orqali ta’lim berish imkoniyatlari kengaymoqda. Bu texnologiyalarning shaxs shakllanishiga ta’siri keng-axborot resurslari orqali o‘zini yangilash, mustaqil o‘rganish, tanqidiy fikrlash qobiliyatini rivojlantirish mumkin.

Pedagogik dasturiy vositalar -o‘quv jarayonida qo‘llaniladigan elektron o‘quv ilovalari, interaktiv darsliklar, avtomatlashtirilgan o‘quv tizimlari va boshqa

o‘quv-moslamalarni anglatadi. Masalan, “Pedagogicheskie programmnыe sredstva: uchebnoe posobie” risolada pedagogik dasturiy vositalarning tasnifi, talablari, intellektual o‘quv tizimlari va boshqa jihatlarini yoritadi. Pedagogik dasturiy vositalar talabalarga mavzuni mustaqil o‘rganish, interaktiv mashg‘ulotlar orqali qiziqishni saqlab qolish va zamonaviy media vositalari orqali vizual hamda amaliy tomonlarini kuchaytirish imkonini beradi. Masalan, bu vositalar yordamida talaba tajriba o‘tkazishi, model yasashi yoki virtual muhitda amaliyot qilish imkoniga ega bo‘ladi. Shuningdek, pedagogik dasturiy vositalar shaxsning o‘z-o‘zini rivojlantirishiga-mustaqil o‘rganish, izlanish, tahlil qilish ko‘nikmalarini shakllantirishga xizmat qiladi.

Muhokama

Shaxs-bu ma’naviy-axloqiy, intellektual, ijtimoiy jihatdan rivojlangan individualdir. Zamonaviy axborot texnologiyalari va pedagogik dasturiy vositalar shaxs shakllanishida quyidagi jihatlar orqali ta’sir qiladi:

- **Ma’lumotga tez va keng kirish imkoniyati**: Internet, elektron ta’lim platformalari orqali shaxs kerakli bilim va resurslarga oson yetib boradi. Bu esa bilim olishni kengaytiradi va tanqidiy fikrlashni rivojlantiradi.
- **Individuallashtirilgan ta’lim**: Axborot texnologiyalari yordamida har bir o‘quvchi yoki talaba o‘z qobiliyatiga mos tarzda o‘rganishi, kuchli va zaif tomonlarini belgilashi mumkin. Masalan, axborot kommunikatsion texnologiyalar asosida ta’lim jarayonini talabaning ehtiyojlariga moslash mumkin.
- **Faollik va ishtirokchiligi**: Interaktiv dasturlar, multimedia vositalari talabani passiv holatdan faollikka o‘tkazadi, bunda shaxsning tashabbuskorligi kuchayadi.
- **Hamkorlik va global aloqalar**: Axborot texnologiyalari yordamida o‘quvchilar va talabalar boshqa mamlakatlar, maktablar bilan aloqaga kirishi, jahon ta’lim maydonida faol bo‘lishi mumkin. Bu esa ijtimoiy jihatdan ochiq, jahonqarashli shaxslarni shakllantiradi.
- **O‘z-o‘zini boshqarish va o‘zini takomillashtirish**: Dasturiy vositalar orqali talaba o‘z taraqqiyotini kuzatishi, o‘zini baholashi, mustaqil topshiriqlarni bajarishi mumkin. Bu esa shaxsiy mas’uliyatni kuchaytiradi.

Bundan tashqari, shaxsning raqamli madaniyatini rivojlantirish, axborot va kommunikatsiya texnologiyalaridan ongli foydalanishni o‘rgatish ham muhimdir. Shu o‘rinda uning afzalliklari va cheklovlari haqida aytish mumkin**.**

Ta’lim jarayonida resurslar va vositalarning xilma-xilligi orqali, ya’ni video, animatsiya, simulyatsiya, virtual muhitlar yordamida mavzular jonliroq, tushunarliroq bo‘ladi.

- Talabalarga axborot texnologiyalari bilan o‘quv jarayoni *“bir shaxs uchun”* tarzda individuallashadi.
- O‘qituvchi va talabaning roli o‘zgaradi, ya’ni faqat ma’lumot beruvchi emas, balki mentor, maslahatchi rolini oladi.
- Bilimga kirish cheklari kamayadi, ya’ni geografik, vaqt chegaralari tekislanadi.

Cheklovlar va xavf-qo‘rqinchlar:

- Texnik vositalar, internet aloqasi va qurilmalar yetishmasligi muammo tug‘dirishi mumkin, ya’ni ayrim hududlarda bu imkoniyatlar cheklangan.
- Raqamli savodsizlik: bunda o‘quvchi, talaba yoki o‘qituvchi texnologiyani samarali ishlata olmasa, imkoniyatlar cheklanadi.
- Dasturiy vositalarning sifati va mazmun jihatdan boyligi turlicha bo‘lishi mumkin, ba’zan dasturiy vosita maqsadga muvofiq bo‘lmaydi yoki o‘quv jarayonini to‘liq qo‘llab-quvvatlamaydi.
- Talaba bilimi ortiqcha axborot bilan boyitilishi mumkin, ya’ni bu xolda tanqidiy fikrlashni rivojlantirish, axborotni saralash qobiliyatini o‘rgatish zarur.
- Interaktiv va texnologik muhit shaxsiy aloqalar, inson-inson munosabatlari o‘rnini to‘liq bosolmaydi, vaxolanki, bu jihat shaxsiy jihatdan rivojlanishda e’tibordan chetda qolmasligi lozim.

O‘zbekistonda ta’lim sohasida axborot texnologiyalarining tatbiq etilishi kengayib bormoqda. Masalan, onlayn ta’lim platformalarining joriy etilishi, elektron darsliklar, interaktiv darslar tashkil etilishi bilan bu jarayon mustahkamlanmoqda. Shu bilan birga, pedagogik dasturiy vositalarning rivojlanishi ham markaziy ahamiyat kasb etmoqda.

Kelajakda esa bir qancha istiqbolli yo‘nalishlar ko‘zda tutilmoqda:

- Bulutli ta’lim muhitlari-talabalar va o‘qituvchilar uchun hamma joydan, hamma vaqtda resurslarga kirish imkoniyatlarini beradi.
- Sun’iy intellekt va mashinaviy o‘rganishning ta’lim jarayoniga integratsiyasi-talabalarning ehtiyojiga mos adaptiv o‘quv tizimlari hisoblanadi.
- Virtual va kengaytirilgan haqiqat, gamifikatsiya-dars mashg‘ulotlarini yanada qiziqarli va interaktiv qilishga yordam beradi.
- Ta’lim jarayonida raqamli etik, axborot xavfsizligi, ma’lumot madaniyati kabi jihatlar o‘z o‘rnini yanada mustahkamlaydi.

Shu bilan birga, mamlakatimizda cheklovlar va muammolar ham mavjud, ya’ni infratuzilmaning muvofiqligi, mutaxassislar salohiyati, pedagoglarning axborot texnologiyalari bo‘yicha savodxonligi va resurslarning zamonaviyligi kabi masalalar e’tibordan chetda qolmasligi lozim.

Xulosa

Zamonaviy axborot texnologiyalari va pedagogik dasturiy vositalar shaxsning shakllanishida muhim asos yaratadi. Ular bilim olishni osonlashtiruvchi, shaxsning o‘z-o‘zini rivojlantirish imkoniyatlarini kengaytiruvchi, ijtimoiy va intellektual jihatdan ochiq bo‘lgan muhit yaratadi. Biroq bu vositalar faqat texnik jihatdan joriy etilishi bilan yetarli emas, ya’ni pedagoglarning metodik tayyorgarligi, texnologiyalarning mazmun jihatdan boyligi, talabalarning axborot madaniyati ham birdek muhimdir. Shaxs shakllanishi jarayonida axborot texnologiyalari va pedagogik dasturiy vositalar bilan birga ma’naviy-axloqiy tarbiya, ijtimoiy muhit va individual psixologik

xususiyatlar ham ahamiyatlidir. Shu bois, kelajakda bu jihatlarga jiddiy e’tibor qaratish zarur hisoblanadi.

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Abdullaeva S. B.
assistenti
Samarqand davlat tibbiyot universiteti
Sindorov F. R.
o‘qituvchisi
Abu Ali Ibn Sino nomidagi Siyob jamoat salomatligi texnikumi

TIBBIY BIOLOGIK MASALALARNI YECHISH ALGORITMLARINI MATEMATIK MODELLASHTIRISH

Annotatsiya: *Modellashtirish orqali murakkab biotizimlarning dinamikasini o‘rganish, bashorat qilish va qaror qabul qilish jarayonlarini takomillashtirish masalalariga e’tibor qaratiladi. Ushbu maqolada tibbiy va biologik masalalarni yechishda qo‘llaniladigan algoritmlarni matematik modellashtirish usullari tahlil qilingan. Biologik jarayonlar va tibbiy holatlarni formal ifodalashda matematik modellarning ahamiyati yoritilib, ular asosida samarali hisoblash algoritmlarini ishlab chiqish imkoniyatlari muhimligi ko‘rsatilgan. Shuningdek, algoritmlarning samaradorligini oshirishda differensial tenglamalar, ehtimollik modellari va hisoblash usullaridan foydalanish imkoniyatlari yoritilgan. Tadqiqot natijalari tibbiy tashxislash, davolashni rejalashtirish va biologik jarayonlarni tahlil qilishda matematik modellashtirishning yuqori samaradorligini namoyon etadi.*

Kalit so‘zlar: *tibbiy biologik jarayonlar, matematik modellashtirish, algoritmlar, prognozlash, qaror qabul qilish, kompyuter modellashtirish.*

Abdullaeva S. B.
assistant
Samarkand State Medical University
Sindorov F. R.
teacher
Syab Public Health Technical School named after Abu Ali Ibn Sino

MATHEMATICAL MODELING OF ALGORITHMS FOR SOLVING BIOMEDICAL PROBLEMS

Abstract: *The main focus is on studying the dynamics of complex biosystems through modeling, as well as improving forecasting and decision-making processes. This article analyzes the methods of mathematical modeling of algorithms used in solving medical and biological problems. The importance of mathematical models in the formal representation of biological processes and medical conditions is highlighted, and the importance of the possibility of developing effective computational algorithms based on them is pointed out. The possibilities of using differential equations, probabilistic models, and calculation methods to improve the efficiency of algorithms are also highlighted. The results of*

the study demonstrate the high efficiency of mathematical modeling in medical diagnostics, treatment planning and analysis of biological processes.

Keywords: *biomedical processes, mathematical modeling, algorithms, forecasting, decision-making, computer modeling.*

Kirish

Hozirgi kunda tibbiyot va biologiya fanlarining jadal rivojlanishi inson salomatligini saqlash, kasalliklarni erta aniqlash va samarali davolash usullarini ishlab chiqishga qaratilgan yangi yondashuvlarni talab etmoqda. Tirik organizmlarda kechadigan fiziologik, biokimyoviy va biofizik jarayonlar murakkab tuzilishga ega bo‘lib, ular ko‘p sonli o‘zaro bog‘liq omillar ta’sirida shakllanadi. Bunday murakkab tizimlarni tahlil qilish va ularning rivojlanish qonuniyatlarini aniqlashda matematik modellashtirish muhim ilmiy vosita hisoblanadi.

Tibbiy biologik masalalarni yechishda qo‘llaniladigan algoritmlar organizmdagi jarayonlarni formallashtirish, ma’lumotlarni qayta ishlash va aniq natijalar olish imkonini beradi. Matematik modellar yordamida real biologik tizimlar soddalashtirilgan, ammo mazmunan to‘liq ifodalanadi. Bu esa kasalliklarning kelib chiqish sabablarini o‘rganish, ularning dinamikasini bashorat qilish hamda davolash strategiyalarini optimallashtirishda katta ahamiyatga ega.

Zamonaviy tibbiyotda raqamli texnologiyalar, kompyuter modellashtirish va hisoblash usullarining joriy etilishi tibbiy qarorlarni qabul qilish jarayonini yangi bosqichga olib chiqdi. Ayniqsa, tibbiy diagnostika, biomeditsin ma’lumotlarni tahlil qilish, genetik va molekular jarayonlarni o‘rganishda matematik algoritmlar samarali qo‘llanilmoqda. Bu algoritmlar aniq hisob-kitoblar, yuqori ishonchli natijalar va vaqtni tejash imkonini yaratadi.

Shuningdek, tibbiy biologik masalalarni yechish algoritmlarini matematik modellashtirish fanlararo yondashuvni talab qiladi. Mazkur yo‘nalish matematika, informatika, biologiya va tibbiyot fanlarining o‘zaro integratsiyasini ta’minlab, ilmiy tadqiqotlar samaradorligini oshiradi.

Adabiyotlar tahlili va metodologiyasi

Tibbiy va biologik jarayonlarni matematik modellashtirish masalalari ilmiy adabiyotlarda keng yoritilgan bo‘lib, ushbu yo‘nalishda ko‘plab olimlar tomonidan nazariy va amaliy tadqiqotlar olib borilgan. Xususan, A.A. Samarskiy va Yu.P. Popov ishlarida murakkab tizimlarni matematik modellashtirishning umumiy prinsiplari ishlab chiqilgan bo‘lib, ular biologik va tibbiy tizimlarga ham muvaffaqiyatli tatbiq etilgan. Olimlarning ta’kidlashicha, modellashtirish real jarayonlarni chuqur tahlil qilish va ularning kelgusi holatlarini bashorat qilish imkonini beradi.

Biologik tizimlarni dinamik modellashtirish borasida Lotka va Volterra tomonidan taklif etilgan differensial tenglamalarga asoslangan modellar muhim ahamiyatga ega. Ushbu modellar populyatsiya dinamikasi, infeksion kasalliklar tarqalishi kabi masalalarni o‘rganishda keng qo‘llanilgan. Shuningdek, Xodjkin va

Xaksli ishlarida neyron faoliyatini matematik modellashtirish orqali nerv impulslarining shakllanishi ilmiy jihatdan asoslab berilgan.

Zamonaviy tadqiqotlarda tibbiy ma’lumotlarni qayta ishlash va tahlil qilishda algoritmlashtirish usullariga alohida e’tibor qaratilmoqda. I.V. Kochergin va V.M. Titov tadqiqotlarida tibbiy tashxislashda statistik va hisoblash algoritmlarining samaradorligi ko‘rsatib berilgan. Ular matematik modellar asosida ishlab chiqilgan algoritmlar tashxis aniqligini oshirishini ta’kidlaydilar.

Maqolada qo‘llaniladigan metodologiya tibbiy biologik jarayonlarni formallashtirish, ular uchun matematik model tuzish va shu modellar asosida yechim algoritmlarini ishlab chiqishdan iboratligini ta’kidlaydi. Tadqiqot jarayonida differensial tenglamalar, statistik tahlil usullari va kompyuter modellashtirish texnologiyalaridan foydalanishning ahamiyatini e’tiborga olish muhimdir. Bunday yondashuv tibbiy biologik masalalarni kompleks ravishda o‘rganish, hisoblash natijalarining ishonchliligini ta’minlash hamda amaliy tibbiyotda qo‘llash imkoniyatlarini kengaytiradi.

Muhokama

Tibbiy biologik masalalarni yechishda matematik modellashtirishning asosiy afzalligi shundaki, murakkab biologik jarayonlarni formal va aniq shaklda ifodalash mumkin bo‘ladi. Modellar turli biologik tizimlarning dinamikasini tahlil qilish va turli ssenariylar bo‘yicha prognoz berish imkonini yaratadi. Shu bilan birga, algoritmlar asosida amalga oshirilgan hisoblashlar tibbiy ma’lumotlarni tizimlashtirish, xatoliklarni kamaytirish va qaror qabul qilish jarayonini ilmiy asoslashga yordam beradi. Tadqiqot davomida aniqlandiki, matematik modellar va algoritmlar kasalliklarni tashxislash va davolash jarayonlarini samarali boshqarishda muhim vosita hisoblanadi.

Biroq, real biologik tizimlar murakkabligi sababli har qanday model ma’lum darajada soddalashtirishni talab qiladi. Ba’zi omillar modelda to‘liq aks etmasligi mumkin, bu esa natijalarning umumlashtirilishida chegara qo‘yadi. Shu sababdan, tibbiy biologik masalalarni modellashtirishda kiruvchi ma’lumotlarning aniqligi va algoritmlarning to‘g‘ri tanlanishi muhim ahamiyatga ega.

Bundan tashqari, zamonaviy tadqiqotlar sun’iy intellekt va mashinali o‘rganish usullarini matematik modellar bilan birgalikda qo‘llash natijalarning aniqligini yanada oshirishini ko‘rsatmoqda. Bu yondashuv katta hajmdagi tibbiy ma’lumotlarni tahlil qilish, turli ssenariylarni solishtirish va tashxis aniqligini yaxshilash imkonini beradi. Umuman olganda, tibbiy biologik masalalarni yechishda matematik modellashtirish va algoritmlardan foydalanish ilmiy va amaliy jihatdan yuqori ahamiyatga ega ekanligi isbotlangan.

Natija

Natijalarga asosan shuni aytish mumkinki, tibbiy biologik masalalarni yechishda matematik modellashtirish va algoritmlardan foydalanish yuqori samaradorlikka ega. Matematik modellar biologik jarayonlarni aniq va formal tarzda ifodalash imkonini beradi, bu esa ularni tahlil qilish va prognozlash jarayonlarini soddalashtiradi. Algoritmlar asosida amalga oshirilgan hisoblashlar tibbiy ma’lumotlarni tizimlashtirish, xatoliklarni kamaytirish va tashxislash

jarayonida qaror qabul qilishni ilmiy asoslash imkonini yaratadi. Modellashtirish turli biologik tizimlarning dinamikasini o‘rganishda muhim vosita sifatida qo‘llaniladi. Shuningdek, algoritmlar yordamida kasalliklarni erta aniqlash, davolash jarayonlarini rejalashtirish va natijalarni bashorat qilish imkoniyatlari mavjudligi ma’lum bo‘ldi.

Real biologik jarayonlarning murakkabligiga qaramay, modellar va algoritmlar ularni soddalashtirilgan holda tahlil qilishga yordam berib, amaliyotda samarali qo‘llanilishini ta’minlaydi. Shu bilan birga, matematik modellashtirish va algoritmlarning samaradorligi kiruvchi ma’lumotlar sifati va to‘g‘ri tanlangan modellarga bog‘liqdir. Kelgusida sun’iy intellekt va mashinali o‘rganish usullari bilan integratsiya qilingan modellar tibbiy biologik masalalarni yechishda natijalarning aniqligini yanada oshirish imkonini beradi. Umuman olganda, tibbiy biologik masalalarni yechishda matematik modellashtirish va algoritmlashtirishning ilmiy va amaliy ahamiyati muhimdir hamda ushbu yo‘nalishda qo‘llaniladigan usullarning kelajakdagi rivojlanishi uchun asos yaratadi.

Xulosa

Tibbiy biologik masalalarni yechishda matematik modellashtirish sohasi zamonaviy ilmiy tadqiqotlarda alohida ahamiyat kasb etadi. Tuzilgan modellar organizmdagi murakkab biologik jarayonlarni struktur va konseptual jihatdan tasvirlash imkonini beradi. Bu usul biologik tizimlarning funksional xususiyatlari va turli ta’sir omillari o‘rtasidagi o‘zaro bog‘liqliklarni chuqur tahlil qilish imkonini yaratadi.

Algoritmlarni qo‘llash jarayonida ma’lumotlarning integratsiyasi, patternlarni aniqlash va funksional prognozlarni tayyorlash soddalashtiriladi. Modellar va hisoblash usullari yordamida tibbiy tadqiqotlarda nazorat qilingan eksperimentlarni qisqartirish, resurslardan samarali foydalanish va tadqiqot jarayonini optimallashtirish mumkin. Shu bilan birga, biologik tizimlarning individual xususiyatlari va noaniqliklari modellarni ishlab chiqishda e’tiborni talab qiladi, bu esa analitik yondashuvning chegaralarini belgilaydi. Kelgusida sun’iy intellekt va mashinali o‘rganish algoritmlari bilan integratsiyalashtirilgan modellar klinik tadqiqotlarda prognozning aniqligini oshirish va farmakologik hamda terapevtik qarorlarni ilmiy asoslash imkoniyatini kengaytiradi. Umuman olganda, tibbiy biologik masalalarni yechish algoritmlarini matematik modellashtirish - matematik modellashtirishning ilmiy jihatdan samarali va amaliy qo‘llanilishi uchun muhim asos bo‘lib xizmat qiladi va tibbiy biologiya sohasidagi tadqiqotlarning rivojlanishi uchun istiqbolli yo‘nalishlarni ochadi.

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Allayarova M. K.
Guliston davlat universiteti

MAMLAKATNING PENSIYA TIZIMI EVOLYUTSIYASI

Annotatsiya. *Mazkur maqola mamlakat pensiya tizimini rivojlanish evolyusiyasi, aholini ijtimoiy himoya qilish modellari taqqoslamali tahliliga va ijtimoiy sug‘urta tizimining pensiyaning shakllanishiga ta’siri o‘z aksini topgan.*

Kalit so‘zlar: *pensiya tizimi, aholini ijtimoiy himoya qilish modellari, ijtimoiy sug‘urta tizimi, sug‘urta badallari, ijtimoiy ta’minot, pensiya miqdori.*

Alayarova M. K.
Gulistan State University

EVOLUTION OF THE COUNTRY'S PENSION SYSTEM

Annotation. *This article reflects the evolution of the country's pension system, a comparative analysis of social protection models and the impact of the social insurance system on pension formation.*

Keywords: *pension system, models of social protection of the population, social insurance system, insurance contributions, social security, pension amount.*

Kirish

Mamlakat sanoatlashtirish yo‘liga o‘tgan davrda fuqarolarni ijtimoiy xavflardan himoya qilishga qaratilgan markazlashgan mexanizmlarni yaratish zaruratining yuzaga kelishiga bir qator omillar sabab bo‘ldi. Ular orasida ushbu iqtisodiy tizimga xos bo‘lgan urbanizatsiya jarayonlari, ommaviy migratsiya, katta oilaning kichik oilaga transformatsiyasi, ishchi harakati shakllanishi kabi ijtimoiy-demografik o‘zgarishlar alohida ahamiyatga ega bo‘ldi. An’anaviy urug‘-aymoq aloqalarining yemirilishi ijtimoiy xavflardan, xususan pensiya xavflaridan oilaviy doirada himoyalanish shaklining o‘z dolzarbligini yo‘qotishiga olib keldi. Bunday sharoitda ijtimoiy xavflarga qarshi an’anaviy himoya shakllarini zamonaviy ijtimoiy muhitga mos keluvchi yangi mexanizmlar - ya’ni ijtimoiy sug‘urta tizimi bilan almashtirish zarurati vujudga keldi.

Natija va xulosalar

Pensiya tizimi mamlakatdagi ijtimoiy-siyosiy va iqtisodiy vaziyatning o‘zgarishlariga muvofiq ravishda shakllantirilgan va isloh qilingan. Mamlakatda yuz bergan tub ijtimoiy-siyosiy o‘zgarishlar milliy pensiya tizimini isloh qilish zaruratini yuzaga keltirgan. So‘nggi 100 yil ichida mahalliy pensiya tizimi aholining ijtimoiy himoyasining uchta modelidan biriga asoslangan holda (Bismark, Beverij va Sovet modellari) bir necha bor qayta tuzilgan, ularning xususiyatlari 1-jadvalda keltirilgan.

1-jadval

Aholini ijtimoiy himoya qilish modellari taqqoslamali tahlili

Asosiy xususiyatlar	Bismark modeli	Beverij modeli	Sovet modeli
Ijtimoiy xatarlarni boshqarish usuli	Ijtimoiy sug‘urta	Ijtimoiy ta’minot va ijtimoiy sug‘urtaning uyg‘unlashuvi	Ijtimoiy ta’minot
Davlat aralashuv darajasi	Cheklangan, tizim avtonom ravishda ishlaydi	Minimal kafolatlarni berish va sog‘liqni saqlashni moliyalashtirishda yuqori darajada	Yuqori
Moliyalashtirish shakli	Avtonom sug‘urta fondlari orqali	Byudjetdan moliyalashtirish va qo‘shimcha sug‘urtaning kombinatsiyasi	Byudjetdan moliyalashtirish
Davlat kafolatlarining mavjudligi	Asosiy moddiy ta’minotni taqdim etish kafolatlanadi	Asosiy moddiy ta’minotni taqdim etish kafolatlanadi	Moddiy ta’minotni taqdim etish to‘liq davlat kafolatida
Ixtiyoriy sug‘urtaning mavjudligi	Mumkin	Ixtiyoriy sug‘urta tizimning bir qismidir	Mavjud emas

XIX asr oxirida paydo bo‘lgan Bismark modeli ijtimoiy himoyaning sug‘urta mexanizmi asosida shakllantirilgan milliy tizimlarini yaratgan aksariyat davlatlar uchun namuna bo‘ldi. Ushbu modelning asosini ijtimoiy xatarlarni boshqarish usuli sifatida ijtimoiy sug‘urta tashkil etadi.

Beverij modeli XX asrning o‘rtalarida Buyuk Britaniyada paydo bo‘ldi. Bu davrda mamlakat hukumati ingliz olimi U. Beverij tomonidan shakllantirilgan prinsiplar asosida ijtimoiy sug‘urta tizimini isloh qildi.

Ushbu model ijtimoiy xatarlarni boshqarishning ikki usulini — ijtimoiy ta’minot va ijtimoiy sug‘urtani uyg‘unlashtirishni nazarda tutadi. Beverij modelida uch bosqichli tuzilma mavjud: majburiy, ijtimoiy ta’minot mexanizmi orqali ijtimoiy xavflarni minimal darajada qoplaydigan; majburiy, ish beruvchining moliyaviy ishtirokida ijtimoiy sug‘urta mexanizmi orqali xodimlarning ijtimoiy risklarini qayta taqsimlashni amalga oshirish; ixtiyoriy, individual asosda ijtimoiy sug‘urta mexanizmi orqali ijtimoiy risklarni qoplash.

Hatto mamlakatimiz tarixining monarxiya davrida ham milliy ijtimoiy sug‘urta tizimini shakllantirish yo‘lida dastlabki qadamlar qo‘yilgan edi. Ushbu jamiyatlarga zavodning barcha ishchilari a’zo bo‘lgan, ularning badallari esa sug‘urta kassasida jamg‘arilgan. Moliyaviy manbalar sifatida ishchilarning ish haqidan 2–3% miqdorida ushlab qolinadigan mablag‘lar va zavod ma’muriyatlari tomonidan har yili ishchilar tomonidan to‘langan jami badallar hajmiga teng miqdordagi qo‘shimcha ajratmalar xizmat qilgan. Shu tarzda shakllantirilgan

sug‘urta fondlari kasallik nafaqalarini, nogironlik pensiyalarini, beva va yetimlarga to‘lovlarni amalga oshirishni ta’minlagan[1].

Mamlakatning moliyaviy resurslari tarkibida davlat moliyasi ustun mavqega ega bo‘lmagan, xususiy kapitalning ulushi esa ancha yuqori bo‘lgan. Pensiya islohotining tashabbuskorlari nemis ijtimoiy sug‘urta modelini (Bismark modelini) namuna sifatida qabul qilib, mehnatkashlar uchun avtonom va majburiy pensiya sug‘urtasi tizimini tashkil etishdi. Bunday tizimni moliyalashtirish uchun optimal mexanizm sifatida sug‘urta tizimi tanlandi. Bu mexanizm xususiy moliyaviy resurslar sharoitida — ya’ni pensiya sug‘urta fondlarining shakllanish manbai bo‘lgan moliyaviy aktivlar xususiy mulk bo‘lgan holatda — mehnatkashlar va ularning oila a’zolarini pensiya asoslari yuzaga kelganda moddiy ta’minlash vazifasini samarali hal etishga imkon bergan.

So‘ngra ijtimoiy sug‘urta tizimi ijtimoiy ta’minot tizimi bilan almashtirildi. Sug‘urtadan faqatgina moliyaviy resurslarni shakllantirish vositasi sifatida ishlatilgan atama — “sug‘urta badali” saqlanib qoldi. Shu bilan birga, ilgari ijtimoiy sug‘urta bilan shug‘ullangan barcha tashkilotlar tugatildi va ularning o‘rniga yangi muassasalar tashkil etildi: Markaziy organ sifatida Ijtimoiy ta’minot va mehnat muhofazasi bo‘limi**;** Mahalliy darajada esa —mehnat bo‘limlarining ijtimoiy ta’minot va mehnat muhofazasi sho‘balari tashkil qilindi.

Ijtimoiy ta’minot huquqi barcha mehnatkashlarga nisbatan tatbiq etildi. Ilk bor pensiya xavflari bo‘yicha ijtimoiy ta’minot huquqi barcha fuqarolarga, ularning kasbiy mansubligidan qat’i nazar, taqdim etilgan. Biroq bu yerda muhim bir izoh berish zarur: umumiy ijtimoiy ta’minot tizimining joriy etilishi hali mamlakatda eng keng tarqalgan pensiya turi — qarilik bo‘yicha pensiyani nazarda tutmagan. Ya’ni, qarilik holati hali pensiya xavfi sifatida sug‘urtalashga kiritilmagan edi**.**

Pensiya miqdori quyidagi tartibda hisoblab chiqilgan: mehnatga layoqatlilikning to‘liq yo‘qotilishi holatida oylik pensiya miqdori pensioner yashab turgan hududda belgilangan kundalik normal nafaqa miqdorining 25 baravari sifatida belgilanar edi. Mehnatga qisman layoqatsizlik holatlarida esa pensiya miqdori yo‘qotilgan mehnatga layoqatlilik darajasiga qarab quyidagicha belgilangan: 15% dan 29% gacha bo‘lgan yo‘qotish — to‘liq pensiyaning 1/5 qismi**;** 30% dan 44% gacha — to‘liq pensiyaning 1/2 qismi; 45% dan 60% gacha — to‘liq pensiyaning 3/4 qismi; 60% dan yuqori holatlarda — to‘liq pensiya miqdori[2].

Ijtimoiy sug‘urta bo‘yicha badallar faqat ish beruvchilar tomonidan, mehnatkashlarning ish haqi miqdoriga nisbatan foizda hisoblab chiqarilgan va to‘langan. Ushbu yondashuvni N.A. Vigdorchik quyidagicha asoslagan: «Yordam ko‘rsatish majburiyati saqlanib qolishi kerak, biroq badallar to‘lash majburiyati

[1] Роик В. Д. Эволюция форм социальной защиты в России / В. Д. Роик // Человек и труд. — 2004. — № 10. — С. 25–30.

[2] Декрет Совета народных комиссаров РСФСР от 31 октября 1918 г. Статья 18 [Электронный ресурс] // СПС «КонсультантПлюс».

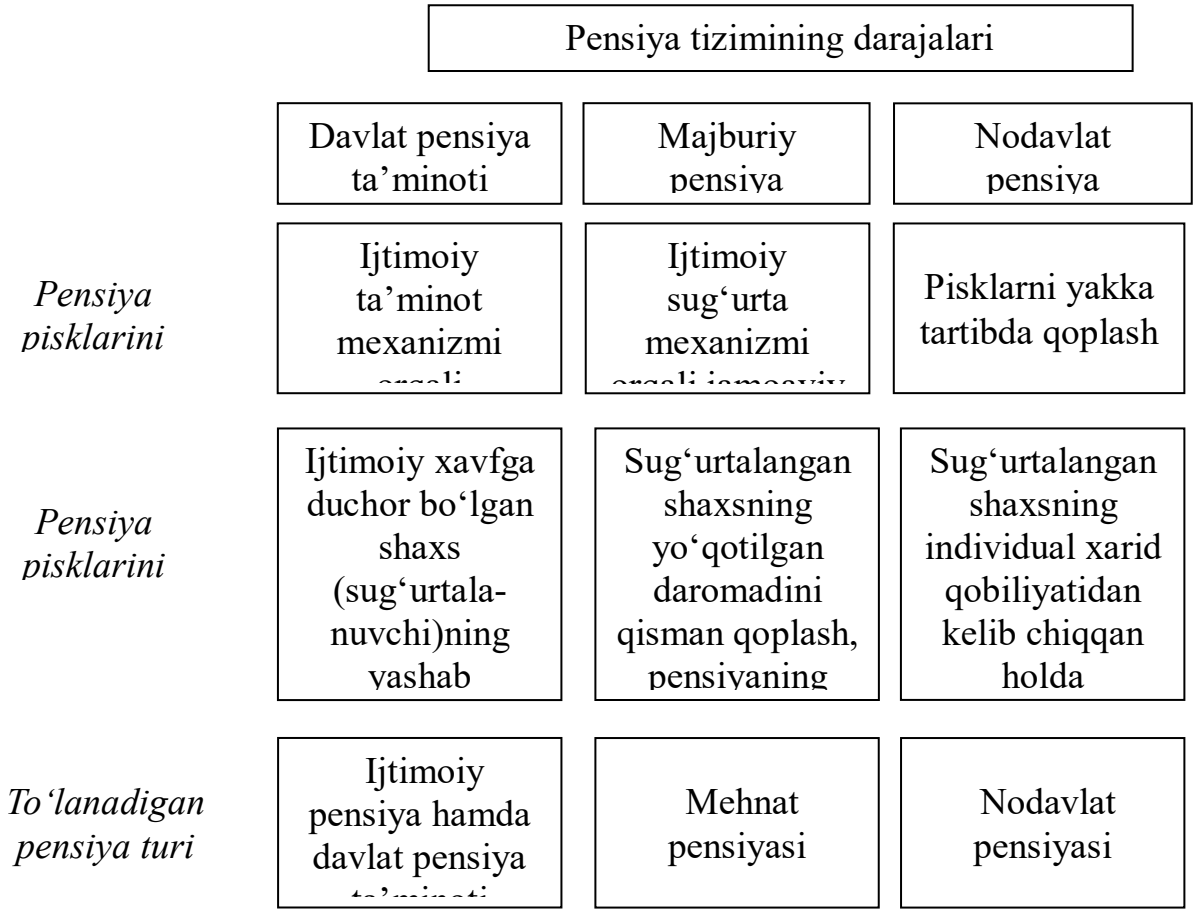
bekor qilinishi lozim. Jamiyatning muhtoj a'zosi yordamni shunchaki ma'lum miqdorda badal to‘lagani uchun emas, balki aynan shu jamiyatning a'zosi bo‘lgani uchun, ehtiyojga tushgan vaqtda yordam olish huquqiga ega bo‘lgani sababli olishi kerak. Sug‘urtaning umumiylik tamoyili shu tariqa o‘zining mantiqiy yakuniga yetkaziladi... Sug‘urta uchun zarur mablag‘lar esa tadbirkorlar uchun maxsus soliq hisobidan yoki davlat byudjetidan ajratilishi lozim»[3].

Pensiyaning asosiy turi – qarilik pensiyasining yosh chegarasi ham saqlanib qolgan: erkaklar uchun — 60 yoshga to‘lganda va umumiy mehnat staji kamida 25 yil bo‘lganda (to‘liq miqdordagi pensiyani olish huquqi bilan); ayollar uchun esa — 55 yoshga to‘lganda va umumiy mehnat staji kamida 20 yil bo‘lganda.

Pensiya miqdorining pastligi va “tenglashtirish” tizimining mavjudligi davlat pensiyalarini hisoblashning yangi usulini — pensionerning individual koeffitsienti asosida hisoblash tizimini joriy etishga olib keldi. Ushbu koeffitsient asosida pensiya miqdori nominal jihatdan maksimal miqdor bilan cheklanmagan edi (garchi individual koeffitsientning o‘zini hisoblashda ayrim cheklovlar mavjud bo‘lsa-da). Biroq pensiya tizimidagi islohotlarning keyingi rivojlanishi mamlakatimizda pensiya ta'minoti darajasining rivojlangan davlatlarnikiga nisbatan pastligiga barham berishga qodir bo‘lmadi. Aksincha, ayrim ko‘rsatkichlar bo‘yicha xorijiy davlatlar bilan farq yanada kengaydi. Hozirgi kungacha ham sug‘urtalangan shaxslarning pensiya huquqlarini konvertatsiya qilishda pensionerning individual koeffitsientini hisoblash mexanizmi modifikatsiyalangan shaklda qo‘llanilib kelinmoqda.

Milliy pensiya tizimi bozor iqtisodiyotiga ega mamlakatlar uchun xos bo‘lgan eng keng tarqalgan model — aralash turdagi pensiya tizimini shakllantirishga urinish amalga oshirildi. Biroq, o‘sha davrdagi mamlakatning umumiy ijtimoiy muammolari (pensiya badallari hisoblanadigan ish haqi darajasining pastligi, aholining soliq madaniyatining pastligi va boshqalar) pensiya tizimlariga xos bo‘lgan ijobiy jihatlarning to‘liq amalga oshirilishiga to‘sqinlik qildi.

[3] Вигдорчик Н. А. Теория и практика социального страхования / Н. А. Вигдорчик. - Л. : Книга, 1925. — Вып. 1 : Теоретические основы социального страхования. — 53-54 с.



1-chizma. Pensiya tizimining xususiyatlari

Zamonaviy pensiya tizimining sifat ko‘rsatkichlari 1-chizmada aks ettirilgan**.** Yagona pensiya tizimi pensiya risklarini boshqarishda uch bosqichli yondashuvdan foydalanadi, bu jarayon esa aralash turdagi pensiya tizimlari uchun xos bo‘lgan amaliyot hisoblanadi. Bazaviy darajada davlat pensiya ta’minoti mexanizmi orqali aholining kam daromadli qatlamlariga xos bo‘lgan pensiya pisklarini qamrab olish (ya’ni kompensatsiyalash) amalga oshiriladi, ularning ijtimoiy ta’minoti minimal darajada kafolatlanadi. Shu darajada, shuningdek, alohida maqomga ega bo‘lgan shaxslar (harbiy xizmatchilar, ichki ishlar organlari xodimlari, davlat fuqarolik xizmatchilari va boshqalar) uchun davlat pensiya ta’minoti ko‘zda tutilgan bo‘lib, ularga yo‘qotilgan daromadning muayyan qismi qoplab beriladi.

Sug‘urta darajasida majburiy pensiya sug‘urtasi mexanizmi orqali mehnatkash aholining pensiya pisklarini jamoaviy qayta taqsimlash amalga oshiriladi. Qo‘shimcha darajada esa, nodavlat pensiya sug‘urtasi mexanizmi orqali yuqori daromadli ijtimoiy guruhlarning pensiya pisklari individual asosda qoplanadi.

Yuqorida olib borilgan pensiya tizimi evolyutsiyasini tahlil qilish shuni ko‘rsatdiki, pensiya tizimi mamlakatda shakllangan ijtimoiy, siyosiy va iqtisodiy sharoitlarga muvofiq tarzda isloh qilinmoqda. Shu bilan birga, pensiya risllarini

boshqarish usullari — ijtimoiy sug‘urta va ijtimoiy ta’minot — vaqti-vaqti bilan o‘zgartirilib borilgan, bu esa pensiya risklarini qoplash vazifasini qaysi usul samaraliroq bajarganiga bog‘liq bo‘lgan.

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Allazov S. A., tibbiyot fanlari doktori,
professor
Samarqand davlat tibbiyot universiteti
Samarqand, O‘zbekiston

UROLOGIK QON KETISHLARDA MAHALLIY GEMOSTAZ UCHUN LAGOCHILUSNING KLINIK QO‘LLANILISHI

Annotatsiya: *Lagochilus inebrians poyasi, barglari va gullarida diterpen spirt lagoxilin saqlashi tufayli qon to‘xtatuvchi xususiyatga ega bo‘lgan mahalliy dorivor o‘simlikdir. Muallif lagochilusning suyuq ekstraktini (10 % li damlama va 12 % li nastoyka) operatsion yaralarda gemostaz maqsadida, urologik kelib chiqishli makrogematuriyalarda, adenomektomiyalarda, chaqmoq tezligida kechuvchi Furnye gangreniyasi bo‘yicha “agressiv jarrohlik”da hamda tashqi jinsiy a’zolar shikastlanishlarida ijobiy samara bilan qo‘llagan.*

Kalit so‘zlar: *urologik kasalliklar, qon ketishlar, lagochilus, gemostaz.*

Allazov S. A., doctor of medical sciences
professor
Samarkand StateMedical University
Samarkand, Uzbekistan

CLINICAL USE OF ZAITZEGUB OP’YANAYUSHCHIY FOR LOCAL HEMOSTAS IN UROLOGICAL BLEEDING

Abstract: *The intoxicating harelip (Lagohilus inebriane Bge) is a domestic hemostatic medicinal plant due to the diterpene alcohol lagochilin contained in the stems, leaves, tsets. The author with a positive effect used a liquid extract (10% infusion and 12% tincture) of lagohilus for the purpose of hemostasis of surgical wounds, with macrohematuria of a urological nature, adenomectomy, “aggressive surgery” for fulminant Fournier's gangrene and damage to the external genital organs.*

Key words: *urological diseases, bleeding, lagokhilus, hemostasis.*

Kirish

So‘nggi yillarda minimal invaziv davolash usullari va texnologiyalariga katta qiziqish tufayli an’anaviy (ochiq) adenomektomiya vaqtida gemostatik o‘simlik preparatlaridan foydalanish deyarli unutilib ketdi, holbuki amaliy urologiyada bu operatsiyaga holatlarning yarmidan ko‘pida murojaat qilishga to‘g‘ri keladi. Prostata adenomektomiyasida “Lagoden” preparatining gemostatik samarasi ishonchli tarzda isbotlangan. Shuningdek, ayrim yakka holatlarda prostata adenomektomiyasi paytida P.M. Shorlujan (1957) va I.M. Mamyshev (1957) tomonidan qon to‘xtatuvchi vosita sifatida mast qiluvchi lagochilus (Lagochilus inebrians) qo‘llanilgan.

Shu nuqtai nazardan, bizning fikrimizcha, 1955-yil 8-yanvarda SSSR Sog‘liqni saqlash vazirligi huzuridagi Farmakologiya qo‘mitasi tomonidan qon to‘xtatuvchi vosita sifatida, keyinchalik esa sedativ vosita sifatida ruxsat etilgan lagochilus damlamasi va nastoykasi alohida qiziqish uyg‘otadi (Akopov I.E., 1957).

Materiallar va usullar

Bemorlar kontingenti pastki siydik yo‘llari kasalliklari va patologik holatlari (uretrorragiyalar, gemorragik sistit, adenomektomiya vaqtida, operatsiyadan keyingi va kech davrda yuzaga kelgan qon ketishlar, siydik pufagi o‘smalari), makrogematuriya bilan kechuvchi holatlar, operatsion yaralar, Furnye gangrenasi va tashqi jinsiy a’zolar shikastlanishlari bilan kechuvchi qon ketishlardan iborat edi.

Lagochilusning suvli damlamasi (1:10 yoki 1:20) — 5% va 10% konsentratsiyada SSSR Davlat farmakopeyasi VIII nashriga muvofiq tayyorlanadi: 1 g kosachabarg (chashyelistik) 10 g qaynoq suvga (10% damlama) yoki 20 g qaynoq suvga (5% damlama). Damlamaning ko‘rinishi damlangan choyga o‘xshash, tiniq, turganda biroz xiralashuvchi bo‘lishi kerak. Ta’mi — achchiq, aromatik. Sovuq joyda 2–3 kundan ortiq saqlanmaydi. Kattalar uchun doza — kuniga 3–6 marta 1 choy qoshiqdan. Uy sharoitida damlama 1 stakan qaynoq suvga 3 osh qoshiq lagochilus kosachabarglari solinib, 6–8 soat davomida damlab tayyorlanadi. Kosachabarglar dorixonalarda retseptsiz beriladi. Mast qiluvchi lagochilus nastoykasi (tinktura) kosachabarglarni 96° etil spirtida 12 kun davomida, vaqti-vaqti bilan chayqatib, 10 qism (og‘irlik bo‘yicha) xomashyo va 90 qism (hajm bo‘yicha) spirt nisbatida tayyorlanadi. Nastoyka sovuq joyda uzoq muddat xossalarini o‘zgartirmasdan saqlanishi mumkin. Kattalar uchun doza 1 choy qoshiq nastoyka 1/4 stakan suvga aralashtirib, kuniga 3–5 marta.

Operativ aralashuvlar va shikastlanishlarda gemostaz maqsadida qon ketayotgan operatsion yara yuzasiga yoki shikastlangan sohaga lagochilus nastoykasi bilan ho‘llangan salfetka 3–4 daqiqa davomida qo‘yiladi. Bu bog‘lash yoki kuydirish (elektrokoagulyatsiya) kabi nisbatan invaziv gemostaz usullarini almashtiradi.

Natijalar

O‘tkazilgan monovariant tahlil shuni ko‘rsatdiki, lagochilus damlamasini instillyatsiya ko‘rinishida qo‘llash uretra yoki siydik pufagidan qon ketishini 10 daqiqadan 1 soatgacha bo‘lgan vaqt ichida to‘xtatishga yordam beradi.

Uretrorragiyali 32 bemordan 29 tasida adenoma o‘rniga lagochilus damlamasi yoki nastoykasi bilan ho‘llangan turunda 5–6 daqiqa davomida qo‘yilganda yaxshi gemostatik samara kuzatildi va 10–30 daqiqa ichida qon ketish to‘xtadi. 2 bemorda elektrokoagulyatsiyaga, 1 bemorda esa tikishga murojaat qilishga to‘g‘ri keldi.

Adenomektomiya vaqtida gemostaz 5–6 daqiqa davomida lagochilus damlamasi bilan ho‘llangan turunda yordamida vaqtinchalik tamponada qilish orqali amalga oshirildi. Odatda 1 yoki 2–3 marta qisqa muddatli tamponada yetarli

bo‘ldi. 60 bemordan 59 tasida gemostaz shu usul bilan ta’minlandi, faqat 1 bemorda adenoma o‘rnini tikish talab qilindi.

Muhim jihati shundaki, 2-jadvaldagi raqamli ma’lumotlarga ko‘ra, qon ketishga moyillik ko‘rsatkichlari, UTT natijalari va buyraklarning funksional holati normallashgan yoki normaga yaqinlashgan. Bu lagochilus damlamasi va nastoykasining kuchli gemostatik xususiyatini tasdiqlaydi.

Muhokama

Amaliy shifokorlar, jumladan urologlar, o‘z hududlarida o‘sadigan dorivor o‘simliklardan olinadigan gemostatik preparatlarni qo‘llashga katta qiziqish bildirmoqdalar.

Vodorod peroksidi, adrenalin, epsilon-aminokapron kislotasi, kaprofer, mum, infuzol, kollagen plastinkalar kabi mahalliy gemostatik vositalar bir qator nojo‘ya ta’sirlarga ega (to‘qimani tirnash, kuydirish, qotirish, nekroz, toksik ta’sir), bundan tashqari, ularning narxi ham yuqori.

Uretrorragiyali 32 bemordan 16 tasida qon ketish uretra shikastlanishidan keyin yuzaga kelgan (9 tasida iatrogen — asbobiy tekshiruv va bujirlash vaqtida, 5 tasida chanoq suyaklari sinishi, 2 tasida jinsiy olat shikastlanishi natijasida). Lagochilus damlamasi bilan instillyatsiya 32 bemordan 29 tasida yaxshi gemostatik ta’sir ko‘rsatdi va 10–30 daqiqa ichida qon ketish to‘xtadi. 2 bemorda shoshilinch epitsistostomiya va elektrokoagulyatsiya, 1 bemorda esa uretrani birlamchi tikish zarur bo‘ldi.

Gemorragik sistitda siydik pufagi bo‘shlig‘iga uch kanalli kateter orqali 2–3 kun davomida instillyatsiya yoki irrigatsiya qilish makrogematuriyaning yo‘qolishiga olib keldi, 3–5 kun ichida 10 bemorda (71,4%) eritrotsituriya bartaraf etildi. Barcha bemorlarda ishuriya, 9 bemorda esa 3–5-kunlarda leykotsituriya yo‘qolishi lagochilus preparatlarining nafaqat qon to‘xtatuvchi, balki yallig‘lanishga qarshi ta’sirga ham ega ekanini ko‘rsatadi.

Lagochilus nastoykasi operatsiya vaqtida (37 bemor) operatsion yara gemostazini ta’minlashda, shuningdek, operatsiyadan keyingi davrda drenaj naychalari olib tashlanganda yuzaga kelgan qon ketishlarda (3 bemor) va operatsion yarani qayta ko‘zdan kechirishda (2 bemor) yaxshi samara bilan qo‘llanildi.

Xulosa

Lagochilus damlamasi va nastoykasini qo‘llash gemostaz texnikasini soddalashtiradi, pastki siydik yo‘llari va operatsion yaralardan qon ketishini to‘xtatishning ishonchli farmakologik usuli hisoblanadi, qon ketayotgan to‘qima yuzasining optimal tuzilishi va fiziologik tiklanishi uchun sharoit yaratadi (kam yoki noinvazivlik). Eng muhimi, bu usul gemostazning boshqa turlariga nisbatan ancha arzon hisoblanadi.

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Allazov S. A., tibbiyot fanlari doktori
professor
Samarqand davlat tibbiyot universiteti
Samarqand, O‘zbekiston

UROLOGIYADA LAPAROSKOPIK VA RETROPERITONEOSKOPIK AMALIYOTLAR

Annotatsiya: *Laparoskopik va retroperitoneoskopik operatsiyalar bo‘yicha zamonaviy ma’lumotlar yoritilgan bo‘lib, ular minimal invaziv aralashuvlarning barcha xilma-xil usullarini qamrab oladi. Laparoskopik va retroperitoneoskopik usullarning afzalliklari hamda kamchiliklari haqidagi adabiy manbalar keltirilgan. Shuningdek, turli urologik kasalliklarda ushbu usullarning diagnostik va davolovchi ahamiyati ko‘rsatib o‘tilgan.*

Kalit so‘zlar: *laparoskopiya, retroperitoneoskopiya, minim*al invaziv urologiya.

Allazov S. A., doctor of medical sciences,
professor
Samarkand StateMedical University
Samarkand, Uzbekistan

LAPAROSCOPIC AND RETROPERITONEOSCOPIC INTERVENTIONS IN UROLOGY

Abstract: *The review covers current information about laparoscopic and retroperitoneoscopic operations in urology, which cover all the various methods of minimally invasive interventions. Literature data on the advantages of laparoscopic and retroperitoneoscopic methods, as well as their disadvantages, are presented. Their diagnostic and therapeutic values are indicated for various urological diseases.*

Keywords: *Laparoscopy retroperitoneoscopy minimally invasive urology*

Kirish

Rretroperitoneal sohada bajariladigan operativ aralashuvlarning eng muhim tarkibiy qismi jarrohlik kirish yohisoblanadi. Aynan kirish yo‘li ko‘p jihatdan operatsiyaning bajarilish sifatini (texnik jihatdan mukammaldan tortib oddiy darajagacha), intraoperatsion asoratlar yuzaga kelish ehtimolini, ularni oldini olish yoki bartaraf etish imkoniyatini belgilaydi, ya’ni aralashuvning xavf darajasi va xavfsizligini aniqlaydi (Morozova A.V., 2002). Hozirgi kunda minimal invaziv operativ aralashuvlar klinik amaliyotga keng joriy etilgan bo‘lib, ular an’anaviy jarrohlik kirish yo‘llariga nisbatan bir qator inkor etib bo‘lmaydigan afzalliklarga ega. Minimal invaziv texnologiyalar operatsiya davomiyligini va operatsiyadan keyingi reabilitatsiya muddatini qisqartirish imkonini beradi (Lopatkin N.A. va

hammualliflar, 2007).

Material va usullar

Siydik-tosh kasalligi bilan og‘rigan 61 nafar bemor bo‘yicha retrospektiv tahlil o‘tkazildi. Tanlash mezonlari: siydik yo‘lining pastki uchdan bir qismi yoki intramural bo‘limida joylashgan konkrementlar, shuningdek, siydik yo‘lining yuqori uchdan bir qismida joylashgan, o‘lchami 0,5 dan 2,0 sm gacha (o‘rtacha 1,1 sm) bo‘lgan toshlar. Minimal invaziv usullar (perkutan nefrolitotomiya, ekstrakorporal litotripsiya, ureterorenoskopiya, laparoskopik ureterolitotomiya) siydik yo‘li toshlarini olib tashlashda muhim va almashtirib bo‘lmaydigan o‘rin tutadi (Axmedov R.N. va hammualliflar, 2012). Popov S.V. va hammualliflar (2013) ishida laparoskopik va lyumboskopik kirish yo‘llari orqali bajarilgan 44 ta buyrak rezektsiyasi tajribasi keltirilgan. Nefronni saqlovchi operatsiyalarni bajarishda turli gemostaz usullarining samaradorligi taqqoslab tahlil qilingan. Jismoniy gemostaz usullari zarur talablarga javob bermasligi, issiqlik ishemiyasi vaqtini va intraoperatsion qon yo‘qotish xavfini oshirishi, rezektsiya chegarasini vizualizatsiya qilishni qiyinlashtirishi ko‘rsatilgan.

Natijalar

Ushbu yo‘nalishda biz O‘zbekistonda va unga tutash hududlarda o‘sadigan dorivor o‘simlik lagochilusning 10 % damlamasi va 12 % nastoykasi yordamida gemostaz usulini sinab ko‘rdik. Ushbu o‘simlik ekstraktlari kuchli mahalliy gemostatik xususiyatga ega. Operatsiyalar natijalari “oltin standart” hisoblangan ochiq rezektsiya natijalari bilan taqqoslanadigan darajada bo‘ldi. Laparoskopik nefronni saqlovchi operatsiyalarni amalga oshirishdagi asosiy to‘siq ishonchli yakuniy gemostazni ta’minlash bilan bog‘liq texnik qiyinchiliklardir. Turli mualliflar ma’lumotlariga ko‘ra, buyrak rezektsiyasidan keyingi operatsiyadan so‘nggi davrda qon ketish 2–12 % bemorlarda kuzatiladi (Fergany A.F. va boshq., 2000; Gill I.S. va boshq., 2007; Breda A. va boshq., 2009). Afzalliklariga qaramay, laparoskopik buyrak rezektsiyasi ochiq rezektsiyaga nisbatan texnik jihatdan murakkab bo‘lib, intraoperatsion asoratlar darajasi yuqoriroq va issiqlik ishemiyasi vaqti uzoqroq bo‘ladi. Qator tadqiqotlarda ishemiya vaqti bilan buyrak funksiyasi yo‘qotilishi o‘rtasida sezilarli bog‘liqlik aniqlangan (Kim F.J. va boshq., 2003; Guilloneau B. va boshq., 2003; Simmons M.N. va boshq., 2008; Simon J. va boshq., 2009). Biroq, yaqinda ayrim mualliflar ishemiya vaqti buyrak funksiyasini saqlashda hal qiluvchi omil degan an’anaviy qarashlarni shubha ostiga qo‘ydilar. Buyrak rezektsiyasi vaqtida yuzaga keladigan ishemiya o‘tkir buyrak funksiyasi buzilishiga olib kelishi mumkin, ammo uzoq muddatli prognozga sezilarli ta’sir ko‘rsatmaydi. Ya’ni, saqlab qolingan parenxima miqdori va sifati ishemiya davomiyligiga qaraganda muhimroqdir (Lane B.R. va boshq., 2010). Hozirgi kunda urolitiaz bilan og‘rigan bemorlarni davolashning asosiy usullari masofaviy (ekstrakorporal) va kontakt (transuretral yoki perkutan) litotripsiya hisoblanadi. Ammo ayrim bemorlarda yirik (1,5–2,0 sm dan katta), uzoq vaqt bir joyda joylashgan siydik yo‘li toshlarida ushbu jarrohlik usullari har doim ham samarali bo‘lavermaydi (Akilov F.A. va hammualliflar, 2014). Zabryushin yiringli-yallig‘lanish kasalliklarini diagnostika qilish va davolash

so‘nggi 20–30 yil ichida tubdan o‘zgardi. Shunga qaramay, asoratlangan urologik kasalliklarni davolashda retroperitoneoskopik usullarni qo‘llash borasida yagona fikr mavjud emas. O‘nlab yillar davomida yiringli-yallig‘lanish kasalliklarini davolashning yagona usuli ochiq operativ aralashuv bo‘lib, u “oltin standart” hisoblangan. Jumagaliyev A.A. va Usupbayev A.Ch. (2013) retroperitoneoskopik va an’anaviy operatsiyalar natijalarini solishtirma tahlil qilganlar. Adabiyotlarda hozirgacha pastki qutb tomirlarining piyeloureteral segment (PUS) obstruksiyasi etiologiyasidagi roli borasida bahslar davom etmoqda. Kesib o‘tuvchi tomirlarning operatsiya muvaffaqiyatiga ta’sirini aniqlash maqsadida J. Stern va hammualliflar (2007) laparoskopik piyeloplastika vaqtida Vitaker testini o‘tkazganlar. Mualliflar tomirni PUS sohasidan ko‘chirib o‘tkazgandan so‘ng jom ichidagi bosim sezilarli darajada pasayganini aniqlaganlar. N. Wagner va hammualliflar (2010) 105 bemorda bajarilgan laparoskopik piyeloplastika natijalarini e’lon qilganlar. Lohanochno-mochetochnik (jom–siydik yo‘li) segmenti plastikasi urologiyada eng keng tarqalgan laparoskopik rekonstruktiv operatsiya hisoblanadi. Hozirgi adabiyotlarda ushbu plastikaning turli metodikalari ochiq operatsiyalar bilan taqqoslangan ko‘plab tavsiflar uchraydi (Brooks J.D. va boshq., 1995; Bauer J.J. va boshq., 1999; Smith K.E. va boshq., 2002; Sundaram C.P. va boshq., 2003; Singh H. va boshq., 2007).

Xulosalar

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2.Shu bilan birga, endoskopik operatsiyalar minimal invaziv texnologiyalarning barcha afzalliklarini siydik yo‘llarining obstruktiv shikastlanishlaridan aziyat chekayotgan bemorlarga taqdim etadi.

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Allazov S. A., tibbiyot fanlari doktori,
professor
Samarqand Davlat Tibbiyot Universiteti
Samarqand, O‘zbekiston

BUYRAK KISTOZ O‘SMALARINI DIAGNOSTIKA VA DAVOLASHNING ZAMONAVIY YONDASHUVLARI

Annotatsiya: *Buyrak kistoz o‘smalari turli tabiatga ega bo‘lib, aniq diagnostikani talab qiladi. Zamonaviy usullar orasida ultratovush (UZI), kompyuter tomografiya (KT) va magnit-rezonans tomografiya (MRT) mavjud bo‘lib, ular kistalarning joylashuvi va xarakterini aniqlash imkonini beradi. Davolash o‘smaning turi va o‘lchamiga bog‘liq bo‘lib, kuzatuv, minimal invaziv muolajalar yoki operatsiyani o‘z ichiga olishi mumkin.*

Kalit so‘zlar: *Buyrak kistoz o‘smalari, diagnostika, davolash, UZI, KT,* MRT

Allazov S. A., doctor of medical sciences,
professor
Samarkand StateMedical University
Samarkand, Uzbekistan

MODERN APPROACHES TO THE DIAGNOSIS AND TREATMENT OF RENAL CYSTIC LESIONS

Abstract: *Renal cystic lesions are diverse in nature and require accurate diagnosis. Modern methods include ultrasound, CT, and MRI to assess the location and characteristics of cysts. Treatment depends on the type and size of the lesion and may involve observation, minimally invasive procedures, or surgery.*

Key words: *Renal cystic lesions, diagnosis, treatment, ultrasound, CT, MRI*

Muammo dolzarbligi

Inson tanasida bunday organ yo‘qki, u rivojlanish nuqsonlariga shunchalik moyil bo‘lsin, xuddi buyrak kabi. Ushbu nuqsonlar orasida eng ko‘p uchraydiganlari — tug‘ma kelib chiqishi bo‘yicha kistoz shakllanishlar. Rentgen-radiologik va kompyuter tomografiya texnologiyalarining takomillashuvi tufayli buyrakdagi kistoz shikastlanishlarni aniqlash chastotasi yildan-yilga oshib bormoqda. Ayniqsa, ilgari faqat operatsiya yoki nekropsiya vaqtida aniqlanishi mumkin bo‘lgan juda kichik kistlarga nisbatan.

Bizning bilimlarimiz kistoz shakllanishlar bilan namoyon bo‘ladigan buyrak anomaliyalariga nisbatan ham kengaydi. Buyrak kistoz kasalliklariga faqat morfologik o‘zgarishlar emas, balki biokimyoviy buzilishlar, xususan, kanal hujayralarining fermentativ faolligi o‘zgarishlari asos bo‘ladi. Ko‘plab kistoz

buyrak anomaliyalarining patogenezi o‘rganilishida muayyan yutuqlarga erishilgan.

Materiallar va usullar

Ilgari taklif qilingan tasniflar buyrak kistlari haqidagi tushunchalarni tartibga solishda o‘z rolini o‘ynagan. Hozirda esa klinik tajriba to‘plangani, diagnostika yaxshilanganligi va kistlar turlari o‘rtasidagi bog‘liqliklarni yaxshiroq o‘rganish imkoniyati paydo bo‘lganligi sababli, eskirgan tasniflarni qayta ko‘rib chiqish vaqti keldi. «Kistoz o‘sma» tushunchasi nisbatan yaqinda, kompyuter tomografiya metodining rivojlanishi bilan paydo bo‘lgan. Ulardan ayrim shakllarni umumlashtirish va aniqlashda Bosniak M.A.ning roli katta bo‘lib, u 1986 yilda muvaffaqiyatli tasnifni taklif qilgan.

Natijalar

Ushbu tasnifga ko‘ra, barcha turdagi «buiyak kistoz o‘smalari» quyidagi shakllarga bo‘linadi: Oddiy kista – yupqa devorli, bo‘linmalar va kalsifikatlar yo‘q. Yaxshi xolatli kista – bir necha bo‘linmalar va kalsifikatlar mavjud. Ko‘p bo‘linmali kistalar – bir nechta bo‘linmalarga ega.Shubhali kistoz shakllanishlar – qalin devorlar va bo‘linmalar mavjud, yaxshi yoki yomon sifatli bo‘lishi mumkin. Aniqlangan yomon sifatli o‘sma – shu jumladan kistoz saraton. Oddiy buyrak kistalarining etiopatogenezi to‘liq o‘rganilmagan. Ba’zi mutaxassislar fikricha, kistalar buyrak va siydik yo‘llarining travmalari yoki infektsiyalari natijasida aniqlanadi. Faqat 5% hollarda buyrak kistasi tug‘ma anomaliya bo‘lib, genetik moyilligi bo‘lgan bemorlarda paydo bo‘ladi. Kelib chiqishi bo‘yicha kistoz o‘sma turlari: Tug‘ma kistalar: Yagona kista oval yoki dumaloq shakldagi, seroz suyuqlik bilan to‘ldirilgan, bo‘linmalarsiz. Ko‘pincha bir vaqtning o‘zida bir nechta kistalar aniqlanadi. Ko‘p kistali (multikistoz) odatda bir buyrakni qamrab oladi, uchrashi 1%. Polikistoz merosiy kasallik, odatda ikki tomonlama. Spongioz buyrak (medullary multikistoz) tug‘ma kasallik, buyrak yig‘uvchi kanallarining kengayishi va ko‘plab kichik kistalar hosil bo‘lishiga olib keladi. Dermoidi (dermoid kista) tug‘ma, kista tarkibida ektodermal elementlar (suyak, yog‘, tish, epidermis va boshqalar) mavjud. Genetik sindromlar bilan bog‘liq kistoz o‘sma – Mekkel, Zellweger, Hippel-Lindau, tuberous sclerosis va boshqalar. Olingan kistalar: turli buyrak kasalliklari fonida paydo bo‘ladi (glomerulonefrit, tuberkulyoz, medullary nekroz, infarkt, o‘sma, piyelonefrit, parazitar infeksiya). Farqlash diagnostikasi: Kistoz o‘sma va yomon sifatli buyrak o‘smasi (kistoz saraton) yoki oddiy kista o‘rtasidagi farqlash muhim, chunki: O‘sma mavjud bo‘lsa jarrohlik muolajasi talab qilinadi. Oddiy kista mavjud bo‘lsa dinamik kuzatuv yetarli. Hozirgi vaqtda kistoz buyrak saratoni va murakkab kistalarini aniqlash va farqlash uchun aniq algoritmlar mavjud emas, shuning uchun ushbu bemorlar guruhini o‘rganish va davolash usullarini ishlab chiqish talab etiladi.

Bosniak tasnifi (1986): buyrak kistalarini malignizatsiya xavfi bo‘yicha bo‘lish imkonini beradi:

I kategoriya – murakkab bo‘lmagan, oddiy kistalar, malignizatsiya xavfi <2%.

II kategoriya – minimal murakkab, 3 sm dan kichik, deyarli hech qachon yomonlashmaydi, dinamik kuzatuv yetarli.

IIF kategoriya – 3 sm dan katta, yupqa bo‘linmalar, qalin devorlar, kalsiy mavjud bo‘lishi mumkin, kontrastni deyarli yutmaydi, operatsiya shart emas, dinamik kuzatuv zarur.

III kategoriya – noma’lum, malignizatsiyaga moyil, noaniq kontur, qalin bo‘linmalar, kalsiy joylari, operatsiya talab etiladi.

IV kategoriya – suyuqlik ko‘p, notekis kontur, kontrastni yig‘adi, har doim operatsiya zarur, malignizatsiya xavfi yuqori (92%).

Xulosa

Kistoz buyrak o‘smasini diagnostika va davolashda farqlangan yondashuvlarni qo‘llash va Bosniak tasnifidan foydalanish urologik yordam sifatini oshiradi va bemorlarni samarali boshqarishga imkon y

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Allazov S. A., tibbiyot fanlari doktori,
professor
Samarqand davlat tibbiyot universiteti
Samarqand, O‘zbekiston

SURUNKALI KASALLIK DAVRIDA VARIKOTSELENING O‘TKIR ASORATLARI

Annotatsiya: *Varikotsele urug‘ tizimchasi venalarining lo‘zovid spileti kengayishi bilan xarakterlanadigan surunkali kasallikdir. Odatda sekin va simptomlarsiz kechsa-da, o‘tkir asoratlar rivojlanishi mumkin, jumladan: moyak xaltasida kutilmagan og‘riq, venoz tromboz, yallig‘lanish o‘zgarishlari va moyak ishemiyasi.*

Kalit so‘zlar: *tromboflebit, urug‘ tizimchasi venalari yorilishi, moyak xaltasida gematoma, siydik nayining shikastlanishi.*

Allazov S. A., doctor of medical sciences,
professor
Samarkand StateMedical University
Samarkand, Uzbekistan

ACUTE COMPLICATIONS OF VARICOCELE IN THE CHRONIC COURSE OF THE DISEASE

Abstract: *Varicocele is a chronic condition characterized by dilation of the pampiniform venous plexus. Although it usually has a slow and asymptomatic course, acute complications may develop, including sudden scrotal pain, venous thrombosis, inflammatory changes, and testicular ischemia.*

Key words: *thrombophlebitis of the veins of the testicle, rupture of the veins of the lobe plexus, hematoma of the scrotum, damage to the ureter.*

Dolzarbligi

Urologik amaliyotda varikotsele asosan surunkali kasallik sifatida qaraladi. Uning asoratlari (xira og‘riqlar, bepushtlik va boshqalar) ham ko‘pincha surunkali xarakterga ega. Varikotsele quyidagi tasnifga ega:

Subklinik shakl: urug‘ tizimchasi venalari paypaslab aniqlanmaydi, tinch holatda ham, Valsalva sinovida ham moyak xaltasi sohasida ko‘rinadigan o‘zgarishlar bo‘lmaydi, biroq ular maxsus tekshiruv usullari (doppler rejimidagi ultratovush tekshiruvi) orqali aniqlanadi.

I-daraja: venalar faqat Valsalva sinovi vaqtida paypaslanadi.

II-daraja: venalar tinch holatda ham paypaslanadi, ammo ularning ko‘zga ko‘rinarli kengayishi yo‘q.

III-daraja: urug‘ tizimchasi venalarining kengayishi ham vizual, ham palpatsiya orqali aniqlanadi.

Randomizatsiyalangan va kuzatuv tadqiqotlari bo‘yicha o‘tkazilgan metatahlillar shuni ko‘rsatdiki, patospermiya bo‘lgan erkaklarda jarrohlik yo‘li bilan bajarilgan varikotselektomiyadan so‘ng eyakulyat ko‘rsatkichlari statistik jihatdan ishonchli darajada yaxshilanadi. Subklinik varikotsele bilan og‘rigan bemorlarni qamrab olgan randomizatsiyalangan tadqiqotlarda esa davolashning homiladorlik yuzaga kelish ko‘rsatkichlariga ta’siri samarasiz ekanligi aniqlangan.Klinik jihatdan namoyon bo‘ladigan varikotsele, oligozoospermiya va boshqa sabablarga bog‘liq bo‘lmagan bepushtlikka ega erkaklar kuzatilgan beshta randomizatsiyalangan tadqiqotning kichik guruh tahlilida jarrohlik davolash foydasiga moyillik qayd etilgan, umumlashtirilgan xavf nisbati 2,39 (95%) ni tashkil etgan. Yaqinda o‘tkazilgan metatahlilda varikotselektomiya oligozoospermiyali erkaklarda spermogramma natijalarini yaxshilashi ko‘rsatilgan. Adabiyotlarda Ivanissevich operatsiyasidan keyin uchraydigan asosiy asoratlar sifatida gidrotsele, operatsion yara yiringlashi va varikotsele qaytalanishi keltiriladi. Ayrim mualliflarning ma’lumotlariga ko‘ra, bu asoratlar 5–33% hollarda uchraydi. Afsuski, Ivanissevich operatsiyasi va endovaskulyar aralashuvlardan keyin yuzaga keladigan jiddiy asoratlar juda kam yoritiladi va muhokama qilinadi. Mavjud adabiyotlarda ular faqat eslatib o‘tiladi. Bular jumlasiga siydik nayi yoki limfa tomirlarining, shuningdek tashqi yonbosh venasining bog‘lab yuborilishi kiradi. Endovaskulyar usullarning umumiy kamchiliklariga nurlanish yuklamasi ta’siri, og‘riq sindromi, trombozlar, tromboflebitlar va gematomalar, rentgen-kontrast moddalarga allergik reaksiyalar rivojlanish ehtimoli kiradi. Qaytalanishlar soni ham yetarlicha yuqori, biroq chov kanaliga yaqin sohada antegrad skrotal skleroterapiya qo‘llanilishi asoratlar va retsidivlar sonini sezilarli kamaytirishga imkon bergan.

Quyida misol tariqasida Allazov S.A. va hammualliflar (2015) tomonidan varikotselening o‘tkir asoratlari bo‘yicha ishlab chiqilgan standart keltirilgan (1-jadval).

1-jadval.
Varikotselening o‘tkir asoratlari

№	Asorat	Soni abs.)	%
1	Moyak xaltasi sohasida o‘tkir og‘riq sindromi	14	20,8
2	Urug‘ tizimchasi venasi devorining yorilishi: a) gematoma bilan b) moyak xaltasida varikoz tugun hosil bo‘lishi bilan	12 (4 / 8)	17,9 (6,0 / 12,0)
3	Urug‘ tizimchasi venalarining trombozi	8	12,0
4	Urug‘ tizimchasi flebitlari	11	16,4
5	Yatrogen asoratlar: a) operatsiyadan keyingi qon ketish b) siydik nayini bog‘lash yoki kesib yuborish	5 (4 / 1)	7,5 (6,0 / 1,5)
6	Jami	67	100

Dehli tibbiyot universiteti olimlari “trombozlangan varikotsele”ni moyak xaltasidagi o‘tkir og‘riqning kam uchraydigan sababi sifatida ta’riflaydilar. Moyak xaltasidagi o‘tkir og‘riqning bir qancha sabablari mavjud: moyak yoki uning qo‘shimchasining burilishi, epididimoorxit ko‘p uchraydi, varikotsele trombozi esa kamdan-kam uchraydi. Varikotsele trombozi operatsiyadan keyin yoki spontan tarzda rivojlanishi mumkin. Spontan tromboz travma yoki qon ivish tizimi buzilgan bemorlarda yuzaga kelishi mumkin. Jinsiy yoki sport faolligi, infeksiyalar, jarohatlar, uzoq davom etgan aviaqatnovlar va narkotik moddalar varikotsele trombozini keltirib chiqarishi mumkin. Varikotsele trombozlari (ham spontan, ham operatsiyadan keyingi) hozirgi kungacha barcha bemorlarda asosan konservativ usulda davolanib kelinmoqda (antibiotiklar, yallig‘lanishga qarshi vositalar va moyak xaltasini ko‘tarib turish — suspensoriy). Trombozlangan varikotsele bo‘lgan bemorlarda jarrohlik aralashuvning zarurati va muddatlari borasida qarama-qarshi fikrlar mavjud. Shu sababli bu masala nihoyatda bahsli hisoblanadi.

Tarixan in vivo spontan tromblar noto‘g‘ri ravishda varikotselektomiyadan keyingi vena trombozlari deb baholangan. Ushbu ikki holat o‘rtasidagi gistopatologik farqlarni alohida ta’kidlash zarur. Spontan varikotsele yorilishi klinik jihatdan ko‘pincha o‘tkir og‘riq (83%) va moyak xaltasining o‘tkir shishishi (100%) bilan namoyon bo‘ladi va bu holatlar moyak burilishi, uning qo‘shimchasi burilishi yoki moyak xaltasi a’zolarining yomon sifatli o‘smalaridan farqlashni qiyinlashtiradi. Shuni hisobga olish kerakki, moyak saratoni bo‘lgan bemorlarning aksariyatida moyak xaltasidagi o‘sma sohasida og‘riq bo‘lmaydi. Faqat 10% bemorlarda o‘tkir simptomlar, jumladan og‘riq kuzatiladi, shuning uchun og‘riq mavjud bo‘lsa, yomon sifatli o‘sma ehtimoli kamroq bo‘ladi. Afsuski, klinik holatlarning birortasida kremaster refleksi haqida ma’lumot berilmagan. Uchta holatdan tashqari barcha spontan gematomalar (83%) chap tomonda aniqlangan bo‘lib, bu chap tomonlama varikotsele ko‘proq uchrashi bilan mos keladi.

Xulosa

Varikotselening o‘tkir asoratlari sababini aniqlash muayyan qiyinchiliklarni keltirib chiqarishi mumkin. Differensial diagnostikaga moyak burilishi, yomon

sifatli o‘smalar, epididimoorxit yoki qamalgan chov churrasi kabi holatlar kiritilishi lozim.

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Amonova G. U., PhD
dotsent
patologik anatomiya seksion-biopsiya kursi bilan kafedrasi
Samarqand Davlat tibbiyot Universiti

KALAMUSHLARDA POSTNATAL DAVRIDA URUG' PUFAKCHALARI NERVLARINING NEYROGISTOLOGIK RIVOJLANISHI

Annotatsiya: *Ushbu maqolada kalamushlarda postnatal davrida urug' pufakchalarining nerv tolalarini rivojlanishini neyrogistologik usullarni qo'llab gistologik tuzulishini o'rganilgan. Urug' pufakchalari nerv elementlari bilan boy ta'minlangan bo'lib, mielinli va mielinsiz nerv chigallari va tolalaridan tashkil topgan. Balog'at davrida urug' pufakchalari nerv tolalari eng yuqori rivojlanish darajasiga erishadi.*

Kalit so'zlar: *kalamush, postnatal davr, urug' pufagchasi, rivojlanishi, innervatsiyasi, neyrogistologik usullar,*

Amonova G. U., PhD,
associate professor
department of pathological anatomy with the sectional-biopsy course
Samarkand State Medical University

NEUROHISTOLOGICAL DEVELOPMENT OF THE NERVES OF SEMINAL VESICLES IN RATS DURING THE POSTNATAL PERIOD

Abstract: *This article, using neurohistological methods, investigates the histological structure and development of nerve fibers in the seminal vesicles of rats during the postnatal period. The seminal vesicles are richly supplied with nerve elements, consisting of myelinated and unmyelinated nerve plexuses and fibers. During the period of sexual maturation, the nerve fibers of the seminal vesicles reach their highest degree of development.*

Keywords: *rat, postnatal period, seminal vesicles, development, innervation, neurohistological methods.*

Kirish

Zamonaviy neyrobiologiyaning murakkab va yetarlicha o‘rganilmagan muammolaridan biri nerv tizimining kelib chiqishi, rivojlanishi va yoshga bog‘liq o‘zgarishlari masalasidir [1,2]. Tuzilishi va vazifaviy jihatdan o‘rtasidagi bog‘liqlikni har tomonlama bilish ularni ontogenetik jihatdan o‘rganishni talab qiladi. Bizga mavjud adabiyotlarni o‘rganish shuni ko‘rsatdiki, kalamushlarning urug‘ puvakchalari rivojlanishi boshqa organlar rivojlanishidan farqli o‘laroq, tadqiqotchilar e’tiborini kam jalb qilgan [3,4,5]. Urug‘ puvakchalari innervatsiyasi masalasiga tadqiqotchilar innervatsiyaning moddiy substratiga kam e’tibor berganlar. Ayrim olimlarning ishlarida kalamushlarning urug‘ puvakchalaridagi

hujayra va to‘qima (ayniqsa nerv) tuzilmalarining turli yosh davrlaridagi rivojlanishi haqidagi gistologik va sitologik ma’lumotlar umuman yo‘q yoki yetarlicha to‘liq taqdim etilmagan [6,7,8]. Ushbu bo‘shliqni qandaydir darajada to‘ldirishni amalga oshirish uchun biz puvakchalarning morfologiyasi va uning nerv elementlarini postnatal rivojlanish davomida o‘rgandik.

Tadqiqot maqsadi

Kalamushlarda postnatal davrda urug‘puvakchalari nervlarining neyrogistologik rivojlanishini o‘rganish.

Materiallar va tadqiqot usullari

Tadqiqot materiali sifatida kalamushlarda sut emizish davridan boshlab, to qarilik davrigacha bo‘lgan 69 ta kalamushning urug‘ puvakchalari tekshirildi. Tadqiqot maqsadini amalga oshirish uchun umumiy gistologik, neyrogistologik va gistoximik tadqiqot usullari qo‘llanildi. Urug’ puvakchalarining umumiy tuzilishini aniqlash uchun gematoksilin-eozin bilan bo‘yash amalga oshirildi. Biriktiruvchi to‘qimaning kollagen va elastik tolalari Van-Gizon va Veygert usullari bo‘yicha bo’yaldi. Urug’ puvakchalarining nerv elementlarini aniqlash Bilshovskiy-Gros, Kampos va Rasskazova usullari bo‘yicha impregnatsiya yo‘li bilan o‘tkazildi. Hujayra yadrolari esa alyuminiy karmin bilan bo‘yaldi.

Tadqiqot natijalari

Tadqiqot natijalari shuni ko‘rsatdiki, urug‘ puvakchalari nerv elementlari bilan boy ta’minlangan: nerv chigallari, miyelinli va miyelinsiz tolalar, gangliylar va sezuvchi nerv oxirlari yaxshi shakillangan. Ko‘plab nerv tutamlari turli qalinlikdagi, asosan miyelinsiz tolalardan iborat to‘dalarga bo‘linadi. Ushbu to‘dalar ko‘p marta shoxlanadi, o‘zaro chigalashadi va nerv chigallarini hosil qiladi. Ba’zi joylarda asosan miyelinsiz tolalardan iborat nerv tutamlari uchraydi. Sezuvchi nerv ohirlari nozik terminallar shaklida namoyon bo‘ladi. Bazilari miyelin qobig‘ini yo‘qotgan miyelinli tolalardan hosil bo‘ladi. Bu retseptor qurilmalar kam uchraydi va ko‘pincha butasimon ko‘rinishga ega. Urug’ puvakchalari qobig‘ida nerv tugunlari mavjudligini aniqlash mumkin. Bazilari nerv hujayralaridan iborat bo‘lib, oxirgilari ko‘pincha turli shakl va o‘lchamlarga ega. Nerv tutamlari va chigallari o‘zaro anastomozlanadi. Adventitsial qavatda alohida nerv tutami va tolalari o‘zaro birlashib keyin nerv chigallarini hosil qiladi. Hosil bo’lgan chigaldan mushak qavatiga nerv tolalari chiqib ketadi. Urug’ puvakchalari mushak qavatida nerv tutamlari burama yo‘lga ega bo‘lib, ko‘p miqdorda nerv chigallari hosil qiladi.

Bir qator nerv tolalari o‘z yo‘lida qon tomirlarini kesib o‘tadi. Kesishish joyida nerv tolalari va alohida tolalar keskin argirofil bo‘lib, kengaygan holatga joylashgan. Bu ehtimol, moslashuvchan funksional hodisadir. Qalin nerv tolalari mayda tolalarga bo‘linadi va ular preterminal tolalarga boshlanib, ko‘pincha butasimon nerv ohirlari bilan tugaydi. Bir qator miyelinli nerv tolalari miyelin qobig‘ini yo‘qotib, daraxtsimon va dixotomik ohirgi shoxlanishlar bilan tugaydi. Bu shoxlanishlar retseptor tabiatiga ega. Nerv tolalari qon tomirlariga hamroh bo‘lib, ularda tomir nerv chigallarini hosil qiladi. Bazi holatda ohirgi nerv tolalari bilan tugaydi – ham tomir devorida, ham urug‘ puvakchasining atrof to‘qimasida.

Bizning materialimiz tahlili shuni ko‘rsatdiki, kalamushlarda sut emizish davrida (1-21 kun) intramural nerv apparati hali to‘liq shakllanmagan; shunday qilib, 8-20 ta differentsiatsiyalanayotgan nerv hujayralaridan yetuklari faqat 2-3 tani tashkil qiladi. 22-120 kunlik yoshda (balog’at davr) nerv elementlarining yanada murakkablashishi sodir bo‘ladi; yetuk nerv hujayralari soni 5-8 taga yetadi. Bu davrda nerv tolal tarkibidagi tolalar soni sezilarli darajada oshadi, nerv chigallarining zichligi ortadi.

Xulosa

Voyaga yetgan va reproduktiv davrda kalamushlarning urug‘ puvakchalari nerv elementlari eng yuqori rivojlanish darajasiga erishadi. Nerv tutamlari eng ko‘p miqdordagi nerv tolalaridan iborat bo‘ladi. Nerv chigallari eng yuqori zichlikka yetadi. Nerv hujayralarining asosiy massasi differentsiatsiyalangan multipolyar neyronlardan tashkil topadi. Ushbu davrda (5–23 oylik) urug‘ puvakchalari eng yuqori rivojlanishga erishadi va eng rivojlangan nerv apparatiga ega bo‘ladi. Qarilik davrida (19–40 oylik) nerv xujayralarida aniq reaktiv strukturaviy o‘zgarishlar kuzatiladi.

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Asatov U.
clinical resident
Asia International University
Murotov N.
head of the department of microbiology, virology and immunology
Bukhara State Medical Institute

MODERN METHODS FOR DETERMINING BLOOD GLUCOSE LEVELS IN PATIENTS WITH DIABETES MELLITUS

Abstract: *Diabetes mellitus is a chronic endocrine disease characterized primarily by persistent hyperglycemia. Accurate and reliable assessment of blood glucose levels is essential for early diagnosis, monitoring treatment efficacy, and preventing complications of diabetes mellitus. In recent years, modern laboratory methods, portable devices, and continuous glucose monitoring systems have been widely implemented in clinical practice. This article analyzes contemporary methods for determining blood glucose levels in patients with diabetes mellitus, highlighting their clinical significance, advantages, and limitations.*

Keywords: *diabetes mellitus, glycemia, glucose monitoring, glucometer, glycated hemoglobin, CGM.*

Introduction

Diabetes mellitus (DM) represents one of the most significant global public health challenges of the 21st century due to its steadily increasing prevalence, chronic course, and high risk of disabling complications. According to data from **World Health Organization** and **International Diabetes Federation**, the number of individuals affected by diabetes continues to rise worldwide, imposing a substantial burden on healthcare systems and national economies.

The fundamental pathophysiological hallmark of diabetes mellitus is chronic hyperglycemia, which results from impaired insulin secretion, insulin resistance, or a combination of both. Sustained elevation of blood glucose levels leads to progressive damage of various organs and systems, including the cardiovascular system, kidneys, eyes, and peripheral nerves. Microvascular and macrovascular complications remain the leading causes of morbidity and mortality among patients with diabetes mellitus.

Accurate measurement of blood glucose is therefore essential not only for establishing the diagnosis of diabetes but also for monitoring disease progression and evaluating the effectiveness of therapeutic interventions. Traditional laboratory-based biochemical methods have long been considered the gold standard for glucose determination. However, these methods provide only a snapshot of glycemic status and are insufficient for capturing daily glucose fluctuations.

In response to these limitations, modern approaches to glucose monitoring have emerged, including portable glucometers, measurement of glycated

hemoglobin (HbA1c), and continuous glucose monitoring (CGM) systems. These technologies have revolutionized diabetes management by enabling more precise, dynamic, and individualized glycemic control.

Particularly noteworthy is the growing role of CGM systems, which allow real-time monitoring of glucose levels and provide valuable information on glycemic variability, nocturnal hypoglycemia, and postprandial hyperglycemia. The integration of such technologies into routine clinical practice aligns with the contemporary paradigm of personalized medicine in diabetes care.

The aim of this article is to comprehensively review modern methods for determining blood glucose levels in patients with diabetes mellitus, analyze their clinical applicability, and discuss their advantages and limitations.

Materials and Methods

This review is based on a comprehensive analysis of international scientific literature, including clinical guidelines, original research articles, and systematic reviews related to blood glucose monitoring in diabetes mellitus. The following methods were evaluated:

- Laboratory biochemical determination of glucose in venous and capillary blood
- Self-monitoring of blood glucose using portable glucometers
- Measurement of glycated hemoglobin (HbA1c)
- Continuous glucose monitoring (CGM) systems
- Emerging minimally invasive and non-invasive glucose sensing technologies

The methods were compared in terms of accuracy, clinical relevance, practicality, and applicability in various patient populations.

Results

The analysis demonstrated that modern glucose monitoring methods offer complementary information and differ in their clinical utility:

1. **Laboratory biochemical methods** provide high analytical accuracy and remain essential for diagnosis and confirmation of diabetes mellitus.
2. **Portable glucometers** enable frequent self-monitoring, facilitating day-to-day glycemic control and treatment adjustments.
3. **HbA1c measurement** reflects average glycemia over the preceding 2–3 months and serves as a key indicator of long-term metabolic control.
4. **Continuous glucose monitoring systems** provide detailed insights into glycemic patterns, variability, and hidden hypo- or hyperglycemic episodes.
5. **Advanced biosensor technologies** aim to reduce invasiveness and improve patient comfort while maintaining measurement accuracy.

Discussion

The findings of this review highlight that no single method of glucose determination can fully capture the complexity of glycemic control in diabetes mellitus. Laboratory-based glucose measurements remain indispensable for diagnostic purposes; however, their inability to reflect daily glycemic variability limits their usefulness for ongoing disease management.

Self-monitoring of blood glucose using glucometers has become a cornerstone of diabetes self-care. It empowers patients to actively participate in their treatment and supports timely therapeutic decisions. Nevertheless, glucometer readings may be influenced by user technique, hematocrit levels, and environmental factors, which should be considered during interpretation.

HbA1c is widely recognized as the gold standard for assessing long-term glycemic control and predicting the risk of chronic complications. Despite its clinical value, HbA1c does not capture short-term glucose excursions and may be affected by conditions such as anemia or hemoglobinopathies.

The introduction of CGM systems represents a major advancement in diabetes management. These systems provide continuous, real-time data, allowing early detection of dangerous glycemic events and facilitating individualized therapy. CGM is particularly beneficial for patients with type 1 diabetes, pregnant women, children, and individuals with unstable glycemic control.

Ongoing research into minimally invasive and non-invasive glucose monitoring technologies holds promise for further improving patient adherence and quality of life. The widespread adoption of these innovations may significantly enhance future diabetes care.

Overall, the selection of glucose monitoring methods should be individualized, taking into account patient characteristics, type of diabetes, disease duration, and risk of complications.

Conclusion

Modern methods for determining blood glucose levels in patients with diabetes mellitus provide high diagnostic and clinical value. Their combined and rational use enables effective glycemic control, reduces the risk of complications, and improves patient outcomes. Continued technological innovation and integration of advanced monitoring systems are expected to further optimize diabetes management.

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Asmanova Ch. A.
basic doctoral student
Samarkand Institute of Architecture and Civil Engineering
Usmanov V. F., doctor of technical sciences,
professor
Samarkand Institute of Architecture and Civil Engineering
Ibragimov Kh. M.
senior lecturer
Samarkand Institute of Architecture and Civil Engineering

MULTI-STORY FRAME REINFORCED CONCRETE BUILDING SEISMIC TESTING OF THE MODEL

Annotation: *This article presents the results of testing a building model for seismic impact to determine the dynamic characteristics of a nine-story frame building made of monolithic reinforced concrete. When testing the model for seismic impact, the "load drop" method was used.*

Keywords: *monolithic reinforced concrete, frame building, model, seismic, dynamic characteristic*.

Introduction

Earthquakes occur frequently in the world. Over the past 100 years, there have been about 2,000 earthquakes with a magnitude of 7 or more in the world. At the same time, there are subtle fluctuations that occur almost without consequences. The earthquake that occurred on December 16, 1920, in Xayyuan County, part of Gansu Province, China, claimed the lives of approximately 270,000 people. The movement of the slabs caused numerous cracks and landslides, the shaking force was 7.8 points and higher. Following the first powerful shock, further tremors occurred, so powerful that the massive destruction encompassed approximately 3.8 thousand square kilometers. Seismic vibrations caused by this earthquake were felt on an area of more than 4 million square kilometers. The provinces of Gansu and Shaanxi in central China suffered the most from the natural disaster. More than 20,000 people died not from destruction, but from the cold, as they lost their homes. In China, many cities, provinces, and districts were damaged. The landslide caused by the earthquake caused the destruction of the entire village of Tsutszyahe. This earthquake is considered the most devastating in history.

On September 1, 1923, an earthquake in Japan with a magnitude of 8.3 struck Tokyo and Yokohama, destroying them almost entirely. The epicenter of the earthquake was 90 km from Tokyo. The tragedy claimed the lives of 174,000 people, and 524,000 went missing. According to official data, about 4 million people were injured. In Yokohama, almost 25% of the city's buildings were destroyed instantly. Due to the strong wind, a rapidly spreading fire started. In

Tokyo, buildings collapsed less frequently, but the city also suffered significant damage from the rapidly spreading fire. As a result, almost half of the city was destroyed by fire and an earthquake. This earthquake is considered the most devastating in Japanese history.

On the night of October 4-6, 1948, an earthquake with a magnitude of 7.3 occurred in Ashgabat. The epicenter of the earthquake was located at a depth of 18 kilometers in the city itself. Neighboring districts and cities of Iran were affected by this earthquake. The exact number of victims of this disaster is unknown, with various estimates suggesting between 110,000 and 170,000 deaths in Ashgabat and its surrounding areas. The earthquake almost wiped the city off the face of the earth, with only some buildings remaining intact. Survivors were evacuated using 120 military and civilian aircraft. If the earthquake had started during the day, there might have been fewer casualties. At night, most of the city's inhabitants slept, and people, not knowing what had happened, were trapped under the rubble. This earthquake is considered one of the most destructive in human history.

One of the strongest earthquakes in human history occurred in Chile on May 22, 1960. The magnitude was 9.5, and tremors were felt over an area of 200,000 square kilometers. In addition, the earthquake caused a tsunami with 10-meter waves reaching the coasts of Japan and the Philippines. At the same time, the number of victims is significantly lower than in other similar disasters - about 6,000 people, most of whom died from tsunamis. The consequences of the disaster affected sparsely populated areas.

Another terrible earthquake occurred in the former USSR in the 20th century. On December 7, 1988, a natural disaster occurred in the city of Spitak in the northwest of the Armenian SSR, claiming the lives of 25,000 people. The consequences of the earthquake affected almost 40% of Armenia's territory, injuring and disabling 140,000 people and leaving 514,000 homeless. Orphaned children were taken to other republics of the former USSR for adoption.

The city of Spitak was at the center of a 6.8 magnitude earthquake, and 58 nearby villages were completely destroyed. As a result of a series of tremors, 321 cities and settlements were damaged.

On December 26, 2004, an earthquake occurred in the Indian Ocean near the island of Sumatra, claiming the lives of nearly 300,000 people. The main damage was caused by a tsunami caused by seismic activity. The magnitude of the earthquake ranged from 9.1 to 9.3, and tsunami waves reached the shores of 14 countries. Waves with a height of more than 20 meters were recorded, and they reached the shore at such a height. Geographically, along the subduction zone (the linear zone at the boundary of lithospheric plates), a very large displacement of rock of about 1200 km for a distance of 15 m occurred, as a result of which the Indian Plate shifted under the Burma Plate. This caused such a powerful tsunami that the wave reached the coast of South Africa, located 6.9 thousand km from the epicenter. This earthquake is among the three strongest earthquakes in the history of all observations.

The earthquake that occurred on January 12, 2010, in the Republic of Haiti consisted of several tremors, the strength of the first of which was 7 points, 15 repeated tremors with a magnitude greater than 5. This natural disaster claimed the lives of more than 222 thousand people, injured more than 311 thousand people, and 869 people went missing. The epicenter of the earthquake was located 22 km from the capital of the republic, Port-au-Prince, at a depth of 13 km. As a result of the earthquake, thousands of residential buildings, hospitals, and administrative buildings were destroyed, and about 3 million people were left homeless.

On February 6, 2023, the strongest 7.8 magnitude earthquake since 1939 occurred in Turkey, accompanied by several aftershocks. As a result of the tragedy, more than 50,500 people died in Turkey and 8,476 in Syria, and tens of thousands more were injured [1].

The list of devastating earthquakes can go on and on. However, from the examples given above, one can understand how serious and urgent the problem of earthquake resistance of buildings and structures is.

Even today, strong earthquakes occurring around the world lead to negative consequences. Earthquakes can have a serious impact on people's lives and society as a whole. As a result of the earthquake, buildings and infrastructure were destroyed. Strong earthquakes cause not only the destruction of buildings, but also the deaths and injuries of many people due to fires, landslides, and other consequences. The economic damage caused by earthquakes is also very significant. In addition to physical and economic consequences, earthquakes have a profound psychological impact on survivors. Therefore, the study of the impact of earthquakes on buildings and structures and ensuring the real seismic resistance of operating and designed buildings is one of the important problems of today.

The developed methods for calculating the main load-bearing structures of buildings do not always objectively and accurately meet the requirements of load-bearing capacity. In these cases, there is a need for experimental studies to assess the seismic resistance of buildings and structures. Since conducting field tests for assessing the seismic resistance of buildings is labor-intensive and expensive, it is advisable to test their models.

The article describes the method and results of testing the building model for seismic impact using the "load drop" method to determine the dynamic characteristics of a nine-story frame building constructed from monolithic reinforced concrete.

Method, results

In the "load drop" method, the seismic load acting on the building was carried out instantaneously as a shock.

The impact arising from testing the model using the "load drop" method is local and does not pose a threat to surrounding buildings. The technology of the vibration process is very simple and does not require large labor and material costs. The cost of conducting tests can mainly be indicated by the placement of high-precision equipment and sensors according to the model.

Although this method cannot fully reflect the impact of an earthquake on the structure, it can show the condition of individual parts of the building under the influence of strong dynamic loads. This method also allows determining the main dynamic characteristics of the building.

Such seismic impact was carried out as follows (Fig. 1). A frame made of metal angle is fitted on top of the frame, and a ring is welded to the center of its load-bearing side. A block is installed on a fixed support at a distance of 2.0 meters from the test sample-model.

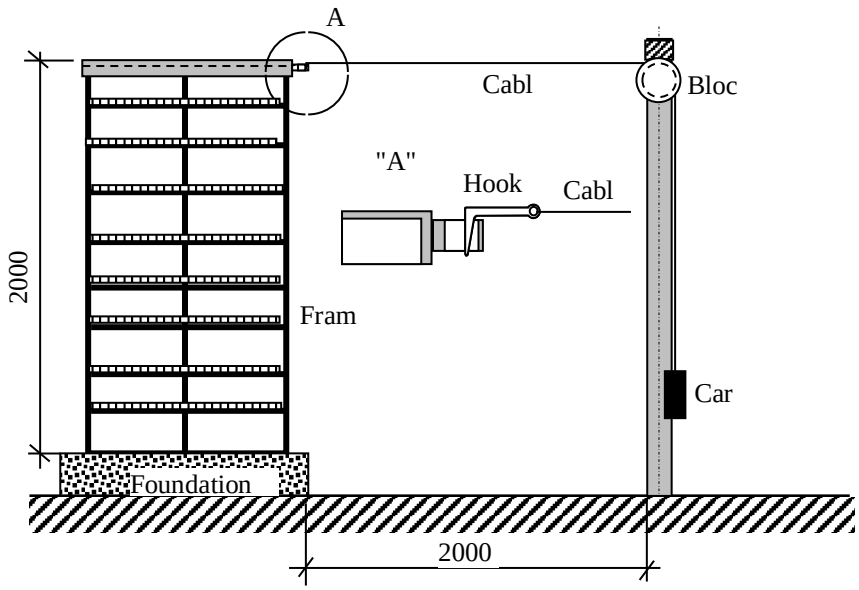


Figure 1. Seismic impact testing scheme of the building model.

The test circuit was carried out as follows. The building model, in addition to its own weight, was loaded with temporary vertical loads, and its dynamic characteristics in free oscillations were determined using measuring instruments (Fig. 2). This process was repeated three times. The graphs obtained during the testing are presented in Fig. 3.



Fig. 2. From the test process.[4]

In addition to its own weight, an instantaneous seismic impact was imitated on a building model loaded with temporary vertical loads using the "Throwing the Load" method, and its dynamic characteristics in the state of forced oscillations were determined using measuring instruments (Fig. 3).

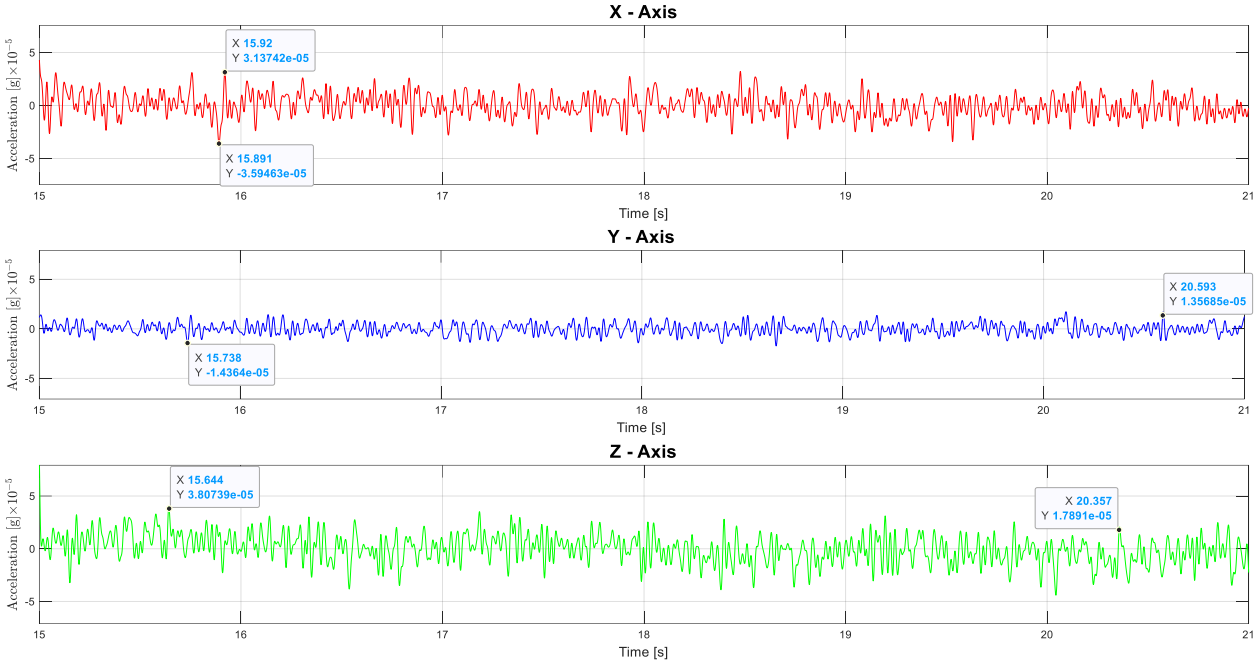


Figure 3. View of the model with instruments.

The test was carried out at the values of "thrown load" of 0.1 kN, 0.2 kN, 0.3 kN, and 0.4 kN. This process was repeated three times for each seismic load. Graphs obtained during the testing process are presented in Figures 4-8.

[4] The tests were conducted jointly with the staff of the Institute of Mechanics and Seismic Resistance of Structures of the Academy of Sciences of the Republic of Uzbekistan.

Results from a sensor placed on the floor level of the 1st floor
Accelogram X, Y, Z



Results from a sensor placed on the floor level of the 9th floor
Accelogram X, Y, Z

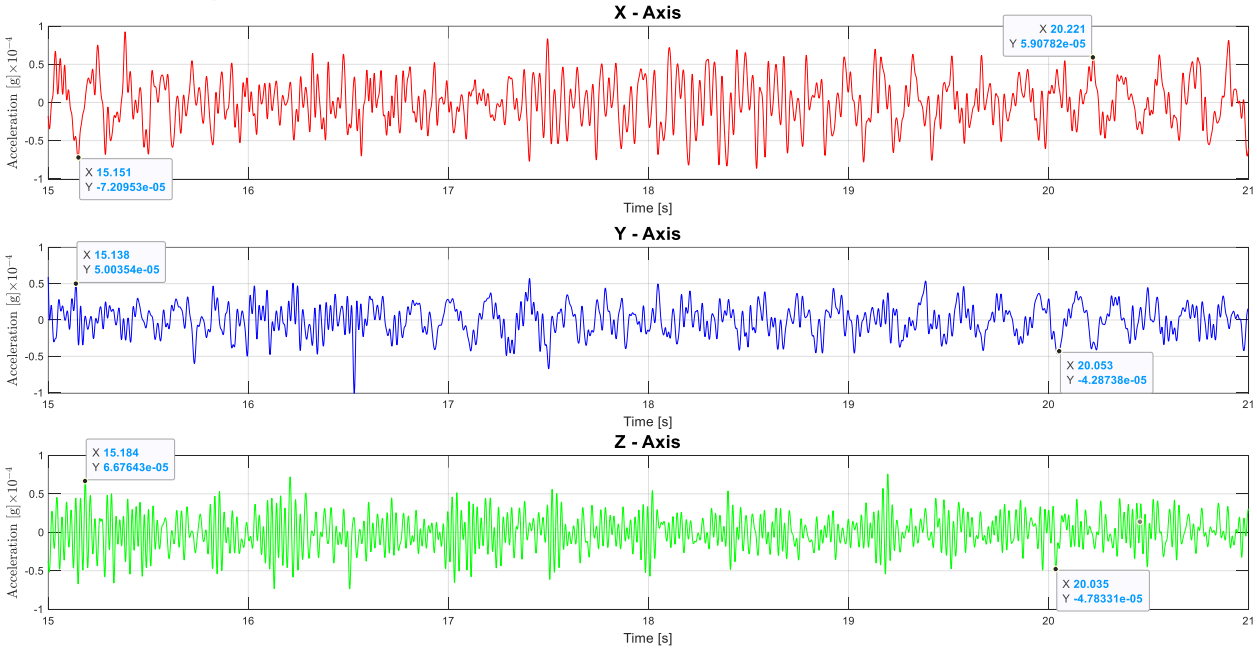
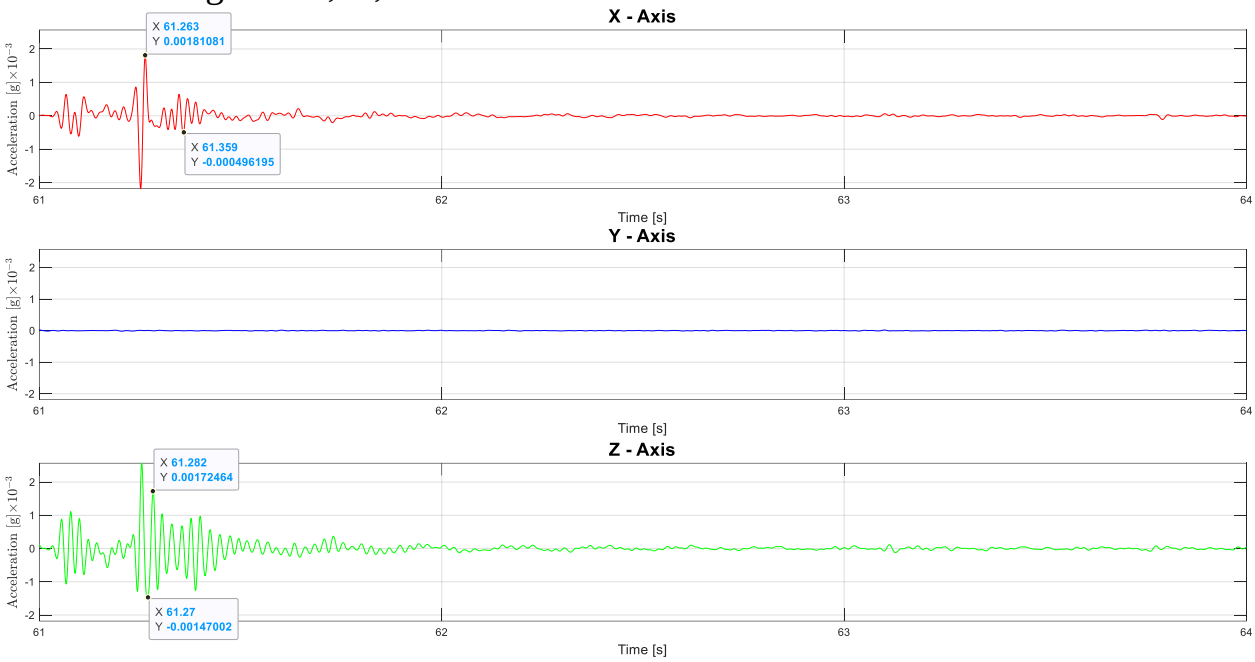
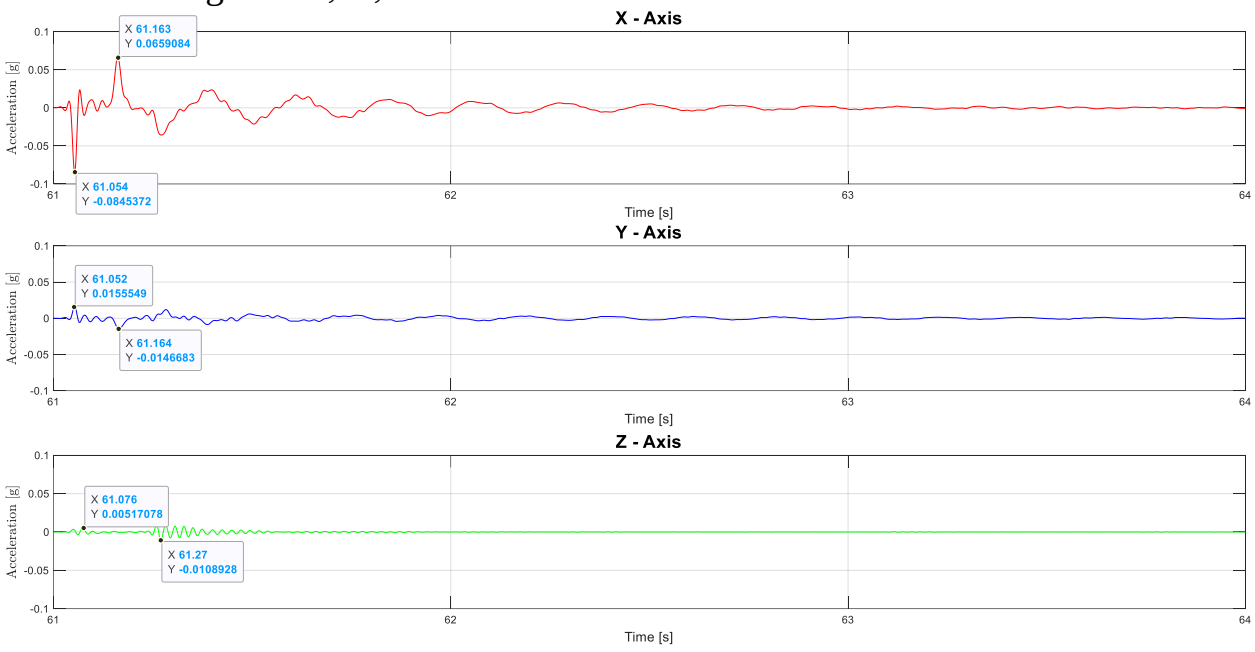


Fig. 4. Accelogram from the resting state of the building.

Results from a sensor placed on the floor level of the 1st floor
Accelogram X, Y, Z



Results from a sensor placed on the floor level of the 9th floor
Accelogram X, Y, Z



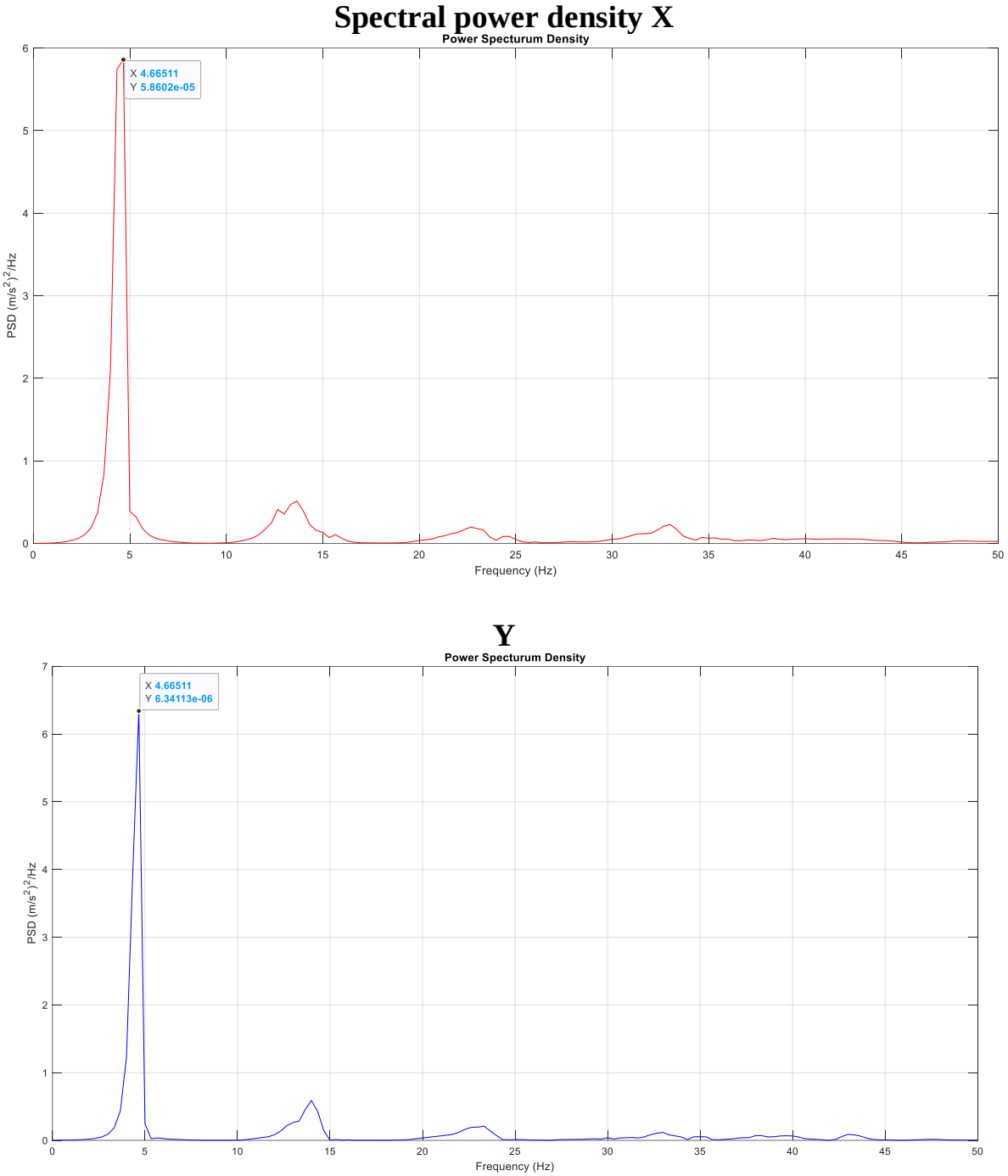
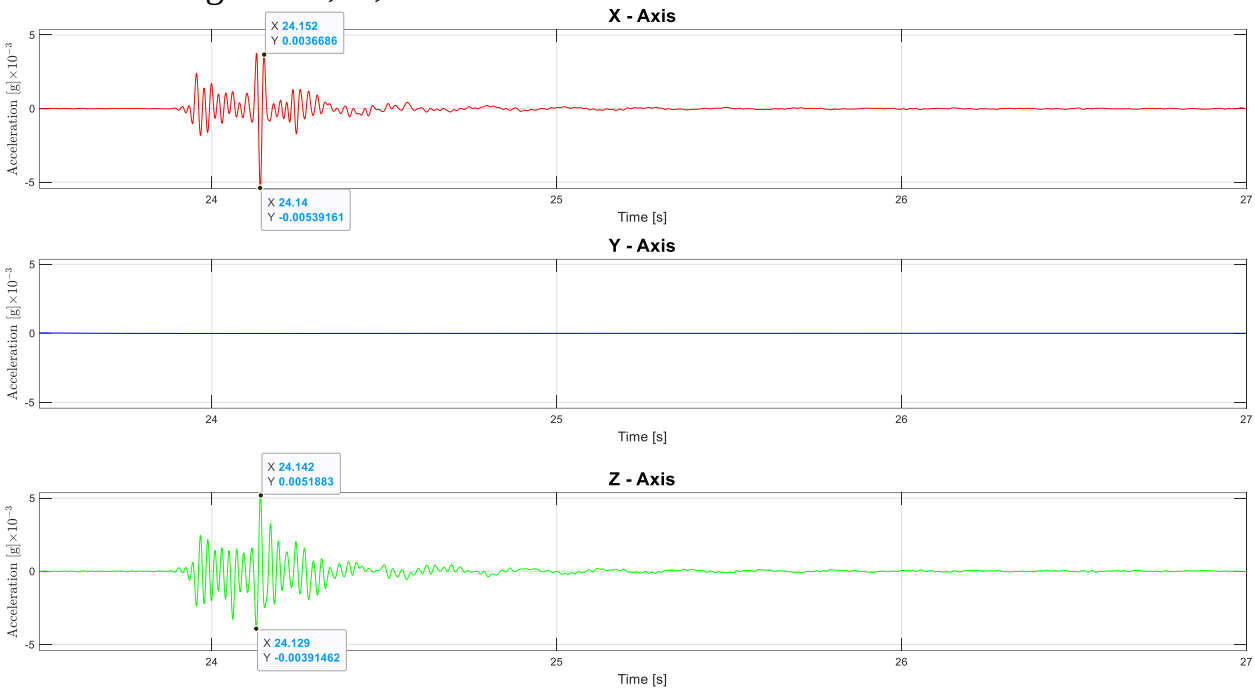
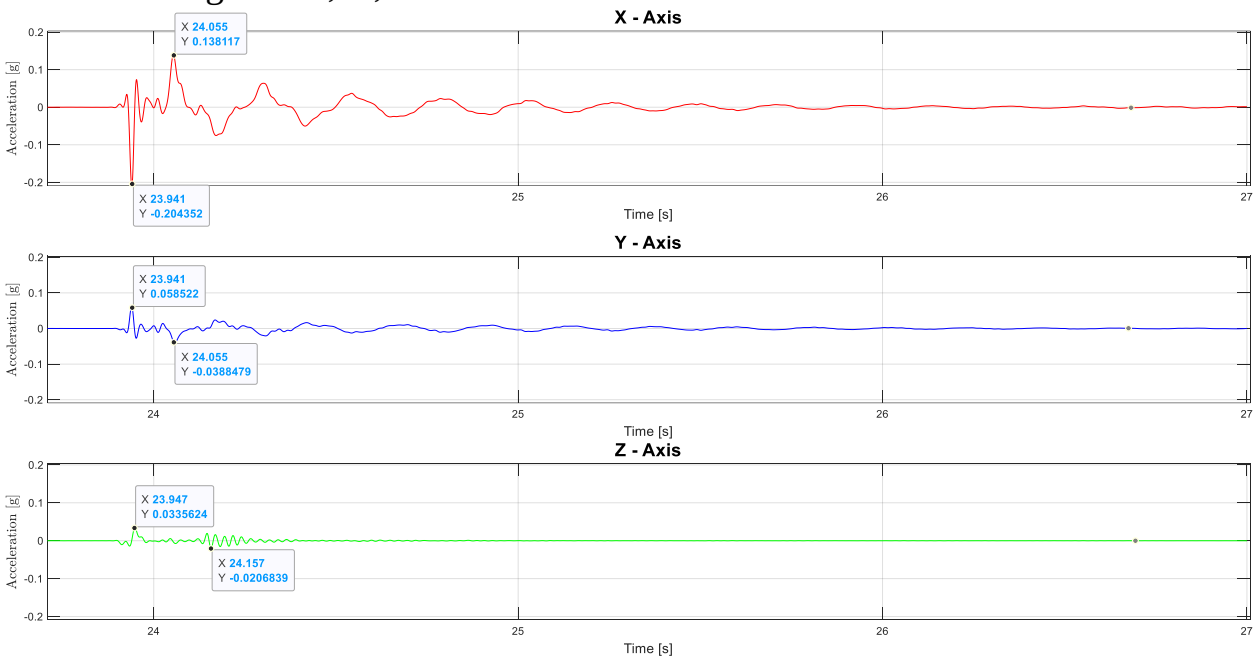


Figure 5. Accelogram from the upper part of the building when it is freed from a position pulled by a cable with a force of 10 kg*.

Results from a sensor placed on the floor level of the 1st floor
Accelogram X, Y, Z



Results from a sensor placed on the floor level of the 9th floor
Accelogram X, Y, Z



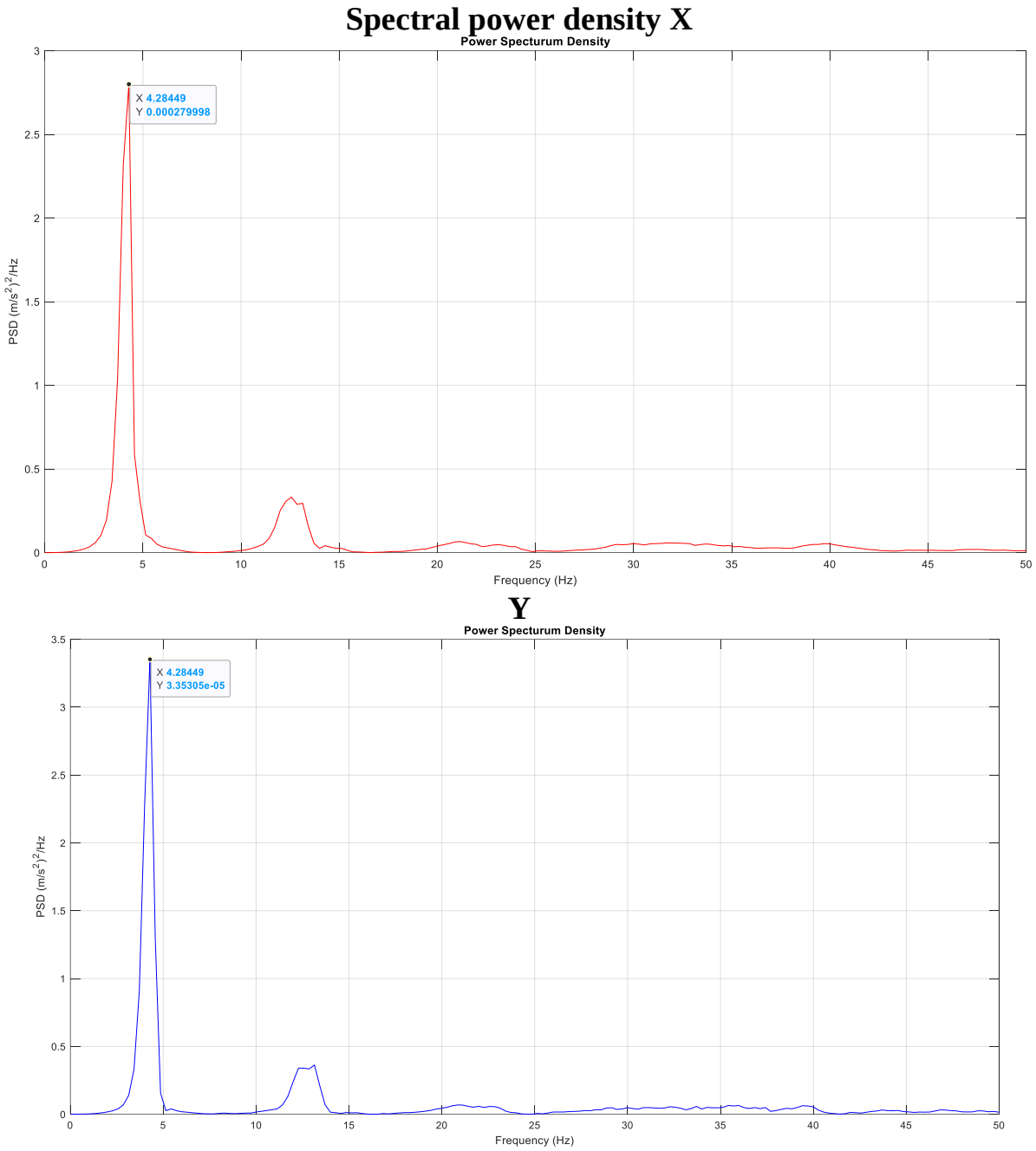
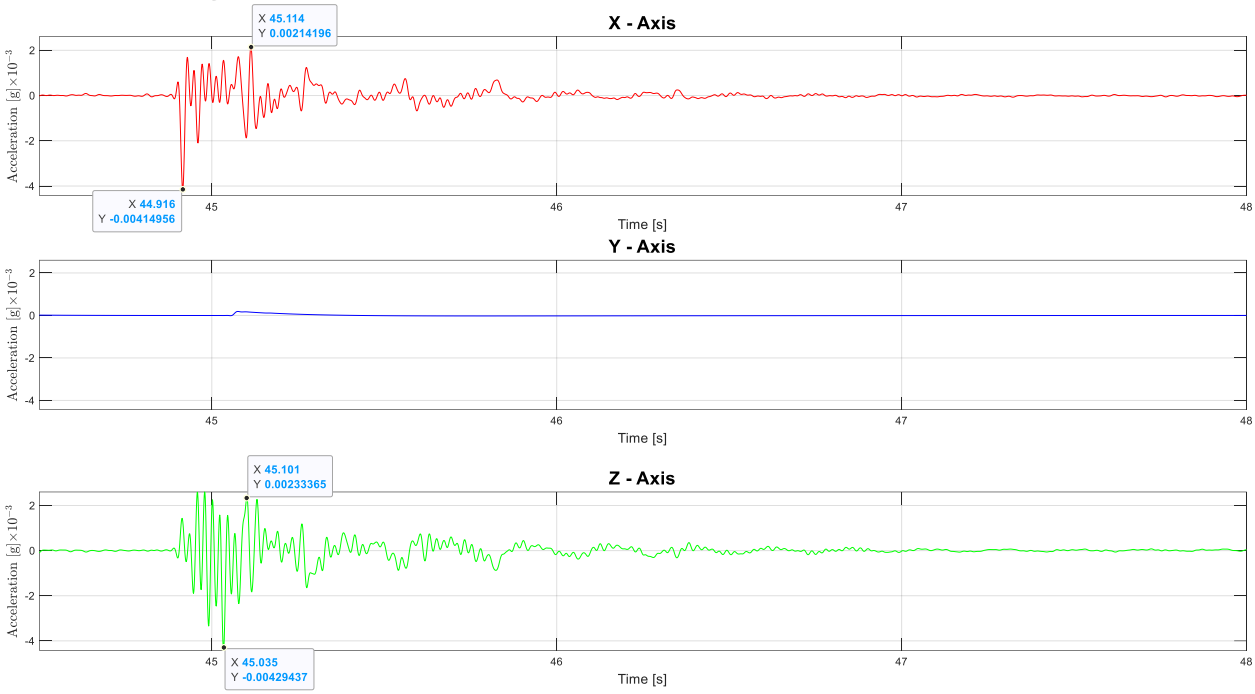
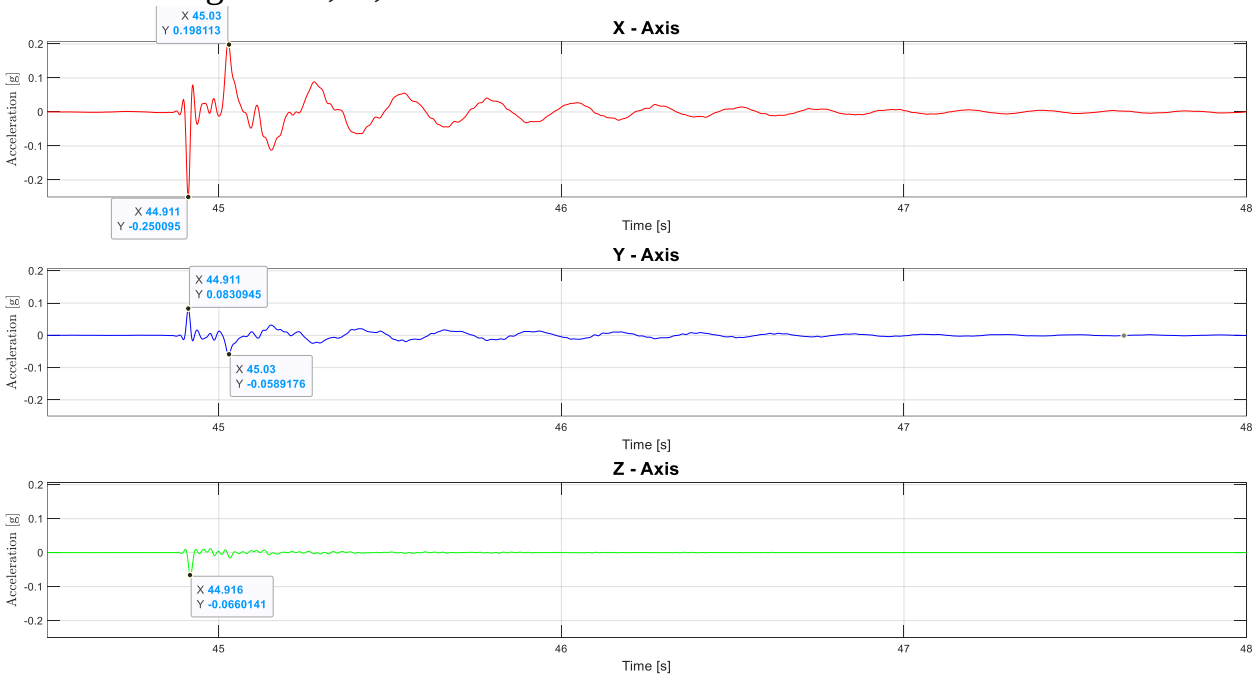


Figure 6. Accelogram and displacement of the building when it is pulled from the top with a force of 20 kg* using a cable and released.

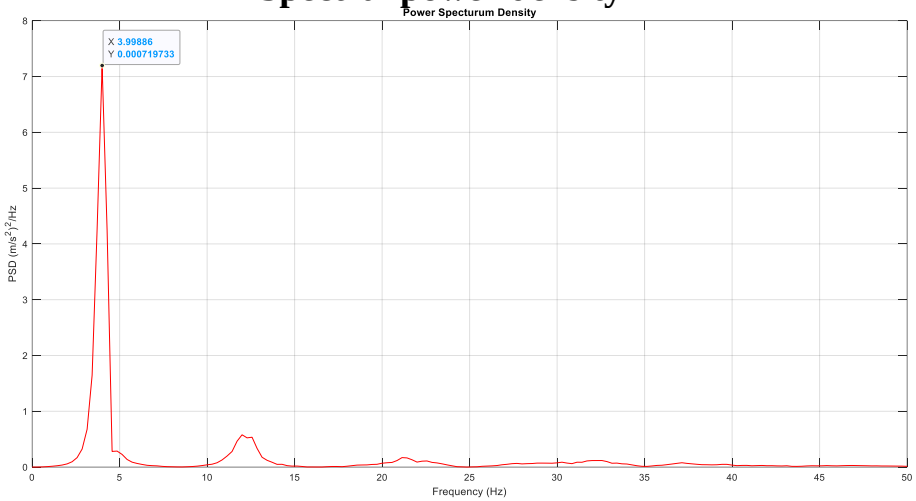
Results from a sensor placed on the floor level of the 1st floor
Accelogram X, Y, Z



Results from a sensor placed on the floor level of the 9th floor
Accelogram X, Y, Z



Spectral power density X



Y

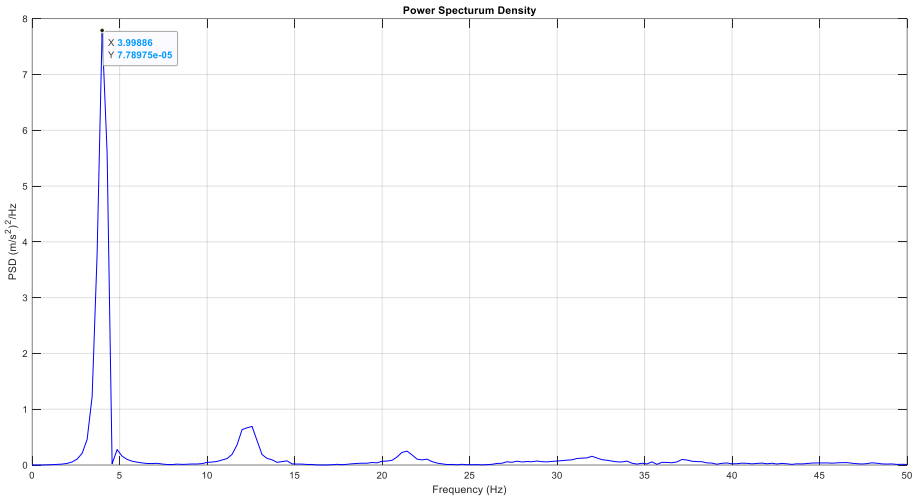
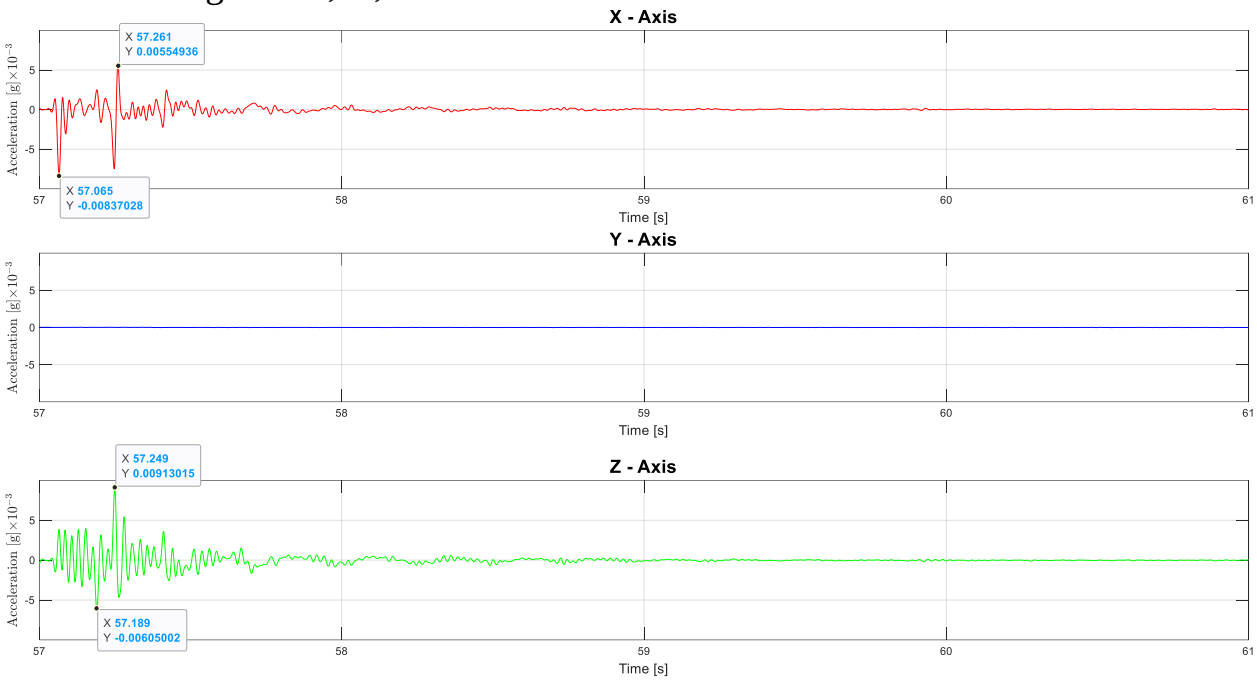
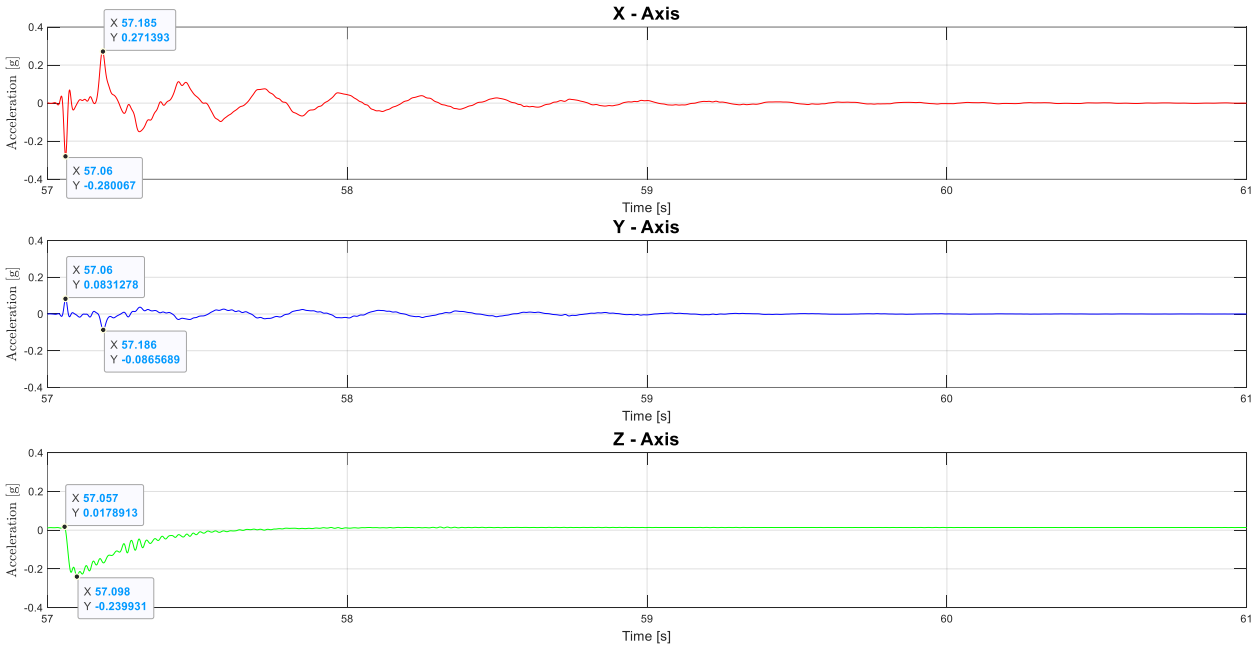


Figure 7. Accelogram and displacement of the building when it is pulled from the top with a force of 30 kg* using a cable and released.

Results from a sensor placed on the floor level of the 1st floor
Accelogram X, Y, Z



Results from a sensor placed on the floor level of the 9th floor
Accelogram X, Y, Z



Spectral power density X

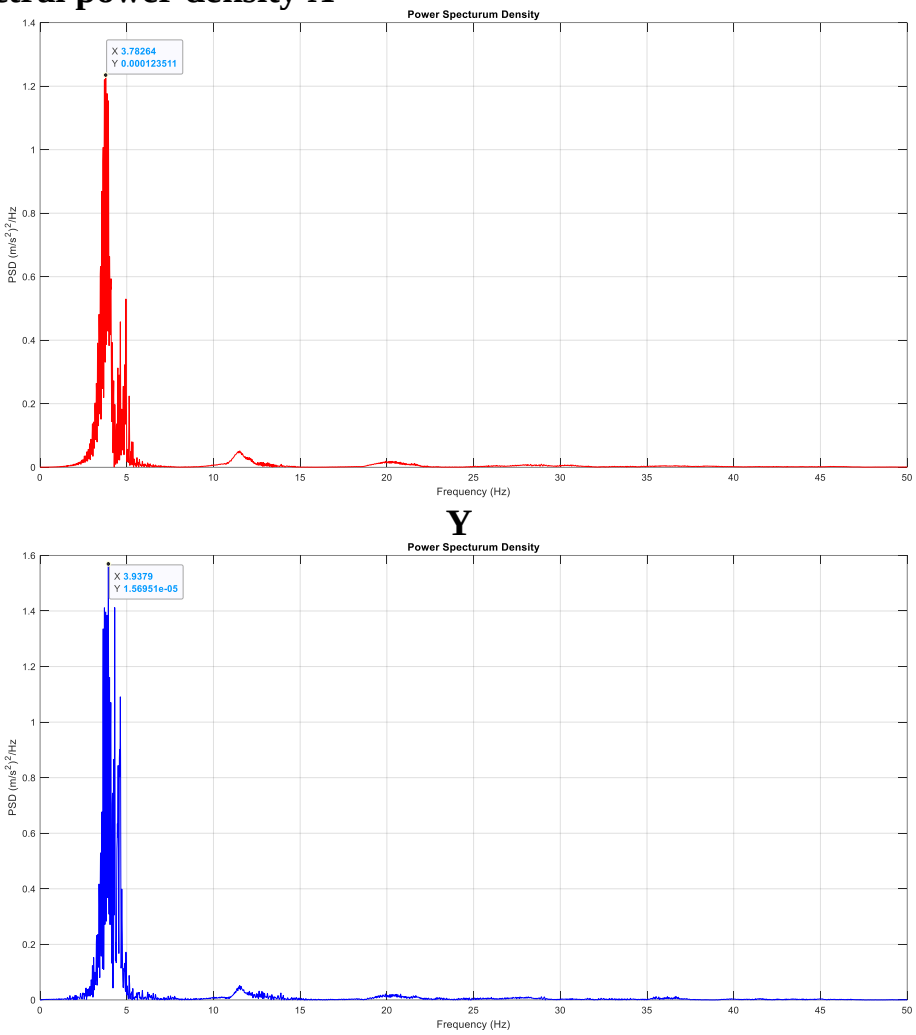


Figure 8. Accelogram and displacement of the building when it is pulled from the top with a force of 40 kg* using a cable and released.

Based on these accelerograms, a Power Spectrum Density (PSD) graph was constructed, and the average frequency of the building is presented in Table 1.

Table 1

TYPE OF TEST	TEST No.	X Frequency (Hz)	Y Frequency (Hz)	Average X_Y Frequency (Hz)	Average Frequency (Hz)
with a force of 10 kg stretched state	TEST 004	4,665	4,665	4,665	4.178
	TEST 005	4.536	4.536	4.536	
	TEST 006	4.502	4.568	4.535	
	Average	**4.568**	**4.590**	**4.579**	
With a force of 20 kg stretched state	TEST 007	4,248	4,248	4,248	
	TEST 008	4,284	4,284	4,284	
	TEST 009	4,248	4,248	4,248	
	Average	**4,260**	**4,260**	**4,260**	
With a force of 30 kg stretched state	TEST 010	3,999	3,999	3,999	
	TEST 011	3,998	3,998	3,998	
	TEST 012	3,999	3,999	3,999	
	Average	**3,999**	**3,999**	**3,999**	
with a force of 40 kg stretched state	TEST 013	3.964	3.964	3.964	
	TEST 014	3.782	3,937	3.8595	
	TEST 015	3,799	3,799	3,799	
	Average	**3.848**	**3,900**	**3.874**	

Taking into account the characteristics of the tested model, the frequency is calculated using the Lira-SAPR-2024 program and is shown in Figure 9 [7].

Частоты собственных колебаний

Файл Редактировать Опции

A	B	C	D	E	F	G	H	I
Частоты собственных колебаний								
№ загруж	№ формы	Собст.значения	Частоты		Период (с)	Коэф.распред.	Мод.масса (%)	Сумма мод. масс (%)
			Круг.частота (рад/с)	Частота (Гц)				
3	1	0.033	29.998	4.774	0.209	0.610	27.807	27.807
3	2	0.033	29.998	4.774	0.209	- 0.849	53.971	81.777
3	3	0.025	39.992	6.365	0.157	0.000	0.000	81.777
3	4	0.011	91.649	14.586	0.069	- 0.552	7.512	89.289
3	5	0.011	91.649	14.586	0.069	- 0.319	2.511	91.801
4	1	0.041	24.249	3.859	0.259	0.956	60.759	60.759
4	2	0.041	24.249	3.859	0.259	0.562	21.019	81.778
4	3	0.031	31.788	5.059	0.198	0.000	0.000	81.778
4	4	0.013	74.079	11.790	0.085	- 0.300	2.118	83.897
4	5	0.013	74.079	11.790	0.085	0.580	7.904	91.800

Figure 9. Lira - frequency obtained from SAPR software.

Conclusions

In the research process, an analysis of the seismic impact of the 1/15 model of a multi-story frame reinforced concrete building was carried out, and its dynamic characteristics were compared with the results of practical tests and calculations in the Lira-SAPR 2024 program.

According to the test results, the frequency of the main oscillation in the building was 4.1 Hz, and in the calculated model - 4.77 Hz. The difference between these two values does not exceed 15%, i.e., the practical results show that the model is sufficiently accurate and reliable.

Based on the obtained results, the following conclusions can be drawn:

1. The calculated model, compiled in the Lira-SAPR 2024 program, describes the seismic forces acting on the building with an accuracy close to real conditions.

2. The correspondence between the results of practical tests and calculations confirms the correct determination of the model's dynamic characteristics.

3. The results of seismic analysis can serve as a reliable criterion for assessing the stability of multi-story frame reinforced concrete buildings and their design in seismic regions.

4. The research results will serve as a basis for the development of recommendations for optimizing building structures, reducing vibration frequencies, and increasing seismic safety in the future.

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Ataniyazov R.
magistrant
O‘zbekiston Respublikasi huquqni muhofaza qilish akademiyasi

MA’MURIY JAVOBGARLIKNING ASOSLARI, MAZMUN-MOHIYATI VA XUSUSIYATLARI

Annotatsiya. *Ushbu maqolada ma’muriy javobgarlikning yuridik javobgarlikning mustaqil turi sifatidagi asoslari, mazmun-mohiyati va o‘ziga xos xususiyatlari ilmiy-nazariy jihatdan tahlil qilingan. Ma’muriy javobgarlik O‘zbekistonda inson huquqlari ustuvorligi, qonuniylik va adolat tamoyillariga tayangan holda, huquqbuzarliklarning oldini olish hamda davlat intizomini mustahkamlashga xizmat qiladi. Maqolada ushbu institutning boshqa yuridik javobgarlik turlaridan, xususan, jinoiy va intizomiy javobgarlikdan farqli jihatlari, jumladan, sudlanganlik holatini keltirib chiqarmasligi va keng doiradagi subyektlarga nisbatan qo‘llanilishi batafsil yoritilgan.*

Kalit so‘zlar: *Ma’muriy javobgarlik, ma’muriy huquqbuzarlik, davlat majburlovi, ma’muriy jarima, ijro hujjatlari, huquqiy kafolat, qonuniylik.*

Ataniyazov R.
master’s student
Academy of Law Enforcement Agencies of the Republic of Uzbekistan

FOUNDATIONS, ESSENCE, AND CHARACTERISTICS OF ADMINISTRATIVE LIABILITY

Abstract: *This article provides a scientific and theoretical analysis of the foundations, essence, and distinctive features of administrative liability as an independent type of legal liability. In Uzbekistan, administrative liability is based on the principles of the supremacy of human rights, legality, and justice, and serves to prevent offenses and strengthen state discipline. The article подробно examines the differences between this institution and other types of legal liability, in particular criminal and disciplinary liability, including the fact that it does not result in a criminal record and is applied to a wide range of subjects.*

Keywords: *administrative liability, administrative offense, state coercion, administrative fine, enforcement documents, legal guarantees, legality.*

Ilmiy adabiyotlarda ma’muriy javobgarlik yuridik javobgarlikning mustaqil shakli sifatida baholanadi hamda u ma’muriy-huquqiy majburlov tizimining tarkibiy qismi bo‘lib, ushbu majburlovga xos bo‘lgan belgilarga ega ekani ta’kidlanadi[1, 413].

O‘zbekiston ijtimoiy-iqtisodiy rivojlanishining hozirgi bosqichida ma’muriy javobgarlik qonuniylikni ta’minlash va huquqbuzarliklarning oldini olishda muhim institutsional mexanizm bo‘lib xizmat qilmoqda. Konstitutsiyaviy tamoyillarga, ya’ni inson huquq va erkinliklarining ustuvorligiga asoslangan ushbu institut nafaqat huquqbuzarliklarga nisbatan davlatning munosabati, balki fuqarolarning huquqlarini himoya qilish va ta’minlashning muhim huquqiy kafolati hisoblanadi.

O‘zbekistonda ma’muriy javobgarlik tizimi inson huquqlari va erkinliklarining konstitutsiyaviy ustuvorligiga tayanib, qonuniylik, mutanosiblik va ijtimoiy adolat tamoyillari asosida amalga oshiriladi. Ushbu institut, ayniqsa, ijro hujjatlarini bajarmagan qarzdor jismoniy shaxslarning mulkiy manfaatlarini himoya qilishda muhim huquqiy kafolat bo‘lib, nafaqat huquqbuzarlikning oldini olishga, balki davlat intizomini mustahkamlash va buzilgan ijtimoiy munosabatlarni tiklashga xizmat qiladi.

Huquq nazariyasida yuridik javobgarlik shaxs erkinligini ta’minlash va qonuniylik talablariga rioya qilish mexanizmining zaruriy elementi sifatida qaraladi. Huquq va erkinliklarni amalga oshirish davlat nazorati va majburlashning samarali shakllari mavjudligini nazarda tutadi, ular suiiste’mol qilish va belgilangan qoidalarni buzishning oldini olishga qaratilgan bo‘ladi. Ilmiy tadqiqotlarda yuridik javobgarlik qonunlarga rioya etilishini va huquq-tartibot barqarorligini ta’minlovchi davlat ta’sirining huquqiy shakllaridan biri ekanligi ta’kidlanadi[2].

Ma’muriy javobgarlikka nisbatan qo‘llanilganda, bu shuni anglatadiki, ma’muriy majburlov choralari, shu jumladan ma’muriy jarima, erkinlikni cheklashga emas, balki xulq-atvor erkinligi va davlatning majburiy talablariga rioya etish majburiyati o‘rtasidagi muvozanatni ta’minlashga qaratilgan, shu jumladan ijro hujjatlarini ijro etish sohasida.

Zamonaviy yuridik fanda ma’muriy javobgarlik murakkab va ko‘p qirrali ijtimoiy-huquqiy hodisa sifatida qaraladi, bu ushbu institutning yagona qonuniy ta’rifi yo‘qligi va uning mohiyatini ochib berishga ilmiy yondashuvlarning xilma-xilligi bilan bog‘liq. Ilmiy adabiyotlarda ma’muriy javobgarlik yuridik javobgarlikning mustaqil turi va davlat boshqaruvi sohasida amalga oshiriladigan ma’muriy majburlov shakli belgilarini o‘zida mujassamlashtirgan dinamik rivojlanuvchi institut ekanligi ta’kidlanadi [3].

Ilmiy adabiyotlarda ma’muriy javobgarlikning ommaviy-huquqiy tabiati uning jamiyat va davlat manfaatlarini himoya qilishga qaratilganligida namoyon bo‘lishi ta’kidlanadi. Ma’muriy javobgarlik jinoiy ijtimoiy xavflilik darajasiga yetmagan, qonun bilan qo‘riqlanadigan manfaatlarga zarar yetkazish yoki zarar yetkazish ehtimoli bilan bog‘liq ma’muriy nojo‘ya xatti-harakatlarga nisbatan davlat tomonidan munosabat bildirish shakli sifatida qaraladi.

Mazkur xususiyatlar ma’muriy javobgarlikni davlat boshqaruvi tizimining qonuniyligi va barqarorligini ta’minlash maqsadida [4], shu jumladan, zimmasiga yuklatilgan majburiyatlarni bajarishdan bo‘yin tovlayotgan shaxslarga nisbatan qo‘llaniladigan ommaviy-huquqiy majburlovning mustaqil turi sifatida ko‘rib

chiqish imkonini beradi. Ilmiy tadqiqotlarda ta’kidlanganidek, uning asosiy vazifasi ommaviy hokimiyatning normativ-huquqiy hujjatlarida belgilangan majburiy talablarga rioya etilishini majburiy ta’minlash, shuningdek, huquqbuzarliklarning oldini olishdan iborat. Ushbu xususiyat qarzdor jismoniy shaxslarning ma’muriy javobgarligini tahlil qilish uchun prinsipial ahamiyatga ega, chunki ijro hujjatlari talablarini bajarmaslik o‘z mohiyatiga ko‘ra davlatning majburiy talablarini buzish hisoblanadi.

Kompensatsion xususiyatga ega bo‘lgan va asosan mulkiy zararni qoplashga qaratilgan fuqarolik-huquqiy javobgarlikdan farqli o‘laroq, ma’muriy javobgarlik ommaviy manfaatlarni himoya qilish va davlat boshqaruvi mexanizmining samarali ishlashini qo‘llab-quvvatlashga qaratilgan. Shu munosabat bilan qarzdor jismoniy shaxslarga nisbatan ma’muriy jarimalarni qo‘llash fuqarolik-huquqiy ma’noda qarzni undirish usuli sifatida emas, balki qonun bilan yuklatilgan majburiyatlarni bajarishga majburlash va buzilgan huquq-tartibotni tiklashga qaratilgan ommaviy-huquqiy ta’sir chorasi sifatida qaralishi lozim[3].

Shunday qilib, ma’muriy javobgarlik davlat majburlov mexanizmining qonuniylik va javobgarlikning muqarrarligi prinsipini amalga oshirishni ta’minlovchi muhim elementi sifatida namoyon bo‘ladi. Qarzdor jismoniy shaxslarga nisbatan uning mohiyati ijro hujjatlari talablarini bajarishning majburiyligini va ommaviy-huquqiy majburiyatlar intizomini ta’minlashga qaratilgan mulkiy cheklov shakli sifatida ma’muriy jarima orqali yaqqol namoyon bo‘ladi.

Ma’muriy javobgarlik jinoiy, fuqarolik-huquqiy va intizomiy javobgarlik bilan bir qatorda yuridik javobgarlikning mustaqil turi bo‘lib, davlat tomonidan ma’muriy qonunchilik normalarini qabul qilish orqali o‘rnatiladi [5]. Ushbu normalar javobgarlikning kelib chiqish asoslarini, ma’muriy jazo turlarini, ma’muriy huquqbuzarlik to‘g‘risidagi ishlarni ko‘rib chiqish tartibini, shuningdek qabul qilingan qarorlarni ijro etish tartibini belgilaydi. O‘zbekiston Respublikasida tegishli qoidalar O‘zbekiston Respublikasining Ma’muriy javobgarlik to‘g‘risidagi kodeksida mustahkamlangan.

Ilmiy adabiyotlarda ma’muriy javobgarlik yuridik javobgarlik va ma’muriy majburlov belgilarini o‘zida mujassamlashtirgan murakkab ijtimoiy-huquqiy hodisa sifatida asosli ravishda ko‘rib chiqiladi. Chunonchi, S.N. Chmirev va hammualliflar uning mohiyati huquqbuzarni rasman qoralash va qonunda belgilangan sanksiyalarni qo‘llash orqali uning huquqiy maqomini cheklashda ifodalanishini ta’kidlaydilar, bu esa huquqiy ko‘rsatmalarning majburiyligini va huquq-tartibot barqarorligini ta’minlash imkonini beradi [6]. Ushbu yondashuv qarzdor jismoniy shaxslarga nisbatan qo‘llaniladigan ma’muriy jarimani tahlil qilish uchun prinsipial ahamiyatga ega, chunki jarima qonun bilan yuklatilgan majburiyatlarni bajarishga majburlashga qaratilgan mulkiy cheklovning bir shaklidir.

O‘zbekistonda ma’muriy javobgarlik shunchaki jazo vositasi emas, balki qonuniylikni ta’minlovchi, huquqbuzarliklarning oldini oluvchi va inson huquqlarini himoya qiluvchi muhim huquqiy mexanizmdir. U davlat organlari

bilan munosabatlarda fuqarolarning konstitutsiyaviy manfaatlarini himoya qilish bilan birga, jamiyatda huquqiy ongni oshirish va tartibni saqlashga xizmat qiladi. Qonunda belgilangan aybli va g‘ayrihuquqiy qilmish ushbu javobgarlikning asosi bo‘lib, u buzilgan ijtimoiy munosabatlarni tiklash va davlat intizomini ta’minlashning muhim kafolati hisoblanadi.

Ma’muriy javobgarlik — bu davlat majburlovining o‘ziga xos shakli bo‘lib, u sudlanganlik holatini keltirib chiqarmasligi va keng doiradagi vakolatli organlar tomonidan qo‘llanilishi bilan ajralib turadi. Uning asosi muayyan yoshga to‘lgan va o‘z harakatlariga javob bera oladigan shaxslar tomonidan sodir etilgan huquqbuzarlikdir. Ushbu institut, ayniqsa, ijro hujjatlari talablarini bajarmagan qarzdorlarga nisbatan jarima qo‘llash orqali qonun ustuvorligini ta’minlashda muhim huquqiy vosita hisoblanadi.

Ma’muriy huquqbuzarlik salbiy ijtimoiy-huquqiy hodisa hisoblanadi, chunki u muhofaza qilinayotgan ijtimoiy munosabatlarga zarar yetkazadi, moliyaviy intizomni buzadi, boshqaruvning belgilangan tartibiga putur yetkazadi. Shu sababli davlat obyektiv ravishda huquqbuzarliklarning oldini olish va buzilgan huquq-tartibotni tiklashga qaratilgan ma’muriy majburlov choralarini qo‘llashga majbur.

Ma’muriy javobgarlik — bu ma’muriy-huquqiy normalar bilan tartibga solinadigan, huquqbuzarlik sodir etgan shaxsga nisbatan vakolatli organlar tomonidan maxsus protsessual tartibda qo‘llaniladigan davlat majburlovining mustaqil turidir. U jamiyatda qonuniylik va huquq-tartibotni saqlash, davlat intizomini mustahkamlash hamda ma’muriy jarima kabi choralar orqali javobgarlikning muqarrarligi prinsipini ta’minlashda asosiy vosita bo‘lib xizmat qiladi. Mazkur institut nafaqat jazolash, balki huquqbuzarliklarning oldini olish va fuqarolarning huquqlarini himoya qilishga qaratilgan yaxlit huquqiy mexanizm hisoblanadi.

Ilmiy adabiyotlarda ma’muriy javobgarlikning o‘ziga xos xususiyatlari ham alohida ta’kidlanadi [7]. Jumladan, A.P. Alyoxin ma’muriy javobgarlik yuridik javobgarlikning umumiy belgilariga ega bo‘lishi bilan bir qatorda, bir qator maxsus jihatlari bilan ham ajralib turishini ko‘rsatadi. Avvalo, ma’muriy javobgarlik normativ-huquqiy jihatdan nafaqat qonunlar, balki qonunosti hujjatlari bilan ham belgilanadi. Bu holat uni faqat qonunlar bilan belgilanadigan jinoiy javobgarlikdan farqlaydi.

Bundan tashqari, ma’muriy javobgarlikning asosini ma’muriy huquqbuzarlik tashkil etadi. Mazkur huquqbuzarliklar, odatda, qonun buzilishi yoki nojo‘ya xatti-harakat shaklida namoyon bo‘ladi. Taqqoslash uchun aytganda, jinoiy javobgarlik jinoyat sodir etilishi bilan, intizomiy javobgarlik intizomiy nojo‘ya xatti-harakat bilan, moddiy javobgarlik esa moddiy zarar yetkazish bilan bog‘liq holda vujudga keladi.

Ma’muriy javobgarlik subyektlari doirasi ham nisbatan keng bo‘lib, unga fuqarolar, mansabdor shaxslar kiradi. Bu esa ma’muriy javobgarlikning ijtimoiy munosabatlarning turli sohalarini qamrab olish imkoniyatini kengaytiradi. Shuningdek, ma’muriy huquqbuzarliklar uchun ma’muriy jazo choralari

qo‘llaniladi, bu jazolar jinoiy, intizomiy yoki moddiy jazolardan o‘zining huquqiy mazmuni va oqibatlari bilan farq qiladi.

Ma’muriy javobgarlikning muhim xususiyatlaridan yana biri shundaki, u qonun hujjatlariga muvofiq keng doiradagi vakolatli davlat organlari va mansabdor shaxslar tomonidan qo‘llaniladi. Bunda ma’muriy javobgarlik sudlanganlik holatini keltirib chiqarmaydi hamda, qoida tariqasida, shaxsning mehnat munosabatlariga bevosita salbiy oqibatlar tug‘dirmaydi. Shuningdek, ma’muriy javobgarlikni qo‘llash uchun bo‘ysunuv munosabatlarining mavjud bo‘lishi shart emasligi uni intizomiy javobgarlikdan ajratib turadi.

Shu bilan birga, Yu.M. Kozlovning ta’kidlashicha, ma’muriy javobgarlik jazolash funksiyasiga ega bo‘lib, u nafaqat individual, balki umumiy ogohlantirish ahamiyatini ham kasb etadi [8]. Bu jihat ma’muriy javobgarlikning profilaktik vazifasini kuchaytiradi va uni huquqbuzarliklarning oldini olishga qaratilgan samarali huquqiy vosita sifatida namoyon etadi.

Ma’muriy javobgarlik barcha fuqarolar uchun majburiy bo‘lgan umummajburiy qoidalarni buzganlik yoki ularga rioya etmaganlik holatlarida qo‘llaniladi. Mazkur qoidalar ijtimoiy munosabatlarning turli sohalarini qamrab oladi va o‘zining xilma-xil ko‘rinishlari bilan tavsiflanadi. Xususan, davlat va jamoat tartibi hamda jamoat xavfsizligini ta’minlash, atrof-muhitni muhofaza qilish, mulkchilik munosabatlari, standartlashtirish, statistika va hisob-kitob yuritish, yo‘l harakati xavfsizligi va transport vositalaridan foydalanish, harbiy hisob, chegara rejimi, kontrabandaga qarshi kurash, valyuta muomalasi kabi sohalarda belgilangan talablar umummajburiy qoidalar sirasiga kiradi. Ushbu qoidalar, qoida tariqasida, vakolatli ijro hokimiyati organlari tomonidan belgilanadi va ularning buzilishi ma’muriy javobgarlikni keltirib chiqaradi.

Ma’muriy javobgarlik, asosan, ma’muriy-huquqiy normalar talablarining buzilishi natijasida vujudga keladi. Shu bilan birga, amaldagi qonunchilik tahlili shuni ko‘rsatadiki, ma’muriy javobgarlik ayrim hollarda mehnat, moliya, yer, hatto konstitutsiyaviy huquq normalarining buzilishi uchun ham qo‘llanilishi mumkin. Bu holat ma’muriy javobgarlikning sohalararo xususiyatga ega ekanligini hamda uning huquqiy tartibga solish tizimidagi universalligini namoyon etadi.

O‘zbekiston Respublikasida ma’muriy javobgarlik instituti bir qator huquqshunos olimlar tomonidan ilmiy jihatdan tadqiq qilingan. Xususan, X.R. Alimov, V.N. Stasko, A.A. Li, L.B. Xvan va boshqa olimlarning ilmiy ishlari mazkur masalaning nazariy va amaliy jihatlarini yoritishga bag‘ishlangan. Jumladan, X.R. Alimov ma’muriy javobgarlikni ommaviy-huquqiy tabiatga ega bo‘lgan, davlat oldidagi javobgarlik shakli sifatida talqin qiladi. Uning ta’kidlashicha, ma’muriy javobgarlik xizmat bo‘yicha bo‘ysunuv munosabatlarida bo‘lmagan aybdor shaxslarga nisbatan vakolatli davlat organlari tomonidan qo‘llaniladigan davlat majburlov chorasi hisoblanadi [9].

Shuningdek, ilmiy adabiyotlarda “javobgarlik” va “jazo” tushunchalarining o‘zaro nisbatiga ham alohida e’tibor qaratiladi. Odatda, javobgarlik turlari deganda, uning tarkibiy elementlari bo‘lgan jazo choralari tushuniladi. Biroq

mazkur tushunchalarning mazmun-mohiyatini tahlil qilish shuni ko‘rsatadiki, “javobgarlik” tushunchasi “jazo”ga nisbatan kengroq mazmunni qamrab oladi. Chunki javobgarlik nafaqat jazo choralarini, balki boshqa huquqiy ta’sir etish vositalarini ham o‘z ichiga oladi. Bu holat ma’muriy javobgarlikning faqat jazolash bilan cheklanmasdan, huquqbuzarliklarning oldini olish va huquqiy tartibotni mustahkamlashga qaratilgan kompleks huquqiy institut ekanligini ko‘rsatadi.

Xulosa qilib aytganda, ma’muriy javobgarlik davlat majburlov mexanizmining qonuniylik va javobgarlikning muqarrarligi prinsiplarini amalga oshirishni ta’minlovchi muhim elementi sifatida namoyon bo‘ladi. U qonuniylik va javobgarlikning muqarrarligi tamoyillarini ta’minlashga xizmat qiladi. Qarzdor jismoniy shaxslarga nisbatan uning mohiyati, ayniqsa, ma’muriy jarima orqali yaqqol namoyon bo‘ladi. Bu mulkiy cheklov shakli ijro hujjatlari talablarining bajarilishini va ommaviy-huquqiy majburiyatlar intizomini ta’minlashga qaratilgan.

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Avloqulova S. S.
PhD student
Tashkent State University of Economics

KEY DRIVERS AND CHALLENGES IN IMPLEMENTING THE DIGITAL PRODUCT PASSPORT

Abstract*: The article examines the digital product passport (DPP) as a strategic digital infrastructure for enterprises under modern digital and circular economy conditions, and provides a systematic analysis of the internal and external factors driving its implementation, as well as the main barriers and risks. Based on the analysis of the European Union's regulatory and legal documents, as well as consulting and industry reports, the paper highlights the impact of DPP on digitalization, operational efficiency, competitive advantage, corporate reputation, and circular economy objectives. At the same time, it classifies key barriers such as problems of data interoperability and standardization, digitalization costs, shortages of technical and managerial skills, concerns related to data collection and security, and resistance to organizational change. The research findings show that DPP should be viewed as a core mechanism for transitioning to sustainability, transparency, and innovative business models, while its successful implementation requires the development of standardization, strengthening human capacity, and enhancing cooperation among stakeholders.*

Keywords: *digital product passport (DPP), circular economy, digital identification, sustainability, digital transformation, Industry 4.0, blockchain, supply chain transparency.*

Introduction

The digital product passport (DPP) is one of the key and distinctive tools in the European Union's sustainable development agenda to ensure the transition to a circular and climate-neutral economy. For this reason, it is envisaged as an integral part of the *Circular Economy Action Plan* (CEAP) and the *European Green Deal* initiative. The DPP approach implies a shift away from the traditional linear economic model toward a circular model in which every product is designed with a minimal environmental footprint and, at the end of its use phase, is conceived so that each component used in its production can be recovered.

CEAP notes that over the next 40 years, the consumption of materials such as fossil fuels, metals, and minerals is expected to double, while the volume of annual waste is projected to increase by 70 percent by 2050. Up to 80 percent of a product's environmental impact is determined at the design stage. However, the traditional linear model does not provide producers with incentives to make products suitable for reuse[5].

[5] Digital Product Passports: A Complete Guide. (2024, Agosto 23). https://root sustainability.com/blogs/digitalproduct-passport/

Thus, the DPP is designed to bridge this gap by enabling the collection and sharing of precise data throughout the entire lifecycle of a product, supporting the monitoring and optimization of its sustainability. In a period of rapid change driven by digital transformation, the digital product passport is regarded as one of the key instruments. With the help of the DPP, technological and operational data on the entire lifecycle of a product are continuously tracked and consolidated into a single digital unit. Through integration with supply chain traceability systems, the DPP provides full visibility over the product's origin and characteristics, makes operational processes more transparent, and contributes to the formation of a responsible supply chain.

Literature review

In international research, the digital product passport (DPP) is interpreted as a central infrastructural element of digital transformation and the circular economy. Studies by Cikis Studio emphasize that the DPP, by integrating material and product flows into a single digital environment, helps to build a modern and competitive supply chain, optimize operational processes, and enable rapid adaptation to market changes[6].

Analyses by Deloitte, meanwhile, consider the introduction of the DPP as a strategic source of competitive advantage for companies: it not only strengthens corporate image and brand trust, but also helps attract customer segments that prioritize transparency and sustainability, and opens up new growth opportunities by facilitating access to market segments regulated or incentivized by sustainability standards. Thus, foreign sources assess the DPP as a comprehensive digital mechanism that unites transparency, sustainability, and competitiveness[7].

Methodology

To analyze the drivers and barriers to implementing the digital product passport, a systematic literature review and content analysis were employed. Scientific articles, European Union documents, and reports from organizations such as Deloitte, McKinsey, GS1, and Cikis Studio were compared. Based on the obtained information, internal and external factors were grouped conceptually, and the impact of the DPP on digitalization, sustainability, and competitiveness, as well as the main implementation risks, were briefly synthesized.

Analysis and results

Strengthening cooperation between enterprises within the supply chain is one of the important dimensions of the DPP. Another advantage of the DPP is that it enhances transparency by providing accurate and verifiable information on the materials and production processes used by different actors. This, in turn, reduces uncertainties in resource use. Thanks to the detailed traceability it ensures,

[6] Digital product passport: Cos'è e perchè implementarlo. (s.d.). urly.it/3141n2

[7] Digital Product Passports are just around the corner | Deloitte UK. (s.d.). https://www.deloitte.com/uk/en/services/riskadvisory/perspectives/digital-product-passports-are-just-around-the-corner.html

companies can optimize end-of-life product management, making it easier to channel products into recycling and material re-use.

The DPP is not merely a data collection system, but a catalyst that promotes corporate sustainability. Access to detailed information enables companies to continuously monitor the environmental impact of their products and to take measures to reduce greenhouse gas emissions and the use of non-renewable resources. With the help of the DPP, firms can calculate the carbon footprint for each product and implement corrective actions aimed at improving the energy efficiency of production processes. Such analysis also facilitates compliance with EU sustainability regulations, such as the European Green Deal and the Circular Economy Action Plan, which require responsible resource use and emission reduction.

In the context of globalization and an increasingly interconnected economy, the role of the DPP becomes even more strategically important. The ability to track products in detail and maintain reliable, verifiable information about them is crucial for ensuring the quality and safety of goods circulating at the international level. For example, in sectors such as electronics or textiles, where supply chains are highly complex, the DPP helps ensure that products meet the quality and sustainability standards required by different markets.

The DPP is integrated with Industry 4.0 technologies such as blockchain and decentralized identifiers (DID), which ensures data security and operational efficiency. When applied to supply chains, blockchain makes it possible to create tamper-proof chains of certificates in which product information can be verified and exchanged among supply chain participants. This system not only reduces the likelihood of fraud, but also guarantees the integrity and immutability of data over time. Owing to these characteristics, the DPP proves to be an indispensable tool for ensuring sustainability, transparency, and competitiveness for companies operating in an Industry 4.0 environment.

The figure 1 illustrates how a garment is linked to its DPP. The QR code on the product label is scanned with a smartphone, giving the consumer access to detailed information on the product’s origin, composition, production process, and environmental indicators.

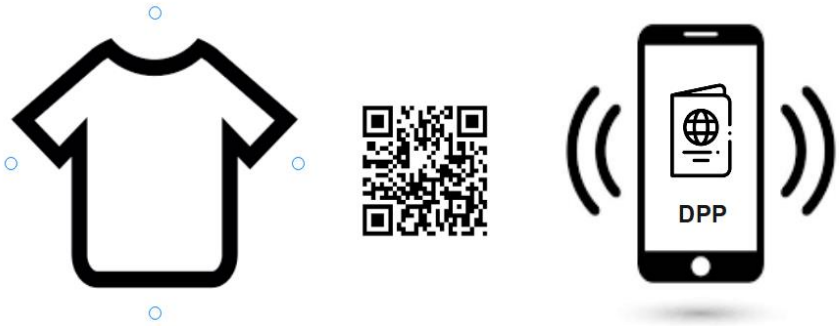


Figure 1. QR-enabled access to DPP.

In recent years, due to new environmental requirements that make sustainable operations mandatory, sustainability has become a strategic priority for businesses. Europe is leading this transformation and, through the Circular Economy Action Plan, is encouraging companies to introduce digital product passports to increase product transparency and sustainability.

The Eco-design for Sustainable Products Regulation (ESPR) is a key pillar of this regulatory framework. While other directives merely recommended the introduction of digital product passports, the ESPR makes the DPP mandatory for certain categories of products. Therefore, for companies dealing with regulated products, the digital product passport becomes a critical instrument for complying with regulatory requirements. By providing structured data, companies not only meet legal obligations, but also position themselves as responsible and competitive brands.

The introduction of the digital product passport is determined by a set of strategic factors that demonstrate how important this system is for enterprises and organizations. These factors represent the main motivations for implementing this digital tool aimed at promoting transparency, sustainability, and innovation. They can be grouped into two broad categories:

1. Internal factors – related to in-company processes and objectives, including improving operational efficiency, enhancing internal management, and building competitive advantage.
2. External factors – stemming from regulatory requirements, consumer expectations, and market trends.

Identifying and understanding these factors in depth is crucial for designing a successful transition strategy toward the DPP. By taking into account internal and external needs and pressures, organizations can develop strategies that not only meet regulatory requirements but also generate significant economic and environmental benefits. This, in turn, allows enterprises to remain competitive and profitable in a rapidly evolving global economy. An expanded analysis of these

factors makes it possible to view the DPP as a strong catalyst for long-term innovation and growth.

The digital product passport is one of the main pillars of digital transformation for companies. By implementing the DPP, enterprises can simplify information management throughout the entire supply chain, increase operational efficiency, and enhance transparency. The DPP creates a unified and standardized database of information on materials, processes, and products, to which different supply chain participants can gain access. At the same time, it reduces errors and system interruptions and helps integrate new technologies such as artificial intelligence and predictive analytics into the organization.

Companies that implement the DPP position themselves as actors committed to sustainability, which today has become a more important factor in consumer purchasing decisions than ever before. As the importance of sustainable practices grows – especially in product selection – the DPP serves as a key source of competitive differentiation. It not only strengthens corporate image but also builds trust among customer segments that prioritize transparency and sustainability. In addition, the DPP facilitates access to market segments that are regulated or incentivized on the basis of sustainability standards, thereby expanding growth opportunities in strategic sectors. In markets where sustainability has become a primary selection criterion, the DPP remains a strategic tool for attracting new customer groups and strengthening the loyalty of existing customers.

Introducing the DPP demonstrates a company's strong commitment to sustainability and transparency and significantly improves its brand image. This tool provides tangible evidence of corporate social responsibility. Such an approach is increasingly valued not only by consumers but also by investors and other stakeholders. The use of DPP increases transparency and trust among strategic partners and customers, contributing to a positive perception of the company within the industry. Moreover, firms that implement DPP can obtain various sustainability certificates and awards, further enhancing their visibility and attractiveness in the marketplace. A strengthened image can, in the long term, turn into a sustainable competitive advantage, positively affecting brand value and customer loyalty.

EU documents such as the European Green Deal are accelerating the transition toward a sustainable economic model. These regulations require firms to comply with increasingly stringent standards and are turning the digital product passport into a necessary tool for ensuring regulatory compliance and anticipating future requirements. At the same time, the DPP provides a significant competitive advantage in a rapidly changing market environment. Companies that follow sustainability standards present themselves as forward-looking and sustainability-oriented actors and thus become particularly attractive to environmentally conscious consumers and investors. The DPP simplifies the integration of sustainability requirements into operational processes and creates a clear information system for tracking and fulfilling environmental obligations.

Growing consumer demand for clear and understandable information on product origin, composition, and sustainability is one of the main external drivers of DPP implementation. Sectors such as fashion and electronics are especially affected by this trend. Consumers increasingly prefer brands that provide transparency and regard it as one of the main criteria in their purchasing decisions. The DPP enables companies to present detailed information on the entire life cycle of a product, including its environmental footprint. Such transparency strengthens customer loyalty and helps brands stand out in highly competitive markets. By implementing DPP, companies can build trust, create more personalized and engaging consumer experiences, and align themselves with broader sustainability goals.

The digital product passport plays a central role in the transition to a circular economy by promoting recycling, re-use, and repairability. According to the European Circular Economy Platform, the introduction of DPP improves end-of-life product management, reduces disposal costs, and optimizes the use of raw materials. This approach directly contributes to emission reductions.

By providing detailed information on materials and components, the DPP enables stakeholders to consciously choose the most appropriate ways to re-use or recycle products. It also supports the development of innovative business models such as “product-as-a-service”, in which companies retain ownership of materials and ensure their efficient recovery. Such alignment with circular economy principles not only benefits the environment but also enhances resource efficiency and opens new market opportunities, helping enterprises succeed in a sustainability-oriented economy.

The factors driving the implementation of DPP show that the system’s innovation and improvement potential covers various dimensions of business and market development. Companies that actively adopt DPP not only adapt to sustainability requirements but also consolidate their position as leaders in innovation, transparency, and circular economy practices. In the current context of intensifying environmental and social challenges, DPP acts as a “bridging link” for future business models, enabling greener and more resource-efficient approaches in certain industries, revisiting production cycles, and contributing to a more sustainable and resilient global economy.

At the implementation stage, the DPP as a strategic tool faces a number of initial challenges. These barriers are linked to both internal and external factors, and their combined impact significantly complicates the process of adopting the DPP (Figure 2). In the internal context, enterprises may encounter obstacles related to their level of preparedness to adopt the solution, as well as the adequacy of technical infrastructure and available resources. On the external side, relationships with suppliers, legal and regulatory requirements, and customer resistance emerge as key constraining factors. Effectively addressing these issues is essential for the gradual and full integration of the DPP into the business environment and for aligning it with future sustainability objectives, new regulations, and market expectations. Overcoming these barriers not only supports

compliance with formal requirements, but also helps transform enterprises into exemplars of transparency and innovation in a globally competitive landscape.

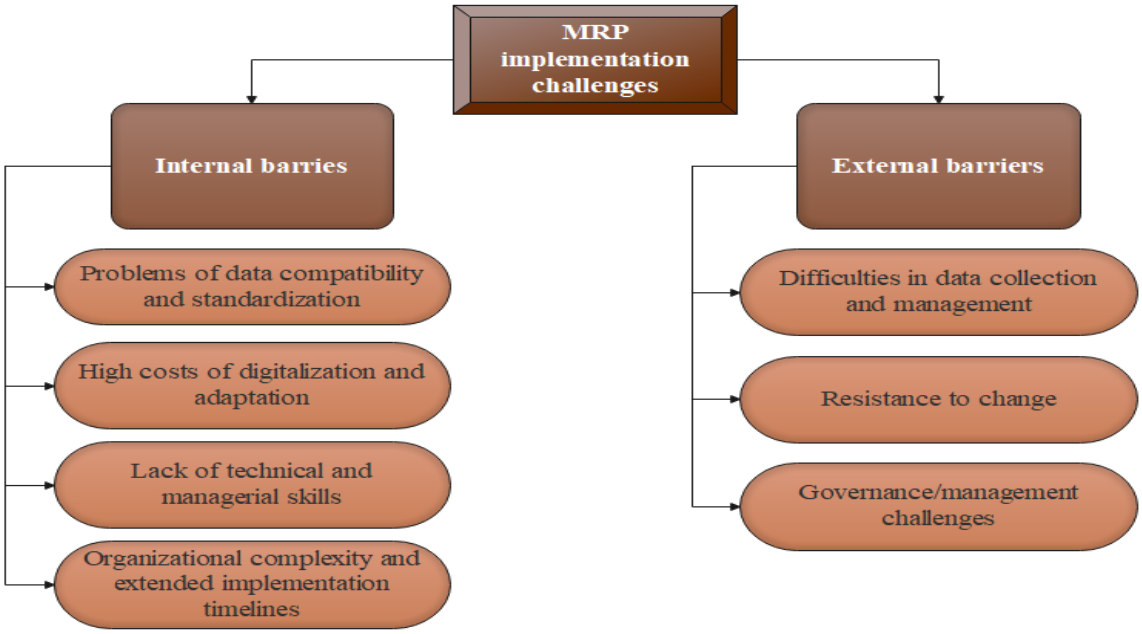


Figure 2. Challenges in implementing the digital product passport.

The lack of unified international standards seriously limits large-scale implementation of the DPP. Organizations face difficulties in ensuring data compatibility between different systems and industries. This challenge requires significant investment in standardization initiatives, including the development of protocols that harmonize data formats and communication interfaces. The EU's Digital Transformation Framework shows that the absence of agreement on data standards complicates cross-border operations and restricts collaboration along supply chains. If this gap is not closed, companies risk creating fragmented and poorly connected systems, which ultimately reduces the effectiveness of the DPP.

Transitioning to the DPP requires investment in advanced digital tools such as blockchain, IoT, and traceability systems. These technologies involve costs for software, hardware, and qualified personnel, which can become a substantial financial burden, especially for small and medium-sized enterprises. The need to integrate new systems and adapt existing infrastructure further increases economic pressure on companies. Finding a balance between long-term benefits and short-term costs is a serious challenge, particularly in sectors with narrow profit margins.

Effective implementation of the DPP is highly dependent on the availability of staff with sufficient expertise in data management, IT systems, and supply chain coordination. However, many organizations report skill gaps precisely in these areas. This shortcoming limits their ability to manage complex digital systems and fully exploit the potential of the DPP. Training programmes and capacity-building initiatives are needed, but they require both time and resources, which further

complicates the process. Bridging this gap demands attention not only to technical training but also to organizational change management.

Integrating the DPP requires broad organizational change, including stronger internal coordination, redesign of business processes, expanded cross-departmental collaboration, and staff training. For companies with global or deeply networked supply chains, such adaptation can require considerable time and resources. Prolonged implementation periods may lead to strategic misalignment and a loss of pace and motivation in the project. According to the World Economic Forum, many companies underestimate the complexity of such transformation processes, which results in delays and suboptimal execution[8].

The extensive data required by the DPP – detailed information on raw materials, components, and production processes – is challenging to collect and manage on a unified platform. Gathering accurate and complete data from suppliers around the world is particularly difficult when working with supply chains located in developing countries. Research by GS1 shows that upstream suppliers are often insufficiently transparent, which raises concerns about the completeness and accuracy of the data[9].

Internal resistance – including employee scepticism and reluctance to share confidential product information – is one of the major barriers to DPP implementation. Concerns about data security, protection of intellectual property, and the potential misuse of shared information intensify this resistance. Building a culture of openness, demonstrating the strategic value of the DPP with practical examples, and clearly explaining its benefits to stakeholders are crucial to overcoming these issues. Otherwise, the implementation process may be prolonged and stakeholder engagement may decline.

Conclusion

These challenges associated with implementing the DPP clearly reflect the complexity of transitioning to a more transparent and sustainable operational environment. Enterprises must address skill shortages, internal resistance to change, and issues of interoperability and data collection gradually and systematically. If these barriers are ignored, the potential benefits of the DPP across the entire value chain will not be fully realized. Conversely, overcoming them through targeted training, standardization, and active engagement with stakeholders will allow companies not only to adapt to new requirements and standards, but also to become leading actors that reshape the market in the direction of sustainability and innovation.

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Axmadjonova G. A.
master's degree student
Fergana State University

THE STRUCTURE OF THE SCHOOL CURRICULUM OF WORLD ECONOMIC AND SOCIAL GEOGRAPHY AND ITS CONTEMPORARY CHALLENGES

Abstract: *This article analyzes the structure and content orientation of the school curriculum of World Economic and Social Geography taught in general secondary education institutions, as well as the contemporary challenges arising in the process of teaching this subject. The study provides a theoretical analysis of the main sections of the curriculum and highlights their role in developing students' spatial thinking and global perspective. Furthermore, in the context of rapid changes in economic and social processes under globalization, the necessity of updating curricular content, strengthening the integration of digital technologies, and enhancing interdisciplinary approaches is substantiated. The article also proposes practical recommendations aimed at addressing existing problems, which contribute to improving the effectiveness of geography education.*

Keywords: *world economic and social geography, school geography education, curriculum structure, globalization, spatial thinking, interdisciplinary integration, digital technologies.*

Introduction

In the context of contemporary globalization, *World Economic and Social Geography* plays a significant scientific and practical role in understanding economic and social processes occurring on a global scale. This subject contributes to the formation of students' knowledge of the territorial distribution of countries worldwide, their socio-economic significance, as well as the development of economic-geographical analytical skills within general secondary education. At the same time, the rapid socio-economic transformations taking place in today's world necessitate the improvement of both the content and structure of the school curriculum.

As with other general education subjects, the restructuring of the *World Economic and Social Geography* curriculum, the enhancement of its scientific rigor in terms of instructional content, and the strengthening of teaching methodologies aimed at improving students' mastery of the subject have become pressing demands of the time.

Without basic economic knowledge, it is impossible to understand any economic-geographical phenomenon or to explain its underlying causes. In this regard, the subject *World Economic and Social Geography* fulfills an important educational function in schools. It not only provides students with geographical knowledge but also plays a crucial role in developing their economic literacy and enabling them to apply acquired knowledge in everyday life. Therefore, alongside

theoretical issues, greater emphasis has been placed on economic knowledge within the teaching of world economic and social geography. In school textbooks, several economic terms that previously existed (such as *freight turnover, enterprise, industrial sector,* and others) have been elevated to the level of key concepts.

Providing a concept means giving a precise definition by clearly identifying its essential characteristics. However, it is not necessary to assign a strict definition to all key concepts and terms used within this discipline. For instance, taking into account various didactic considerations, it is not advisable to provide a formal definition of the term *"World Economy"* in the 9th grade. Instead, students should be encouraged to consider which sectors constitute the world economy and how these sectors are interconnected. At the same time, students are expected to be familiar with terms such as *"economic region"* and *"concentration of production,"* as these concepts are included in the curriculum.

Nevertheless, introducing general concepts, mastering them, and explaining the causes of phenomena alone do not ensure the acquisition of meaningful geographical knowledge. If students are unable to apply their knowledge and skills in real-life contexts, and if this knowledge does not enable them to understand the world independently, such knowledge remains a "useless burden." Only when students are capable of applying geographical knowledge in everyday life can it be said that they have truly mastered the subject. However, the majority of school geography teachers tend to focus primarily on knowledge acquisition, while insufficient attention is given to organizing and facilitating its practical application.

This aspect is particularly important because students' thinking develops through the analysis of numerous engaging facts and examples, their comparison, verification of accuracy, and the process of drawing logical conclusions.

The structure of the *World Economic and Social Geography* course, including its sections, topics, content, interconnections, as well as the changes introduced into the school curriculum, can be summarized as follows:

- In the 9th grade, *World Economic and Social Geography* is allocated 68 instructional hours, during which natural and social phenomena as well as geographical laws are presented to students in a clear, simple, and comprehensible manner. Particular attention is given to students' age-related psychological characteristics and their ability to understand, thoroughly master, and effectively assimilate the learning material. The course includes an introduction and covers topics such as *the economic-geographical characteristics of the branches of the world economy and the world's countries*, *the political map of the world and its structure*, and *international economic relations*.
- The introductory section of *World Economic and Social Geography* is limited to outlining the object and subject of the discipline, its specific role, objectives, and tasks. Within this framework, it is essential to explain the reasons behind the emergence of issues related to the rational location of production, as

well as to clarify the differences between the study of natural resources in physical geography and economic geography courses.

- Within the section *"General Characteristics of the World,"* the topic *"The Political Map of the World"* introduces the concept of the world political map. This topic addresses the current number of states in the world, their territorial size, and their classification according to geographical location, as well as changes that have occurred in the world political map over the past 25–30 years. It also includes the classification of countries according to their level of socio-economic development, along with traditional issues related to forms of government and state structure. At this stage, students are provided with initial information about general concepts.

- The section *"World Natural Resources"* systematizes the knowledge students acquired in grades VI–VII regarding global natural resources. This section introduces the concept of *"economic evaluation of natural resources,"* which enables students to develop an initial understanding of the role of natural resources in the development of production and their historical character. Furthermore, the necessity of rational use of mineral, soil, water, and other resources is emphasized, along with the importance of protecting the atmosphere, rivers, lakes, and seas from industrial pollution. Natural resources are evaluated according to their intrinsic characteristics, sectoral relevance, and regional distribution.

- The section *"World Population"* has been expanded and deepened through the inclusion of new issues. It examines the size, growth, and distribution of the world's population, as well as its gender, age, and racial composition, and the processes of urbanization in countries around the world.

- In the section *"World Economy,"* new concepts are gradually introduced in line with advances in science and technology. In the subsection devoted to a concise definition of the world economy, explanations are provided for many important and newly introduced concepts. However, this does not imply that all these concepts can be fully mastered within a single lesson. Rather, they are revisited and reinforced in each subsequent lesson. Some concepts may be explained in greater depth by the teacher within selected topics, as deemed necessary.

The regional section of the course begins with the economic-geographical description of countries and major regions of the world. Its content is considerably deepened, incorporating topics such as the role of natural, historical, and economic conditions in the spatial distribution of labor, the nature of specialized sectors, auxiliary and local industries, and their interrelationships. The first topic of the regional section examines the economic-geographical position of a region, which is defined in terms of its location relative to other regions [1].

The economy of each region consists of a complex system of sectors, which develop as integral components of the global economy under specific natural and socio-economic conditions. The primary purpose of the regional part of *World Economic and Social Geography* is to highlight the unique characteristics of

regions. Consequently, the objectives defined in terms of economic-geographical description cannot be fully explored in every lesson of the regional section due to the limited time allocated [4].

Although studying the distinctive features of regional economies is a crucial task, it is not the only task. Students need to understand that the specific characteristics of a region's economy result from general laws manifested differently in various locations. Therefore, during the study of regions, concepts such as *enterprise*, *industry*, and *forms of production organization* are repeatedly revisited [2].

The current school curriculum presents a somewhat diversified system of practical work, requiring students to conduct observations in production, and to work with textbook material, cartographic and statistical sources, diagrams, and thematic tables. The regional section concludes with a summary and generalization [3].

Based on the above requirements, the article outlines the components of students' learning-cognitive activity. This activity has a complex structure, which organizes the conditions for learning-cognitive activity within the teacher-student interaction. It also forms subject-specific competencies, including criteria, stages, approaches, aspects, methodological conditions, and expected outcome components.

In the process of developing subject-specific competencies, the functional roles of both teachers and students in learning-cognitive activity are central. To this end, the learning-cognitive activity conditions must allow students to perceive geographical information through sensory experience and organize the collection and search for data. Furthermore, it is essential to facilitate students' independent and active search for geographic information. To develop subject-specific competencies, criteria must be established that foster students' creativity, motivation, and high-level cognitive needs based on theory, methods, and technologies [5].

The principles for forming subject-specific competencies are derived from social, scientific, and psychological foundations. They include:

- Scientific validity;
- Comprehensibility;
- Consistency;
- Coherence;
- Systematic approach;
- Use of visual aids.

These principles enable the development of both activity-based and personality-oriented approaches to forming subject-specific competencies. The developed approaches play a key role in motivational introduction, academic literacy, practical activity, and meaningful assessment of outcomes.

Conclusion

Achieving the expected results in subject-specific competencies is possible by fostering students' motivation and developing methodological conditions that

include the combination of teaching methods, forms, and goal-oriented strategies. The study indicates a clear need to advance and refine the modern scientific and innovative methodological system for teaching *World Economic and Social Geography*. To address this, the research proposed the use of innovative technologies, ICT-based pedagogical tools, and modern learning tasks for monitoring and assessing students' knowledge, which were implemented in 9th-grade lessons.

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Axunboboyev M. M.
o‘qituvchisi
Guliston davlat universiteti
Zikirov I. Y.
o‘qituvchisi
Guliston davlat universiteti
Kenjayev A. A., PhD
katta o‘qituvchisi
Guliston davlat universiteti

SIRDARYO VILOYATI TUPROQLARIDA SHO‘RLANISH JARAYONLARINING SENTINEL-2 MULTISPEKTRAL TASVIRLARI ASOSIDA NDSI KO‘RSATKICHI ORQALI FAZOVIY BAHOLANISHI

Annotatsiya: *Ushbu tadqiqotda Sirdaryo viloyati hududida tuproq sho‘rlanishining fazoviy va mavsumiy tarqalishini masofadan zondlash texnologiyalari asosida aniqlash maqsad qilingan. Sho‘rlanish O‘zbekistonning sug‘orma dehqonchilikka ixtisoslashgan mintaqalarida tuproq unumdorligiga bevosita ta’sir etuvchi eng muhim degradatsion jarayonlardan biridir. Tadqiqotda Yevropa Kosmik Agentligining Sentinel-2 sun’iy yo‘ldosh tasvirlari asosida NDSI (Normalized Difference Salinity Index) ko‘rsatkichi hisoblandi va uning yordamida 2024-yil mart hamda avgust oylarida olingan kosmik tasvirlar ustida sho‘rlanish xaritalari yaratildi.*

NDSI indeksi SWIR va Green diapazonlari nurlanish qaytish qiymatlariga asoslangan holda chiqarilib, tuproqdagi sho‘rlanishning turli darajalarini aniq farqlash imkonini berdi. Tahlil natijalariga ko‘ra, mart oyida sho‘rlanish darajasi asosan o‘rtacha va past toifalarda qayd etilgan bo‘lsa, avgust oyida yuqori harorat va bug‘lanishning kuchayishi hisobiga sho‘rlanishning yuqori va juda yuqori toifalarining sezilarli ortgani kuzatildi. Ayniqsa Oqoltin, Mirzaobod, Boyovut va Sardoba tumanlarida sho‘rlanishning kuchli jamlangani aniqlangan.

Olingan natijalar Sirdaryo viloyati tuproqlarida sho‘rlanish jarayoni mavsumiy omillarga kuchli bog‘liqligini ko‘rsatadi hamda masofadan zondlash ma’lumotlari sho‘rlanishni muntazam monitoring qilish uchun yuqori samarali vosita ekanini tasdiqlaydi. Tadqiqot natijalari meliorativ chora-tadbirlarni rejalashtirish, suv resurslaridan oqilona foydalanish va agrotexnik jarayonlarni optimallashtirishda amaliy ahamiyatga ega.

Kalit so‘zlar: *Sirdaryo viloyati, meliorativ holat, sug‘oriladigan yerlar, bug’lanish, yer osti suvlari, sho‘rlanish xaritalari, piksel tahlili.*

Akhunboboyev M. M.
teacher
Gulistan State University
Zikirov I. Y.
teacher
Gulistan State University
Kenjayev A. A., PhD
senior lecturer
Gulistan State University

SPATIAL ASSESSMENT OF SOIL SALINIZATION IN THE SYRDARYA REGION USING THE NDSI INDEX DERIVED FROM SENTINEL-2 MULTISPECTRAL IMAGERY.

Abstract: *This study aims to identify the spatial and seasonal distribution of soil salinization in the Syrdarya region using remote sensing technologies. Soil salinization is one of the most significant degradation processes directly affecting soil fertility in irrigated agricultural regions of Uzbekistan. In this research, the Normalized Difference Salinity Index (NDSI) was calculated based on Sentinel-2 satellite imagery provided by the European Space Agency, and soil salinity maps were generated using images acquired in March and August 2024.*

The NDSI index was derived from reflectance values in the SWIR and Green spectral bands, enabling clear differentiation of various levels of soil salinity. The analysis results indicate that in March, soil salinity levels were predominantly classified as low to moderate, whereas in August, due to increased air temperature and intensified evaporation, a significant expansion of areas with high and very high salinity levels was observed. Particularly high concentrations of soil salinization were identified in the Okaltyn, Mirzaabad, Bayaut, and Sardoba districts.

The obtained results demonstrate a strong dependence of soil salinization processes in the Syrdarya region on seasonal factors and confirm that remote sensing data represent a highly effective tool for continuous salinity monitoring. The study findings are of practical importance for planning reclamation measures, ensuring rational water resource management, and optimizing agrotechnical processes.

Keywords: *Syrdarya region, land reclamation status, irrigated lands, evaporation, groundwater, salinity maps, pixel-based analysis.*

Kirish

Tuproq sho‘rlanishi qishloq xo‘jaligi uchun jiddiy ekologik va iqtisodiy muammo bo‘lib, ayniqsa O‘zbekistonning sug‘orma dehqonchilikka ixtisoslashgan hududlarida hosildorlik va tuproq unumdorligiga sezilarli ta’sir ko‘rsatadi. Sirdaryo viloyati hududi yer osti suvlari sathining yuqoriligi, suv resurslarining mavsumiy o‘zgarishi va yuqori bug‘lanish sharoiti tufayli

sho‘rlanish jarayonlariga nisbatan yuqori sezuvchanlikka ega. Shu bois, bu hududda sho‘rlanishning fazoviy va mavsumiy tarqalishini aniqlash, tuproq resurslarini samarali boshqarish va meliorativ chora-tadbirlarni rejalashtirish uchun dolzarb vazifa hisoblanadi.

So‘nggi yillarda masofadan zondlash texnologiyalari (remote sensing) tuproq sho‘rlanishining regional va hududiy ko‘lamda monitoringini tezkor, aniq va iqtisodiy samarali usulda amalga oshirish imkonini berdi[1]. Landsat va Sentinel-2 kabi sun’iy yo‘ldosh tasvirlari yordamida NDSI (Normalized Difference Salinity Index) kabi ko‘rsatkichlar ishlab chiqilgan bo‘lib, ular tuproq sho‘rlanishining turli darajalarini aniqlash va xaritalashda samarali vosita sifatida keng qo‘llaniladi[2]. NDSI indeksi SWIR va Green diapazonlaridagi nurlanish qaytish qiymatlariga asoslanib, sho‘rlanish darajasining aniqligini oshiradi va mavsumiy o‘zgarishlarni tahlil qilish imkonini beradi.

Ushbu tadqiqot Sirdaryo viloyati hududida 2024-yil mart va avgust oylarida olingan Sentinel-2 tasvirlari yordamida tuproq sho‘rlanishining fazoviy va mavsumiy tarqalishini aniqlashga qaratilgan. Tadqiqot natijalari hududdagi sho‘rlanish jarayonining mavsumiy omillarga sezilarli bog‘liqligini ko‘rsatadi va masofadan zondlash ma’lumotlarining sho‘rlanishni muntazam monitoring qilishda yuqori samarali vosita ekanini tasdiqlaydi. Shu bilan birga, natijalar suv resurslarini oqilona boshqarish, agrotexnik jarayonlarni optimallashtirish va meliorativ chora-tadbirlarni rejalashtirishda amaliy ahamiyatga ega.

Materiallar va uslublar

Masofadan zondlash ma’lumotlari

Tadqiqotda Yevropa Kosmik Agentligining Sentinel-2A/B sun’iy yo‘ldoshlaridan olingan 10–20 m fazoviy aniqlikka ega multispektral tasvirlar ishlatildi. Tasvirlar 24.03.2024 va 15.08.2024 sanalarida olingan bo‘lib, atmosfera korreksiyasi Sen2Cor algoritmi yordamida amalga oshirildi.

NDSI indeksini hisoblash

Tuproq sho‘rlanishini aniqlash uchun ishlatilgan NDSI quyidagi formula asosida hisoblandi:

$$NDSI=SWIR-Green/SWIR+Green$$

Bu yerda:

SWIR (B11 yoki B12) — sho‘rlangan tuproqning o‘ziga xos yuqori qaytish xususiyatini aks ettiradi;

Green (B3) — namlik va sho‘rlanish jarayoniga sezgir diapazon.

NDSI qiymatlari quyidagi toifalarga bo‘lindi:

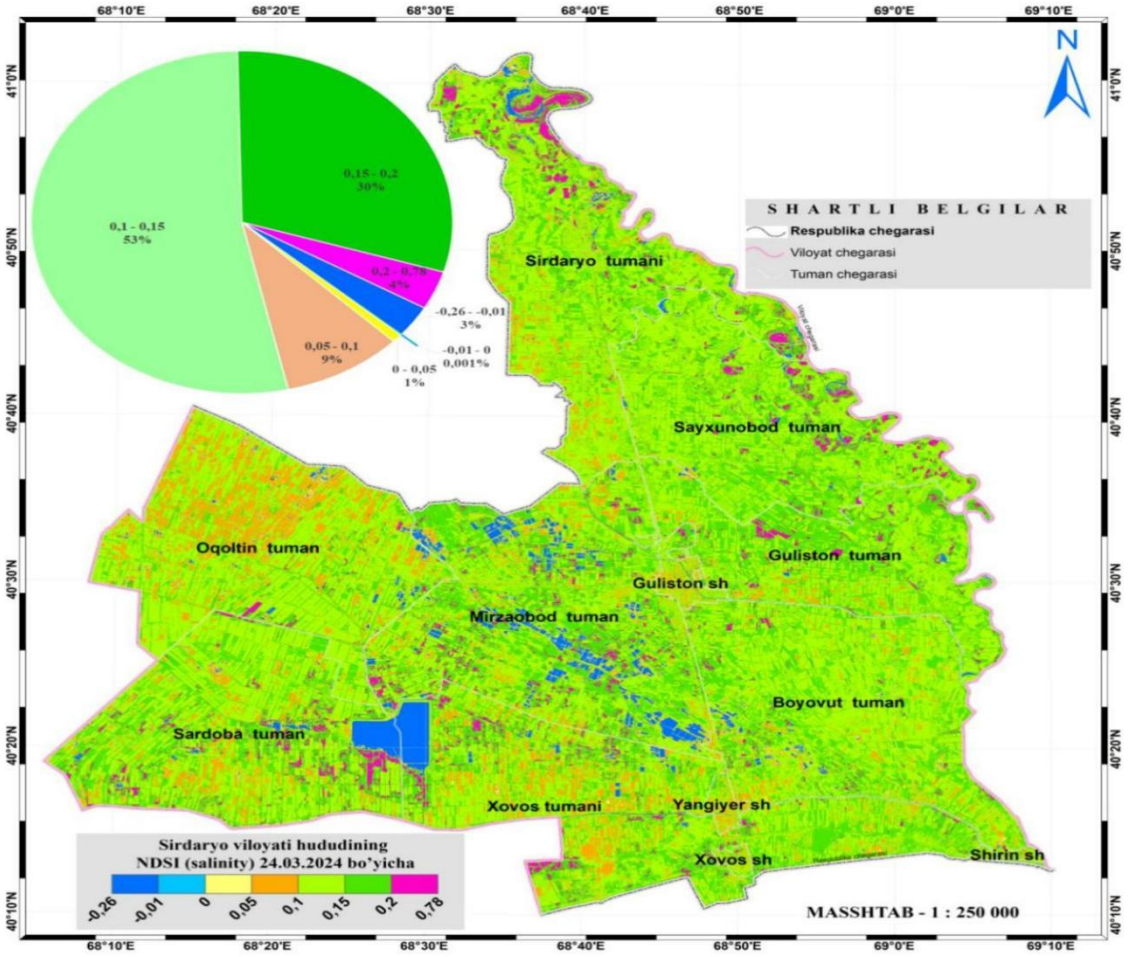
№	NDSI qiymati	Sho‘rlanish darajasi
1	< 0	Sho‘rlanish kuzatilmaydi
2	0 – 0.05	Juda past
3	0.05 – 0.1	Past
4	0.1 – 0.15	O‘rtacha
5	0.15 – 0.2	Yuqori
6	> 0.2	Juda yuqori

Hudud bo‘yicha statistik tahlil

Har ikki tasvirdagi NDSI qatlamlari piksel maydoni bo‘yicha qayta ishlanib, sho‘rlanishning hududiy taqsimlanish foizlari aniqlanib, sektoral diagrammalar shaklida vizual tahlil qilindi(1-2 rasm).

Natijalar

Sirdaryo viloyati hududining 24-mart 2024-yil holatiga oid xarita tuproq qatlamida vegetatsiya qatlami hali rivojlanmagan davrni aks ettiradi, shuning uchun sho‘rlangan maydonlar xaritada yaqqol ko‘rinadi. Diagramma tahliliga ko‘ra, hududining 53% ni 0.1–0.15 NDSI qiymatiga ega maydonlari yani o‘rtacha sho‘rlanish tashkil etadi, 30% ni 0.15–0.2 NDSI qiymatiga ega maydonlari yani yuqori sho‘rlanish tashkil etadi, 4% ni 0.2 NDSI qiymatiga ega maydonlari yani juda yuqori sho‘rlanish tashkil etdi qolgan 10 % ni sho‘rlanish darajasi past bo‘lgan maydonlardan iborat, ya’ni hududning nisbatan yaxshi meliorativ holatga ega qismlari mavjud. Biroq umumiy manzara sho‘rlangan tuproqlarning ustunligini ko‘rsatadi: umumiy hududning 87% qismi (o‘rtacha + yuqori + juda yuqori) sho‘rlangan(1-rasm).



1-rasm. Sirdaryo viloyati hududuning 24.03.2024 holati bo‘yicha sho‘rlanish xaritasi.

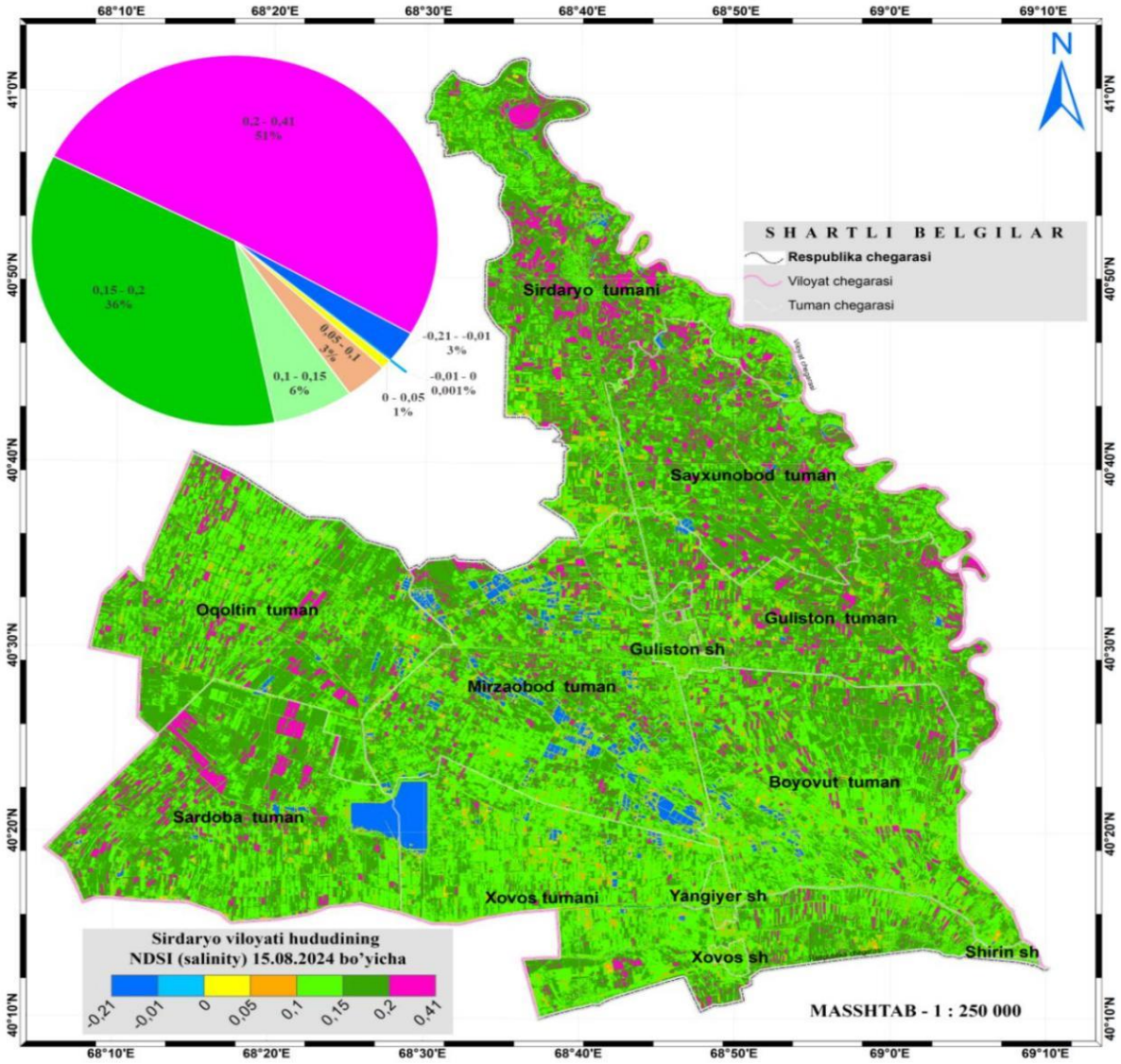
Shuningdek, diagrammadagi manfiy NDSI qiymatlariga ega maydonlar (−0.26 dan 0 gacha bo‘lgan 3.001%) asosan suv sathlari, nam tuproqlar yoki spektral refleksiyasi past bo‘lgan noaniq obyektlar bilan bog‘liq bo‘lib, ular sho‘rlanish bahosiga bevosita kirmaydi.

Umuman olganda, 24-martdagi natijalar vegetatsiya boshlanishi davrida sho‘rlangan maydonlarning strukturasini aniq aks ettiradi hamda sho‘rlanishning yuqori ulushi Sirdaryo viloyatida meliorativ holatning yomonlashganligini ko‘rsatadi.

3.2. Sirdaryo viloyati hududining 15-avgust 2024-yilga oid NDSI sho‘rlanish xaritasi yozning eng yuqori harorat davrini aks ettiradi. Bu vaqtda bug’lanish jarayonining kuchayishi, yer osti suvlarining kapillyar ko‘tarilishi va sug‘orish suvlarining notekis taqsimlanishi tufayli sho‘rlanish sezilarli darajada ortadi. Kosmik tasvirlarda ayniqsa ochiq dalalar, bo‘sh yotgan maydonlar va suv ta’minoti sust bo‘lgan hududlarda sho‘rlanish dog‘lari juda aniq kuzatiladi.

Diagramma natijalari sho‘rlanishning mart oyiga nisbatan ancha kuchayganini ko‘rsatadi. Diagramma tahliliga ko‘ra, hududining 51% ni 0.1–0.15 NDSI qiymatiga ega maydonlari yani o‘rtacha sho‘rlanish tashkil etadi, 36% ni 0.15–0.2 NDSI qiymatiga ega maydonlari yani yuqori sho‘rlanish tashkil etadi, 6 % ni 0.2 NDSI qiymatiga ega maydonlari yani juda yuqori sho‘rlanish tashkil etdi qolgan 7 % ni sho‘rlanish darajasi past bo‘lgan maydonlardan iborat, ya’ni hududning nisbatan yaxshi meliorativ holatga ega qismlari mavjud. Biroq umumiy manzara sho‘rlangan tuproqlarning ustunligini ko‘rsatadi: umumiy hududning 93% qismi (o‘rtacha + yuqori + juda yuqori) sho‘rlangan.Yuqori sho‘rlanish (0.15–0.2): keskin oshgan. Avgust oyidagi sho‘rlanish ko‘rsatkichlari Sirdaryo viloyatida sho‘rlanish jarayoni mavsumiy omillarga (harorat, bug’lanish, suv taqsimoti, yer osti suvlari sathi) juda kuchli bog‘liq ekanini tasdiqlaydi. Martdan avgustgacha bo‘lgan davrda sho‘rlangan maydonlarning umumiy ulushi kengayadi va yuqori toifa (0.15–0.2) hamda juda yuqori toifa (>0.2) hududlari ancha ko‘payadi(2-rasm).

Bu ma’lumotlar viloyatda meliorativ ishlarni rejalashtirishda, suv ta’minotini tartibga solishda va agrotexnik choralarni belgilashda muhim ahamiyatga ega.



2-rasm. Sirdaryo viloyati hududuning 15.08.2024 holati bo‘yicha sho‘rlanish xaritasi.

Olib borilgan tadqiqot natijalari shuni shuni ko’rsadiki, Sirdaryo viloyati hududida sho‘rlanishning mavsumiy xarakterga ega ekanini aniq ko‘rsatadi. Mart oyida qayd etilgan o‘rtacha sho‘rlanish (0.1–0.15) toifasi 53 %dan iborat bo‘lib, avgustga kelib 51 %ni tashkil etgan. Bu nisbatan kichik o‘zgarish ushbu diapazonning mavsumiy omillarga unchalik sezgir emasligini, hamda mazkur toifa viloyat sho‘rlanishining asosiy qismini tashkil qilishini ko‘rsatadi(1-jadval).

Eng sezilarli o‘sish yuqori sho‘rlanish (0.15–0.2) toifasida kuzatildi: mart oyidagi 30 % ulush avgust oyida 36 % ga yetdi. Bu 6 foizlik oshish yozgi mavsumda bug’lanish jarayonining kuchayishi, suv taqsimoti nomutanosibligi hamda yer osti suvlarining ko‘tarilishi tufayli sho‘rlanishning keskin ortishini tasdiqlaydi.

1-jadval
Sirdaryo viloyati tuproqlarida sho‘rlanishning mart–avgust (2024) oylaridagi dinamikasi.

Sho‘rlanish toifasi	Mart (24.03.2024)	Avgust (15.08.2024)	O‘zgarish (mart → avgust)
Past + juda past (≤0.1)	13 %	7 %	–6 % (kamaygan)
O‘rtacha (0.1–0.15)	53 %	51 %	–2 % (deyarli o‘zgarmagan)
Yuqori (0.15–0.2)	30 %	36 %	+6 % (sezilarli oshgan)
Juda yuqori (>0.2)	4 %	6 %	+2 % (oshgan)
Umumiy sho‘rlangan maydon (≥0.1)	87 %	93 %	+6 % (sho‘rlanish kengaygan)

Shuningdek, juda yuqori sho‘rlanish darajasi (>0.2) ham 4 % dan 6 % ga ko‘tarilgan. Bu holat tuproq resurslarining degradatsiyasi chuqurlashayotganini va ayrim hududlarda sho‘rlanish jarayonining keskinlashganini anglatadi.

Aksincha, past sho‘rlangan maydonlar (≤0.1) ulushi mart oyidagi 13 %dan avgustda 7 %ga qisqargan. Bu mavsumiy sharoitlar ta’sirida meliorativ holatning yomonlashganini ko‘rsatadi(1-jadval).

Muhokama

Tadqiqot natijalari Sirdaryo viloyatida tuproq sho‘rlanishining sezilarli mavsumiy farqlarga ega ekanini ko‘rsatadi. Mart oyida vegetatsiya boshlanishi davrida sho‘rlanish darajasi nisbatan past bo‘lsa, yoz oylarida yuqori harorat va bug‘lanish jarayonining kuchayishi natijasida NDSI qiymatlari sezilarli darajada oshadi. Shu bilan birga, suv taqsimoti notekis bo‘lgan hududlarda sho‘rlanish kuchaygan, bu esa hududiy suv resurslarini boshqarishning ahamiyatini ko‘rsatadi.

Ushbu natijalar ilgari olib borilgan tadqiqotlar bilan uyg‘un keladi. Ilmiy adabiyotlarda masofadan zondlash ma’lumotlari asosida sho‘rlanishning hududiy va mavsumiy o‘zgarishlarini aniqlash samaradorligini ta’kidlagan[1]. Sentinel-2 va Landsat 8 tasvirlari yordamida regional ko‘lamda sho‘rlanishni baholash mumkinligini ko‘rsatgan[2]. Shuningdek, sho‘rlanish jarayonining harorat, tuproq namligi va sug‘orish intensivligi bilan uzviy bog‘liqligini tasdiqlagan[2]. Natijalarimiz ushbu xulosalarni Sirdaryo viloyati sharoitida tasdiqlaydi.

Sho‘rlanish bilan kurashishda meliorativ va ekotexnik chora-tadbirlarning samaradorligi ham muhim hisoblanadi. Tadqiqotlar shuni ko‘rsatadiki, licorice (Glycyrrhiza spp.) kabi sho‘r bardoshli o‘simliklardan foydalanish tuproq sho‘rlanishini kamaytirish va yer unumdorligini tiklashda samarali vosita bo‘lishi mumkin [3,4]. Ayniqsa, Mirzachul hududida olib borilgan tadqiqotlar licorice ekish orqali sho‘rlangan tuproqlarda hosilni oshirish va iqtisodiy jihatdan foyda olish imkoniyatlarini ko‘rsatgan. Shu asosda Sirdaryo viloyatida ham ushbu o‘simliklardan foydalanish sho‘rlanishni kamaytirish va meliorativ chora-tadbirlarni qo‘llashda samarali bo‘lishi mumkin[4].

Shunday qilib, tadqiqot natijalari Sirdaryo viloyati tuproqlarida sho‘rlanish jarayonining mavsumiy va hududiy o‘zgarishlarini aniqlashga yordam beradi, masofadan zondlash texnologiyalarining monitoringdagi samaradorligini

tasdiqlaydi hamda sho‘rlanish bilan kurashish va suv resurslarini oqilona boshqarish bo‘yicha amaliy tavsiyalarni shakllantirish imkonini beradi.

Xulosa

Sentinel-2 tasvirlari asosida hisoblangan NDSI ko‘rsatkichi Sirdaryo viloyati hududida sho‘rlanishni kuzatishning samarali usuli ekanligi isbotlandi. 2024-yil mart va avgust oylari bo‘yicha taqqoslash natijalarida:

Yozgi davr sho‘rlanishning keskin oshganini ko‘rsatdi.

Sug‘orish tizimi sust hududlarda sho‘rlanish yuqori darajada jamlangan.

Masofadan zondlash uslublari sho‘rlanish monitoringini muntazam olib borish uchun qulay imkoniyat yaratadi.

Natijalar asosida sug‘orish rejimini optimallashtirish, meliorativ tadbirlarni kuchaytirish va sho‘rlanish monitoringini davriy ravishda olib borish taklif etiladi.

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Aziztayeva F. A.
associate professor
"economics and management" department
Jizzakh Polytechnic Institute

THE ROLE AND IMPORTANCE OF SMALL BUSINESS AND ENTREPRENEURSHIP IN THE ECONOMY OF UZBEKISTAN

Abstract. *This paper explains the problems within a comprehensive strategy to support the development of small business and entrepreneurship from the perspective of the institutional approach. It examines the role and significance of small business and entrepreneurship in Uzbekistan's economic development. In recent years, the government has implemented large-scale reforms aimed at supporting private enterprise, improving the business climate, and encouraging innovation. Small and medium-sized enterprises (SMEs) make a substantial contribution to GDP growth, job creation, regional development, and the diversification of the national economy. Entrepreneurship promotes innovation, strengthens market relations, and enhances Uzbekistan's competitiveness in international markets. The findings emphasize that small business remains a key driver of sustainable economic growth and socio-economic modernization in the country as of 2025.*

Key words: *small business, private business, infrastructure efficiency, employment, business support system, infrastructure factors.*

Despite intensified efforts to stimulate the private sector, the effectiveness of government actions to support small businesses does not always correspond to the resources allocated. The lack of coordinated measures tailored to regional needs has highlighted the necessity of forming an effective management system for small business support institutions. Solving this issue is essential for the successful development of the sector in 2025 and beyond.

To stimulate the formation and development of small business linkages, the following conceptual approaches must be considered:

- ensure not only conditions for the functioning of small enterprises based on various forms of ownership, but also their effective and sustainable development;
- establish a dynamic system that facilitates the emergence of new partnerships and interactions among its components;
- ensure the system corresponds to the level of small business development and meets the needs of business structures, taking into account their sectoral and functional specialization;
- guarantee accessibility for all business structures—regardless of region—regarding the cost and quality of services, awareness of opportunities, and support in solving key small business challenges (access to information networks, property and information support, human resources, financial and tax consulting, etc.).

Based on these principles, we have formulated a strategy for the management system of small business support institutions aimed at creating favorable conditions for the development of small enterprises in Uzbekistan. Using business process reengineering, we identify the conditions and factors that directly influence the successful development of small businesses.

The function of researching and updating the regulatory framework is performed by small business support infrastructure bodies. Management is based on current legislation, business support programs, and analytical methods. The result of this function is a developed strategy and an updated regulatory framework. At the first stage, accumulated information is used to formulate strategic directions. Regularly updated regulations guide all support activities. The strategy includes fundamental guidelines and intentions directed at small business development.

The function of coordinating and motivating small business support institutions includes creating a motivating model for their activities. At this stage, missing, weak, and duplicated functions are identified. These functions are then coordinated with consideration of horizontal and vertical integration, resulting in a more effective structure. Additionally, motivating factors must be introduced to encourage better performance of support institutions.

Innovation policy should be directed toward supporting the development of small businesses. The function of promoting innovation is carried out by entrepreneurship support bodies based on regulatory factors and criteria for evaluating investment projects. The outcome of this function is the creation of new goods, services, and technologies. Profit is generated through commercialization of innovative ideas.

The function of protecting the interests of entrepreneurs is performed by regional branches of the Chamber of Commerce and Industry. All support infrastructure bodies must be involved in implementing these functions. Considering this structure, priority support programs can be developed to create favorable conditions for small business development across regions of Uzbekistan in 2025.

Integration of Small Business and the Banking Sector

The main direction for integrating the interests of small business and the banking sector should be the strengthening of their bilateral relations. The proposed model requires rethinking the traditional ideology of the bank–enterprise relationship. These relationships must include clear principles and obligations at all points of intersection of economic interests.

Regional small business development does not occur spontaneously. Both successes and failures depend not only on external factors but also on specific decisions reflecting the strategy and tactics of change management chosen by regional leaders.

To bring the research closer to practical outcomes, regional development should be viewed in the context of the accompanying management process. Development is understood as a repeated cycle of four key stages:

1. Assessment of the economic situation;
2. Formulation of strategic goals and tasks for small business development;
3. Identification of factors limiting small business growth;
4. Development and implementation of strategies for sustainable SME development.

First Stage: Assessment

1. Analysis of available information on the economy and SME sector, using secondary data (state statistics, regulatory documents) and sociological research (surveys, qualitative methods). Evaluation should not only rely on the volume of data but also on critical interpretation of trends and system functionality. Current planning approaches often remain traditional, lacking deeper analysis. Comparative methods are necessary for accurately assessing regional SME conditions.

2. Determining priorities for SME development and support systems. This requires qualitative research such as interviews and focus group workshops. Discussions should involve three key stakeholders:

- government bodies,
- business community,
- non-profit and public sector organizations.

An important tool is constructing a "problem tree" of regional entrepreneurship challenges, followed by developing a "goal tree" to ensure reforms target real priorities.

Recent Developments: Key Measures from the 2023 Presidential Dialogue with Entrepreneurs

Although announced in 2023, these measures remain highly relevant and actively implemented during 2024–2025:

1. An integrated ecosystem for training entrepreneurs, supporting projects, financing, and finding markets.
2. Transformation of "Rural Construction Bank" into "Business Development Bank" with new financing mechanisms.
3. Co-financing scheme: if an entrepreneur invests 10%, the bank and the state each provide 45%.
4. Loans for 5–7 years on preferential terms, with credit lines of USD 150 million.
5. Reduced collateral requirements (by 50%) for entrepreneurs with clean credit and tax histories.
6. Introduction of the "mortgage of services" system in tourism, trade, and services.
7. USD 100 million to compensate logistics costs and USD 25 million for international certification and training.
8. Grants of 50 million soums for companies attracting major global brands.

Small business and entrepreneurship remain vital components of Uzbekistan's modern economy. They generate employment, stimulate innovation,

support regional development, and strengthen economic resilience. With ongoing government support and reforms in 2024–2025, the SME sector is expected to become an even stronger engine of economic growth.

Clear formulation of goals and measurable objectives, along with effective coordination of support institutions, will enhance SME efficiency. As a result, the number of small enterprises, employment levels, and business productivity will continue to grow, contributing to sustainable economic development across Uzbekistan.

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Bafoyeva L.
clinical resident
Asia International University
Murotov N.
head of the department of microbiology, virology and immunology
Bukhara State Medical Institute

COMPARATIVE ANALYSIS OF PCR AND RAPID DIAGNOSTIC TESTS IN THE DIAGNOSIS OF INFECTIOUS DISEASES

Abstract: *Accurate and timely diagnosis of infectious diseases is a cornerstone of effective clinical management, epidemiological control, and public health decision-making. Among the most widely used diagnostic approaches are polymerase chain reaction (PCR) and rapid diagnostic tests (RDTs), each offering distinct advantages and limitations. PCR-based methods are considered the gold standard for pathogen detection due to their high sensitivity and specificity, while rapid tests provide fast, point-of-care results that are critical in resource-limited and emergency settings. This article presents a comprehensive comparative analysis of PCR and rapid diagnostic tests in the diagnosis of infectious diseases, focusing on their methodological principles, diagnostic performance, clinical applicability, and limitations. The analysis highlights the complementary role of these methods and emphasizes the importance of selecting diagnostic strategies based on clinical context, infrastructure, and public health priorities.*

Keywords: *infectious diseases, PCR, rapid diagnostic tests, laboratory diagnosis, sensitivity, specificity.*

Introduction

Infectious diseases remain a major cause of morbidity and mortality worldwide despite significant advances in medical science and public health. The rapid spread of emerging and re-emerging pathogens, including viral, bacterial, and parasitic agents, underscores the critical importance of reliable laboratory diagnostics. Early and accurate identification of infectious agents enables timely initiation of appropriate therapy, reduces transmission, and supports effective outbreak control.

Laboratory diagnosis plays a central role in infectious disease management. Over recent decades, diagnostic technologies have evolved from conventional culture-based methods to advanced molecular and immunological techniques. Among these, polymerase chain reaction (PCR) and rapid diagnostic tests (RDTs) have become indispensable tools in clinical laboratories and point-of-care settings.

PCR-based diagnostics revolutionized infectious disease detection by enabling direct identification of pathogen-specific nucleic acids with high analytical sensitivity. This technique allows detection of low pathogen loads, making it particularly valuable in early stages of infection and in cases with

atypical clinical presentation. As a result, PCR has become the reference method for diagnosing many viral and bacterial infections.

In contrast, rapid diagnostic tests are designed to provide results within minutes, often without the need for complex laboratory infrastructure. These tests typically rely on immunochromatographic detection of antigens or antibodies and are widely used in emergency departments, outpatient clinics, and field settings. Their simplicity and speed make them especially useful in large-scale screening and outbreak situations.

Despite their widespread use, PCR and rapid tests differ significantly in terms of sensitivity, specificity, turnaround time, cost, and technical requirements. Understanding these differences is essential for optimizing diagnostic strategies in clinical and public health practice. Therefore, this article aims to provide a detailed comparative analysis of PCR and rapid diagnostic tests in the diagnosis of infectious diseases, with particular emphasis on their clinical and epidemiological implications.

Materials and Methods

This study is based on a narrative review and comparative analysis of international scientific literature, including clinical guidelines, systematic reviews, and original research articles published in peer-reviewed journals. Data were collected from authoritative sources such as **World Health Organization**, **Centers for Disease Control and Prevention**, and leading infectious disease journals.

The following aspects were analyzed and compared:

- Diagnostic principles of PCR and rapid tests
- Analytical sensitivity and specificity
- Turnaround time and operational requirements
- Clinical and epidemiological applications
- Limitations and sources of diagnostic error

The methods were evaluated in the context of different healthcare settings, including centralized laboratories and point-of-care environments.

Results

The comparative analysis demonstrated that PCR and rapid diagnostic tests serve distinct but complementary roles in infectious disease diagnostics.

PCR diagnostics showed superior sensitivity and specificity, enabling detection of minimal amounts of pathogen genetic material. PCR methods were particularly effective in early infection stages and in cases requiring definitive confirmation. However, PCR requires specialized equipment, trained personnel, and longer processing times.

Rapid diagnostic tests provided results within 10–30 minutes and required minimal technical expertise. These tests proved valuable for rapid screening, triage, and outbreak management. Nevertheless, their sensitivity was generally lower than PCR, particularly in cases with low pathogen load, leading to potential false-negative results.

The results indicate that PCR remains the gold standard for confirmatory diagnosis, while rapid tests are optimal for initial screening and point-of-care decision-making.

Discussion

The findings of this analysis highlight the critical importance of selecting appropriate diagnostic tools based on clinical context and available resources. PCR-based diagnostics offer unparalleled accuracy and are indispensable for definitive diagnosis, surveillance, and antimicrobial stewardship. Their ability to detect pathogen nucleic acids with high precision makes them essential in reference laboratories and specialized clinical centers.

However, the limitations of PCR, including cost, infrastructure requirements, and longer turnaround times, restrict its accessibility in low-resource settings. In such contexts, rapid diagnostic tests provide a practical alternative, enabling timely clinical decisions and early isolation measures. Although less sensitive, rapid tests significantly contribute to reducing diagnostic delays and improving patient flow.

The complementary use of PCR and rapid tests has emerged as an optimal diagnostic strategy. Rapid tests can be employed for initial screening, followed by PCR confirmation in negative or ambiguous cases. This tiered approach enhances diagnostic efficiency while balancing accuracy and feasibility.

Furthermore, recent advances in molecular diagnostics, such as isothermal amplification and multiplex PCR, aim to bridge the gap between accuracy and speed. Similarly, improvements in rapid test design continue to enhance sensitivity and specificity, expanding their clinical utility.

Overall, integrating PCR and rapid diagnostic tests into coherent diagnostic algorithms is essential for effective infectious disease management and preparedness for future outbreaks.

Conclusion

PCR and rapid diagnostic tests are fundamental components of modern infectious disease diagnostics. PCR remains the gold standard due to its high sensitivity and specificity, while rapid tests offer speed, simplicity, and accessibility. Their rational and complementary use enables timely diagnosis, effective patient management, and improved public health outcomes. Future innovations are expected to further enhance diagnostic accuracy and accessibility across diverse healthcare settings.

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Baltabayeva M. O.
o‘qituvchi
Farg‘ona Davlat Universiteti
https://orcid.org/0009-0002-5077-6926

EKOLOGIK (E) OMIL ESG ILMIY TA’MINOTI: SANOAT KORXONALARINING RAQOBATBARDOSHLIGINI OSHIRISH UCHUN ENERGIYA TEJAMKOR VA YASHIL TEXNOLOGIYALARNI JORIY ETISH

Annotatsiya. *Ushbu maqolada ESG (Environmental, Social, Governance) konsepsiyasining ekologik (E) omili sanoat korxonalarining raqobatbardoshligini oshirishdagi o‘rni ilmiy jihatdan tahlil qilinadi. Global iqtisodiyotda barqaror rivojlanish talablarining kuchayishi, energiya samaradorligini oshirish va chiqindilarni kamaytirish bo‘yicha xalqaro me’yorlarning qat’iylashuvi ishlab chiqarish korxonalarini yashil texnologiyalarni joriy etishga motivatsiya qilmoqda. Tadqiqotda energiya tejamkor uskunalar, qayta tiklanuvchi energiya manbalari, chiqindisiz texnologiyalar, karbon izi monitoringi hamda raqamlashtirilgan ekologik menejment tizimlarining afzalliklari va ularning raqobat ustunligi shakllanishiga ta’siri yoritilgan. Shuningdek, O‘zbekiston sanoatida “yashil iqtisodiyot” bo‘yicha amalga oshirilayotgan chora-tadbirlar, xalqaro tajriba va istiqboldagi rivojlanish yo‘nalishlari chuqur o‘rganilgan.*

Kalit so‘zlar: *ESG, ekologik omil, yashil iqtisodiyot, energiya tejamkor texnologiyalar, qayta tiklanuvchi energiya, raqobatbardoshlik, barqaror rivojlanish, sanoat korxonalari, karbon izi, chiqindisiz texnologiya.*

Baltabayeva M. O.
teacher
Fergana State University
https://orcid.org/0009-0002-5077-6926,

ENVIRONMENTAL (E) FACTOR ESG SCIENTIFIC SUPPLY: INTRODUCTION OF ENERGY EFFICIENT AND GREEN TECHNOLOGIES TO IMPROVE THE COMPETITIVENESS OF INDUSTRIAL ENTERPRISES

Annotation. *This article scientifically analyzes the role of the ESG (Environmental, Social, Governance) concept in improving the competitiveness of environmental (e) factor industrial enterprises. The strengthening of sustainable development requirements in the Global economy, the strengthening of international standards for energy efficiency and waste reduction are motivating production enterprises to introduce green technologies. The study highlights the advantages of energy-efficient equipment, renewable energy sources, waste-free technologies, carbon footprint monitoring, as well as digital environmental*

management systems and their impact on the formation of a competitive advantage. Also, the Uzbek industry has been deeply studied the measures implemented on the "green economy", the directions of international experience and development in the future.

Keywords: *ESG, environmental factor, green economy, energy efficient technologies, renewable energy, competitiveness, sustainable development, industrial enterprises, carbon footprint, waste-free technology.*

So‘nggi yillarda global iqtisodiy va ekologik muhitda yuz berayotgan o‘zgarishlar sanoat korxonalari uchun yangi mas’uliyat va majburiyatlarni yuzaga keltirmoqda. Xalqaro bozorlarda kompaniyalardan nafaqat yuqori sifatli mahsulot, balki ekologik xavfsizlik, uglerod chiqindilarini kamaytirish, energiya resurslaridan oqilona foydalanish va barqaror boshqaruv tamoyillariga amal qilish talab etilmoqda. ESG (Environmental, Social, Governance)[10] yondashuvi aynan shu talablarni o‘zida mujassam etgan bo‘lib, korxonaning ekologik samaradorligi, ijtimoiy mas’uliyati va boshqaruv sifatini kompleks baholash imkonini beradi.

ESGning ekologik (E) omili sanoat tarmoqlarida alohida ahamiyatga ega, chunki aynan ishlab chiqarish sektorida atmosferaga chiqindilar, issiqlik energiyasi isrofi, suv resurslarining ortiqcha sarfi va chiqindi hosil bo‘lishi eng yuqori darajada uchraydi. Shu bois korxonalar energiya tejamkor va yashil texnologiyalarni joriy etish orqali nafaqat ekologik talablarni bajaradi, balki ishlab chiqarish xarajatlarini kamaytiradi, raqobatbardoshligini oshiradi va xalqaro bozorlarda ishonchni mustahkamlaydi.

Ekologik omil korxonaning atrof-muhitga ta’sirini baholovchi ko‘rsatkichlar majmuasidan iborat bo‘lib, u quyidagilarni o‘z ichiga oladi: energiya iste’moli va energiya samaradorligi; chiqindilar hajmi va ularni qayta ishlash darajasi; zararli gazlar, xususan CO_2 emissiyasi; suvdan foydalanish va suvni tejash texnologiyalari va qayta tiklanuvchi energiyadan foydalanish va ishlab chiqarish jarayonlarining ekologik xavfsizligi.

Mazkur ko‘rsatkichlar korxonaning ekologik barqarorlik darajasini belgilab beradi. Jahon amaliyoti shuni ko‘rsatadiki, E omili bo‘yicha yuqori natija ko‘rsatgan kompaniyalar investorlardan ko‘proq ishonch qozonadi, kredit reytinglari oshadi va xalqaro bozorlarda ularga keng imkoniyatlar yaratiladi.

Sanoat korxonalarida energiyani tejaydigan texnologiyalarni joriy etish bugungi kunda nafaqat resurslarni oqilona boshqarish, balki korxonaning raqobatbardoshligini oshirishning eng muhim omillaridan biri sifatida qaralmoqda. Energiya samaradorligini oshirishga qaratilgan texnologik modernizatsiya dastlab xarajatlarni qisqartiradi, keyinchalik esa ishlab chiqarish jarayonlarining umumiy unumdorligini oshirish orqali korxona barqaror rivojlanishiga xizmat qiladi. Masalan, elektr energiyasini kam sarflaydigan uskunalardan foydalanish natijasida

[10] Iqtisodiyot fanlari nomzodi E.V. Viktorov. BARQAROR RIVOJLANISH: QIYINCHILIKLAR VA IMKONIYATLAR . https://unecon.ru/ . SANKT-PETERBURG DAVLAT IQTISODIYOT UNIVERSITETI. — 2020. Kirish sanasi: 2021-yil 4-aprel. Arxivlangan sana: 2022-yil 1-mart.

iste’mol darajasi o‘rtacha 20–40 foizgacha kamayadi[11], issiqlik yo‘qotishlarining oldi olinadi va ishlab chiqarish jarayonlari ancha tejamkor ishlay boshlaydi. Buning natijasida korxonalar mahsulot tannarxini pasaytirish imkoniga ega bo‘lib, bozordagi raqobat ustunligini mustahkamlaydi. Eng oddiy misol sifatida LED yoritish tizimlari, invertor dvigatellar, avtomatlashtirilgan issiqlik va energiya nazorati kabi texnologiyalarni qo‘llashni keltirish mumkin. Bunday uskunalar energiya sarfini sezilarli kamaytiradi, xizmat ko‘rsatish xarajatlarini pasaytiradi va ishlab chiqarish samaradorligini oshiradi[12].

Yashil texnologiyalarni ishlab chiqarish jarayoniga tatbiq etish esa raqobatbardoshlikning yangi manbai sifatida shakllanmoqda. Quyosh panellari, shamol turbinalari yoki biogaz qurilmalaridan foydalanish korxonalarni energiya mustaqilligiga olib keladi, energiya narxining keskin o‘zgarishiga bog‘liqlikni kamaytiradi hamda karbon izini sezilarli darajada pasaytiradi. O‘zbekistonda sanoat zonalarida quyosh elektr stansiyalarining barpo etilishi korxonalar uchun iqtisodiy hamda ekologik barqarorlikni ta’minlovchi samarali yechim sifatida shakllanib bormoqda.[13]

Shuningdek, chiqindisiz ishlab chiqarish tizimlarining joriy etilishi korxonalarga chiqindilarni ikkilamchi xomashyo sifatida qayta ishlash, resurslardan maksimal foydalanish va qo‘shimcha daromad manbayini yaratish imkonini bermoqda. Raqamli monitoring tizimlari yordamida korxonalar energiya sarfi va emissiya darajasini real vaqt rejimida kuzatib boradi, bu esa ESG talablariga mos ravishda shaffof hisobot yuritishni osonlashtiradi. Ochiq va ishonchli ekologik ma’lumotlar esa investorlar uchun muhim bo‘lgan omillardan biridir.

So‘nggi yillarda O‘zbekiston “Yashil iqtisodiyot” strategiyasi asosida sanoat korxonalarini ekologik va energiya samarador texnologiyalarga bosqichma-bosqich o‘tkazishni davlat darajasida qo‘llab-quvvatlamoqda. Xususan, energiya auditini majburiy joriy etish, ishlab chiqarish quvvatlarini energiya samarador uskunalar bilan modernizatsiya qilish, past karbon iqtisodiyotiga o‘tish bo‘yicha milliy maqsadlar belgilanishi va chiqindilarni qayta ishlash hajmini oshirish kabi chora-tadbirlar amalga oshirilmoqda. Bu jarayon sanoat tarmoqlarining xalqaro ekologik standartlarga moslashuvini tezlashtirmoqda va mahalliy korxonalar uchun eksport imkoniyatlarini kengaytirmoqda.

Xalqaro tajriba shuni ko‘rsatadiki, Yevropa Ittifoqi, AQSh, Yaponiya va Janubiy Koreya kabi rivojlangan davlatlar energiya tejamkor va yashil texnologiyalarni keng qo‘llash orqali energiya sarfini o‘rtacha 30–50 foizgacha

[11] Boranbaeva Zinaxan Marat Qizi (2024). KORXONALARNINING ELEKTR TA'MINOTI SAMARADORLIGINI OSHIRISH. Eurasian Journal of Academic Research, 4 (6-1), 83-86. doi: 10.5281/zenodo.11526534

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kamaytirgan, ishlab chiqarish samaradorligini sezilarli oshirgan va global bozorda ekologik mas'uliyatli brend sifatida mustahkam mavqega ega bo'lgan[14].

Bu tajribalar O'zbekiston korxonalari uchun ham muhim saboqlar beradi: energiya tejamkor texnologiyalarga o'tish uzoq muddatda katta iqtisodiy samaraga ega, ekologik sertifikatlar eksportni yengillashtiradi, ESG hisobotlarining yuritilishi esa korxonani investorlar uchun jozibador qiladi.

Shuni ham aytish joizki, ishlab chiqaruvchilar, odatda, eng yuqori foyda keltiradigan yo'nalishlarga ustuvorlik berishi tabiiy holat bo'lib, bu esa iqtisodiyotning barcha tarmoqlarini bir xil darajada rivojlantirish imkonini bermaydi. Masalan, qurilish, kimyo sanoati yoki boshqa yirik ishlab chiqarish jarayonlarini cheksiz kengaytirish iqtisodiy va ekologik jihatdan ma'lum xavflarni yuzaga keltiradi. Shu sababli, bugungi rivojlanish bosqichida davlatning vazifasi tadbirkorlarga "yashil iqtisodiyot"ga yo'naltirilgan investitsiyalarning real, uzoq muddatli samaradorligini tushuntirish va ularni ushbu yo'nalishda faol bo'lishga rag'batlantirishdan iborat.[15]

Shuni alohida qayd etish kerakki, "yashil iqtisodiyot" doirasida ishlab chiqarilgan mahalliy mahsulotlarning eksport salohiyati yildan yilga ortib bormoqda. Global talabning o'zgarishi, ekologik standartlarning kuchayishi va ekologik toza mahsulotlarga talabning oshishi O'zbekiston tadbirkorlari uchun yangi imkoniyatlar ochmoqda. Shu munosabat bilan, hukumat xorijiy bozorlarning talablari, iste'molchi ehtiyojlari va ekologik standartlari bo'yicha chuqur tadqiqotlar olib borib, mazkur ma'lumotlarni mahalliy ishlab chiqaruvchilarga yetkazish orqali ularni qo'llab-quvvatlamoqda. Bundan tashqari, xalqaro miqyosda tan olingan sertifikatlashtirish tizimini joriy etish va kengaytirish eksport salohiyatini yanada oshirishga xizmat qilmoqda. Bularning barchasi tashqi bozorlarga kirish jarayonini yengillashtirib, "yashil iqtisodiyot" asosidagi tadbirkorlik faoliyatining kengayishiga ijobiy ta'sir ko'rsatmoqda[16].

O'zbekiston sanoat sohasi mamlakatda yoqilg'i-energiya resurslarining asosiy iste'molchisi hisoblanadi. Kimyo sanoati va tog'-kon sanoatining yirik ulushi tufayli, sanoat tarmog'i umumiy elektr energiyasining qariyb chorak qismini sarflaydi, shuningdek, tabiiy gazning eng katta iste'molchilari sirasiga kiradi. Issiqxona gazlari emissiyasi bo'yicha ham sanoat yetakchi o'rinda turib, metallurgiya, sement ishlab chiqarish, kimyo va to'qimachilik tarmoqlari asosiy manbalar sifatida qayd etiladi. Ushbu tarmoqlarning jadal rivojlanib borayotgani fonida iqlimga salbiy ta'sir ko'rsatuvchi emissiyalar miqdori ortib borishi tabiiy holatdir.

Mazkur jarayonlar ekologik muammolarni chuqurlashtirib borayotgani sababli, iqtisodiyotda yangi yondashuv zarurati yuzaga chiqmoqda. Bunday

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[14] Eshmurodov Xurshidbek Farhod o'g'li. (2025). XALQARO TAJRIBA: YEVROPA ITTIFOQI, JANUBIY KOREYA VA XITOYDA YASHIL SIYOSAT. Ta'limda Raqamli Texnologiyalarni Tadbiq Etishning Zamonaviy Tendensiyalari Va Rivojlanish Omillari , 45 (1), 62-65. https://scientific-jl.com/trt/article/view/24663

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[16] Khan, S., Lee, J. ESG Integration and Industrial Competitiveness in the Asian Region. — Sustainability Journal, 2020. — Vol. 12(14). — 1–19 p.

sharoitda sanoatni “yashillashtirish”, ya’ni ishlab chiqarish jarayonlariga energiya tejamkor, past emissiyali va ekologik xavfsiz texnologiyalarni joriy etish eng maqbul yechim sifatida qaraladi. Yashil iqtisodiyotga bosqichma-bosqich o‘tish nafaqat ekologik barqarorlikni ta’minlaydi, balki sanoatning uzoq muddatli raqobatbardoshligini oshiradi, energiya xarajatlarini kamaytiradi va xalqaro bozorlarga chiqish imkoniyatlarini kengaytiradi.

Yashil energiya zamonaviy barqaror rivojlanish konsepsiyasining eng muhim tayanchlaridan biri bo‘lib, u insoniyatning ekologik barqarorligini saqlash, tabiiy resurslardan oqilona foydalanish va iqtisodiy o‘sishni qo‘llab-quvvatlashda beqiyos o‘rin tutadi. Qayta tiklanadigan energiya turlarini amaliyotga keng joriy etish orqali nafaqat ekotizimlarga zarar yetkazilishi kamayadi, balki global miqyosdagi iqlim o‘zgarishlarini sekinlashtirish, issiqxona gazlari chiqindilarini qisqartirish va kelajak avlodlar uchun tabiiy resurslarni tejash imkoniyati yaratiladi.

Bugungi kunda ekologik toza texnologiyalarni rivojlantirish, energiya iste’molini optimallashtirish hamda chiqindisiz ishlab chiqarish tamoyillariga o‘tish jahonda asosiy ustuvor vazifalardan biridir. Aholi sonining ortishi, sanoatning kengayishi va energiyaga bo‘lgan talabning oshishi yashil energiya manbalariga bo‘lgan ehtiyojni yanada kuchaytirmoqda. Shu sababli, qayta tiklanadigan energiya infratuzilmasini rivojlantirish barqaror kelajakni shakllantirishning ajralmas bo‘lagiga aylandi.

Bundan tashqari, yashil energiya iqtisodiy va ijtimoiy farovonlikni ham qo‘llab-quvvatlaydi. Masalan, qayta tiklanadigan energiya loyihalari qishloq hududlarida elektr ta’minotini yaxshilab, yangi ish o‘rinlari yaratadi, hududning infratuzilmasini rivojlantiradi va aholining hayot sifatini oshiradi.[17]

Xulosa qilib aytganda, ekologik (E) omil ESG konsepsiyasining markaziy qismidir va sanoat korxonalarining raqobatbardoshligini oshirishda hal qiluvchi ahamiyatga ega. Energiya tejamkor va yashil texnologiyalarni joriy etish korxona uchun quyidagi asosiy natijalarga olib keladi: ishlab chiqarish xarajatlari kamayadi, mahsulot tannarxi pasayadi, ekologik xavfsizlik oshadi, brend imiji yaxshilanadi va korxona xalqaro bozorlarda raqobatbardosh bo‘ladi.

Shu bois sanoat korxonalari ekologik boshqaruvni raqamlashtirish, qayta tiklanuvchi energiyaga o‘tish, chiqindisiz texnologiyalarni joriy etish va karbon izi monitoringini kuchaytirishga ustuvor ahamiyat qaratishi lozim. O‘zbekiston sanoati uchun ham yashil texnologiyalarni keng joriy etish – barqaror rivojlanishning eng muhim sharti hisoblanadi.

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Bekmukhamedova B. U.
senior lecturer
Gulistan State University

THE ROLE OF MARKETING IN THE PROMOTION OF LOCAL PRODUCTS

Abstract. *This article examines the importance of marketing in the effective promotion of local products in the market. The article analyzes the main marketing tools, advertising strategies, brand creation, and effective customer relations. The article also provides recommendations on increasing the competitiveness of local products and increasing the role of marketing in attracting consumer attention. The results of the study show that the correct application of a marketing strategy helps local manufacturers increase their sales and strengthen their position in the market.*

Keywords: *local manufacturers, marketing, product promotion, brand creation, advertising strategy, consumer attention, competitivenessç*

Introduction

The role of marketing in promoting local products is increasingly important today. In order for local brands to be competitive and attract the attention of consumers, they need to develop effective marketing strategies, not only by delivering quality products. Marketing allows you to determine the position of the product in the market, understand consumer needs, and effectively promote the product. Therefore, the role of marketing in the development of local manufacturers is of particular importance.

Literature review

As a result of the analysis of the literature, it is clear that the role of marketing in business development has been widely studied. Kotler and Keller (2016) emphasize that the main task of marketing is to successfully launch a product on the market and attract consumer attention. At the same time, in the context of local manufacturers, Abdullaev (2020) and Islamov (2021) studied the effectiveness of tools such as social media, advertising, and direct communication with the customer in promoting local brands. Research shows that marketing strategies have a significant impact on strengthening the manufacturer's position in the market and increasing sales.

Research methodology

This study was conducted on the basis of a mixed-method approach aimed at obtaining qualitative and quantitative data. The main data used are the results of surveys and interviews with local manufacturers and consumers. At the same time, statistical data and previous scientific studies on the topic are analyzed. The main purpose of the study is to determine the impact of marketing on the promotion of local manufacturers' products and to identify effective marketing tools. The results

obtained are intended to provide recommendations that will be useful for manufacturers and marketing specialists.

Analysis and results

The results of the study show that the level of use of marketing tools varies among local manufacturers. Based on the results of surveys and interviews, it was found that 65% of respondents noted that they do not carry out marketing activities sufficiently. At the same time, it was observed that sales volumes and customer satisfaction increased significantly when manufacturers who pay attention to product quality actively used marketing tools. Social media and advertising tools stood out as the most effective marketing channels, as they allow for direct communication with consumers. The study also showed that price, quality and innovation factors are equally important in promoting a brand.

Table 1
Analytical data on the effectiveness of marketing activities at local manufacturers

Indicator	Unit of measurement	Result	Analysis
Level of effective use of marketing activities	% (survey result)	35% active, 65% not enough	Most local producers do not fully implement marketing activities.
Social media channel effectiveness	1–5 points (consumer opinion)	4.3 points	Social media marketing is proving to be the most effective way to promote products.
Advertising effectiveness	1–5 points	4.0 points	Traditional advertising media plays an important role in promoting a product.
The impact of customer communication	% satisfaction level	78% of customers are satisfied	Direct communication builds trust in the product and increases the number of loyal customers.
Sales volume growth (before and after marketing)	% growth	15% increase	Implementing marketing strategies has significantly increased sales.
Brand awareness level	% query result	60% known	Marketing campaigns have had a positive impact on the market recognition of local brands.

The results of the study show that only 35% of local manufacturers are implementing marketing activities effectively and systematically, while the remaining 65% are not sufficiently active in this regard. This situation may be due to a lack of knowledge and resources in the field of marketing. At the same time, social media channels showed the highest efficiency in promoting products, which were highly rated by consumers with a score of 4.3. Traditional advertising media also played an important role, their effectiveness was rated with a score of 4.0. Direct communication with customers increases confidence in the product and

ensures a 78% customer satisfaction level. This allows local manufacturers to form a long-term customer base. The fact that sales volumes increased by an average of 15% as a result of the implementation of marketing strategies is also a significant achievement.

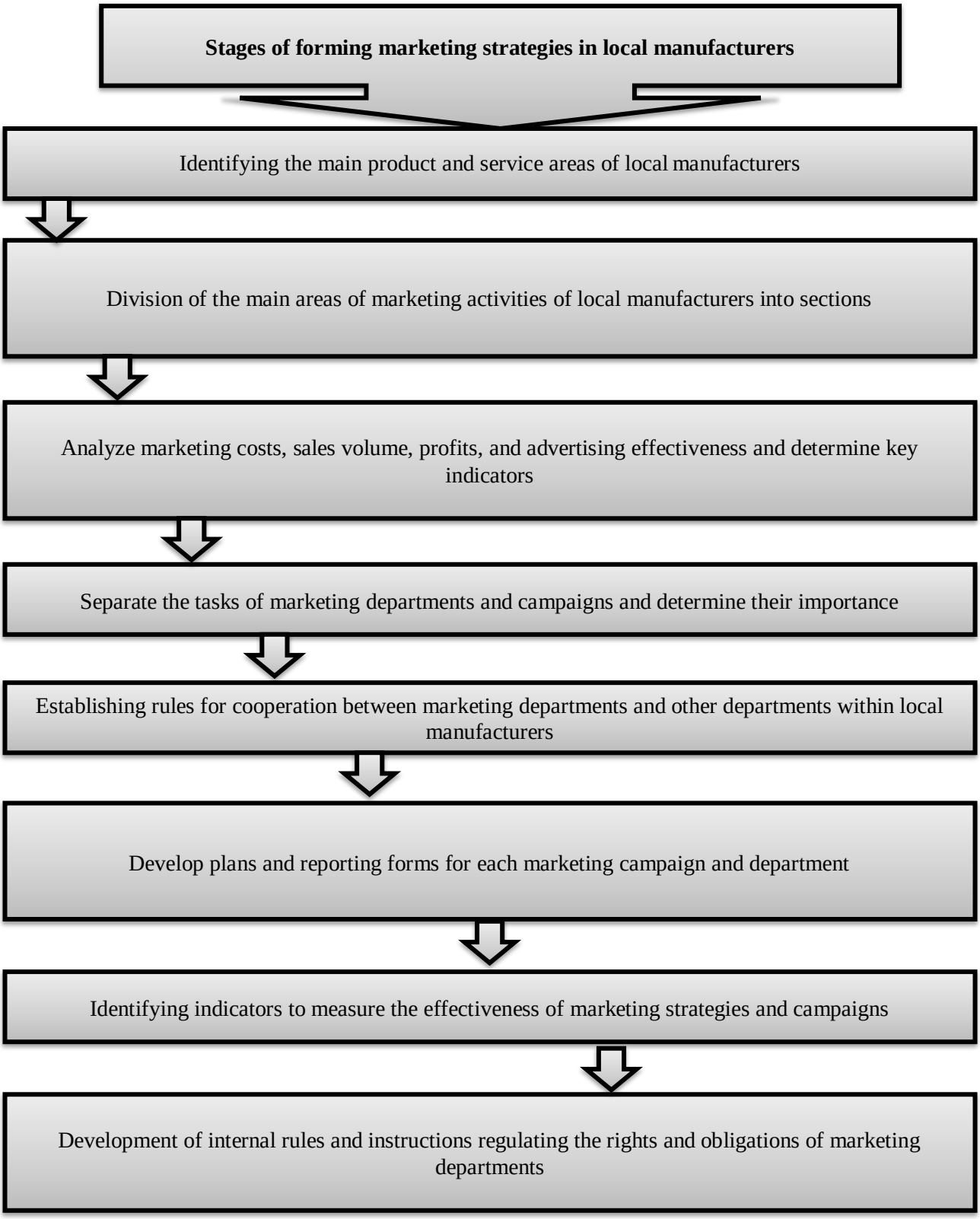


Figure 1. Stages of organizing marketing activities of local producers

In addition, marketing campaigns had a positive impact on the market recognition of local brands, increasing the level of recognition of products by 60% of consumers. In general, it was found that the effective use of marketing is an important factor in strengthening the market position of local manufacturers, increasing sales volumes and ensuring customer loyalty. Therefore, local manufacturers are advised to make full use of marketing tools and actively implement modern communication channels.

The process of forming marketing strategies in domestic manufacturers consists of several stages, which are aimed at increasing the effectiveness of marketing activities. First of all, manufacturers need to determine their main product and service areas. At this stage, clearly defining which products or services the company will launch on the market allows for the effective allocation of marketing resources.

The next stage is to divide the main areas of marketing activities into departments. This process serves to determine the necessary indicators for analyzing the costs, sales volume, profit and advertising effectiveness of marketing activities. The results of the study showed that the costs of product promotion and the effectiveness of advertising are important for the success of marketing, especially the high efficiency of social media channels (4.3 points) and the importance of traditional advertising (4.0 points) are a clear example of this.

Based on these analyses, the tasks of marketing departments and campaigns are clearly separated and their importance is determined. Also, the rules of cooperation between marketing departments and other departments within domestic manufacturers are established. This stage helps to build trust in the brand through customer communication (78% satisfaction rate).

Developing a plan and reporting forms for each marketing campaign and department ensures the systematization and control of marketing activities. This is reflected in results such as an increase in sales (15%) and an increase in brand recognition (60%).

The final stage is to define specific indicators to measure the effectiveness of marketing strategies and campaigns, and to develop internal rules and guidelines that govern the rights and obligations of marketing departments. This process serves to ensure continuous improvement and competitiveness of marketing activities.

Conclusions and recommendations

The role of marketing in promoting the products of local manufacturers is of great importance. In this regard, the development and implementation of effective marketing strategies is a priority. This will help products become more recognizable in the market, increase sales volumes, and strengthen the brand image. By using modern digital marketing tools, including social networks, websites, and e-mail marketing, manufacturers can effectively reach a young and technology-savvy audience. This will lead to increased market demand for products and an expanded audience base.

Table 2

Marketing proposals and expected results in promoting the products of local manufacturers

Offer	Expected result
Develop and implement effective marketing strategies for local producers.	Greater recognition of products in the market, increased sales volume, and strengthened brand image.
Extensive use of digital marketing tools (social media, website, email marketing).	Expanding the product market, reaching a younger and technology-savvy audience.
Organizing advertising and PR campaigns that highlight the benefits of local products.	Increased trust and interest among buyers, increased demand for the product.
Encourage local manufacturers to actively participate in exhibitions, fairs, and events.	The opportunity to present products to real customers, develop business relationships and increase sales.
Introducing and certifying quality and competitiveness standards for local products.	Buyers' confidence in the product will increase, and export potential will increase.

Also, organizing advertising and PR campaigns that emphasize the advantages of products will help build trust among buyers and increase interest in the product. Encouraging local manufacturers to actively participate in exhibitions, fairs, and various events will help develop relationships with real customers and increase sales volumes.

Finally, the introduction and certification of quality and competitiveness standards for products will increase buyer confidence and enhance the export potential of products. In this way, a proper and systematic approach to marketing allows local producers to market their products effectively and be competitive.

Conclusion

Marketing is an important tool for effectively introducing products of local manufacturers to the market. Research and analysis show that properly developed marketing strategies, the use of digital tools, advertising and PR campaigns, and active participation in exhibitions and fairs increase product recognition, strengthen customer trust, and increase sales. Also, the introduction and certification of quality standards not only increase confidence in the product, but also strengthen the export potential of local manufacturers. Thus, a systematic and targeted approach to marketing allows for the successful introduction of products to the market, brand development, and competitiveness. In general, marketing for local manufacturers is not only a means of advertising products, but also a strategic tool for business development, strengthening relationships with customers, and increasing their position in the market.

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Bektoshev Q. X.
katta o‘qituvchisi
“raqamli va fundamental fanlar kafedrasi”
Toshkent amaliy fanlar universiteti
ORCID: https://orcid.org/0009-0000-2869-4188
Xurramov Sh. I.
katta o‘qituvchisi
“raqamli va fundamental fanlar kafedrasi”
Toshkent amaliy fanlar universiteti
ORCID: https://orcid.org/0009-0007-3875-5723

ANIQ INTEGRALLARNI HISOBLASH

Annotatsiya: *Maqola olimpiada tanlovlaridagi aniq integrallarni hisoblashning umumiy va xususiy hollariga qaratilgan. Maqolada toq funksiyalar orqali hisoblash, integralni integrallar yig’indisiga ajratish bilan, integralni yangi o’zgaruvchi kiritish usullari bilan hisoblash ko‘rsatilgan.*

Tayanch so’zlar: *Aniq integral, Nyuton-Leybnis formulasi, toq funksiya, differensial, topmoq, chegaralangan, ko’phad, ayniyat, umumiy ko’paytuvchi, argument, yechim, bajarmoq, almashtirmoq.*

Bektoshev K. H.
senior lecturer
department of “digital and fundamental sciences”
Tashkent University of Applied Sciences
ORCID: https://orcid.org/0009-0000-2869-4188
Khurramov Sh. I.
senior lecturer
department of “digital and fundamental sciences”
Tashkent University of Applied Sciences
ORCID: https://orcid.org/0009-0007-3875-5723

CALCULATION OF DEFINITE INTEGRALS

Annotation: *The article is devoted to the general and specific cases of calculating definite integrals in olympiad competitions. The article demonstrates calculation through odd functions, by breaking the integral into a sum of integrals, and by using methods involving the introduction of a new variable.*

Keywords: *Definite integral, Newton-Leibniz formula, odd function, differential, to find, bounded, multiple, reciprocal, common factor, argument, solution, to perform, to substitute.*

Kirish

Matematika, fizika, mexanika va boshqa fanlarda tadqiqotlar olib borishning eng yaxshi vositalaridan biri aniq integraldir. Egri chiziqlar bilan chegaralangan yuzalarni, yoylarning uzunliklarini, hajmlarni, ishni, tezlikni, yo'lni, inersiya momentlarini hisoblash aniq integralni hisoblashga keltiriladi.

Matematika fan olimpiadalarida berilgan ba'zi aniq integrallarni funksiya xossalaridan foydalangan holda hisoblash mumkin.

Aniq integral ostidagi funksiya, toq funksiya bo'lsa, u holda

$$\int_{-a}^{a} f(x)dx = 0, \quad f(-x) = -f(x), \quad (1)$$

tenglikdan foydalanamiz.

1-misol. $\int_{-1}^{1} x^2 \ln(x+\sqrt{x^2+1})dx$ aniq integralni hisoblang.

Yechish. Bu integral ostidagi funksiya toq funksiya ekanligini ko'rsatib hisoblaymiz.

$$f(-x) = (-x)^2 \ln(-x+\sqrt{(-x)^2+1}) = x^2 \ln\left(\frac{(\sqrt{x^2+1}-x)(\sqrt{x^2+1}+x)}{\sqrt{x^2+1}+x}\right) =$$

$$= x^2 \ln\left(\frac{x^2+1-x^2}{\sqrt{x^2+1}+x}\right) = x^2 \ln\left(\frac{1}{\sqrt{x^2+1}+x}\right) = -x^2 \ln(x+\sqrt{x^2+1}) = -f(x)$$

Integral ostidagi funksiyaning toqligidan, $\int_{-1}^{1} x^2 \ln(x+\sqrt{x^2+1})dx = 0,$ ga teng.

2-misol. $\int_{0}^{2008} x\cdot(x-4)\cdot(x-8)\cdot\ldots\cdot(x-2008)\cdot dx$ integralni hisoblang.

Yechish. Aniq integralni hisoblash uchun, quyidagicha belgilash kiritib, yuqoridagi (1) dan foydalanib, toq funksiyaga keltiramiz.

$$\int_{0}^{2008} x\cdot(x-4)\cdot(x-8)\cdot\ldots\cdot(x-2008)\cdot dy = \left|\begin{array}{l} y = x-1004 \\ dx = dy \\ -1004 \le y \le 1004 \end{array}\right| =$$

$$= \int_{-1004}^{1004} (y+1004)\cdot(y+1000)\cdot\ldots\cdot(y+4)\cdot y\cdot(y-4)\cdot\ldots\cdot(y-1000)\cdot(y-1004)\cdot dy =$$

$$= \int_{-1004}^{1004} (y^2-1004^2)\cdot(y^2-1000^2)\cdot\ldots\cdot(y^2-4^2)\cdot y\cdot dy = 0$$

Integralning qiymati nolga teng ekan.

3-misol. $\int_{-a}^{a} \frac{1}{1+\varphi(x)+\sqrt{1+\varphi^2(x)}}dx,$ integralni hisoblang, bu yerda $\varphi(-x)=-\varphi(x)$ ga teng.

Yechish. Aniq integralni hisoblashda berilgan shartlardan foydalanib hisoblaymiz.

$$\int_{-a}^{a} \frac{1}{1+\varphi(x)+\sqrt{1+\varphi^2(x)}}dx = \int_{-a}^{0} \frac{1}{1+\varphi(x)+\sqrt{1+\varphi^2(x)}}dx + \int_{0}^{a} \frac{1}{1+\varphi(x)+\sqrt{1+\varphi^2(x)}}dx =$$

$$= \int_{0}^{a} \frac{1}{1-\varphi(x)+\sqrt{1+\varphi^2(x)}}dx + \int_{0}^{a} \frac{1}{1+\varphi(x)+\sqrt{1+\varphi^2(x)}}dx =$$

$$= \int_{0}^{a} \left(\frac{1}{1+\sqrt{1+\varphi^2(x)}-\varphi(x)} + \frac{1}{1+\sqrt{1+\varphi^2(x)}+\varphi(x)} \right) dx =$$

$$= \int_{0}^{a} \left(\frac{1+\sqrt{1+\varphi^2(x)}+\varphi(x)+1+\sqrt{1+\varphi^2(x)}-\varphi(x)}{\left(1+\sqrt{1+\varphi^2(x)}\right)^2-\varphi^2(x)} \right) dx = \int_{0}^{a} \frac{2+2\sqrt{1+\varphi^2(x)}}{2+2\sqrt{1+\varphi^2(x)}}dx = \int_{0}^{a} 1dx = a.$$

4-misol. $\int_{-1}^{1} \frac{1}{1+x^3+\sqrt{1+x^6}}dx$ integralni hisoblang.

Yechish. Bu yerda, birinchi qo'shiluvchida $x=-x$ deb olib ikkinchi integral o'zini yozib, quyidagicha hisoblaymiz.

$$\int_{-1}^{1}\frac{1}{1+x^3+\sqrt{1+x^6}}dx=\int_{-1}^{0}\frac{1}{1+x^3+\sqrt{1+x^6}}dx+\int_{0}^{1}\frac{1}{1+x^3+\sqrt{1+x^6}}dx=$$

$$=\int_{0}^{1}\frac{1}{1-x^3+\sqrt{1+x^6}}dx+\int_{0}^{1}\frac{1}{1+x^3+\sqrt{1+x^6}}dx=$$

$$=\int_{0}^{1}\left(\frac{1}{1-x^3+\sqrt{1+x^6}}+\frac{1}{1+x^3+\sqrt{1+x^6}}\right)dx=$$

$$=\int_{0}^{1}\left(\frac{1+x^3+\sqrt{1+x^6}+1-x^3+\sqrt{1+x^6}}{\left(1+\sqrt{1+x^6}\right)^2-x^6}\right)dx=\int_{0}^{1}\frac{2+2\sqrt{1+x^6}}{2+2\sqrt{1+x^6}}dx=\int_{0}^{1}1dx=1.$$

Ma'lumki, $\frac{1}{1+a}+\frac{1}{1+a^{-1}}=\frac{1}{1+a}+\frac{a}{1+a}=1$ tenglikdan ham foydalanib integralni oson hisoblash mumkin.

5-misol. $\int_{-1}^{1}\frac{1}{(e^x+1)(1+x^2)}dx$ integralni hisoblang.

Yechish. Yuqoridagi $\frac{1}{1+a}+\frac{1}{1+a^{-1}}=1$ ayniyatdan, foydalanib, integralni qiymatini topamiz.

$$\int_{-1}^{1}\frac{1}{(e^x+1)(1+x^2)}dx=\int_{-1}^{0}\frac{1}{(e^{-x}+1)(1+x^2)}dx+\int_{0}^{1}\frac{1}{(e^x+1)(1+x^2)}dx=$$

$$=\int_{0}^{1}\left(\frac{1}{(e^{-x}+1)(1+x^2)}+\frac{1}{(e^x+1)(1+x^2)}\right)dx=\int_{0}^{1}\left(\frac{1}{e^{-x}+1}+\frac{1}{e^x+1}\right)\cdot\frac{1}{1+x^2}dx=$$

$$=\int_{0}^{1}\left(\frac{e^x}{e^x+1}+\frac{1}{e^x+1}\right)\cdot\frac{1}{1+x^2}dx=\int_{0}^{1}\frac{1}{1+x^2}dx=arctgx\Big|_{0}^{1}=arctg1-arctg0=\frac{\pi}{4}.$$

6-misol. $\int_{-2019}^{2019}\frac{1}{1+2^{\pi tgx}}dx$ integralni hisoblang.

Yechish. Berilgan integralni quyidagicha yozib hisoblash mumkin.

$$\int_{-2024}^{2024}\frac{1}{1+2^{\pi tgx}}dx=\int_{-2024}^{0}\frac{1}{1+2^{\pi tgx}}dx+\int_{0}^{2024}\frac{1}{1+2^{\pi tgx}}dx=\int_{0}^{2024}\frac{1}{1+2^{-\pi tgx}}dx+\int_{0}^{2024}\frac{1}{1+2^{\pi tgx}}dx=$$

$$=\int_{0}^{2024}\left(\frac{1}{1+2^{\pi tgx}}+\frac{1}{1+2^{-\pi tgx}}\right)dx=\int_{0}^{2024}\left(\frac{2+2^{-\pi tgx}+2^{\pi tgx}}{2+2^{-\pi tgx}+2^{\pi tgx}}\right)dx=\int_{0}^{2024}1dx=2024$$

7-misol. $\int_{0}^{\frac{\pi}{2}}\left(\cos^2(\cos x)+\sin^2(\sin x)\right)dx$ integralni hisoblang.

Yechish. Bu integralni hisoblashda $I=\int_{0}^{\frac{\pi}{2}}\left(\cos^2(\cos x)+\sin^2(\sin x)\right)dx$ deb olib,

$x=\frac{\pi}{2}-y$ belgilash kiritib olamiz, bu yerda $\sin(\frac{\pi}{2}-y)=\cos y,\ \cos(\frac{\pi}{2}-y)=\sin y$ ga teng.

$$I=\int_{0}^{\frac{\pi}{2}}\left(\cos^2(\cos x)+\sin^2(\sin x)\right)dx=\left|\begin{array}{l}x=\frac{\pi}{2}-y\\dx=-dy\\\frac{\pi}{2}\le y\le 0\end{array}\right|=\int_{0}^{\frac{\pi}{2}}\left(\cos^2(\cos(\frac{\pi}{2}-y))+\sin^2(\sin\frac{\pi}{2}-y)\right)dy=$$

$$=\int_{0}^{\frac{\pi}{2}}\left(\cos^2(\sin y)+\sin^2(\cos y)\right)dy=\int_{0}^{\frac{\pi}{2}}\left(1-\sin^2(\sin y)+1-\cos^2(\cos y)\right)dy=$$

$$=\int_{0}^{\frac{\pi}{2}}2dy-\int_{0}^{\frac{\pi}{2}}\left(\sin^2(\sin y)+\cos^2(\cos y)\right)dy$$

Berilgan integral $\int_{0}^{\frac{\pi}{2}}\left(\cos^2(\cos x)+\sin^2(\sin x)\right)dx$ va $\int_{0}^{\frac{\pi}{2}}\left(\sin^2(\sin y)+\cos^2(\cos y)\right)dy$ larning qiymati o'zgaruvchiga bog'liq emas, demak ularning qiymatlari bir xil ya'ni I ga teng. Oxirgi tenglikdan $I=\int_{0}^{\frac{\pi}{2}}2dy-I,\ \Rightarrow 2I=\pi,\ \Rightarrow I=\frac{\pi}{2}.$

Berilgan integralni qiymati $\frac{\pi}{2}$ ga teng.

Xulosa

Maqolada olimpiada tanlovlaridagi aniq integrallarni hisoblashning umumiy va xususiy hollari keltirilgan. Toq funksiyalar orqali hisoblash, integralni integrallar yig'indisiga ajratish yoki yangi o‘zgaruvchi kiritish usullari bilan hisoblash yo‘llari ko‘rsatilgan. Yuqoridagi usullardan foydalanib aniq integrallarni hisoblash, o‘ylaymizki, matematika ixlosmandlariga foydali bo‘ladi.

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Berdiyeva L. N.
katta o‘qituvchisi
pedagogika kafedrasi
Axborot texnologiyalar va Menejment universiteti

TA’LIM JARAYONIDA METODIK TA’MINOTNI RIVOJLANTIRISH YO‘LLARI

Annotatsiya. *MDH mamlakatlari pedagogik ilmida metodik ta’minot – bu nafaqat o‘quv materiallarining majmuasi, balki ta’lim jarayonida o‘quvchilarning kognitiv, emotsional va obrazli tafakkurini shakllantirishga xizmat qiluvchi ko‘rgazmali-didaktik vositalar tizimi sifatida talqin qilinadi. Ushbu yondashuv metodik ta’minotning faqat informatsion emas, balki kognitiv va kreativ komponentlarini ham o‘z ichiga olishini ko‘rsatadi. Ushbu maqolada ta’lim jarayonida metodik ta’minotini rivojlantirish yo‘llari borasida fikr-mulohazalar yuritilgan.*

Kalit so’zlar. ***O****‘yin va ko‘rgazmali vositalar, didaktik o‘yinlar, bola ruhiyati, boshlang’ich sinf o’quvchilari, tafakkur, yoshga moslik va rivojlantiruvchanlik, kognitiv rivojlanishi.*

Berdiyeva L. N.
senior lecturer
department of pedagogy
University of Information Technologies and Management

WAYS TO DEVELOP METHODOLOGICAL SUPPORT IN THE EDUCATIONAL PROCESS

Abstract. *In the pedagogical science of CIS countries, methodological support is interpreted not only as a set of educational materials but also as a system of visual and didactic tools that serve to shape students' cognitive, emotional, and imaginative thinking in the educational process. This approach indicates that methodological support includes not only informational but also cognitive and creative components. This article discusses ways to develop methodological support in the educational process.*

Keywords. *Play and visual aids, didactic games, child psychology, primary school students, thinking, age-appropriateness and developmental orientation, cognitive development.*

MDH mamlakatlarida o‘yin va ko‘rgazmali vositalardan foydalanish masalasiga oid tadqiqotlar ham keng ko‘lamli ilmiy asosga ega bo‘lib, bu borada psixologiya va pedagogika fanining ilg‘or nazariy qarashlari shakllangan. Jumladan, taniqli rus olimi V.V. Davidov o‘yin faoliyatini bola tafakkurining shakllanishi va rivojlanishida asosiy metod sifatida e’tirof etadi. Uning fikricha,

o‘yin bolada real hayotdagi ijtimoiy munosabatlar modelini yaratadi, bu esa bola tafakkurining mantiqiy va tushunchaviy bosqichlarga o‘tishini ta’minlaydi. Davidovning didaktik o‘yinlar haqidagi yondashuvi shundan iboratki, o‘yin orqali bola faqatgina narsalarni o‘rganmaydi, balki ularning mohiyatini anglaydi va ularga nisbatan reflektiv yondasha oladi [18]. Shu nuqtai nazardan qaraganda, Davidov o‘yinni bolaning kognitiv rivojlanishida intellektual faollikni shakllantiruvchi asosiy vosita sifatida ko‘radi.

Yana bir muhim tadqiqotchi – L.A. Venger o‘z izlanishlarida ko‘rgazmali o‘yinlarning bola psixikasiga, xususan, uning idrok, tasavvur va tafakkur kabi psixik funksiyalarining shakllanishiga bevosita ta’siri borligini isbotlaydi. Vengerning fikricha, vizual obrazlar asosida qurilgan o‘yin faoliyati bolaga nafaqat predmetni ko‘rish, balki uni anglash, taqqoslash, umumlashtirish va yangi obrazlar yaratish imkonini beradi[19]. Bu jarayon, o‘z navbatida, bola tafakkurining struktural elementlarini tashkil etadi va fikrlashning vizual-mantiqiy shakliga o‘tishda muhim asos bo‘lib xizmat qiladi. Venger ta’kidlashicha, ayniqsa boshlang‘ich sinf yoshidagi bolalar uchun ko‘rgazmalilik va obrazli ifoda shakllari orqali berilgan bilimlar o‘zlashtirish darajasi yuqori bo‘ladi, chunki bu yoshda obrazli tafakkur yetakchi rol o‘ynaydi.

Umuman olganda, Davidov va Vengerning qarashlari o‘zaro mazmunan uzviy bog‘liq bo‘lib, ularning yondashuvlari didaktik o‘yinlar va ko‘rgazmali vositalarning bola rivojidagi o‘rni va ahamiyatini chuqur tahlil qiladi. Bu esa boshlang‘ich ta’lim jarayonida o‘yin asosidagi metodlarning, ayniqsa vizual vositalar bilan boyitilgan metodlarning samaradorligini oshirish zarurligini ko‘rsatadi.

O‘zbekistonlik pedagoglar orasida boshlang‘ich ta’limda o‘yinlar va ko‘rgazmali vositalardan foydalanish masalasiga chuqur va tizimli yondashuvlar mavjud bo‘lib, bu boradagi ilmiy izlanishlar ushbu metodlarning kognitiv, affektiv va psixomotor rivojlanishdagi o‘rnini aniqlashga qaratilgan.

Jumladan, pedagog olima M. Taxtaxodjayeva o‘z tadqiqotlarida didaktik o‘yinlarning boshlang‘ich sinf o‘quvchilari tafakkurini faollashtirishdagi rolini chuqur tahlil etadi. Uning fikricha, o‘yinlar orqali o‘quvchilarda mustaqil fikrlash, kuzatish, muammoli vaziyatni tahlil qilish, yechim topish va mantiqiy fikr yuritish ko‘nikmalari shakllanadi. U ayniqsa, tafakkur jarayonining erkinlik va ijodiylikka yo‘naltirilgan shakllari didaktik o‘yinlar muhitida eng samarali rivojlanishini ta’kidlaydi [20]. U, shuningdek, o‘yin faoliyatining ijtimoiy kommunikatsiya va irodaviy sifatlar rivojiga ham ijobiy ta’sir ko‘rsatishini asoslab beradi.

Professor Sh. Munavvarov esa ko‘rgazmali vositalardan foydalanishning nazariy-metodik asoslarini ishlab chiqib, ularni obrazli, tahliliy va assotsiativ fikr yuritish mexanizmlarini shakllantiruvchi vosita sifatida tavsiya qiladi. Uning izlanishlarida ta’limda ko‘rgazmalilik nafaqat axborot yetkazish vositasi, balki tafakkurni idrok darajasidan tahlil va umumlashtirish bosqichigacha olib

18Давыдов В.В. Проблемы развивающего обучения: Опыт теоретического и экспериментального психологического исследования. – М.: Педагогика, 1986. – С. 74–82.

19Венгер Л.А. Психологические проблемы обучения дошкольников. – М.: Просвещение, 1976. – С. 112–123.

20Taxtaxodjayeva M. (2019). *Boshlang‘ich sinf o‘quvchilarining tafakkurini rivojlantirishda didaktik o‘yinlarning o‘rni*. – Toshkent: TDPU Ilmiy to‘plami, №4, 56–62-betlar.

chiquvchi didaktik poydevor sifatida qaraladi [21] . Munavvarov ta’kidlaydiki, boshlang‘ich sinf o‘quvchilarida vizual asosdagi fikrlashni rag‘batlantirish uchun ko‘rgazmali materiallar estetik va funksional jihatdan uyg‘un bo‘lishi lozim.

Zamonaviy pedagog olim Bekzod Xodjayev esa didaktik o‘yinlar va ko‘rgazmali vositalar integratsiyasining yangi bosqichini taklif etadi. U o‘z tadqiqotlarida o‘yin faoliyatining ijtimoiy faollik, reflektiv tafakkur va o‘zini baholash ko‘nikmalarini shakllantirishdagi o‘rnini ochib beradi. Ayniqsa, ko‘rgazmali vositalarni interaktiv ta’lim muhitida qo‘llash orqali ta’limning samaradorligini oshirish g‘oyasi B.Xodjayev konsepsiyasining markazida turadi. Unga ko‘ra, har bir o‘yin elementi o‘quvchining bilish faoliyatiga bevosita ta’sir ko‘rsatishi va uning bilim olish motivatsiyasini kuchaytirishi lozim[22].

Yuqoridagi mulohazalar asosida boshlang‘ich ta’limda o‘yinlar va ko‘rgazmali vositalardan foydalanishga oid quyidagi didaktik talablarni ajratib ko‘rsatish mumkin:

Yoshga moslik va rivojlantiruvchanlik – didaktik vositalar bolaning psixologik, emotsional va intellektual rivojlanish bosqichlariga moslashtirilgan bo‘lishi lozim;

Tizimlilik va maqsadlilik – o‘yinlar va ko‘rgazmali vositalar dars maqsadlari, fan mazmuni va kompetensiyaviy yondashuv bilan uyg‘un holda tanlanishi zarur;

Harakatlilik va vizual asos – har bir metodik vosita bola faoliyatida ko‘rinadigan obrazni yaratishi, uni intellektual harakatga undashi va tafakkurini faollashtirishi shart.

Amaliy kuzatuvlarim asosida aytishim mumkinki, o‘yinlar va ko‘rgazmali vositalardan maqsadli foydalanish, ayniqsa boshlang‘ich sinfda, o‘quvchilarning ko‘rgazmali-harakatli tafakkurini rivojlantirishda hal qiluvchi omil bo‘lib xizmat qiladi. Ayniqsa, har bir o‘yin yoki vizual material muayyan ta’limiy maqsadga qaratilgan bo‘lsa, o‘quvchilarda mustaqil fikrlash, kuzatish, tahlil qilish, umumlashtirish kabi tafakkur amaliyotlari shakllanadi. Shu bois, metodik ta’minotda o‘yinlar va ko‘rgazmali vositalarni tizimli, ilmiy asoslangan va interaktiv yondashuv asosida qo‘llash zarur deb hisoblayman.

Ta’lim jarayonining zamonaviy bosqichida boshlang‘ich sinf o‘quvchilarining tafakkur shakllarini rivojlantirish, xususan, ko‘rgazmali-obrazli tafakkurini shakllantirish dolzarb metodik vazifalardan biriga aylangan. Bunday tafakkur turi bolaning real predmet va hodisalarni tasvirli obrazlar orqali qabul qilish, ular ustida fikran harakat qilish, muammoli vaziyatlarni tasviriy yechish imkoniyatini beradi. Ko‘rgazmali-obrazli tafakkur bola tafakkurining dastlabki shakli sifatida bilimlarni chuqurroq anglashga xizmat qiladi.

Mazkur tafakkur turini rivojlantirishda metodik ta’minot vositalarining sifatli, tizimli va pedagogik talablar asosida yaratilgani muhim omil hisoblanadi. Didaktik materiallarning mazmunan boyligi, vizual asoslanganligi, funksional

21Munavvarov Sh. (2020). *Ko‘rgazmali vositalar asosida obrazli tafakkurni rivojlantirish metodikasi*. – “Pedagogik izlanishlar” jurnali, №2, 71–78-betlar.

22Xodjayev B. (2021). *Interaktiv muhitda ko‘rgazmali vositalarni qo‘llash samaradorligi*. – “Ta’lim innovatsiyalari” jurnali, №1, 44–51-betlar.

ko‘lamdorligi o‘quvchining obrazli fikrlash mexanizmlarini faollashtiradi. Shu jihatdan, metodik ta’minotni rivojlantirish masalasi ta’lim sifati, samaradorligi va o‘quvchilarning intellektual salohiyatini shakllantirish bilan bevosita bog‘liqdir.

Xorijiy pedagogik tadqiqotlarda metodik ta’minot vositalarining rivojlanishi o‘quvchilarning intellektual faoliyatiga ko‘rsatadigan ta’siri chuqur tahlil etilgan. Xususan, amerikalik psixolog J. Bruner metodik resurslar, ayniqsa vizual elementlarga boy bo‘lsa, bu o‘quvchilarda obrazli fikrlashni faollashtiradi va murakkab tushunchalarni yaxshiroq o‘zlashtirish imkonini beradi, degan g‘oyani ilgari suradi[23]. U o‘quv jarayonida vizual materiallardan foydalanish bolalar tafakkurining uch darajasini – enaktiv (harakat asosidagi), ikonik (ko‘rgazmali), va simvolik (abstrakt) tafakkurni uyg‘un rivojlantirishga xizmat qilishini ta’kidlaydi.

G. Gardner esa o‘zining mashhur “ko‘p intellekt nazariyasi”da vizual-fazoviy intellektni mustaqil intellektual soha sifatida ajratib ko‘rsatadi. U vizual-didaktik materiallar va ko‘rgazmali metodlar aynan shu yo‘nalishdagi intellektual faoliyatni faollashtiradi, deb hisoblaydi[24]. Gardnerning fikricha, o‘quvchilar tafakkurining diversifikatsiyalashuvi o‘qituvchidan turli intellekt turlariga mos metodik yondashuvlarni talab etadi.

Masalan, mashhur rus olimasi V.S. Avanesova didaktik materiallar tarkibiga vizual komponentlar (tasvirlar, grafikalar, diagrammalar)ning ko‘proq kiritilishi o‘quvchilarda obrazli assotsiatsiyalarni faollashtirishi, bu esa ularning mavzuni eslab qolish va qayta yaratish darajasini sezilarli darajada oshirishini ta’kidlaydi[25]. Unga ko‘ra, vizual taqdimotlar o‘quvchilarda tafakkurning emotsional komponentlarini faollashtirib, ularni bilimlarni ongli o‘zlashtirish jarayoniga jalb qiladi.

Shuningdek, psixolog va pedagog olim L.S. Vigotskiy bola tafakkuri rivojlanishida tasviriy faoliyat – chizish, modellashtirish, qurish kabi harakatlarning o‘rni beqiyosligini asoslab bergan. Uning fikricha, aynan tasviriy faoliyat orqali bola murakkab fikr strukturasi, rejalashtirish, muammoni modellashtirish va uni hal etish ko‘nikmalarini egallaydi[26]. Vygotskiy bu jarayonni bolaning yaqin rivojlanish zonasiga olib kiruvchi vosita sifatida talqin etadi.

Vigotskiy fikrlariga tayangan holda, boshqa zamonaviy tadqiqotchilar ham vizual didaktik vositalarning bola miyasida verbal va noverbal informatsiyaning sintezini ta’minlashda alohida rol o‘ynashini ta’kidlashadi. Bunday integratsion yondashuv, ayniqsa boshlang‘ich sinf o‘quvchilari uchun didaktik ta’minotni loyihalashda muhim ahamiyat kasb etadi.

Boshqa mashhur rus psixologi L.A. Venger esa vizual o‘yinlarning bolaning psixik rivojiga ko‘rsatadigan ijobiy ta’sirini chuqur tahlil qilgan. U vizual-harakatli o‘yinlar bolaning idrok, diqqat, xotira va tafakkur strukturasi shakllanishida muhim o‘rin tutishini ta’kidlab, aynan vizual obrazlar orqali

23Bruner, J. (1966). *Toward a Theory of Instruction*. Harvard University Press.

24Gardner, H. (1983). *Frames of Mind: The Theory of Multiple Intelligences*. Basic Books.

25Avanesova, V.S. Didaktik materiallarning vizual komponentlari va ularning ta'lim sifatiga ta'siri. – Moskva: Pedagogika nashriyoti, 2004. – B. 64–66.

26Vigotskiy, L.S. Pedagogik psixologiya.– Moskva: Pedagogika, 1991. – B. 89–93.

tafakkurning murakkab turlari, xususan, analitik va mantiqiy fikrlash elementlari yuzaga chiqishini ilmiy asoslab bergan. Vengerga ko‘ra, ko‘rgazmali o‘yinlar faqat ko‘ngilochar vosita emas, balki bolalarning kognitiv rivojlanishini rag‘batlantiruvchi kuchli pedagogik resursdir.

Jumladan, rus olimasiV.V. Davidov o‘yin faoliyatini bolaning tafakkurining ilk shakllarini rivojlantirishda asosiy metod sifatida qaraydi[27]. U o‘yinlar orqali bolaning nazariy fikrlashga o‘tishi uchun zamin yaratilishini, ayniqsa, ko‘rgazmali-harakatli tafakkurning shakllanishida o‘yin elementlarining hal qiluvchi ahamiyatga ega ekanligini asoslab bergan. Davidov ta’limda bolani faol sub’yekt sifatida ko‘rgan holda, uning rivojida o‘zaro muloqotli, vazifaga yo‘naltirilgan didaktik o‘yinlarning samarasini alohida ta’kidlaydi.

Shunday qilib, xorijiy va MDH tadqiqotlarining umumiy xulosasidan kelib chiqilsa, bola tafakkurini rivojlantirishda ko‘rgazmali vositalar va ularning metodik jihatdan to‘g‘ri tashkil etilishi hal qiluvchi omil sifatida qaralmoqda. Bu esa o‘z navbatida boshlang‘ich sinf pedagogikasida vizual-didaktik materiallar va ko‘rgazmali o‘yinlarning o‘rni beqiyos ekanligini ko‘rsatadi.

O‘zbekistonlik olimlar ham bu borada chuqur ilmiy tadqiqotlar olib borishmoqda. Masalan,taniqli pedagog olim A’zam Xoliqov ham didaktik materiallarning o‘quvchiga estetik va psixologik ta’siri haqida fikr yuritadi. U metodik ta’minotni faqat bilim manbai sifatida emas, balki bolalarning shaxsiy tajribasi va aqliy faolligini rivojlantirishga xizmat qiladigan interaktiv va reflektiv vosita sifatida talqin qiladi. Uning fikricha, o‘quvchilarning bilishga bo‘lgan ichki motivatsiyasi aynan ko‘rgazmali-ta’lim vositalar orqali qo‘zg‘atiladi, bu esa obrazli fikrlash va ijodiy yondashuvni faollashtiradi[28].

Xoliqov o‘z asarlarida shuningdek, vizual materiallarning tanlanishi va qo‘llanishi pedagogik maqsadga muvofiq bo‘lishi lozimligini ta’kidlab, bunday vositalarning bolaning kognitiv rivojlanish darajasi bilan uyg‘unlashgan holda berilishini muhim deb hisoblaydi[11]. Bu yondashuv metodik ta’minot vositalarining faqat texnik yordam emas, balki shaxsiylashtirilgan o‘quv tajribasini yaratishda ham asosiy rol o‘ynashini ko‘rsatadi.

O‘tkir Tolipov o‘zining “Pedagogik texnologiyalar” nomli ilmiy-uslubiy qo‘llanmasida metodik ta’minotga didaktik tizimning ajralmas tarkibiy qismi sifatida qaraydi. U dars jarayonida qo‘llaniladigan vositalarni uch darajaga — axborot manbalari, ko‘rgazmali vositalar va faoliyatga yo‘naltiruvchi texnologik vositalarga ajratadi. Uning mulohazasiga ko‘ra:“O‘quv faoliyatini samarali tashkil etish uchun metodik ta’minot shunchaki ko‘makchi emas, balki o‘quvchini faol o‘rganishga jalb etuvchi kuchli pedagogik mexanizmdir[29].” Ayniqsa boshlang‘ich sinflarda vizual va ko‘rgazmali materiallar bolaning konkret-obrazli tafakkurini rivojlantirishda beqiyos ahamiyatga ega.

Ushbu yondashuvlarni umumlashtirgan holda, metodik ta’minotni rivojlantirish natijasida o‘quvchi:

27Давыдов, В. В. (1996). *Развивающее обучение*. М.: Институт развития личности.

28Xoliqov A’. Ta’limda zamonaviy texnologiyalar. – Toshkent: TDPU, 2017.

29Tolipov O.T., Usmonboeva M. “Pedagogik texnologiyalar” – T.: Fan va texnologiya, 2006. – B. 118.

- O‘quvchining ko‘rish, tasavvur qilish va tushunish jarayonini soddalashtiradi;
- Obraz va harakatlar orqali fikrning vizual modelini yaratadi;
- Tafakkurda strukturaviy va tizimli assotsiatsiyalarni kuchaytiradi;
- Ijodiy, konstruktiv va reflektiv fikrlash ko‘nikmalarini shakllantiradi.

O‘z amaliy kuzatuvlarva ilmiy tahlillar asosida aytish mumkinki, metodik ta’minot vositalari, ayniqsa, ko‘rgazmali va interaktiv shakllarda taqdim etilganida, boshlang‘ich sinf o‘quvchilarining obrazli tafakkurini faollashtirishda samarali vosita bo‘lib xizmat qiladi. Har bir vizual vosita o‘quvchining real tasavvurlarini mustahkamlaydi, mavhum tushunchalarni konkretlashtiradi, fikrlashda harakatlilikni kuchaytiradi. Shu bois, metodik ta’minotni rivojlantirish – bu nafaqat pedagogik talab, balki o‘quvchining fikrlash salohiyatini kengaytiruvchi strategik yo‘nalish deb hisoblayman.

Zamonaviy ta’lim jarayonida o‘quvchilarning bilim olish samaradorligini oshirish, mustaqil fikrlashini, ijodiy yondashuvini rivojlantirishda testlar, tarqatma materiallar, ko‘rgazmali qurollar va didaktik o‘yinlardan foydalanish muhim omillardan biri hisoblanadi. Bunday vositalar nafaqat ta’lim sifatini oshiradi, balki o‘quvchilarda faol ishtirok, motivatsiya va muammoli vaziyatlarda to‘g‘ri qaror qabul qilish qobiliyatlarini ham shakllantiradi. Shuning uchun ularni tayyorlash va qo‘llashda ilmiy-metodik asoslarga tayanish zarur.

Namoyish metodi o‘rganilayotgan ob’yekt harakat dinamikasini ochib berishda qo‘l keladi va ayni chog‘da predmetning tashqi ko‘rinishi va ichki tuzilishi haqida to‘laqonli ma’lumot berishda keng qo‘llaniladi. Tabiiy obyektlarni namoyish qilishda odatda uning tashqi ko‘rinishi (shakli, hajmi, miqdori, rangi, qismlari, ularning o‘zaro munosabatlari)ga e’tibor qaratiladi, so‘ngra ichki tuzilishi yoki alohida xususiyatlarini o‘rganishga o‘tiladi. Ko‘rsatish ko‘p holatlarda o‘rganilayotgan obyektlarning subyekti yoki chizmasi yordamida kuzatiladi. Tajribalar namoyishi esa sinf taxtasiga chizish yoki o‘qituvchining maxsus jihozlar yordamida ko‘rsatib berishi hisobiga amalga oshadi, bunda ushbu tajriba asosida yotuvchi tamoyillarni tushunish osonlashadi.

Predmetlar, hodisa yoki jarayonlarni tabiiy holatda namoyish qilish yanada ko‘proq didaktik samara beradi, biroq, bunday namoyishni amalga oshirish har doim ham mumkin bo‘lavermaydi. Shu bois o‘qituvchilar tabiiy predmetlarni namoyish qilishda sun’iy muhitga murojaat qilishadi (masalan, hayvonlar bilan hayvonot bog‘ida, turli o‘simliklar bilan esa issiqxonalarda tanishish) yoki sun’iy ravishda yaratilgan obyektlar (maket, model, mulyaj, skelet va boshqalar)dan foydalaniladi.

Bu metod yordamida o‘qituvchi o‘quvchilarni mustaqil ravishda obyektlarni o‘rganish, zaruriy o‘lchov ishlarini olib borish, aloqadorlikni o‘rnatish, shuningdek, hodisalarning mohiyatini anglab etishga bir so‘z bilan aytganda faol bilish jarayoniga yo‘naltirishi lozim. Namoyish samarasi ko‘p jihatdan o‘qituvchining bilish jarayoni mohiyatan o‘quvchilarning yoshiga mos holda to‘g‘ri tanlanishi hamda mumkin qadar ularning diqqatini namoyish etilayotgan predmetning muhim jihatlariga yo‘naltirishiga bog‘liqdir.

Dars jarayonida qo‘llaniladigan testlar, tarqatma materiallar va ko‘rgazmali qurollar o‘zining mazmuni, shakli va metodik yo‘nalishi bilan o‘quvchilarni bilim olishga jalb qilishi, ularning kognitiv darajasiga mos bo‘lishi lozim. Testlar aniqlik, aniqlovchanlik va obyektivlik tamoyillariga asoslangan holda ishlab chiqilishi kerak. Tarqatma materiallar esa o‘quvchilarning mustaqil ishlashiga, mavzuni chuqurroq o‘zlashtirishiga xizmat qilishi lozim[30].

Tasvirning samarasi ko‘pincha o‘qituvchi tomonidan ko‘rsatuv texnologiyasi qay darajada o‘zlashtirilganligiga bog‘liq bo‘ladi. Ko‘rsatmalardan foydalanishning bilish jarayonidagi didaktik ahamiyati o‘rganilayotgan ob’yekt mohiyatini to‘laqonli yorita olishi bilan belgilanadi. Aslida illyustratsiyalar oldindan tayyorlanib, dars jarayonida zarur o‘rinlarda kerakli hajmda ko‘rsatiladi, aks holda ular sonining oshib ketishi o‘quvchilarni hodisa mohiyatini anglashda chalg‘itadi. Ayrim hollarda tarqatma materiallar (fotosurat, jadval, tabiiy obyektlar va boshqalar) yoki texnik vositalar xizmatidan foydalanishga to‘g‘ri keladi.

R.Clark ta’kidlashicha, vizual va amaliy vositalar o‘quvchilarning mavzuni tushunish darajasini sezilarli darajada oshiradi[31]. P.Petkevich esa ko‘rgazmali qurollar darsning samaradorligini oshirishda muhim omil ekanligini ta’kidlaydi. O‘zbek pedagogi Sh. Xudoyqulov fikricha, "testlar va ko‘rgazmalar o‘quvchilarning nutqiy va tafakkuriy faoliyatini bir vaqtda rivojlantirishga xizmat qiladi"[32].Muallif nuqtai nazariga ko‘ra, bunday vositalarni tayyorlashda ularning didaktik, psixologik va estetik mezonlarga muvofiqligini ta’minlash muhimdir. Materiallar o‘quvchilarni faol fikrlashga undashi, ularda tanqidiy va ijodiy yondashuvni rivojlantirishi lozim.

O‘qituvchi uchun testlar va ko‘rgazmali qurollarni tayyorlash

O‘qituvchining kasbiy faoliyatini baholash, takomillashtirish va tahlil qilishda testlar va vizual vositalarning roli katta. Bunday vositalar orqali o‘qituvchi o‘zining pedagogik faoliyatini baholaydi, o‘quvchilarning darsdagi ishtirokini kuzatadi va o‘z yondashuvlarini qayta ko‘rib chiqadi.

Angeli & Valanides tomonidan ishlab chiqilgan TPACK modeli asosida o‘qituvchi materiallari bilim, texnologiya va pedagogikani uyg‘unlashtirgan holda tayyorlanishi lozim. T.G. Brazhe fikricha, o‘qituvchining o‘z faoliyatini testlar orqali aks ettirishi innovatsion o‘qituvchilik madaniyatining tarkibiy qismi hisoblanadi[33]. O‘zbek olimi A. Turg‘unov esa shunday deydi: "O‘qituvchi o‘z darsini tahlil qilishni o‘rganmas ekan, ta’lim sifatining uzluksiz rivoji haqida gap bo‘lishi mumkin emas". Muallif sifatida aytish joizki, o‘qituvchilar uchun mo‘ljallangan metodik vositalar reflektivlikni, ya’ni o‘z ustida ishlash va tahlil qilish ko‘nikmasini shakllantiradi. Bu esa uzluksiz kasbiy o‘sishni ta’minlaydi.

Tarqatma materiallar dars mazmunini kengaytirish, o‘quvchilarning mustaqil faoliyatini rag‘batlantirish va ular bilan individual ishlashni samarali

30Taxtaxodjayeva. Pedagogika. 41-42-bet.

31 Clark, R. & Yu, J. *Effective Visual Learning Tools*. San Francisco: 2021. Learning Sciences Press. – 189 b

32. Xudoyqulov, Sh. *Pedagogik innovatsiyalar asoslari*. Toshkent: 2019. O‘zbekiston milliy ensiklopediyasi. – 200 b.

33. Turg'unov, A. (2018). *O'qituvchi faoliyatida tahlil metodlari*. Toshkent: Fan va texnologiya. – 176 b.

tashkil etish vositasi hisoblanadi. O‘qituvchi ushbu materiallarni tayyorlashda quyidagi jihatlarga e’tibor berishi lozim:

- Materiallarning mazmuni dars maqsadiga mos bo‘lishi;
- O‘quvchilarning yosh va psixologik xususiyatlariga muvofiqligi;
- Materiallarning grafik va estetik jihatdan jozibadorligi.

Yuqoridagi nazariy asoslardan kelib chiqib aytish mumkinki, ta’limda yuqori natijaga erishish metodik vositalarning ilmiy asoslanganligi, ularni o‘z vaqtida va o‘rinli qo‘llash bilan chambarchas bog‘liqdir. Xalqaro, MDH va milliy tajribalarni uyg‘unlashtirgan holda testlar, tarqatma materiallar, ko‘rgazmali qurollar va didaktik o‘yinlar bilan ishlash ta’lim sifatini sezilarli darajada oshirish imkonini beradi.

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Boltayeva Z.
teacher
Ortiqova Sh.
teacher
Mardonov I.
teacher
Eshonqulova G.
teacher
Vobkent District Technical School No. 2

WAYS AND METHODS OF OVERCOMING LEXICAL DIFFICULTIES

Abstract: *This article investigates advanced approaches and pedagogical methodologies aimed at mitigating lexical difficulties arising in the process of foreign language acquisition. Lexical challenges constitute one of the most substantial barriers preventing learners from enlarging their vocabulary repertoire and achieving communicative fluency. The study seeks to identify the principal lexical obstacles encountered by learners and to examine their linguistic, cognitive, and instructional dimensions. Furthermore, the research analyzes a range of effective vocabulary-learning strategies, including contextualized instruction, semantic processing, multimodal (visual and auditory) techniques, game-oriented learning, mnemonic devices, and communicative methodologies. The findings demonstrate that the implementation of an integrative instructional framework significantly strengthens learners' capacity for autonomous vocabulary expansion and facilitates the long-term acquisition of new lexical units.*

Key words: *lexical challenges, foreign language acquisition, vocabulary learning strategies, contextualized learning, communicative methodology, mnemonic devices, game-based learning, semantic processing, pedagogical approaches, linguistic competence*

Introduction

The process of foreign language acquisition is inherently complex and multifaceted, with lexical difficulties representing one of its most critical components. Insufficient mastery of vocabulary often restricts learners' ability to comprehend texts accurately and to express ideas fluently across diverse communicative contexts [Zimmerman, C. B., 2009; 78]. This issue is particularly salient in second language learning, where students frequently encounter unfamiliar lexical items, idiomatic expressions, polysemous words, synonymous variations, and collocational patterns. Consequently, overcoming lexical barriers is of paramount importance, as vocabulary competence directly influences communicative effectiveness, reading comprehension, and written production. The present study aims to explore the underlying causes of lexical difficulties and to evaluate pedagogically sound strategies designed to enhance vocabulary acquisition. Drawing upon both linguistic theory and classroom-based practice, the

research emphasizes practical techniques that enable learners to develop lexical competence in a systematic and sustainable manner. By integrating theoretical perspectives with applied methodologies, this study aspires to offer educators and learners a comprehensive toolkit for effective vocabulary mastery. Vocabulary acquisition has long been a central focus within applied linguistics and language pedagogy. Researchers such as Nation (2001) and Schmitt (2010) underscore the foundational role of lexical knowledge in overall language proficiency, asserting that vocabulary competence is indispensable for meaningful communication. Additionally, studies conducted by Laufer (1997) and Meara (2002) illuminate the cognitive demands associated with learning and retaining new lexical items, particularly with regard to word frequency, salience, and depth of lexical knowledge. Contemporary pedagogical paradigms, including Communicative Language Teaching (CLT) and Task-Based Language Teaching (TBLT), have been widely acknowledged for their effectiveness in promoting vocabulary retention. Ellis (2005) and Thornbury (2002) argue that vocabulary instruction should be embedded within authentic communicative contexts to facilitate deeper semantic processing. Moreover, empirical research has highlighted the efficacy of mnemonic strategies (Atkinson & Raugh, 1975) and the growing influence of digital technologies in vocabulary instruction (Godwin-Jones, 2018).

Despite extensive scholarly attention, a noticeable gap remains in the development of holistic models that synthesize multiple instructional strategies while accommodating diverse learner profiles. This study seeks to address this gap by proposing an integrated approach to overcoming lexical difficulties in foreign language learning. This research adopts a qualitative methodological framework that incorporates textual analysis, pedagogical experimentation, and learner-centered feedback. The primary research methods include:

- **Contextual Analysis:** Investigating lexical items within authentic texts to determine how meaning is constructed through surrounding linguistic elements.
- **Experimental Instructional Practices:** Implementing diverse vocabulary-teaching techniques in classroom environments and assessing their pedagogical effectiveness.
- **Comparative Analysis:** Evaluating the relative efficacy of mnemonic strategies, communicative tasks, and technology-assisted learning tools.
- **Learner Surveys and Interviews:** Collecting qualitative data on learners' experiences, preferences, and challenges related to vocabulary acquisition.

The findings indicate that effective management of lexical difficulties necessitates a multidimensional approach integrating cognitive, contextual, and technological components [Thornbury, S., 2002; 39]. Vocabulary retention and retrieval were found to depend largely on meaningful exposure, active learner engagement, and systematic reinforcement. One of the most significant outcomes of the study is the confirmation that contextualized learning substantially enhances lexical retention. Learners exposed to new vocabulary through authentic texts,

dialogues, and communicative tasks demonstrated superior understanding of word usage, collocational patterns, and pragmatic nuances compared to those relying on isolated memorization. Contextual learning also promoted semantic networking, enabling learners to associate new lexical items with existing knowledge structures. The research further establishes that mnemonic strategies—such as visualization, associative linking, and narrative construction—play a critical role in facilitating vocabulary recall. Techniques like the keyword method proved particularly effective for retaining abstract or complex lexical items [Schmitt, N., 2010; 56]. Visual aids, including mind maps and pictorial flashcards, strengthened memory traces and improved recall accuracy.

In addition, game-based learning emerged as a powerful motivational tool that enhances learner engagement and repetition. Vocabulary games, role-play activities, and competitive tasks not only increased enjoyment but also fostered peer interaction and collaborative learning. Participants engaged in gamified instruction exhibited higher retention rates and greater confidence in lexical usage than those taught through traditional drilling methods. The integration of digital tools was also shown to significantly support autonomous vocabulary learning. Learners who regularly used applications such as Quizlet, Anki, and Duolingo benefited from spaced repetition systems, multimodal input, and immediate corrective feedback [Waring, R., 2004; 80]. These technologies facilitated personalized learning pathways and encouraged sustained learner motivation.

Overall, the study confirms that no single instructional strategy is universally effective [Nation, P., 2001; 70]. Instead, an integrative approach combining contextual exposure, mnemonic reinforcement, game-based interaction, and digital resources yields the most robust outcomes in vocabulary acquisition.

In conclusion, this research demonstrates that overcoming lexical difficulties in foreign language learning requires a comprehensive and flexible pedagogical framework. Traditional rote memorization, when used in isolation, proves insufficient for long-term retention and meaningful application of vocabulary. Conversely, strategies grounded in contextual learning, mnemonic techniques, gamification, and technology-enhanced instruction foster deeper cognitive processing and sustainable lexical development.

The study underscores the necessity of adopting a holistic approach that addresses diverse learner needs and learning styles. Future research should further explore the adaptation of these strategies across varying linguistic, cultural, and educational contexts to ensure more inclusive and effective vocabulary instruction.

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Djurayeva S. Z.
assistant
Samarkand State Medical University

METHODOLOGY FOR STUDYING INNOVATIVE PEDAGOGICAL TECHNOLOGIES

Abstract: *This article discusses the methodology for researching innovative pedagogical technologies. Methods for determining the effectiveness of modern approaches and technologies in the educational process, experimental and observational methods, as well as the use of qualitative and quantitative research methods in pedagogical research are considered. The article provides scientific recommendations for the assessment, implementation and analysis of pedagogical innovations in the educational process.*

Keywords: *Innovative pedagogical technologies, Educational process, Pedagogical research methodology, Experimental method, Observation and analysis, Educational effectiveness, Scientific research approach.*

Introduction

As you know, the success of a teacher's activity depends first of all on how correctly he implements the general didactic principle (laws) from the content, methods and organizational forms of Education introduction: as you know, the success of a teacher's activity depends first of all on how correctly he implements the generantroduction: as you know, the success of a teacher's activity depends first of all on how correctly he implements the general didactic printroduction: as you know, the success of a teacher's activity depends first of all on how correctly he implements the general didactic principle (laws) from the content, methods and organizational forms of Education. By law, it is stable, necessary, proportionality and important communication between one or another phenomena and processes. Therefore, in the educational process, it is necessary to educate, educate and carry out the general development of students in one whole. The laws of education are the sum of the requirements for this teaching process. We say that education is the principle (law), the laws, the rules that will become the basis for the teaching of all stages and all subjects of Education say that education is the principle (law), the laws, the rules that will become the basis for the teaches say that education is the principle (law), the laws, the rules that will become the basis for the teaching of all stages and all subjects of Education. The laws of Education reflect the most important internal importance between the student and the teacher. From the principles of teaching come its rules, and they reflect the private rules of one or another principle. It is important for every teacher to realize that effective construction of the educational process means the use of pedagogical laws, rules, didactic rules, which justified themselves in work, in their entirety and in interaction, with creative use in solving new issues in the current conditions.t is important for every teacher to realize that effective construction of the educational

process means the use of pedagogical laws, rules it is important for every teacher to realize that effective construction of the educational process means the use of pedagogical laws, rules, didactic rules, which justified themselves in work, in their entirety and in interaction, with creative use in solving new issues in the current conditions. In order to choose alternative aspects of training, it is necessary to take into account the unity of the whole laws and the didactic rules. The principles of education were also given great attention by our famous allomas in the past. For example, Abu Nasr Farabiy and Abu Ali ibn Sina stated in their works on these principles or example, Abu Nasr Farabi and Abu Ali ibn Sina stated in their works on these principles. In particular, the qomusian scholar Ibn Sinor example, Abu Nasr Farabi and Abu Ali ibn Sina stated in their works on these principles. In particular, the qomusian scholar Ibn Sina was also interested in the principles of didactics, or example, Abu Nasr Farabi and Abu Ali ibn Sina stated in their works on these principles. In particular, the qomusian scholar Ibn Sina was also interested in the principles of didactics, in particular, instructional teaching. The scientist has read the formation of an imagination in which a person correctly reflects objective reality, thanks to the fact that he perceives existing objects or their image by sight. From the laws of teaching, certain important requirements arise in relation to its effective organization, which are called teaching rules. Knowledge of the teaching rules allows you to more confidently choose the necessary methods of teaching knowledge of the teaching rules allows you to more confidently choose the necessary methods of teaching. Summarizing the above opinions of pedagogical scientists, we can say as a conclusion that the principles of teaching are the main leading rules that determine the nature knowledge of the teaching rules allows you to more confidently choose the necessary methods of teaching. Summarizing the above opinions of pedagogical scientists, we can say as a conclusion that the principles of teaching are the main leading rules that determine the nature of teaching in accordance with the goals of providing education and training to the younger generation. The rules of education include the activities of teaching and the basic laws and guidelines for the acquisition of scientific knowledge by students, the formation of relevant skills and qualifications. At the same time, the teaching rules summarize both activities, namely a number of requirements that give the teacher and the student the opportunity to successfully carry out the tasks set before them.t the same time, the teaching rules summarize both activities, namely a number of requirements that give the teacher and the student the opportunity to successfully carry out the tasks set before them. The rules of education are said to be the direction of reading and teaching processes aimed at the implementation of the goals and objectives of universal education, the assimilation of scientific knowledge by students, the sum of the basic laws and rules for the formation of knowledge and skills. In the pedagogical literature created by scientists in recent years, didactic rules are grouped differently the pedagogical literature created by scientists in recent years, didactic the pedagogical literature created by scientists in recent years, didactic rules are grouped the pedagogical literature created by scientists the pedagogical

literature created by scientists in recent n the pedagogical literature created by scientists in recent years, didactic rules are grouped differently. Based on these, it is possible to indicate the rules of education as follows. 1. The rule of education to be scientific. 2. The rule of systematic and consistent education. 3. The rule of unity of education and upbringing. 4. The rule that theory in education is related to practice. 5. The rule of awareness, activism and independence in education. 6. The rule of instruction in education. 7. The rule to take into account the characteristics of any student in the educational process and that education is appropriate for the student Educational character of Education. The rule of education to be scientific educational of Education. The rule of educatiod ucational character of Education. The rule of education to be scientific. Scientific knowledge is the true perception of reality. The rule of science of education is necessary educational character of Education. The rule of education to be scientific. Scientific knowledge is the true perception of reality. The rule of science of education is necessary inducational character of Education. The rule of education to be scientific. Scientific knowledge ducational character of Education. The rule of education to be scientific. Scientific knowledge is the true perception of reality. The rule of science of education is necessary in order to create the right conditions for the student to reflect, understand and assimilate the laws in the educational material. Understanding theoretical rules is an important sign of the interpretation of material on a scientific basis, which determines the features of the thinking activity of the reader. In the process of acquiring scientific knowledge, students find a scientific worldview, beliefs. Thinking develops. The rule of science of education in the educational process arm students with scientific knowledge corresponding to the current level of scientific and technological progress, introducing young people to scientific research methods the teacher's systematic statement of knowledge allows students to deeper understand the structure and logic of the subject of study, distinguish the main idea and Basic Rules of science, determine Choosing an alternative structure of the content of the lesson requires taking into account the rule of systematicity of didactics in teaching hoosing an alternative structure of the content of the lesson requires taking into account the rule of systematicity of didactics in teaching. The systematic nature of teahoosing an alternative structure of the content of the lesson requires taking into account the rule of systematicity of didactics in teaching. The systematic nature of teaching is a guarantee of success in teaching, ing an alternative structure of the content of the lesson requires taking into account the rule of systematicity of didactics in teaching. The systematic nature of teaching is a guarantee of success in teaching, regulating thoughts, facilitating and improving the mastery of knowledge, skills and competencies. In education, it is necessary to be taught in accordance with consistency, so that the knowledge learned today will strengthen what was learned yesterday, to lay the groundwork for those who will be studied tomorrow. The systematic nature of education is related to its consistency. A characteristic sign of consistency-based education is that it is aimed at creating new knowledge, and vice versa, it is aimed at ensuring further deepening, expanding and strengthening

the previously acquired knowledge, skills and competencies in the process of outlining their new knowledge. characteristic sign of consistency-based education is that it is aimed at creating new knowledge. The systematic and consistency rule of Education also includes strengthening the stated teaching materials and serving to complement the previous ones; independent work of students in a continuous and systematic picture; taking into account the acquired knowledge and acquired skills, qualifications of students. The systematic and consistency rule of Education the systematic and consistency rule of Education also includes strengthening the stated teaching materials and serving to complement the previous ones; independent work of students in a continuous and systematic picture; taking into account the acquired knowledge and acquired skills, qualifications of students. The rule of the unity of education and upbringing. The unity of education is largely dependent on the correct Organization of the educational process and the ability to use different methods and techniques of teaching. Especially to ensure the unity of education with education Especially to ensure the unity of education with education: a) the correct Organization of the content of the especially to ensure the unity of education with education: a) the correct Organization of the content of the stated educational materials, both scientific and ideological; Especially to ensure the unity of education with education: a) the correct Organization of the content to ensure the unity of education with education: a) the correct Organization of the content of the stated educational materials, both scientific and ideological; b) the disclosure of the scientific and educational essence of the subject being taught, the creation of the possibility of using hadiths, proverbs in the educational process; C) a thorough and solid assimilation of the scientific knowledge described and its observance in marriage; g) to create a problematic process in education, to strengthen the focus on ensuring the interests, activity and initiative of students; d) in the educational process, it is necessary to ensure the education of students ' sense of organization, discipline and responsibility, mutual assistance.) in the educational process, it is necessary to ensure) in the educational process, it is necessary to ensure the education of students ' sense of organization, discipline and responsibility, mutual assistance. The rule of awareness) in the educational process, it is necessary to ensure the education of students ' sense of organization, discipline and responsibility, mutual assistance. The rule of awareness, activism and independence in education. This rule provides for the organization of teaching in such a way that students consciously and actively take over scientific knowledge and methods of enslaving them in practice. They contain independence, thinking, speech culture and scientific worldview, beliefs in creative initiative and educational activities. The rule of mindfulness and activity in the teaching process implies the development of thinking and speech in students the rule of mindfulness and activity in the teaching process implies the development of thinking and speech in students. The he rule of mindfulness and activity in the teaching process implies the development of thinking and speech in students. The activity of students in the educational process is, first of all, their mental activity - the activity of

contemplation. Accordingly, the rule of conscious mastery of education, on the one hand, implies independent, active thinking of students, and on the other hand, it is during this process that students are brought up and developed their independence and activity, as well as their logical thinking activities. The mindfulness and activism rule requires students to be trained in methods of creative activity in labor and teaching the mindfulness and activism rule mindfulness and activism rule requires students to be trained in methods of creative activity in labor and teaching. The rule of instruction the mindfulness and activism rule requires students to be trained in methods of creative activity in labor and teaching. The rule of instruction in education. This rule is one of the didactic ones, which increases the quality of the teaching process, facilitates the acquisition of knowledge by students. The principle of expressiveness allows you to facilitate perception and associate theoretical knowledge with life, practice. This rule requires the mobilization of sensory organs such as vision, hearing, sense of smell, taste, skin, muscle-movement over a single object in the process of training, and also increases interest in the phenomena under study, helps to acquire knowledge more thoroughly. In didactics, the main and leading rule is to connect education with life and production practice didactics, the main and leading rule is to connect education with life and production practice. In addition to the theoretical didactics, the main and leading rule is to connect education with life and production practice. In addition to the theoretical explanation of each subject, it is necessary to study its practical side, ways of applying it to practice. Consequently, both the goals and objectives of harmonious human education and the content of education, both teaching methods and forms of Organization of education are based on the unity of practice with theory. As a result of the consistent implementation of the rule of unity of theory and practice in the educational process, students comprehend the fundamental essence of educational material, the laws of the development of nature and society on a scientific basis in detail correctly, deeply and form the skills, skills and qualifications necessary for future practical activities a result of the consistent implementation of the rule of unity of theory and practice in the educational process, students comprehend the fundamental essence of educational material, the laws of the development of nature and society on a scientific basis in detail correctly, deeply and form the skills, skills and qualifications necessary for future practical activities. This rule is closely linked to the scientific rule of education. As students improve their knowledge, acquire excellent, study science in theory, they learn that science arose due to a practical need, how it progresses production forces, innovations in technology and economics, and science, in turn, helps to improve production and improve life.

Conclusion

The rule of unity of theory and practice in the educational system in educational institutions is initially carried out in the process of study, depending on the content and specificity of the academic discipline conclusion: the rule of unity of theory and practice in the educational system in educational institutonclusion: the rule of unity of theory and practice in the conclusion: the

rule of unity of theory and practice in the educational system in educational institutions is initially carried out in the process of study, depending conclusion: the rule of unity of theory and practice in the educational system in educational institutions is initially carried out in the process of study, depending on the content and specificity of the academic discipline. Preparing students for practical activities begins in the process of acquiring theoretical knowledge. It is then continued in laboratory and practical exercises. In these activities, students, under the guidance of the teacher, check, reinforce and deepen the credulity of the knowledge they receive in the experimental setting. They generate skills to put knowledge into practice. As a result of the unity of theory and practice, the student-student carefully acquires knowledge, his independent thinking is well formed, and also finds its place in the profession, production and social life as a wholes a result of the unity of theory and practice, the student-student carefully acquires a result of the unity of theory and practice, the student-student carefully acquires knowledge, his independent thinking is well formed, and also.

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Egamkulov Kh. E., doctor of geographical sciences, PhD.,
associate professor
Gulistan State University
Shermatov J. A.
master's student of the methodology of teaching
exact and natural sciences (geography)
Gulistan State Pedagogical Institute

GEODEMOGRAPHIC SITUATION OF THE SYRDARYA REGION AND ITS TERRITORIAL CHARACTERISTICS

Abstract: *The dynamics of population change and population growth index indicators of the Sirdaryo region have been analyzed in detail from a territorial perspective over a number of years. In addition, population density, ethnic composition, the number of households and their structure, as well as territorial differences in birth and death rates have been comprehensively examined. The analysis shows that population density differs significantly between urban and rural areas, while the ethnic composition reflects the socio-cultural environment of the region. The number and structure of households vary across territories, which is closely related to living conditions, economic opportunities, and the availability of social services in these areas. Differences in birth and death rates, in turn, reflect the level of demographic stability and the state of public health in the region.*

Keywords: *Population, ethnic composition, birth, death, index, area, family, district.*

Introduction

In the Sirdaryo region, the population is predominantly composed of Uzbeks (79.4%), Kyrgyz (2.1%), Tajiks (9.3%), and representatives of other nationalities (9.2%), including Russians and more than 70 other ethnic groups. The population density amounts to 216.4 persons per square kilometer (2025). The rural population numbers 494.2 thousand people, while the urban population accounts for 366.7 thousand people.

Degree of study of the problem

Foreign scientists J.Huizinga, T.R.Malthus, R.Pressat, P.Raymond, A.Quetelet, A.Landry, S.Melinda, I.I.Mechnikov, M.V.Ptuxa, M.S.Bedny, B.S.Urlanis, A.G.Vishnevsky, V.M.Medkov, I.V.Plyush and others were engaged in the scientific study of the population and the causes of its death. Issues related to mortality in Uzbekistan were studied geographically by O.B.Ata-Mirzaev, A.A.Kayumov, M.R.Buriyeva, N.K.Komilova, Z.N.Tojieva, I.Turdimambetov, N.Zh.Yembergenov, N.Zh.Mukhamedova. The geodemographic situation and mortality of the population of the Syrdarya region were studied by H.E.Egamkulov.

Research methodology

When writing the article, analytical data on the geodemographic situation, population size, and mortality rates of the Syrdarya region, their features, formation, and development were used.

Analysis and results

The total number of households is 228,588. Among them, 108,536 households have children under the age of 18; 12,074 households are large families (with four or more children); 5,273 households are single-parent families (where either the father or the mother is absent). The number of households with persons with disabilities is 14,312, while 3,420 households include members suffering from serious chronic diseases. The number of elderly people living alone (aged 65 and above) is 486. Households engaged in family entrepreneurship total 12,208, and 13,766 households have family members who have migrated abroad for employment purposes.

As of January 2025, the population of the Sirdaryo region amounts to 930,800 people. The most populous district is Boyovut District, with a population of 141.5 thousand residents. Although the overall birth rate in the Sirdaryo region is lower than in some other regions of the Republic, the birth rate per 1,000 population remains relatively high compared to the national average.

Table 1.

Growth indicators of the population of administrative units of Syrdarya region over the years

Territories	2020	2021	2022	2025	Change Index 2020-2025
Syrdarya region	**846,3**	**860,9**	**892,2**	**930,8**	**+1,09**
Gulistan city	90,5	91,3	98,3	102,1	+1,12
Shirin city	18,7	18,9	19,2	19,4	+1,03
Yangiyer city	43,3	44,2	46,4	49,1	+1,13
Akaltyn district	52,0	52,9	54,5	56,6	+1,08
Boyovut district	129,4	131,7	135,0	141,5	+1,09
Gulistan district	72,5	74,1	76,8	81,1	+1,11
Sayhunabad district	77,2	78,5	81,0	83,9	+1,08
Mirzaabad district	73,3	75,1	77,9	82,3	+1,12
Sardoba district	65,8	67,0	68,9	71,4	+1,08
Syrdarya district	128,2	130,1	134,2	139,3	+1,08
Khavast district	95,4	97,1	100,0	104,1	+1,09

Source: *Information from the Department of Statistics of Syrdarya region*

The population of the Sirdaryo region amounted to 846.3 thousand people in 2020, while by January 2025 this figure had increased to 930.8 thousand people. During this period, the population growth index reached +1.09, indicating a stable and positive population growth trend in the region.

Regarding territorial differences in population dynamics, the highest population growth index was recorded in Yangiyer city (+1.13), Guliston city

(+1.12), Mirzaobod District (+1.12), and Guliston District (+1.11). The lowest growth index, although still positive, was observed in Shirin city (+1.03). These data clearly reflect the territorial characteristics of geodemographic processes within the region.

As of 2024, mortality - one of the key indicators of demographic processes in the Sirdaryo region - was also analyzed. According to statistical data, a total of 4,456 deaths were recorded across the region. Of these, 1,978 were women and 2,478 were men, indicating that male mortality exceeded female mortality by 500 individuals.

The analysis of the sex ratio indicates that the higher level of male mortality may be explained by factors such as men's greater involvement in hazardous occupations, lifestyle characteristics, and differences in access to and utilization of healthcare services. This situation highlights the need to further improve the healthcare and social protection systems in the region.

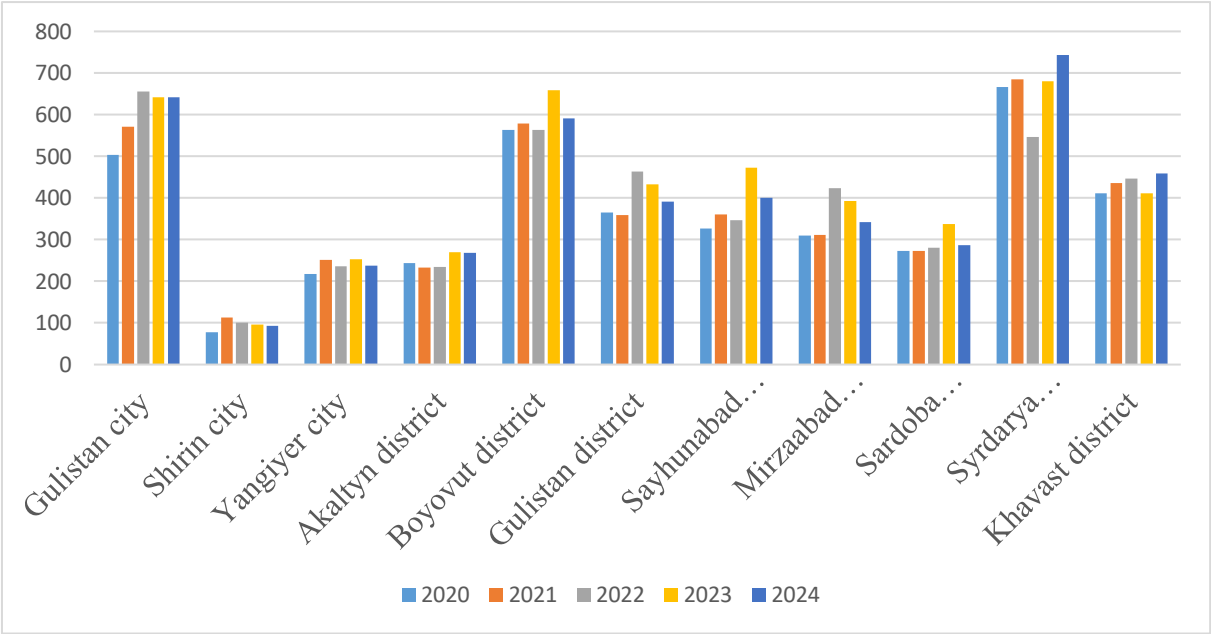


Figure 1. Mortality rates of the population of Syrdarya region.

Significant territorial disparities in mortality rates are observed across administrative-territorial units. The highest number of deaths was recorded in Sirdaryo District, amounting to 744 individuals. This figure can be explained by the relatively high population density of the district and a larger proportion of elderly residents. The next highest figures were observed in Guliston City (642 deaths) and Boyovut District (591 deaths), with these areas accounting for a substantial share of total deaths in the region.

In contrast, the lowest number of deaths was recorded in Shirin City, totaling 93 individuals. This situation is not indicative of a lower mortality rate, but rather reflects the relatively small population size of the city. Therefore, when analyzing mortality patterns, it is advisable to consider not only absolute numbers but also relative indicators, such as the mortality rate per 1,000 population.

Conclusions and suggestions.

Overall, variations in mortality rates across territories and between sexes in the Sirdaryo region demonstrate the complexity of demographic processes and emphasize the necessity of implementing healthcare policies that take regional characteristics into account.

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Eshonov R. M.
o‘qituvchisi
biotibbiyot muhandisligi, biofizika va axborot texnologiyalari kafedrasi kafedrasi
Farg‘ona jamoat salomatligi tibbiyot instituti
O‘zbekiston

TRIODDAN TRANZISTORGACHA EVOLYUTSION QADAMLAR

Annotatsiya: *Ushbu maqolada vakuumli triod lampasidan yarimo‘tkazgichli tranzistorga o‘tishning fizik, tarixiy va texnologik asoslari tahlil qilinadi. Trioddagi termoelektron emissiya, grid orqali boshqaruv hamda tranzistordagi p–n o‘tish va elektr maydon bilan boshqaruvning o‘xshash va farqli jihatlari ko‘rsatiladi. Integral sxema, planarlash, MOSFET va CMOS arxitekturalari rivoji misolida miniaturizatsiya va energiya samaradorligi qonuniyatlari yoritiladi. So‘nggi avlod chiplaridagi tranzistorlar soni (milliardlab) bo‘yicha misollar keltirilib, elektronikaning ijtimoiy-iqtisodiy ta’siri muhokama qilinadi.*

Kalit so‘zlar: *triod, audion, termoelektron emissiya, p–n o‘tish, tranzistor, MOSFET, planar jarayon, integral sxema, CMOS, miniaturizatsiya.*

Eshonov R. M.
lecturer
department of biomedical engineering, biophysics and information technologies
Fergana Institute of Public Health
Uzbekistan

FROM TRIODES TO TRANSISTORS: EVOLUTIONARY STEPS

Abstract: *This article analyzes the physical, historical, and technological foundations of the transition from the vacuum triode tube to the semiconductor transistor. The similarities and differences between thermionic emission and grid control in the triode and the p–n junction and electric field control in the transistor are shown. The laws of miniaturization and energy efficiency are illustrated using the example of the development of integrated circuits, planarization, MOSFET, and CMOS architectures. Examples are given of the number of transistors (billions) in the latest generation of chips, and the socio-economic impact of electronics is discussed.*

Keywords: *triode, audion, thermionic emission, p–n junction, transistor, MOSFET, planar process, integrated circuit, CMOS, miniaturization.*

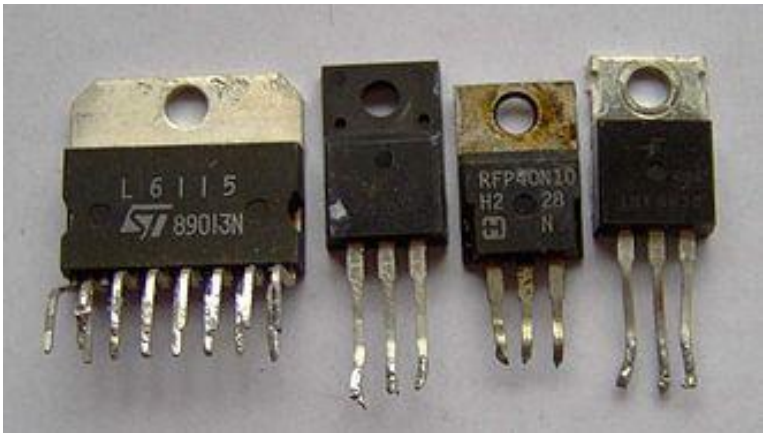
Kirish

XX asr boshida aloqa va radio muhandisligi uchun kuchaytirgich va kommutatsiya elementlari sifatida vakuum lampalari paydo bo‘ldi. 1906-1908-yillarda Li de Forest tomonidan uch elektrodli audion-triod yaratilishi signalni kuchaytirish imkonini berdi. Biroq, katta hajm, yuqori issiqlik, qisqa xizmat muddati va yuqori kuchlanish talablaridan kelib chiqqan holda, yarimo‘tkazgichli alternativga ehtiyoj kuchaydi. 1947-yilda Bell laboratoriyalarida germaniy asosidagi nuqtaviy kontaktli tranzistor ishlashi namoyish etilgach, elektronika yangi davrga kirdi.

Triod lampasining fizik asoslari va boshqaruv metaforasi. Triodning uch asosiy elektrodi - katod, grid (boshqaruvchi to‘r) va anoddir. Katod qizdirilganda elektronlar katod yuzasidan chiqish ishi yengilgan taqdirda vakuumga emissiya qiladi (termoelektron emissiya). Gridning katodga nisbatan manfiy potensiali elektronlar oqimini «klapan» singari boshqaradi: manfiylik ortsa, anod toki kamayadi; kamayganda esa ortadi. Shu jihatdan, triod «suv krani» metaforasi orqali o‘qitishda o‘ta intuitiv tushuntiriladi. Triodlar radioeshittirish, telefoniyadagi kuchaytirgichlar va dastlabki hisoblash mashinalarida muhim rol o‘ynagan, biroq issiqlik va barqarorlik cheklovlari ularni zamonaviy masshtabda samara bermaydigan qilgan.

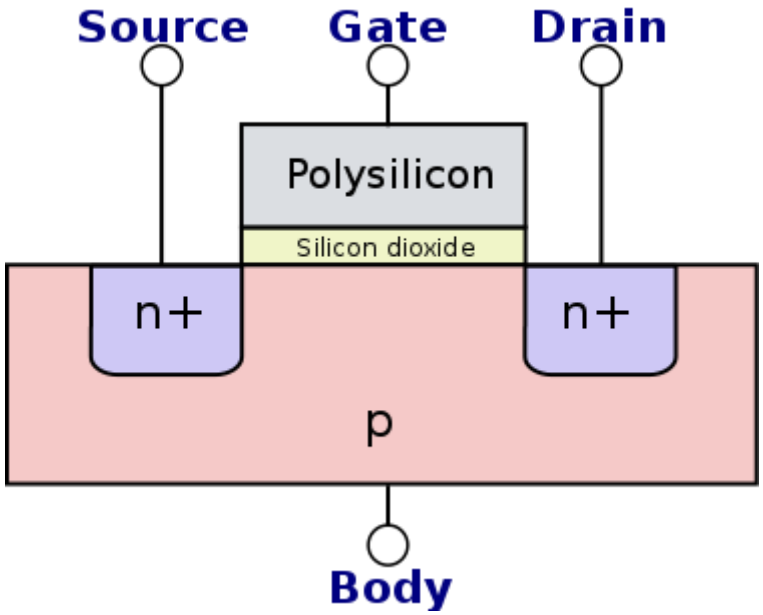
Jadval. Triod va tranzistorning konseptual taqqoslashi

Xususiyat	**Triod (vakuum lampa)**	**Tranzistor (yarimo‘tkazgich)**
Ish muhiti	Vakuum (qizigan katod)	Yarimo‘tkazgich kristall
Boshqaruv	Grid potensiali bilan elektron oqimi	Baza toki / zatvor kuchlanishi bilan kanal
Energiya sarfi	Yuqori (isitish zarur)	Past (qizdirish shart emas)
Hajm	Katta, mo‘rt	Miniatuyura, yuqori zichlik
Ishonchlilik	Past–o‘rta	Yuqori
Chastota/tezlik	MHz–o‘nlab MHz	GHz va undan yuqori



“Alohida qadoqlangan diskret MOSFETlar”
Individually packaged discrete MOSFETs

Tranzistorning paydo bo‘lishi: nuqtaviy kontakt, o‘tishli (BJT) va MOSFET. Nuqtaviy kontaktli tranzistorda germaniy yuzasiga yaqin joylashtirilgan ikki metall igna (emitter va kollektor) hamda past qarshilikli baza kontakti mavjud bo‘lib, mos ofset kuchlanishlarda kuchaytirish kuzatiladi. Keyingi bosqichda yaratilgan o‘tishli (BJT) tranzistorda n–p–n yoki p–n–p qatlamlari tashuvchilar injeksiyasi va kollektor-baza teskari siljishi orqali katta oqimni kichik baza toki bilan boshqarish imkonini berdi. 1959-yilda Atalla va Kahng metall–oksid–yarimo‘tkazgichli maydoniy tranzistor (MOSFET)ning amaliy nusxasini ko‘rsatdilar; u elektr maydoni orqali kanal o‘tkazuvchanligini boshqaradi va CMOS logikasining poydevorini yaratdi.

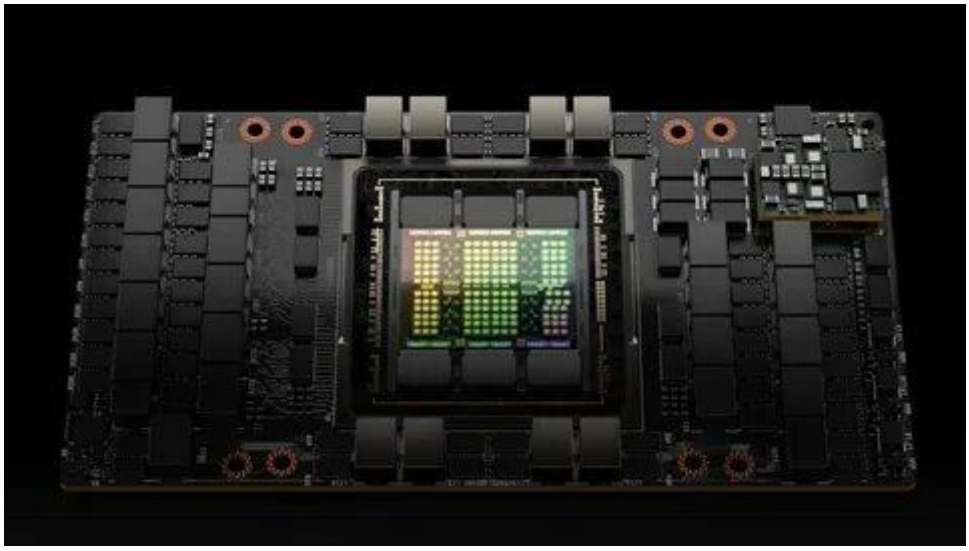


“p-tipli yarimo‘tkazgich”
p-type semiconductor

Planar jarayon va integral sxemaga o‘tish (IC). Planar jarayon (Jean Hoerni, 1959) va sirtni passivlashtirish usullari tranzistorning ishonchliligini keskin oshirdi va litografiya asosida ketma-ket qatlamlarni yaratishga imkon berdi. Robert Noyce planar jarayonga metall izlar bilan o‘zaro ulash g‘oyasini qo‘shib, monolit integral sxema konsepsiyasini patentladi. Bunga parallel ravishda Jack Kilby (Texas Instruments) 1958-yilda birinchi ishchi integral sxemani namoyish etdi. Ushbu yutuqlar natijasida bitta chip ichida yuzlab, so‘ng minglab va nihoyat milliardlab tranzistorlarni joylashtirish imkoni tug‘ildi.

MOSFET va CMOSning hukmronligi, miqyoslash va bugungi ko‘rsatkichlar. MOSFET bugungi kunda eng keng qo‘llaniladigan tranzistor bo‘lib, zamonaviy raqamli integral sxemalarning asosini tashkil etadi; bitta chipda milliardlab MOSFETlar bo‘lishi odatiy hol. Apple M3 chipida 25 milliard tranzistor mavjudligi e’lon qilingan, NVIDIA H100 (GH100) grafik protsessorida esa 80 milliard tranzistor bor. 2025-yilda taqdim etilgan Apple M3 Ultra paketli arxitekturasi esa ikki yirik matritsani birlashtirib, 184 milliard tranzistorgacha yetganini ko‘rsatadi. Bular miniaturizatsiya, materiallar muhandisligi, ko‘p

qatlamli metallizatsiya va ilg‘or litografiya (EUV) singari omillar kombinatsiyasining natijasidir.



“NVIDIA Hopper H100 GPU texnik xususiyatlari yangilandi: FP32 unumdorligi 60 dan 67 TFLOPS gacha oshirildi.”
NVIDIA Hopper H100 GPU specs upgraded: FP32 perf from 60 to 67 TFLOPS

Fizik metaforadan texnologik paradigmagacha: “elektron kran”dan “maydon kanal”gacha. Trioddagi boshqaruv - grid orqali vakuumdagi elektron oqimini «bo‘g‘ish/ochish» (klapan) tamoyiliga tayanadi. Tranzistorda esa boshqaruv yarimo‘tkazgich ichidagi zaryad tashuvchilar konsentratsiyasi va harakatiga bog‘liq: BJTda baza orqali injeksiya va rekombinatsiya dinamikasi, MOSFETda esa darvoza (gate) ostida kanalda kuchlanish bilan induktsiyalangan o‘tkazuvchan qatlam. Shunday qilib, funksional mohiyat bir xil - oqimni boshqarish bo‘lsa-da, fizik vosita tamoman boshqacha: vakuumdan qattiq jism ichiga ko‘chgan boshqaruv. Bu o‘zgarish elektronika tarixida energiya samaradorligi, ishonchlilik va integratsiya zichligida eksponensial sakrashlarni ta’minladi.

Ijtimoiy-iqtisodiy ta’sir va kelajak yo‘nalishlari. Trioddan tranzistorgacha bo‘lgan evolyutsiya raqamli iqtisodiyotning tamal toshiga aylandi: mobil aloqa, internet, boshqaruv tizimlari, tibbiy diagnostika va terapiya (masalan, UZI, MRT elektronikalari), aviatsiya-kosmonavtika va sun’iy intellekt infratuzilmasining barchasi yarimo‘tkazgichlar va integral sxemalarsiz mumkin emas edi. Keyingi bosqichda 2D materiallar, 3D stacking, chiplet va tizim-darajadagi paketlash, shuningdek quvvat elektronikasida keng tarmoqli materiallar (SiC, GaN) muhim rol o‘ynashda davom etadi. Ammo konseptual nuqtai nazardan, barchasi bir fikrga qaytadi: oqimni aniq, tez va iqtisodiy boshqarish.

Xulosa

Triod - «boshqariladigan elektron oqimi» g‘oyasini amalda ko‘rsatdi; tranzistor esa shu g‘oyani qattiq jism fizikasida nihoyatda ixcham, ishonchli va energiya tejamkor shaklda ro‘yobga chiqardi. Planar jarayon, integral sxema va

MOSFET/CMOS kombinatsiyasi esa bu g‘oyani milliardlab nusxada takrorlay oladigan, global miqyosdagi texnologik paradigmagacha kengaytirdi. Bugungi kunda elektronika taraqqiyoti, mohiyatan, ana shu evolyutsiyaning izchil davomidir.

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Gulmurodov F. E.
doctoral student (dsc)
department of geomatic engineering
Samarkand State University of Architecture and Construction
named after Mirzo Ulugbek
Umarov N. Sh.
doctoral student (dsc)
department of geomatic engineering
Samarkand State University of Architecture and Construction
named after Mirzo Ulugbek
Kalandarov M. M.
researcher
department of geomatic engineering
Samarkand State University of Architecture and Construction
named after Mirzo Ulugbek

LAND ACCOUNTING IN SETTLEMENTS USING REMOTE SENSING AND GIS TECHNOLOGIES

Abstract: *This article focuses on improving methods for accounting of land resources in settlements using remote sensing and GIS technologies, conducting state cadastre work, and organizing these processes based on GIS technologies.*

Keywords: *satellite, geographic information technology, settlements, remote sensing, cadastral maps, and modern geographic information systems.*

Currently, the technology for creating high-precision electronic digital maps using extensive space and aerial imagery in the development of geographic information systems across various sectors of our republic's economy has been established. Digital maps with scales ranging from 1:200 to 1:25000 are being created. Additionally, digital maps originally created in various formats are being converted to ArcGIS program formats.

The creation of digital maps in the ArcGIS program, compiled for land management and state land cadastre purposes, as well as for other purposes, occupies a central role.

The advantages of data automation in the land and building cadastre system are as follows:

– development of high-precision maps and plans for land and building cadastre purposes;

– rapid provision of digital maps of various scales to landowners, land users, and tenants;

– faster map creation process compared to other programs;

– availability of data comparison capabilities;

– creation of centralized geoinformation databases;

– remote editing of digital maps (via internet);

– possibility of direct transfer of maps to GPS devices and electronic tacheometers;

– provision of interactive geoinformation services;

– economic advantages and time savings.

Electronic digital maps of districts in our republic are available in ArcGIS, OAZIS, and PANORAMA programs.

The distribution of the unified state land fund of the Republic of Uzbekistan by land categories is presented in Table 1.

Table 1
Distribution of the land fund by categories
(As of January 1, 2025)

No.	Land fund categories	Total area, thousand ha		Including irrigated lands	
		total	As a percent age	total	As a percentage
1	**Agricultural lands**	22264.6	50.13	4213.8	9.49
2	**Lands of settlements**	235.4	0.53	49.7	0.11
3	**Lands intended for industry, transport, communications, defense and other purposes**	1968.0	4.43	11.7	0.03
4	**Lands for environmental protection, health improvement, and recreational purposes**	75.5	0.17	0.6	0.001
5	**Lands of historical and cultural significance**	0.4	0.001	0	0
6	**Forest fund lands**	8661.2	19.50	29.4	0.07
7	**Water fund lands**	815.8	1.84	4.5	0.01
8	**Reserve lands**	10389.4	23.40	1.9	0.004
	Total land:	44410.3	100	4311.6	9.71

According to the data from the "Cadastre Agency" of the Republic of Uzbekistan, as of January 1, 2025, the total land area of settlements in the republic is 235.4 thousand hectares, which constitutes 0.53 percent of the total land area of the republic. The area of irrigated land belonging to settlements in the republic is 49.7 thousand hectares, which is 0.11 percent. Of the total area of cities and villages, 68.6% is arable land, 12.4% is orchards and fruit plantations, and 19.0%

is land occupied by buildings.

Currently, there are 3,214 households in the M. Sultanov massif of the Kattaming rural citizens' assembly in the Kattakurgan district of the Samarkand region, and the area of household plots is 653 hectares. Information about the area of household plots belonging to citizens living in the Kipchak village of the Kumak mahalla in the massif is provided.

According to the data in the table cited in the Rural Citizens' Assembly (RCA) land plot book, the land area used by citizens should have been 15.9 hectares. However, as a result of the conducted measurements, the area of land used by rural residents amounted to 23.81 hectares. That is, it was established that the excess land area used by rural residents is 8.12 hectares. Currently, there is a list of 133 citizens who have household plots according to the RCA book. If we conduct a brief analysis of this list, we can observe the following. Citizen Kalaev Suvon is listed as number one in the RCA book. The area of land used by him is indicated as 0.15 hectares. However, the actual land area he is using was found to be 0.22 hectares. That is, it was determined that this citizen currently has an excess land area of 0.07 hectares.

However, at the same time, it was found that there are citizens who have land plots smaller than those recorded in the RCA book. For example, although the land area belonging to Muhammadiyev Uktam, assigned serial number 5, was 0.15 hectares, it actually amounted to 0.10 hectares. That is, a deficit of 0.05 hectares was observed. The land area belonging to Ortikov Uchkun, listed under serial number 8, was indicated as 0.2 hectares, but in reality, it was 0.17 hectares, that is, 0.03 hectares less.

The same situation can be seen with Buriyev Tolib, cited under number 63, Buriyev Erkin, also cited under number 63, and others.

It was confirmed that the land area of 11 citizens listed with the corresponding number in the QFY matches the information provided in the book.

Figure 1 shows a digital map of household plots of the residents of the "Kipchak" mahalla in the M. Sultanov massif of the Kattaming rural community, Kattakurgan district, Samarkand region, developed using GIS programs. This map displays the boundaries of settlements, the serial number of each household, borderdescriptions, roads, and irrigation ditches

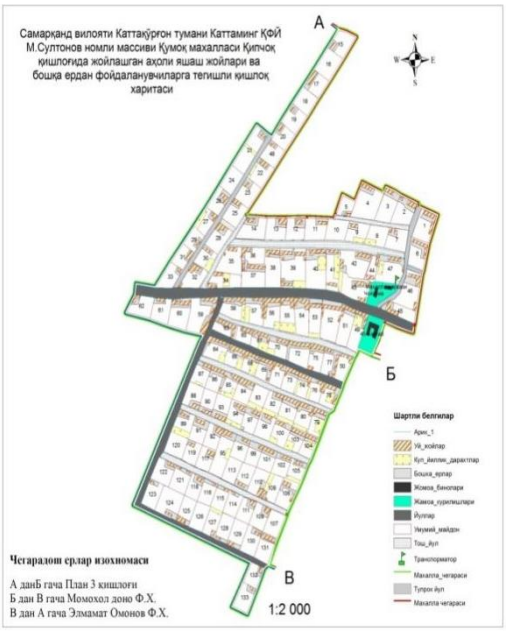


Figure 1. Cadastral map of residential areas

Table 2.
Types of land users in the Kipchak village of the Kumak mahalla, M. Sultanov massif, Kattaming rural community, Kattakurgan district, Samarkand region

No	Type of land users	Number of land users	Total land area determined by measurement (ha)
1	Families	123	22.15
4	School	1	0.6
3	Teahouse	1	0.1
4	Community center	1	0.09
2	Land plots not used for housing	10	1.66
6	Streets and roads		4.9
7	Irrigation ditches and canals		0.6
	Total		30.1

Table 2 shows the types of land users in the Kipchak village. According to the table data, the village currently has 1 school, 1 teahouse, a mahalla center, land plots not used for housing, streets and roads, irrigation ditches and canals, and a total of 30.1 hectares of land for 123 families.

Table 3

Information on the household plot areas belonging to citizens residing in the Kipchak village of the Kumak mahalla, M. Sultanov massif, Kattaming rural community, Kattakurgan district, Samarkand region.

Description	Cultivated land area determined by measurement (ha)	Residential area determined by measurement (ha)	Perennial trees identified as a result of measurements, ha	Other lands identified as a result of measurements, ha	Total land area identified as a result of measurements, ha	Land area used by citizens, ha	Difference, +-
Total land area of household plots, ha	17.45	2.77	1.22	2.37	23.81	15.69	8.12



Figure 2. Household plot area of Kipchak village



Figure 3. Excess land area identified as a result of measuring the household plot area in Kipchak village

Table 2 and Figures 2-3 provide information on the area of household plots belonging to citizens located in Kipchak village of Kumak mahalla, M. Sultanov massif, Kattaming rural community, Kattakurgan district, Samarkand region.

Cultivated land identified as a result of measurements: 17.45 ha (73%)

Houses identified as a result of measurements: 2.72 ha (12%) Appendix 2

Trees identified as a result of measurements: 1.22 ha (5%) Appendix 3

Other lands identified as a result of measurements: 2.32 ha (10%) Appendix 4

Total land area identified as a result of measurements: 23.81 ha (100%)

Land area used by citizens: 15.69 ha (66%)

Difference: +- 8.12 ha (34%)

Table 4

Information on the area of household plots belonging to citizens not used as housing in Kipchak village

Serial number	Last name and first name	Serial number in QFY book	Cultivated land identified as a result of measurements, ha	Houses identified as a result of measurements, ha	Perennial trees identified as a result of measurements, ha	Other lands identified as a result of measurements, ha	Total land area identified as a result of measurements, ha
1	**Ortikov Uchkun**	1814	0.14		0.03		0.17
2	**Toshpulatov Jurabek**	1815	0.18				0.18
3	**Ubaydov Feruzjon**		0.20				0.2
4	**Ruzibaev Asad**	1825a	0.16				0.16
5	**Buriev Jonibek**	1910a	0.15				0.15
6	**Daminov Shakhzod**	1931	0.12		0.03		0.15
7	**Mukhammadiev Bakhtiyor**	1831	0.16				0.16
8	**Shodiev Khasan**	1945	0.15				0.15
9	**Omonov Zohid**	1948	0.17				0.17
10	**Turdiev Shukhrat**		0.17				0.17
Total land area of household plots in hectares			1.60	0.00	0.06	0.00	1.66



Figure 4. The area of household plots belonging to citizens not used as housing in the village of Kipchak

Table 4 and Figure 4 provide information on the area of household plots belonging to citizens not used as housing in the village of Kipchak. In the village of Kipchak, 10 owners of household plots are not using the land allocated for individual construction as housing; their total land area is 1.66 ha (7%).

Table 5 Information on the area of household plots belonging to citizens not included in the citizens' assembly list in the village of Kipchak

Serial number	Last name and first name	Cultivated land, determined by measurement, ha	Houses identified as a result of measurements, ha	Perennial trees, identified as a result of measurements, ha	Other lands identified as a result of measurements, ha	Total land area determined as a result of measurements, ha
1	Buriev Jakhongir	0.15	0.01		0.02	0.18
2	Ubaidov Feruzjon	0.20				0.2
3	Kalaev Bekmurod	0.14	0.01		0.02	0.17
4	Kalaev Buyod	0.13	0.01		0.01	0.15
5	Buriev Elyor	0.23	0.01	0.02	0.02	0.28
6	Salimov Sherali	0.15	0.01		0.01	0.17
7	Toshpulatov Orif	0.23	0.01		0.02	0.26
8	Soliev Shukhrat	0.12	0.02		0.01	0.15
9	Turdiev Shukhrat	0.17				0.17
10	Normurodov Alibek	0.11	0.01	0.02	0.01	0.15
11	Islomov Nodir	0.14	0.01		0.01	0.16
12	Toshtemirov Mirjalol	0.16	0.01		0.01	0.18
13	Bobokulov Islom	0.14	0.03		0.01	0.18
14	Usmonov Sarvar	0.11	0.01		0.01	0.13
15	Muhammadiev Egamberdi	0.15	0.01		0.01	0.17
Total land area of household plots (ha)		2.33	0.16	0.04	0.17	2.7



Figure 5. The area of household plots belonging to citizens not included in the Citizens' Assembly list in the village of Qipchaq

Table 5 and Figure 5 provide information on the area of household plots belonging to citizens not included in the Citizens' Assembly list in the village of Qipchaq. Based on this, it was established that in Qipchaq village, land plots belonging to 15 citizens are not listed at all, and these citizens have not been paying land and property taxes. It was determined that the total land area used by these citizens is 2.7 ha, which is 11.3% of the total.

Thus, according to the records of the Qipchaq Rural Citizens' Assembly of Kattaqo'rg'on district, the land area of residential settlements is indicated as 15.69 hectares, while our research revealed it to be 23.81 hectares. The difference is 8.12 hectares. Taking Kattaqo'rg'on district as an example, when we calculated the residential land area in the records of the village citizens' assemblies and mahalla citizens' assemblies, it amounted to 5760 hectares. If we conduct inspections of residential land plots in Kattaqo'rg'on district, it was found that an additional 2,980.96 hectares of land could potentially be discovered.

In conclusion, the results obtained during the study reveal that, due to the boundaries between residential properties in the Kipchak village not being clearly marked on the map, the actual dimensions of residential yards differ on average by 6 sotix from the data entered in the cadastral book for each household. As a result, while the cadastral data of Kipchak village reflected the area of residential buildings as 15.69 hectares in reports, in reality, the area of residential buildings was found to be 23.81 hectares. Consequently, every year the state tax authorities have been deprived of the opportunity to collect taxes on 8.12 hectares of land from houses in the village area. Of course, my goal was not to verify the correct collection of land tax. Primarily, this pilot experiment was intended to test the possibility of accurately defining residential area boundaries, which could be applied for remote landscaping of the village territory, laying electricity lines, and

organizing work based on public-private partnerships. This would allow for correct determination of the work area for each household and help prevent potential disputes over residential property boundaries. The results revealed that this could bring even greater economic benefits for society than I had anticipated.

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Ibatova Sh. M., candidate of medical sciences,
associate professor
Samarkand State Medical University
Samarkand, Republic of Uzbekistan

EVALUATION OF HEMOCOAGULATION STATUS IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

Annotation: *An analysis of the parameters of the blood hemostasis system in patients with chronic obstructive pulmonary disease was performed. The data presented highlight the significant pathogenetic significance of changes in hemostasis in patients with chronic obstructive pulmonary disease, which requires the search for new methods of pathogenetic therapy based on anticoagulant effects.*

Key words: *chronic obstructive pulmonary disease, patients, blood, hemostasis, indicators, shifts.*

Introduction

It is known that the lungs play a significant role in maintaining the physiological balance of the coagulation, fibrinolytic system and in the regulation of hemostasis [3,4,6,11]. Thus, the lungs are the site of fibrinolysis, the richest source of heparin. In addition, in the reticuloendothelial cells of the connective tissue of the lungs, the possibility of synthesizing fibrinogen, prothrombin, tissue thromboplastin and Ac - globulin is allowed [8,10]. Naturally, the inflammatory process in the lungs can be accompanied by changes in the blood coagulation system. Of particular interest are these changes in chronic lung pathology in children, when emerging hemocoagulation disorders can aggravate hypoxia and determine the course and prognosis of the disease [1,2,5,7,9,12].

Violation in the hemostasis system in chronic lung pathology determines the severity of the disease, the presence of an exacerbation, the degree of pulmonary heart failure, so monitoring this system is important.

Purpose of the study

To analyze the parameters of the blood hemostasis system in patients with chronic obstructive pulmonary disease.

Materials and research methods

100 patients with chronic obstructive pulmonary disease were examined, which were divided into two groups: group I consisted of 30 patients aged 12-14 years (with bronchial deformity - 24 patients; with bronchiectasis - 6), and group II - 70 patients aged 15 and over. -16 years old (with bronchial deformity - 46 patients; with bronchiectasis - 24).

Recalcification time according to the method of K. Bergerhof et Roka. Determination of prothrombin time according to the method of A.L.Qwik; Plasma

fibrinogen concentration was determined by the gravimetric method of R.A. Rutberg; The level of free heparin according to the method of E. Simray. Ethanol test according to V.G. Lychev; Lipinski protamine sulfate test; Fibrinolytic activity according to the method of M.A. Kotovshchikova and B.I. Kuznik. Plasma tolerance to heparin according to the L. Poller method. Fonio's platelet count. PDF according to the method of Merskey et al.

Results of the study and their discussion

Studies of the indicators of the hemostasis system were carried out for the first time on the days of admission to the clinic in the acute phase, against the background of heparin therapy (7-8 days of treatment), and after the treatment before discharge. The results of the study of the coagulation system are presented in Table 1.

Table 1.

Changes in hemostasis parameters in chronic obstructive pulmonary disease in children upon admission in the acute phase (M±m)

№	Indicators	Healthy children		Children with chronic obstructive pulmonary disease	
		3-7 years	8-15 years	3-7 years n=30	8-15 years n=70
1.	**Plasma recalcification time (sec)**	90,1±6,8	90,6±7,8	78,2±5,4 P<0,05	74,6±4,7 P<0,05
2.	**Plasma tolerance to heparin (min)**	8,74±0,69	9,38±0,79	6,94±0,44 P<0,05	6,45±0,76 P<0,001
3.	**Free heparin in blood plasma (sec)**	6,4±0,54	7,1±1,12	4,2±0,5 P<0,02	3,8±0,52 P<0,001
4.	**Plasma fibrinogen (g/l)**	2,94±0,12	2,69±0,2	4,81±0,6 P<0,001	5,1±0,47 P<0,001
5.	**PDF (g/l)**	2,8±0,9	2,91±0,92	3,4±0,76 P>0,05	6,7±0,96 P<0,05
6.	**ethanol sample**	negative	negative	13,3% positive	20% positive
7.	**Protamine sulfate test**	negative	negative	10% positive	25,7% positive
8.	**Prothrombin index (%)**	94,5±0,44	96,0±0,76	94,8±1,2 P>0,1	99,88±1,02 P<0,05
9.	**Platelets (1 µl)109 /l**	239.0 ±13,6	268±9,76	288,2±17,5 P<0,05	300±22,0 P<0,05
10	**Fibrinolytic activity (%)**	10,2±0,91	10,7±0,94	7,71±0,92 P<0,05	6,23±0,74 P<0,001

Note: *P- reliability of the difference between the indicators of healthy and sick children*

As can be seen from Table 1, in the period of exacerbation with chronic obstructive pulmonary disease in the studied children in all age groups, the average value of the time of recalcification compared with analogous indicators in

healthy children is accelerated 78.2±5.4 74.6±4.7 (P <0.05), which indicates an increase in the overall blood clotting ability. When studying the time of blood plasma recalcification, depending on the form of chronic pneumonia, Fig.1. it was found that in children with bronchiectasis, an even more shortening of the time of blood plasma recalcification was observed compared with the group of healthy children and averaged 76.04±4.68 sec. (P<0.001) and in children with bronchial deformity without their expansion 79.14±3.46 sec. (P>0.1).

The most significant acceleration of the time of recalcification was observed in children with a serious condition in the complication of chronic obstructive pulmonary disease with pulmonary heart failure, the addition of circulatory failure. On average, it was 70.4±3.4 seconds, which is significantly (P<0.05) higher than in patients with moderate disease severity 82.68±5.4. According to the Bergerhof-Rock test, it can be noted that in patients with chronic obstructive pulmonary disease there are shifts towards hypercoagulability, while the severity of these shifts depends both on the activity of the inflammatory process in the bronchopulmonary system and on the severity and duration of the disease.

Data on the content of free heparin in blood plasma in patients with chronic pneumonia showed significant changes. Thus, in the phase of exacerbation of the disease, there was a sharp (P<0.001) decrease in free heparin in all age groups, on average, up to 4.2±0.5 seconds; 3.8±0.52, at the norm, respectively, 6.4±0.54; 7.1±1.12 seconds. When considering individual fluctuations in 18 patients with a recent (2-year-old) duration of the disease, the level of free heparin was within the normal range, in 6 patients above the control figures.

So the first days of admission to the clinic, the level of free heparin in these patients slightly exceeds the general indicators and averaged 5.75±0.95; 4.84±0.64 sec. (P>0.05). Based on the data obtained, it can be noted that the level of free heparin in the blood of sick children with chronic obstructive pulmonary disease in the phase of exacerbation of the disease tends to decrease. A decrease in the content of free heparin indicates an increased readiness of the blood to coagulate, as a result of an exacerbation of the inflammatory process in the lungs. The higher content of free heparin in the blood that we have established in the bronchiectasis variant and in the severe course of the disease, apparently, is a consequence of an increase in the number of mast cells in the focus of inflammation and a manifestation of one of the mechanisms of the body's compensatory-adaptive reactions to the constant hypoxic state of patients in this group, so how heparin increases the tolerance of tissues to oxygen, adapts them to a lack of oxygen.

Data on the content of fibrinogen in blood plasma in patients with chronic obstructive pulmonary disease are shown in Table 1.

Analysis of our results revealed an increase in the content of fibrinogen in the blood plasma in children with this pathology aged 13 to 16 years 4.81±0.6, while in the control group it was 2.94±0.12; 2.69±0.2 (P<0.001). Marked hyperfibrinogenemia in our studies occurs due to an increase in inflammatory fibrinogen A, which is an indicator of inflammation (caused by the inflammation process) and is aimed at limiting the focus of inflammation.

Somewhat different results were obtained in the study of the content of fibrinogen in patients with bronchiectasis and with a severe course of the disease, so these patients showed the greatest increase in the content of fibrinogen in the blood plasma compared with patients with bronchial deformity, with moderate severity of the disease (P<0.05) and was 5.8±0.35; 6.8±0.52, which indicates the highest activity of the inflammatory process in these patients. Данные протромбинового индекса у больных с хронической пневмонией подвержены довольно незначительным колебаниям (табл. 1). В фазе обострения хронической обструктивной болезни легких наблюдалось достоверное повышение среднего показателя у больных от 8 до 15 лет и составило 99,88±1,02 (P<0,05). У больных детей в возрасте от 3 до7 лет отмечалось некоторые повышение протромбиновой активности 94,8±1,2 (P>0,1), в то же время в группе здоровых детей этот показатель в среднем составлял 94,5±0,44; 96,0±0,76%.

As can be seen from the above data, the prothrombin index in sick children with chronic pneumonia has a deviation from the norm. At the same time, the most significant deviation from the level of control figures was observed in the phase of exacerbation of the disease.

A study of the platelet link of hemostasis showed that during the period of exacerbation of chronic pneumonia, an increase in the number of platelets was observed in all age groups (288.2±17.5; 300±22.0). Of these, in some children of patients with bronchiectasis and a serious condition, hyperthrombocytosis was observed (329.8±13.1; 342.4±18.7), which we assessed as a thrombophilic condition.

An analysis of blood fibrinolytic activity (FAK) showed that in children with this disease at the age of 13-16 years, an insignificant decrease in the average level of 7.71 ± 0.92% was observed at admission, with a norm of 10.2 ± 0.91%. The most pronounced decrease in fibrinolytic activity was observed in patients aged 8-15 years (6.23±0.74 P<0.001).

FAK blood was detected in 3% of sick children with a serious condition with pulmonary heart failure. So, in the phase of exacerbation of the disease, FAC in these patients was 11.48±0.96 P<0.05 compared with the control group 10.20±0.91. In children with a moderately severe condition, the index of fibrinolytic activity of the blood was significantly reduced (P<0.001). An increase in FAC is explained by significant hypoxia of organs and tissues, a compensatory response of the body to increased blood clotting, and a factor preventing thrombosis.

Summarizing the above data, it should be noted a clear dependence of the state of the blood coagulation system on the phase of the course, the clinical form, the duration of the disease, and the severity of the patients' condition.

When studying the hemostasis system in patients with chronic obstructive pulmonary disease, depending on the clinical form, age and severity of the patients' condition, we encountered large fluctuations of these indicators. In this

regard, we identified the following types of changes in the functional state of the hemostasis system in chronic pneumonia in children.

We regarded the increase or decrease in hemostasis indicators from the initial level of healthy children by 50-60% as a compensatory type, 60-90% subcompensatory type, 100% or more decompensatory type I and below 40% decompensatory type II hemostasis disorders Table 2.

A compensatory type of disorder was observed in 60% of patients aged 3-7 years and 44.3% at the age of 8-15 years. When assessed from the clinical form, a compensatory type of disorder was observed in 34.3% of patients with bronchial deformity without their expansion. And in patients with moderate severity, a compensatory type of hemostasis disorder was observed in 28.6%.

Table 2.
Comparative assessment of hemostasis indicators in relation to the number of patients (%)

Indicators	Compensatory type	Subcompensatory type	Decompensatory type I	Decompensatory type II
In children aged 3 to 7 years n=30	60	26,6	13,4	-
For children 8 to 15 years old n=70	44,3	38,6	12,8	4,3
With bronchial deformity n=70 With bronchiectasis n=30	34,3	65,7	-	-
With moderate condition n=84 With serious condition n=16	-	33,4	56,6	10

In patients with a compensatory type of hemostasis disorder during exacerbation of chronic obstructive pulmonary disease, a moderate activation of the procoagulant link of the hemostasis system occurs. The activation of the procoagulative link was evidenced by a moderate increase in plasma fibrinogen content, a shortening of the plasma recalcification time, an increase in plasma tolerance to heparin, a slight decrease in blood fibrinolytic activity (P> 0.05) and a negative ethanol and protamine sulfate test. We regarded the compensatory type of hemostasis impairment as a state of moderate hypercoagulability and considered it an adequate response of the body to inflammation. A subcompensatory type of hemostatic disorder was observed in 26.6% of patients aged 3-7 years, in 38.6% of patients aged 8-15 years, in children with bronchial deformity, a subcompensatory

type of disorder was observed in 65.7%, with bronchiectasis in 33, 4% of patients, which was associated with the duration of the disease and the incidence of bronchiectasis.

When studying the severity of the condition of patients, the subcompensatory type of disorder was found in 71.4% of patients with moderate severity. In patients with a subcompensatory type of hemostasis disorder, there was a higher activation of the procoagulant link of the hemostasis system. These patients had an even more significant increase in fibrinogen content.

In decompensatory type I hemostasis disorders, the level of prothrombin activity began to decrease, the level of fibrinogen significantly increased ($P<0.001$), and more noticeably than in the subcompensatory type of disorder, the most significant acceleration of recalcification time was observed, the content of heparin in the blood was significantly reduced, inhibition was noted. fibrinolytic activity of the blood, in 25% of children all paracoagulation tests - fibrinogen B, ethanol, protamine sulfate test were positive.

Conclusions

Thus, the presented data indicate a significant pathogenetic significance of changes in hemostasis in patients with chronic obstructive pulmonary disease, which requires the search for new methods of pathogenetic therapy based on the anticoagulant effect.

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Ismoilov K.T.
asisstenti
tibbiy biologiya va genetika kafedrasi
Samarqand davlat tibbiyot universiteti
Narzilloyeva Z. N.
talabalari
Narzilloyeva F. N.
talabalari
Samarqand davlat tibbiyot universiteti

QONNING NORMAL IVIMASLIGI ANOMALIYASINING TARQALISHI VA KELIB CHIQISH SABABLARI

Annotatsiya: *Ushbu maqolada qonning normal ivimasligi anomaliyasi-gemofiliya kasalligi yoritilgan .Unda qon ivish tizimidagi nuqsonlar,X xromosomaga bog'liq irsiylanish mexanizmi,asosiy patogenetik omillar va klinik ko'rinishlar bayon etilgan.Zamonaviy laborator tashxis va davolash usullariga ham e'tibor qaratilgan.*

Kalit so'zlar: *gemofiliya,qon ivish mexanizmi,koagulatsiya tizimi buzilishi,ivish omillari yetishmovchiligi(VIII va IX), X xromosomaga bog'liq irsiy kasallik,gemorragik holatlar,laboratory tashxis,zamonaviy davolash usullari.*

Ismailov K. T.
assistant
department of medical biology and genetics
Samarkand State Medical University
Narzillaeva Z. N.
student
Narzillaeva F. N.
student
Samarkand State Medical University

PRESENCE AND CAUSES OF ABNORMAL BLOOD COAGULATION ANOMALY

Abstract: *This article discusses hemophilia as an anomaly of normal blood coagulation.It describes defects in the blood coagulation system,the X-linked inheritance mechanisim,the main pathogenetic factors,and clinical manifestations of the disease.Special attention is paid to modern laboratory diagnostic methods and treatment approaches.*

Key words: *hemophilia,blood coagulation mechanism,disorders of the coagulation system,deficiency of clotting factors(VIII and IX) X-linked hereditary disease,hemorrhagic conditions,laboratory diagnostics,modern treatmen methods.*

Kirish

Gemofiliya kasalligi qonning ivishini ta’minlovchi oqsilni sintez qiladigan ferment strukturasining buzilishi natijasida yuzaga chiqadi.Gemofiliya kasalligining irsiy xususiyatiga ega ekanligi ilgaridan ma’lum.Ayrim ma’lumotlarga qaraganda bu kasallik bilan faqat erkaklar kasallanishi V asrdayoq ma’lum bo’lgan.Hozirgi kunda gemofiliyaning bir qancha turlari ma’lum (A,B,C.D). Qonning normal ivimasligi anomaliyasi bilan tug’ilgan bolaning kindigi kesilganda qon ketishi to’xtamasdan bola halok bo’lishi mumkin.Qon ketishining to’xtamasligi ozgina jarohatlangan ichki organlarda ham yuz beradi.Qon ivish tizimidagi ushbu murakkab jarayonlarning buzilishi turli gemorragik kasalliklarning rivojlanishiga sabab bo’ladi. Gemofiliyaning; gemofiliya A (VIII faktor etishmovchiligi) va gemofiliya B (IX faktor etishmovchiligi) hisoblanadi. Kasallik asosan X-xromosoma bilan bog‘liq genetik o‘tish tufayli erkaklarda ko‘proq uchraydi; ayollarda esa ko‘pincha tashuvchi bo‘lib qoladi. Gemofiliya dunyoda kam uchraydigan, ammo davolash va boshqarish strategiyalari talab qiladigan surunkali X xromosomaga bog’liq retsessiv tarzda irsiylanadigan patalogiya hissoblanadi.

Tadqiqot maqsadi:qonning normal ivish mexanizmlari va gemofiliyaga olib keluvchi buzilishlarni o’rganish,kasallikning irsiy asoslarini,asosiy patogenetik omillarini va klinik ko’rinishlarini aniqlashdir.Shuningdek, tadqiqot gemofiliyaning zamonaviy laborator tashxis usullari va davolash yondashuvlarini tahlil qilishni ham maqsad qiladi.

Tadqiqot materiali va adabiyotlar tahlili

Gemofiliya kasalligining irsiylanish tipi X xromosomaga bog’liq retsessiv xarakterga ega.

1-jadval

Irsiylanish mexanizmi

Ona	Ota	Natija	Izoh
XHXH	XY	XHY-normal o’g’il,XHXH-normal qiz	Har ikki normal
XHXH	XhY	XHY-normal o’g’il,XHXh-tashuvchi qiz	Faqat qiz tashuvchi bo’ladi
XHXh	XY	XHY-normal o’g’il,XhY-kasal o’g’il,XHXH-normal qiz,XHXh-tashuvchi qiz	Kasallik faqat o’g’ilga o’tadi
XHXh	XhY	XhY-kasal o’g’il,XHY-normal o’g’il,XHXh-tashuvchi qiz,XhXh-kasal qiz	Juda kam uchraydi,qiz ham kasal bo’lishi mumkin

XH-normal allel, Xh-gemofiliya alleli

Butunjahon gemofiliya federatsiyasining (World Federation of Hemophilia, WFH) ma’lumotlariga qaraganda gemofiliya kasalligi odatda,faqat erkaklarda

uchraydi chunki bu kasallikni keltirib chiqaruvchi retssessiv mutant gen X-xromosomalarda joylashgan bo'lib,Y-xromosomlarda bu gen uchramaydi.Gemofiliya kasalligi bilan og'rigan ota o'zining gemofiliyani yuzaga chiqaruvchi mutant geni bo'lgan X-xromosomasini qiziga beradi. Ammo bu X-xromosomani olgan qiz gemofiliya bilan og'rimaydi,Chunki unda shu genning dominant alleli bo'lib (XH), geterozigotali organizmda (XHX) dominant gen belgisi yuzaga chiqadi.Lekin bu qiz kasal bo'lmasada, shu kasallikni tashuvchi hisoblanadi.Tashuvchi ona endi o'zidagi gemofiliya kasalligi genini o'z o'g'illariga o'tkazadi.

Qon ivimasligi anomaliyasining quyidagi asosiy turlariga ajratish mumkin:

Gemofiliya A- VIll faktor yetishmovchiligi

Gemofiliya B- IX faktor yetishmovchiligi

Gemofiliya C-XI faktor yetishmovchiligi (kam uchraydi)

Kasallikning asosiy belgilari:bo'g'imlar va mushaklarga qon quyilishi;ko'karishlar,ichki qon ketishlar,bola davrida kuchli qon ketishga moyillik,og'riq,harakat cheklanishi.

Gemofiliyni xalqlar o'rtasida tarqalishi Butunjahon gemofiliya federatsiyasining ma'lumotlariga ko'ra; Ba'zi Arab va Yaqin Sharq hududlari bo'yicha Bag'dodda gemofiliya umumiy prevalensiya 15.9/100 000 aholiga teng bo'lib, bu 8.1/100 000 umumiy global ko'rsatkichdan yuqori bo'lsa, Eronda — 7.1/100 000, Turkiya — 7.0/100 000, Misr — 6/100 000 ni, rivojlangan 2024 yilgi WFH Annual Global Survey 2024 ma'lumotlariga ko'ra, global darajada jami 459 606 qon ivish buzilishi bilan yashovchi bemorlar aniqlangan. Bu raqamlar 135 mamlakatdan olingan ma'lumotlarga asoslanadi (89% javob darajasi).qayd etilgan.

Jahonda 271 918 kishi gemofiliya bilan (shu jumladan 224 353 hemofiliya A va 45 600 gemofiliya B) og'rigan. Shundan 110 184 von Willebrand kasalligi;

77 504 boshqa qon ivish buzilishlari. So'nggi hisobotlarda global aniqlangan gemofiliya bemorlar soni 6% ga oshgani, von Willebrand kasalligi aniqlanishi ham 6% ga oshgani qayd etilgan.Jumladan; Gemofiliya A — tax. 17.1 / 100 000 erkaklar; Og'ir Gemofiliya A — 6.0 / 100 000;Gemofiliya B — 3.8 / 100 000; Og'ir Gemofiliya B — 1.1 / 100 00 nisbatta ekanligi qayd etilgan.

Natijalar va muhokama

Epidemiologik tadqiqotlar shuni ko'rsatadiki, gemofiliyaning geogrfik tarqalishi va asosan daromad darajasiga qarab mamlakatlarda sezilarli darajada farq qiladi. Tashxis imkoniyatlari va tibbiyot tizimi kuchli bo'lgan yuqori daromadli mamlakatlarda gemofiliya aniqlanish sur'ati yuqori, past daromadli mamlakatlarda esa ko'pincha kasallik yetarli darajada aniqlanmaydi. Gemofiliya klinik belgilari,davolash,statistik hisob kitoblarni to'g'risidagi mulohazalar bilan qisqacha tanishamiz.Klinik belgilar-uzoq qon ketishi;ko'karishlar (Hematomalar); bo'g'imlarda qon quyilishi (Hemartroz);mushak ichiga qon quyilishi;ichki qon ketish;burundan qon ketish;yangi tug'ilgan chaqaloqlarda (bosh chaqasiga qon quyilishi).Gemofiliyaning ma'lum davosi yo'q,ammo u tibbiyot mutaxassislar tomonidan muvaffaqiyatli davolanadi.Davolashning maqsadi yo'qolgan proteinlarni tiklash va muammolarni oldini olishdir.Yo'qolgan yoki yetarli

bo’lmaganqon ivish omillarini berish yoki tiklash talab qiladi.Gemofiliyani davolash simptomlarni yengillashtirishga qaratilgan bo’lib, bu ksallik irsiy bo’lganligi uchun uni davolab bo’lmaydi. Teri jarohatlarida thrombin,prontrombin eritmalari va aminokapron kislotani qo’llash orqali alomatlar yengillashtiriladi. Hisob kitoblarga ko’ra dunyo taxminan har 10 000 kishidan 1 nafari gemofiliya kasalligiga chalingan va bu degani yer yuzi bo’yicha 450,000 kishi gemofiliyadan aziyat chekadi. Gemofiliya bilan 59% bemorlar cheklangan harakatlanish qobiliyatiga ega,94% ota-onalari tomonidan qo’llab-quvvatlanishni his etadilar, 51% bemorlar farzandlaridagi gemofiliya oilalarni yanada jipslashtirishini his etadilar.

Xulosa

Gemofiliya bo’yicha olib borilgan tadqiqotlar irisy genetik bilimlar bilan klinik amaliyotni birlashtirib, bemorlar hayotini yaxshilash va kasallikni oldini olish imkoniyatlarini sezilarli darajada kengaytiradi.Bu ilmiy mulohazalar nafaqat kasallik mexanizmini tushunishda balki sog’lom avlodni ta’minlashda ham muhim ahamiyat kasb etadi.Shuningdek, gemofiliya tadqiqotlari ko’rsatadiki, har bir gen,har bir xromosoma “Hayotiy kod” sifatida bemorlarning hayotiga bevosida ta’sir qiladi.Shu sababli, genetik maslahat va erta tashxis nafaqat kasallikning klinik oqibatlarini kamaytiradi, balki oilalarga kelajak avlodni sog’lom va xavfsiz shakllantirish imkoniyatini beradi.

Butun jaxon gemofiliya federatsiyasining (BJGF) hozirgi 2025 yilga qadar gemofiliya va von Willebrand kasalligini aniqlash darajasini sezilarli oshirish maqsad qilingan (25% gemofiliya bo‘yicha) bo’lsa, BJGF har yili 20 000 dan ortiq bemorlarga gumanitar yordam ko‘rsatishni davom ettirishni vazifalarni yuklamoqda. Bu esa bemorlar bilan hamkorlikda kasallikning irsiylanish, kelib chiqish darajasini kamaytirish, ijtimoiy himoya kuchaytirish, aholini irsiy kaslliklarni kelib chiqishi, oqibatlari haqida bilim darajasini oshirish va klinik imkoniyatlarni yaxshilash yo‘lida sog’lom turmush tarziga rioya qilish bu kasllikni sonini kamytirishga erishiladi.

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Ismoilov K. T.
asisstenti
Samarqand davlat tibbiyot universiteti
Ergasheva R.
talaba
Jononboyeva Sh.
talaba
Djumayeva S.
talaba
Samarqand davlat tibbiyot universiteti

EKOLOGIYA BUZILISHI OQIBATLARINING INSON SALOMATLIGIGA TA'SIRI VA ONTOGENETIK, IRSIY O'ZGARUVCHANLIK OQIBATLARI

Annotatsiya: *Ushbu maqolada ekologik muhitning buzilishi natijasida inson salomatligida yuzaga keladigan patologik holatlar, shuningdek, ontogenetik va irsiy o'zgaruvchanlikka ta'sir etuvchi omillar tahlil qilinadi. Atmosfera, suv va tuproq ifloslanishining inson organizmiga ta'siri statistik ma'lumotlar asosida baholanib, ekologik stress omillarining genetik apparatga ta'siri ilmiy jihatdan yoritiladi. Tadqiqot natijalari ekologik muammolarning nafaqat individual, balki avloddan-avlodga o'tuvchi salbiy oqibatlarga ega ekanligini ko'rsatadi.*

Kalit so'zlar: *ekologiya, salomatlik, ontogenez, irsiy o'zgaruvchanlik, mutatsiya, ekologik stress.*

Ismailov K. T.
assistant
Samarkand State Medical University
Ergasheva R.
student
Zhononboeva Sh.
student
Dzhumaeva S.
student
Samarkand State Medical University

THE IMPACT OF ENVIRONMENTAL DEGRADATION ON HUMAN HEALTH AND THE CONSEQUENCES OF ONTOGENETIC, HEREDITARY VARIABILITY

Abstract: *This article analyzes pathological conditions arising in human health as a result of environmental degradation, as well as factors influencing ontogenetic and hereditary variability. The impact of atmospheric, water, and soil pollution on the human body is assessed based on statistical data, and the*

influence of environmental stress factors on the genetic apparatus is scientifically illuminated. The research results show that environmental problems have not only individual, but also hereditary negative consequences.

Keywords: *ecology, health, ontogenesis, hereditary variability, mutation, ecological stress.*

Kirish

So‘nggi o‘n yilliklarda sanoatlashtirish, urbanizatsiya va texnogen faoliyatning jadallashuvi natijasida ekologik muvozanat keskin buzildi. Atmosfera havosining ifloslanishi, ichimlik suvi sifatining pasayishi, radiatsion va kimyoviy omillarning ortishi inson salomatligiga jiddiy tahdid solmoqda. Jahon sog‘liqni saqlash tashkiloti ma’lumotlariga ko‘ra, ekologik omillar global kasalliklarning qariyb **23–25 %** ini keltirib chiqaradi.Ekologik muhitning buzilishi nafaqat somatik kasalliklarni, balki ontogenetik rivojlanish jarayonida kechadigan morfofunksional o‘zgarishlarni ham yuzaga keltiradi. Bundan tashqari, genetik apparatga ta’sir etuvchi mutagen omillar irsiy o‘zgaruvchanlikni kuchaytirib, kelajak avlod salomatligiga salbiy ta’sir ko‘rsatadi.

Bugungi kunda ekologik muammolar insoniyat oldida turgan eng dolzarb global masalalardan biri hisoblanadi. Sanoat ishlab chiqarishining keskin rivojlanishi, qishloq xo‘jaligida kimyoviy moddalardan haddan tashqari foydalanish, transport vositalari sonining ortishi natijasida tabiiy muhitning ifloslanish darajasi yildan-yilga oshib bormoqda. Ilmiy tadqiqotlar shuni ko‘rsatadiki, insonlarda uchraydigan kasalliklar va patologik holatlar yagona omil bilan emas, balki bir nechta biologik va ijtimoiy omillar majmuasi ta’sirida yuzaga keladi.

Adabiyotlar sharxi

Ekologik ifloslanish — bu tabiiy muhit tarkibiga tirik organizmlar uchun zararli bo‘lgan moddalar yoki energiya shakllarining me’yoridan ortiq darajada kirib kelishidir.

Ilmiy tadqiqotlar shuni ko‘rsatadiki, insonlarda uchraydigan kasalliklar va patologik holatlar yagona omil bilan emas, balki bir nechta biologik va ijtimoiy omillar majmuasi ta’sirida yuzaga keladi.

Ekologik ifloslanish quyidagi asosiy turlarga bo‘linadi:atmosfera havosining ifloslanishi;suv havzalarining ifloslanishi;tuproqning kimyoviy ifloslanishi; radiatsion ifloslanish;shovqin va elektromagnit ifloslanish.Atmosfera havosining ifloslanishi inson salomatligi uchun eng xavfli omillardan biri bo‘lib, u asosan sanoat korxonalari, transport vositalari va energetika tizimlari faoliyati bilan bog‘liq.

Tadqiqot materiallari va metodlari

Statistik tahlil (korrelyatsion va foizli taqqoslash),ekologik va tibbiy adabiyotlar tahlili .Model asosida sog‘liq ko‘rsatkichlarini solishtirish.Grafik va sxematik modellashtirish.

Tahlil uchun shartli ravishda ekologik jihatdan ifloslangan hududlar va nisbatan toza hududlar aholisining salomatlik ko‘rsatkichlari solishtirildi (n = 1000).

Natija va muhokama

Ilmiy tadqiqotlar shuni ko‘rsatadiki, insonlarda uchraydigan kasalliklar va patologik holatlar yagona omil bilan emas, balki bir nechta biologik va ijtimoiy omillar majmuasi ta’sirida yuzaga keladi.

1-jadval.

Ekologik holatga qarab kasallanish darajasi (%)

Kasallik turi	Toza hudud (%)	Ifloslangan hudud (%)
Nafas yo‘llari kasalliklari	12	34
Yurak-qon tomir kasalliklari	18	41
Allergik kasalliklar	9	27
Onkologik kasalliklar	4	11

Jadvaldan ko‘rinib turibdiki, ekologik ifloslangan hududlarda yashovchi aholida kasallanish darajasi deyarli 2–3 barobar yuqori.

Ontogenez davrida (embrional, bolalik va o‘smirlik bosqichlarida) ekologik zararli omillar quyidagi holatlarga olib keladi:Jismoniy rivojlanishning sekinlashuvi; Immun tizimining susayishi; Asab tizimi faoliyatining buzilishi;Gormonal disbalans.

Ekologik stress → hujayra darajasida zararlanish → metabolik buzilish → organ va tizimlar faoliyati izdan chiqishi → rivojlanish nuqsonlari kabi ketma-ketlikdagi oqibatlarga sabab bo’ladi.

Irsiy o‘zgaruvchanlik va genetik xavflar-Ekologik muhitda mavjud mutagenlar (og‘ir metallar, pestitsidlar, ionlashtiruvchi nurlanish) DNK tuzilmasiga bevosita ta’sir ko‘rsatadi.

2-jadval.

Ekologik omillarga bog‘liq genetik o‘zgarishlar

Omil turi	Genetik ta’sir turi	Oqibat
Radiatsiya	Xromosomal aberratsiya	Tug‘ma nuqsonlar
Og‘ir metallar	Gen mutatsiyasi	Metabolik kasalliklar
Pestitsidlar	DNK replikatsiyasi buzilishi	Irsiy sindromlar

Statistik tahlil natijalariga ko‘ra, ifloslangan hududlarda tug‘ma nuqsonlar uchrash chastotasi 1,8–2,2 baravar yuqori ekanligi aniqlangan.

Shartli ravishda inson salomatligini 100 % deb olsak, patologiyalarning kelib chiqish omillari quyidagicha taqsimlanadi.

3-jadval.

Inson salomatligiga ta’sir etuvchi asosiy omillar (%)

Omillar guruhi	Ulushi (%)	Misollar
Turmush tarzi	45–50 %	Noto‘g‘ri ovqatlanish, kamharakatlik, chekish, alkogol
Ekologik omillar	20–25 %	Havo, suv, tuproq ifloslanishi, radiatsiya
Irsiy (genetik) omillar	15–20 %	Tug‘ma kasalliklar, gen mutatsiyalari
Tibbiy xizmat sifati	10–15 %	Profilaktikaning sustligi, kech tashxis
Jami	100 %	

Muhokama

Olingan natijalar ekologik buzilishlar inson salomatligiga ko‘p darajali ta’sir ko‘rsatishini tasdiqlaydi. Ontogenetik rivojlanishdagi o‘zgarishlar ko‘pincha qaytmas bo‘lib, shaxsning butun hayoti davomida saqlanib qoladi. Irsiy o‘zgaruvchanlik esa ekologik muammolarning eng xavfli jihati bo‘lib, genofondning yomonlashuviga olib keladi.Ekologik omillar va salomatlik o‘rtasida kuchli **musbat korrelyatsiya (r ≈ 0,68)** mavjudligi aniqlandi, bu esa ekologik holatni yaxshilash sog‘liqni saqlashning muhim sharti ekanligini ko‘rsatadi.

Patologiyalarning kelib chiqish omillar bo‘yichaquyidagi guruhlarga bo’lamiz;

Turmush tarzi bilan bog‘liq patologiyalar (≈ 50 %)-Bu eng katta ulushni tashkil etadi. Asosan:yurak-qon tomir kasalliklari,qandli diabet,semirish, gipertoniya, oshqozon-ichak kasalliklari. Misol:Noto‘g‘ri ovqatlanish + kamharakatlik → metabolik sindrom → yurak ishemik kasalligi.

Ekologik omillar bilan bog‘liq patologiyalar (≈ 25 %)- bu ekologik muhitning buzilishi bilan bog‘liq kasalliklar:nafas yo‘llari kasalliklari (bronxit, astma),allergiyalar,onkologik kasalliklar,immunitet yetishmovchiligi. Misol: Atmosfera havosining ifloslanishi → o‘pka to‘qimasining zararlanishi → surunkali bronxit.

Irsiy (genetik) omillar bilan bog‘liq patologiyalar (≈ 20 %)-Bu guruhga quyidagilar kiradi:tug‘ma yurak nuqsonlari, fenilketonuriya, gemofiliya,irsiy metabolik kasalliklar.Misol:DNKdagi gen mutatsiyasi → ferment yetishmovchiligi → metabolik kasallik.

Tibbiy xizmat sifati bilan bog‘liq omillar (≈ 10 %)-Bu omil kasallikning og‘irlashishiga sabab bo‘ladi:kech tashxis,noto‘g‘ri davolash, profilaktikaning yetarli emasligi.

Xulosa

Ekologiya buzilishi inson salomatligiga bevosita va bilvosita salbiy ta’sir ko‘rsatadi. Ayniqsa, ontogenetik rivojlanish va irsiy o‘zgaruvchanlik bilan bog‘liq oqibatlar uzoq muddatli va avlodlararo xavf tug‘diradi. Shu sababli:ekologik monitoringni kuchaytirish,sanoat chiqindilarini cheklash,ekologik gigiyena va profilaktik choralarni rivojlantirish dolzarb vazifa hisoblanadi.

Inson salomatligini 100 % deb olgan holda, patologiyalarning eng katta ulushi turmush tarzi (≈50 %) va ekologik omillar (≈25 %) hissasiga to‘g‘ri keladi. Bu shuni ko‘rsatadiki, ekologik muhitni yaxshilash va sog‘lom turmush tarzini shakllantirish orqali kasalliklarning kamida 60–70 % ini oldini olish mumkin.

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Isroilova M.
talaba
tibbiyot fakulteti
farmatsiya ishi
Kokand Universiteti, Andijon filliali

KASALLIKLARNI DAVOLASHDA ASALNING DORIVOR XUSUSIYATLARI HAQIDA

Annotatsiya. *Mazkur ishda asalning tabiiy dorivor xususiyatlari va xalqda ishlatiladigan shifo manba sifatida keng amalda ishlatilishi haqida ma'lumot berilgan. Inson uchun iste'moli, nafaqat xozirgi davrda, balki Qur'onni Karimda xam keltirilganligi takidlangan. Tarkibida asali bo'lgan manbalarga qarab asalning navlari haqida ma'lumot berishga harakat qilingan. Mavjud ozuq manbaiga ko'ra tarkibi o' zgarib turadi, ya'ni dorivor xususiyati xam o'zgarashi ko'rsatilgan.*

Kalit so'zlar: *tabiiy davo, shifo manbai, anemiya, kimyoviy tuzilishi. fermentlar, vitaminlar, mineral moddalar, fenal birikmalar.*

Isroilova M.
student
pharmacy
faculty of medicine
Andijan Branch of Kokand University

ABOUT THE MEDICINAL PROPERTIES OF HONEY IN TREATING DISEASES

Abstract. *This work provides information about the natural medicinal properties of honey and its widespread use as a healing source among the people. It is emphasized that its use for humans is not only in the present era, but also in the Holy Quran. An attempt has been made to provide information about the types of honey depending on the sources that contain honey. It is shown that the composition varies depending on the available food source, that is, the properties of the medicine also change.*

Keywords: *natural medicine, healing source, anemia, chemical structure. enzymes, vitamins, minerals, phenolic compounds.*

Kirish

Insoniyat avvaldan kasalliklarni tabiiy vositalar (o'simlik, suv va boshqa tabiat ne'matlari) bilan davosini izlagan. Shular qatoriga asal xam kiradi. Uning turlari va mavjud joylari turlicha bo'lib, ularni shu yerlik axoli doimo foydalanib kelgan. Bir tomondan, oziq-ovqatga qo'shimcha bo'lsa, boshqa tomondan esa dorivor vosita sifatida qaralgan va xozirda xam keng ko'lamda foydalanmoqda.

Asal -tabiat bergan shifo va hayot manbai. Asal insonga ma’lum bo’lgan eng qadimiy tabiiy maxsulotlardan biri bolib, u nafaqat shirinlik, balki haqiqiy shifobaxsh nematdir.

Asosiy maqsad-asalning dorivor xususiyatlari bilan tanishish va eng asosiy xususiyatlaridan biri immunitetni mustaxkamllashi haqida ma’lumot bilan tanishishdir.

Muxokama

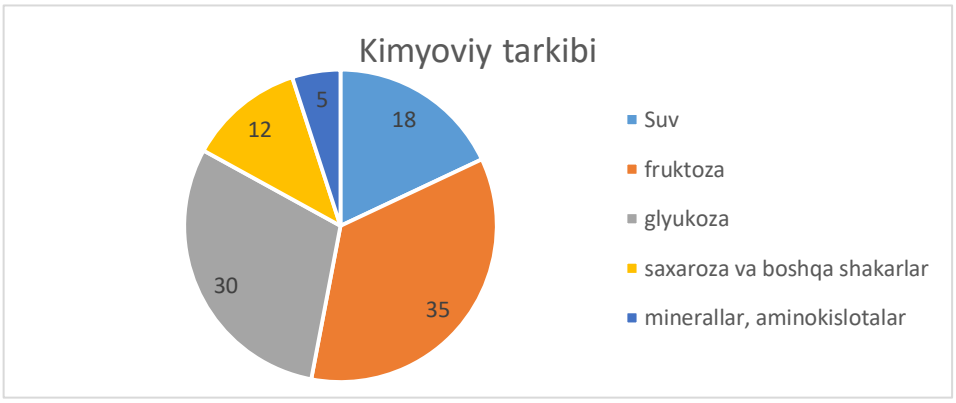
Zamonaviy tibbiyot ham asalni ilmiy tadqiqotlar asosida tasdiqlamoqda.Asal asalari nektarlari tomonidan xosil qilingan tabiiy maxsulot bo’lib, u biologik faol moddalarga boy. Boshqa tomondan, davolash va dietologik maxsulotlarni tayyorlashda keng ko’lamda ishlatiladi. Uning tarkibida misning azotni qamrab olgan birikmalari uchraydi va ular erkin aminokislotalar xisoblanadi: treonin, prolin, fenilalanin, metionin, glutamin kislota, lizin. Boshqa tomondan, oqsilli birikmalar xam uchraydi (fermentli va erkin aminokislota) – bu miqdoriy jihatdan muhim ko’rsatkich emas. Bir tomondan, asalning ozuqaviy qimmatligini xam oshirishiga asos xam bo’lmaydi [9].

Asalning kimyoviy tarkibi haqida qisqacha ma’lumotlarni berib o’tsak bo’ladi.

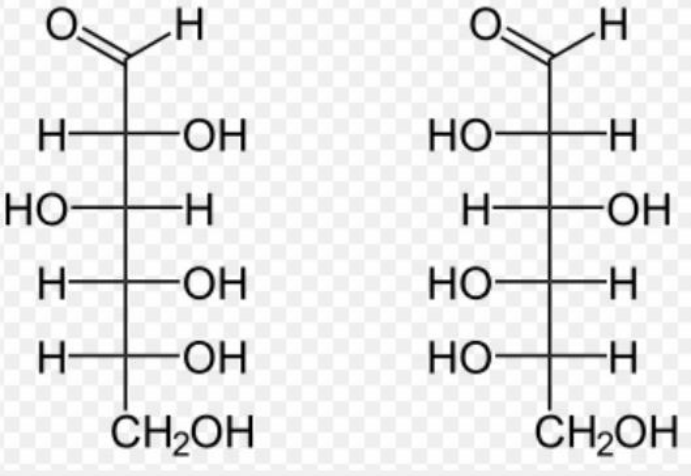
Tarkibiga quyidagilar kiradi: fruktoza(38-43%), glyukoza(31-38%), saxaroza (2-4%).

Boshqa murakkab shakar (maltoza, izomaltoza) turlari xam mavjud. Bundan tashqari, suv, mineral moddalar, vitamin, fermentlar, aminokislotalar, organik kislotalar va gul changi kabi ko’plab biologik moddallarni o’z ichiga oladi [1-4].

Asalning asosiy tarkibi C6H12O6 (fruktoza va glyukoza) dan tashkil topgan tabiiy aralashmadir.



1-rasm. Asalning tarkibidagi moddalar miqdori [7].



2 rasm. Asalning kimyoviy formulasi [8].

Tarkibida asal bo'lgan manbaga qarab, asalning quyidagi navlari mavjud: arachagul, qashqabeda, g'oza, kungaboqar, abxaz va aralash asallar.

1. Archagul asali qandlashmagan xolatda ochiq yoki qizg'ich qong'ir rangda bo'ladi, yopishqoq. Mazasi tahirroq bo'lib, o'tkir chamanzor o'tloq xidi anqib turadi.

2. Qashqabeda asali sharbatsimon xolatada tiniq qaxrabo rangda, qandlashganda esa oq yoki sarg'ish tusda toblanadi. Chokmasi mayda donador bo'ladi. Bu turdagi asal yoqimli ta'mga ega. Sifati jihatidan ham eng yaxshi asal navlari qatoridan joy egallagan [5].

3. Kungaboqar asali suyuq xolatda tiniq, qaxrabo tusda bo'ladi. Mazasi o'ziga xos juda shirin, o'ziga xos taxir biroz xushbo'y. Tez kristallashadi, cho'kmasi suvda yaxshi eruvchi bo'lib mayda yoki donadordir. Sifatiga qarab, o'rtacha navli asallar sirasiga kiradi.

4. G'oza asali rangsiz yoki och qaxrabo rangda boladi. U och kulrang tusli bo'lib, yirik yoki donador bo'lib kristallashadi. Mazasi yoqimli bir oz xushbo'y suyuq holatda o'ziga xos ta'mi borligi uchun qandlashgan xolatida ishlatiladi. Bu navli asal bir muncha past navli asallar qatoriga kiradi.

5. Abxaz asalini yovvoyi asalarilar qoya toshlarning orasi va daraxtlarning kavaklarida to'playdi. Asal va mumning aralashishi natijasida konsetratsiyasi quyuqlashadi. Mazzasi xush bo'y va juda yoqimli. Sifati va shifobaxshligiga ko'ra eng yaxshi asallar qatoriga kiradi

6. Aralash navli asal xarxil gullarning nektaridan olinadi. Shuning uchun bu asal rangi xushbo'yiligi, mazasi va konsetratsiyasi jihatdan turlichadir. Bu turdagi asalning rangi tiniqdan to qaxrabogacha va har xil toblanuvchi to'q ranggacha bo'lishi mumkin. Sifati jihatidan esa eng yaxshi asal sirasiga kiradi.

1. Organizmga foydali xolatda tasir etishi uchun asalni to'g'ri iste'mol qilish lozim. Bir sutkalik me'yori 20-50 gr (bundan ortiq yemaslik kerak).

2. Asalni och qoringa tanavul qilish yaxshiroq. Uning tarkibida (benzen C6H6) ertalab tetik holatda bo'lishga, kechqurun esa tezroq uxlab qolishga yordam beradi.

3. Asalni sut limon yoki qora zira bilan iste'mol qilish mumkin.

4. Asalni 40% darajadan yuqori bo’lmagan harortada qizdirish mumkin emas. Aks holda barcha foydali xususiyatlari yo’qoladi. Asal qo’shilgan issiq choy yurakni zo’riqishga olib keladi.

Bir yoshgacha bo’lgan bolalar va allergik kasalligi bo’lgan insonlar asalni iste’mol qilish mumkin emas [6].

Quyida asalning bilmagan foydali xususiyatlari keltirilgan:

1. Asal qon aylanishni yahshilaydi. Tarkibida temir va fermentlar borligi xisobiga qon hosil bo’lishini faollashtiradi.

2.Asalni muntazam ravishda qabul qilib borish, qon bosimini meyyorlashtiradi, xolestirin miqdorini pasaytiradi va tomirlarda tromplar kelib chiqishini oldini oladi.

Amaliy tavsiyalar

Yuqorida keltirilganlarga asoslanib qiyidagi amaliy tavsiyalarni keltirishimiz o’rinli bo’ladi:

Og’iz boshlig’i kasaliklarida xam foydalanish mumkin:

- asal milk yalliglanishi, (gingivit), ogizdan noxush xid kelishida, stomatitda ham foydalanish mumkin.
- tabiiy antibyotik manbai ekanligini tumov yutal misolida korishimiz mumkin.
- tumov yoki yotal belgillarini yengillashtirishda ham foydasi katta.
- asal choy qilib ichish juda foydalidir.
- ich ketishi (diareya)da xam samarasi katta u organizmdagi kaliy va suv zaxirasini to’ldiradi.
- asal bakteriya va viruslarga xam qarshi tasirga ega.

Teri kassaliklari:

- dermatit xar xil kichishishlarni xam davolashda ishlatish mumkin. Bunda zararlangan joyga asalli boglam qilib 2 yoki 3 soat qoyish lozim.
- asal tarkibidagi aminokislotalar -organizmning suyak to’kimasining asosiy komponenti bo’lgan kalsiyni samarali ozlashtirishga yordam beradi (suyaklar murtlashishini oldini oladi),
- stressni kamaytiradi,
- uyquni yaxshilaydi va miya faoliyatini quvvatlantiradi,
- asal erkin radikallarni neytrallashtirib, xujayra qarishini sekinlashtiradi. Ayniqsa, qora sedana bilan iste’mol qilish foydaliligi keltiralgan.
- asal temirning surilishining yahshilaydi va gemoglobin miqdorini oshishiga yordam beradi (bu ayniqsa, bolalar va xomilador ayollarga foydali),
- asal limfositlar faolligini oshiradi, yalliglanishi kamaytiradi va organizmning infektsiyaga chidamlilligini kuchaytiradi.
- kesilgan yoki tirnalgan joylarga asalli boglama qoyish foyda beradi (bu virus tushishini oldini oladi).

Organizmni mustaxkamlab virus, bakteriya, infeksiyalarga chidamlilligini oshirishda muhim omil sifatida foydalanish samarali natija beradi.

Qur’oni Karimda shu haqda mana shunday satrlar keltiriladi: “Asal aridan turli rangdagi suyuqlik chiqadi unda kishilar uchun shifo bor.Albatta bunda taffakur qiluvchilar uchun oyat alomatlar bordur”. ("Naxl" surasi, 94-oyat).

Xulosa

Mazkur ishda asal-tabiiy davo ekanligini uni togri va me’yorida iste’mol qilish soglom hayot sari yetaklashiga amin boldik. Insoniyat barcha kasalliklarni tabiiy yo’l bilan, tabiat in’om etgan ne’matlarni o’z vaqtida me’yorida iste’mol qilsa, shifo manbai sifatida qarasa, albatta, natijasi a’lo darajada foyda beradi. Asalni organizmni barcha organlari yaxshi faoliyat yuritishda va eng asosiysi immunitetni mustaxkamlashda foydasi beqiyos ekanligi namoyon bo’ldi.

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Istamova S. N.
assistant
Samarkand State Medical University
Elmurodova S. G`.
student
Samarkand State Medical University

THE USE OF ABA THERAPY FOR SPEECH FORMATION IN CHILDREN WITH AUTISTIC SPECTRUM DISORDERS

Abstract: *This article discusses the theoretical and practical foundations of the use of ABA therapy (Applied Behavior Analysis) in the process of speech formation in children with autism spectrum disorder (ASD). The article analyzes the causes of speech development delays characteristic of autism, the principles of teaching based on behavior analysis, and the importance of positive reinforcement techniques. It also provides practical examples of how ABA therapy can help children develop communication skills, increase vocabulary, and respond to social cues. The results of the study show that ABA therapy is an effective method for reducing speech development deficits, increasing communicative competence, and integrating autistic children into the social environment.*

Keywords: *autism spectrum disorder, ABA therapy, behavior analysis, speech formation, positive reinforcement, communicative development, speech therapy, special pedagogy, child rehabilitation.*

Introduction

In the modern educational and rehabilitation system, the emphasis is on the social, emotional and communicative development of children with autistic spectrum disorders (ASBs).ntroduction In the modern educational and rehabilitation system, the emphasis is on the social, emotional and communicative development of children with autistic spntroduction In the modern educational and rehabilitation system, the emphasis is on the social, emotional and communicative development of children with autistic spectrum disorders (ASBs). Autism syndrome negatively affects the child's ability to interact with the surrounding world, the development of speech activity, and behavior management processes. Therefore, the formation of speech and the development of communicative skills is one of the most important directions in working with autistic children [1]. Speech is the main tool of human thought, the exchange of social experience. In autistic children, however, the mechanisms of natural formation of this process may be impaired.peech is the main tool of human thought, the exchange of social experience. In autistic children, however, the mechanisms of natural formation of this process may be impaired. Therefore, in addition to traditional logopedic trpeech is the main tool of human thought, the exchange of social experience. In autistic children, however, the mechanisms of natural formation of this process may be impaired. Therefore, in addition to traditional logopedic training when

working with them, special Correctional technologies based on behavioral analysis, in particular ABA (Applied Behavior Analysis) therapy, provide effective results. ABA therapy is a methodology for analyzing behavior, increasing motivation, and teaching the necessary social and speech skills step by step. In this approach, the main goal is to develop the child's independent communication, purposeful use of words, the ability to respond to social signals.n this approach, the main goal is to develop the child's independent communication, purposeful use of words, the ability to respond to socialn this approach, the main goal is to develop the child's independent communication, purposeful use of words, the ability to respond to social signals. During therapy, each speech reaction of the child is observed, and through positive reinforcement (incentive), speech activity is stimulated. For example, when a child utters the desired word or speaks correctly through a hint, he is given a compliment or a small gift. Thus, ABA therapy forms speech step by step through motivational learning mechanisms [2]. Working with autistic children in the conditions of Uzbekistan has been reaching a new level in recent years. ABA therapy elements tested in developed countries are being integrated with logopedic training, social games, and cognitive developmental programs. Working with autistic children in the conditions of Uzbekistan has been reaching a new level in recent years. ABA therapy elements tested in developed countries are being integrated with logopedic training, social games, and cognitive developmental programs. On a Republican scale, individual ABA-based activities are organized under special preschool educational institutions, defectological centers and “Human” centers. This significantly improves the communicative development of autistic children. Foreign Studies show that when ABA therapy is used at an early stage, children of the autistic spectrum have a 2-3-fold increase in vocabulary, while the frequency of access to communication increases by 60-70% [1].oreign Studies show that when ABA therapy is used at an early stage, children of the autistic spectrum have a 2-3-fold increase in vocabulary, while the frequency of access to communication increases by 60-70% [1]. Therefore, the harmonization of this style with logopedic correction programs accelerates speech formation and contributes to the successful integration of the child into social life. Thus, ABA therapy is a scientifically based, effective and individualized approach to the development of speech and communicative competencies in children with autistic spectrum disorders. ABA therapy is a scientifically based, effective and individualized approach to the development of speech and communicative competencies in children with autistic spectrum disorders. The article analyzes the theoretical foundations of this therapy, its practical application and the possibilities of its introduction in the conditions of Uzbekistan. The issue of speech formation in children with autistic spectrum disorder (ASB) has been the focus of many foreign and domestic researchers in recent decades. He issue of speech formation in children with autistic spectrum disorder (ASB) has been the focus of many foreign and domestic researchers in recent decades. Scientific research in this direction is mainly proving the effectiveness of the method of behavioral analysis (ABA-Applied

Behavior Analysis) on the basis of practical evidence. American scientist American scientist B. F. The theory of behavioral analysis, founded by Skinner, interprets human actions and speech formation through a stimulus-reactmerican scientist B. F. The theory of behavioral analysis, founded by Skinner, interprets human actions and speech formation through a stimulus-reaction–reinforcement chain. The researcher noted that speech reactions are formed through positive reinforcement, which creates the most natural learning mechanism for autistic children [3]. The results of the experiment conducted by Lovaas (1987) confirmed the effectiveness of ABA therapy in a practical way. He results of the experiment conducted by Lovaas (1987) confirmed the effectiveness of ABA therapy in a practical way. The 40 hours of intensive ABA traihe results of the experiment conducted by Lovaas (1987) confirmed the effectiveness of ABA therapy in a practical way. The 40 hours of intensive ABA training he conducted recorded a significant improvement in speech development in 47% of autistic children at an early age. After this study, ABA therapy became one of the main methods of training and rehabilitation of autistic children around the world [4]. Also in his work, Smith (2013) analyzes the role of ABA therapy in increasing social adaptation, vocabulary, and communication frequency, arguing that this method is a flexible system that requires an individual approach [5].lso in his work, Smith (2013) analyzes the role of ABA therapy in increasing social adaptation, vocabulary, and communication frequency, arguing that this method is a flexible syst

Local researcher Rasulova N.ococal researcher Rasulova N. M. (2023), however, studied the effectiveness of integrating ABA therapy with logopedicocal researcher Rasulova N. M. (2023), however, studied the effectiveness of integrating ABA therapy with logopedic training in the Uzbek context. He believes that in woocal researcher Rasulova N. M. (2023), however, studied the effectiveness of integrating ABA therapy with logopedic training in the Uzbek context. He believes that in working with autistic children, harmonizing ABA elements with play activities, visual materials and emotional stimulation will give positive results. Also, Rasulova emphasizes the need to adapt the ABA approach to the local psychological and pedagogical system [6]. In general, literature analysis shows that ABA therapy is recognized as one of the main areas of speech formation in autistic spectrum disorders.n general, literature analysis shows that ABA therapy is recognized as one of the main areas of speech formation in autistic spectrum disorders. Its effecn general, literature analysis shows that ABA therapy is recognized as one of the main areas of speech formation in autistic spectrum disorders. Its effectiveness has been scientifically proven to allow the development of speech and social competencies in early childhood through intensive training. And new research conducted by scientists from Uzbekistan is expanding the possibilities of more effective use of ABA therapy by adapting it to local conditions. In children with autistic spectrum disorders, speech formation is a complex and step-by-step process, in which an in-depth analysis of the individual psychological and physiological characteristics of the child is

important.n children with autistic spectrum disorders, speech formation is a complex and step-by-step process, in which an in-depth analysis of the individual psychological and physiological characteristics of the child is important. An autistic child usually has little access to social communication, bypasses eye contact, and has little natural need for speech communication. For this reason, traditional logopedic techniques in the development of their speech in many cases do not give sufficient results. It is at this point that ABA therapy is characterized by its systematic, motivational and individual approach.It is at this point that ABA therapy is characterized by its systematic, motivational and individual approach. The essence of ABA therapy is that the behavior of the child is analyzed and the stimulating factors that aft is at this point that ABA therapy is characterized by its systematic, motivational and individual approach. The essence of ABA therapy is that the behavior of the child is analyzed and the stimulating factors that affect it are determined. Each properly executed action or speech reaction is supported by positive reinforcement. For example, when a child uses the word “give” correctly, he is given a compliment, a toy, or a small gift. In this way, the child learns to achieve the goal through his actions, and speech activity gradually begins to form. In the process of therapy, speech development is carried out in several stages. At the initial stage, the child's skills to attract sensory attention, respond to sounds, establish gestures and eye contact are strengthened.n the process of therapy, speech development is carried out in several stages. At the initial stage, the child's skills to attract sensory attention, respond to sounds, establish gestures and eye contact are strengthened. In later stages, simple words are taught, followed by prepositions and short sentences. At each stage, the teaching process is carried out on an individual program, and the child goes to the next stage, depending on the degree of success. An important aspect of ABA therapy is that it is harmonized with gaming activities. In the process of play, the child will have the opportunity to speak in a natural environment, express his opinion and respond to social gestures.n important aspect of ABA therapy is that it is harmonized with gaming activities. In the process of play, the child will have the opportunity to speak in a natural environment, express his opinion and respond to social gestures. In this way, the child learns to actively use speech not only in the teaching process, but also in everyday life. Also in therapy, visual materials are widely used cards, icons, pictures and video samples. These materials make it possible to better understand and connect the colloquial meaning, since the visual perception of autistic children is strong. Also in therapy, visual materials are widely used cards, icons, pictures and video samples. These materials make it possible to better understand and connect the colloquial meaning, since the visual perception of autistic children is strong. For example, when water painting with the word” drink " is used together, the child associates the meaning of the word with a concrete object and easily remembers it. In the process of therapy, active participation of parents and educators is also necessary. They continue the process by strengthening the words and phrases learned in daily communication with the child, creating a positive environment and stimulating each small achievement.n

the process of therapy, active participation of parents and educators is also necessary. They continue the process by strengthening the words and phrases learned in daily communication with the child, creating a positive environment and stimulating each small achievement. ABA therapy requires consistency, as the child reinforces the acquired speech skills through regular exercise. According to practical observations, children who have been engaged in ABA therapy from an early age experience an acceleration of speech development, an increase in vocabulary, an improvement in eye contact and social cues.ccording to practical observations, children who have been engaged in ABA therapy from an early age experience an acceleration of speech development, an increase in vocabulary, an improvement in eye contact and social cues. They gradually begin to adapt to the social environment, trying to express their needs in words. Most importantly, this process increases the child's self-confidence and facilitates his social adaptation.

Conclusion

In conclusion, ABA therapy is a scientifically based, systematic and personality-oriented approach to the formation of speech in children with autistic spectrum disorders conclusion: In conclusion, ABA therapy is a scientifically based, systematic and personality-oriented approach to the formation of speech ionclusion: In conclusion, ABA therapy is a scientifically based, systematic and personality-oriented approach to the formation of speech in children with autistic spectrum disorders.

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Istamova S. N.
assistant
Samarkand State Medical University
Rahimova M. A.
student
Samarkand State Medical University

WILD ROSE AND ITS IMPORTANCE IN MEDICINE

Abstract. *Namatak (Rosa Canina) is a tall shrub reaching 2-3 m in height. It grows mainly in mountains and forests. The leaves are complex, oddly feathery, with 5-9 petals, and are among the plants that bloom in June-July. When the fruits are ripe, they are dark and bright in color. The flowers are fragrant, red, black, white or yellow, 8-9 cm wide, mostly pale pink, 5-petalled, the flower has a lot of pollinators and seeds. Rosa Canina contains oil in its seeds, and cooking fish in its roots and leaves. The fruit of the Rosa Canina plant has several therapeutic properties, and for this reason, its medicinal properties canbe used in the treatment of diseases and detoxification. The fruits of Rosa Canina species come in multivitamin fruits that store various nutrients.*

Key words: *flavonoid, fibroblast, dermis, collagen, elastin, spiny, seret, leafy, nodular, dark hairy, peel, yellow, bright colored, berry, vitamin C, oil, sugar, protein, avitaminosis, carotene, pectin, root, flower, fruit.*

Rosa Canina is a common and inexpensive remedy for the Prevention of many diseases, skin care, wound healing and slowing down the aging process. Its effectiveness has been proven by a long history of the use of folk medicine. Useful fruits of the plant canbe collected in the forest and prepared independently, or purchased on the market as dry raw materials. Ready-made preparations (syrups, tablets, oil) are sold in pharmacies and specialized stores. Given the many health benefits, it is consumed as a tasty and healthy tea to strengthen the immune system during seasonal infections. It is recommended to use Rosa Canina oil for the face in regular care, as it improves the structure of the skin, protects from the sun and helps to fight the first signs of aging. Rosa Canina is a deciduous shrub with erect growing or creeping stems from -15 CM to 10 m. Rosa Canina (lat. Ephedra) plant is a cactus-like plant that is green in winter and grows in very dry areas. It is in the family Ephedraceae and is found in various regions of the world. The plant is often found in areas such as Central Asia, China, India, and South America. The homeland of namatak is the mountain slopes of Iran and the Himalayas. The healing properties of plant fruits were known in Ancient Greece and Rome. The leaves are arranged alternately on the stem. In most species, it comes up to 5-15 CM in length. The leaf shape is leafy, the edges are toothed. The leaf shape at the bottom of the STEM is lance-shaped. Mostly the color is evergreen. The petals are five, in some species four. The colors are white or pink. The harvested fruit of roses is among the berries. Rich in vitamin C. The so-called thorns, which grow

along the branches of roses, come from the tissue of the epidermis and are practically no different from the real thorn. Some species of felt have pendant branches, and these species are mainly used as ornamental plants. The Rosa Canina plant grows mainly in dry, semi-arid and mountainous areas. It is resistant to heat, cold, and low water, and has adapted to specific ecosystems. This plant uses little water and can therefore be found frequently in sub-Saharan and semi-Saharan conditions. It grows in wetter areas of mountain slopes, open areas in forested areas, river and wetlands, deserts and steppes. Resistant to frost and drought, it thrives well on loamy and gravelly soils. Rosa Canina is a medicinal and decorative plant that is widely distributed throughout the world. Its distribution is bounded by the following regions: 1. Europe and Asia. The main natural area of Rosa Canina is the temperate regions of Europe and Asia. It is particularly common in the Mediterranean, Caucasus, Central Asia, Russia, China, and India. 2. Central Asia and Central Asia. It is abundant in the mountainous regions and valleys of Uzbekistan, Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan. Usually they grow on dry steppes, weaves, mountain skirts. 3. North Africa. It is found in Mediterranean coastal states such as Morocco, Tunisia. Grows naturally in mountain slopes and natural woodlands. 4. North and South America. Imported from Europe and cultivated in countries such as the United States, Canada. It can also be found in South American countries such as Argentina and Chile. 5. Australia and New Zealand. Cultivated and found wild in some areas. This medicinal plant has long been used in traditional medicine due to its health benefits due to its certain chemical composition. Numerous studies have shown that fruits and seeds contain carbohydrates (16%), proteins (1.74%), lipids (1.04%), expressed in glucose, sucrose and fructose. Of the acids, there are most apples and lemons (3.3%), as well as a lot of useful pectin (up to 25%). The calorie content is 109 kcal (based on 100 g). Wild Rose fruits have high biological activity and healing properties. In terms of the quantitative composition and variety of vitamins and useful nutrients, they are much superior to other plants. Rosa Canina is a record holder for the amount of vitamin C, 100 g of dry fruit contains about 18 daily doses, which is 50 times more than black currant and lemon. In addition, ascorbic acid is present in the leaves and even roots of the plant. Its composition depends on the lighting and habitat of the Bush. For example, rose hips that grow in the mountains accumulate more vitamin C than those that grow in the plane. In addition to vitamin C, Wild Rose fruits contain the following trace elements: vitamins B1, B2-participate in protein and carbohydrate metabolism, are responsible for the health of the mucous membranes, skin and hair. Vitamin PP (B3) is necessary for breathing, good functioning of the cardiovascular system. Vitamin E is an antioxidant, stimulates the synthesis of hemoglobin, proteins, as it is necessary for the absorption of vitamin A, Vitamin A is an antioxidant and is a source of tissue growth, the health of the organs of vision, to increase immunity. Vitamin K-promotes normal blood clotting and mineralization of bone tissue, is involved in the formation of ATP, an energy supplier for biochemical reactions. The macro-and microelements of Rosa

Canina are made up of zinc, manganese, calcium, potassium, iron, phosphorus, magnesium, sodium, molybdenum and copper. In addition, it contains pectin, nitrogen and tannins, phytosthenins, lycopene, rubixanthin, pentosan, as well as flavanoids and essential oils. In addition to vitamin C, the leaves contain phytoncides, tannins and a lot of chlorophyll. The roots and bark of the plant store substances of pyrocatechin and pyrogal groups, phytoncides, sugar, ascorbic acid and coloring pigments. The beneficial properties of Rosa Canina include 4-6%, sometimes up to 15% vitamin, vitamin B2, P, E and K, 12-27% carotene, up to 29% organic (lemon, apple, and other) acids, up to 18% sugars, up to 3.7% pectin, up to 4.5% additives in its seed. The fruit contains medicinal herbs, citric acid, additives and other substances that are considered essential for human health. The false fruit of the Rosa Canina plant is harvested from late August until late autumn. The amount of vitamin C in cold-struck fruits decreases. The collected fruits are quickly dried in the open air in the sun or on an 80-90C stove. Sometimes the Rosa Canina fruit is sent directly to pharmaceutical plants to obtain medicinal preparations from drying. It has been found that by rubbing its dried fruits, cosachabarg Exchange has a good effect on vascular permeability. 2 tablespoons of the Rosa Canina fruit are infused in 500 ml of boiling water and infused for 1st time. The tincture is drunk from 100ml 2-3 times a day before meals. This recipe is useful for anemia, weakness, kidney and liver disease. The fruit of the Rosa Canina species belongs to the fruits with multivitamin, which store various vitamins. High vitamin types are used to treat and prevent avitaminosis diseases. An oil extract made from the seed and a soft part of its fruit-caratolin is used to treat burns, trophic ulcers, eczema, skin diseases, burns from roentgen light, ulcerative colitis and other diseases. From some types of Rosa Canina, vitamin concentrates, juices are prepared, vitamin C (Ascorbic acid) is taken, tablets and pills are made from dry fruit, decoctions are made from their flowers for washing eyes, soaking gauze in the eyes, these drugs are used in the treatment and Prevention of avitaminosis. Ascorbic acid is part of many complex preparations. Of the less abundant types of Rosa Canina Vitamin C - the fruit of Rosa Canina contains up to 0.2-2.2% vitamin C, the drug xolosas, which is made from the fruit, is used to treat liver diseases (cholecystitis, hepatitis-yellow disease, etc.). Decoctions and decoctions made from the fruit of the Rosa Canina species are used in folk medicine for the treatment of gastrointestinal diseases (diarrhea, blood mixed diarrhea, intestinal infections) and as a medicine that stops blood flow from the uterus, leaves fever, grass and urinates. This is the case of oral diseases (inflammation of the gums, and blood flow from it) with drug types oral rinse. Rosa Canina fruit is again used to energize the body, renew the metabolism, and its real fruits-nuts-inside fake fruits-are used to urinate in kidney and urinary tract diseases. Tincture and decoction made from plant roots are popularly used as a claim for diseases of the stomach and liver, and the powder of its leaves for wounds. Types of Rosa Canina fruit are used in the food industry, in the preparation of vitamin-rich concentrates, candies and other confectionery products. A decoction of Rosa Canina fruit is used to treat pulmonary tuberculosis,

liver, inflammation of the gallbladder, intestinal, kidney, bladder diseases. Not only flowers and fruits of Rosa Canina remain healing, but a decoction prepared on the basis of its leaves is considered useful for gastric pain. In folk medicine, it is even recognized that a decoction of the roots of Rosa Canina gives a lot of freshness to a person if he is drunk when a stone comes to the kidneys and gives pain. In addition, a decoction prepared on the basis of Rosa Canina fruits will give a positive result in the construction of tincture, anemia, as well as non-medication. Tincture made from Rosa Canina is used to treat small rashes observed in children, acute infectious disease with a tendency to purulent-septic complications rubella, sweating and other diseases. In addition, Rosa Canina includes the following features. Anti-aging properties. Rosa Canina is a natural storehouse of antioxidants and today, as a result of many studies, it is considered to have a powerful anti-inflammatory effect. Reduces the risk of many diseases. Thanks to vitamins A, C and E, flavonoids, phytostiroles, essential fatty acids and other useful microelements in the plant, it prevents the development of "age-related" diseases such as cardiovascular, arterial hypertension, diabetes, osteoarthritis, arthritis, cancer. Rosa Canina oil acquires a wide range of dermocosmethicity as a powerful regenerative agent and a fighter against external signs of aging. This helps maintain skin elasticity, as it stimulates the production of collagen and elastin in the dermis by acting on the fibroplasts that form these molecules. The antioxidant content of Rosa Canina, known as wild Rose, fights free radicals, prevents skin aging, reduces blemishes that appear after sun exposure, and protects against negative external factors. The anti-aging effect of the Wild Rose has been proven in studies. During the experiment, powder from seed and fruit skins was used, obtained by participants aged 35 to 65 with "goose feet" (wrinkles in the corners of the eyes). During the experiment, skin monitoring was carried out using a special Visiocan tool, which assessed its condition on several parameters: elasticity, moisture and depth of wrinkles. In addition, at the beginning and end of the study, all subjects donated blood to determine the life expectancy of cells. A significant improvement in all the assessed parameters was determined, visually the participants in the experiment were also satisfied. The blood showed a decrease in the rate of destruction of red blood cells, an increase in cell life, that is, a slowdown in the aging of the body was achieved. In addition, Rosa Canina is also used in the treatment of arthritis. In a 2018 study, Rosa Canina was found to have an effect on the gene responsible for the production of collagen in the hips – an important part of the articular fluid, the loss of which leads to osteoarthritis. Wild Rose contains fatty acid, which reduces pain, improves joint mobility in rheumatoid arthritis. Taking powder from dry berries of the plant helps to reduce the amount of synthetic drugs used in the complex treatment of arthrosis and arthritis by 40%. It helps to reduce pain and limited movements characteristic of diseases. Rosa Canina will help obese people get rid of excess weight. Its use as a safe and effective weight loss remedy has been proven in research. Firstly, it is a low-calorie product, and secondly, it contains substances that accelerate metabolism, burn fat, remove toxins and activate fat metabolism. Potassium in the

composition normalizes the water-salt balance in the body, helps to get rid of excess fluid. In addition, it helps to improve bowel function, remove toxins and reduce hunger due to the large number of pectins. The weight correction potential of Rosa Canina has been proven by Japanese scientists. The participants in the experiment-16 men and 16 women with a body mass index of 25-30-were divided into 2 groups. For 12 weeks, the first group took 100 mg of rose extract every day, and the second took a placebo tablet. Scientists did not interfere with the nutrition of the subjects. At the end of the study, it was found that rose hips significantly decreased the percentage of visceral fat, weight and body mass index and subcutaneous abdominal fat in those who received not only to the group that received the placebo, but also to their state at the beginning of the experiment. At the same time, no side effects were found. For weight loss, a decoction of tea or ground dry fruits is used, which is taken as an independent drink on fasting days or with the addition of additional fat-burning ingredients (ginger, figs, raisins). The beneficial effect on the state of the heart health, cardiovascular system was determined. A study was conducted at the Swedish Department of Experimental Medicine to help reduce the risk of cardiovascular disease by 17% when taking Rosa Canina powder. Due to the antioxidants and flavonoids contained in the fruit, it reduces the level of "bad" cholesterol, as well as high blood pressure. Diabetes one of the studies showed its benefits in the fight against type 2 diabetes. Obese patients were given a variety of drinks, some based on apples and grapes, while others were given a tincture made from the Rosa Canina plant. The study lasted 6 weeks, after which the researchers measured blood pressure indicators, blood lipid levels and insulin resistance. Scientists conclude that" bad cholesterol " has been proven to be most effective by reducing it by 6%. In gastrointestinal problems, Rosa Canina is used as a natural laxative. Thanks to pectin, digestion is stimulated, bowel function is improved and constipation is eliminated. Rosa Canina extract is used as a choleretic agent for cholecestitis and hepatocholecystitis. However, during the period of exacerbation of gastritis, stomach and duodenal ulcers, it is better to refuse to use drugs. In addition, Rose Tea has long been used to control intestinal parasites. The Rosa Canina plant is also used in cancers. Scientists conducted various experiments, changing the concentration of rose extract. The high concentration of the drug has been found to reduce the amount of two enzymes responsible for the growth of cancer cells. In addition, the extract increases the effectiveness of chemotherapy, which is traditionally used in the treatment of this type of cancer. In addition , from the Rose Rosa Canina plant, tea, broth, decoction, decoctions are prepared. It is produced as syrups and powders in the treatment of rheumatism, cystitis, colds, acute respiratory viral infections, stomach problems, atherosclerosis, diabetes, hypertension, coronary artery disease, anemia. It is widely used in medicine as a ready-made raw material for the production of medicines of various directions.. Syrup from plant fruits is used to improve appetite in children, as well an additional source of vitamin C and vitamin P for stagnation of bile in older people. Theophrastus, an ancient Greek scientist, philosopher, naturalist of the 4th century BC, described this plant in

detail in his book "Natural History". The use of Rose Powder to strengthen dental gums is mentioned in the herbal medicine books of 1563. Wild rose oil was used to treat wounds during an era when antiseptics and sterilization methods were not yet discovered. Ancient medical herbalists described the beneficial properties of the plant and the diseases it helps. To treat wounds and prevent gangrene in ancient warriors, bandages were impregnated with decoctions of petals and used as ointments for wounds to quickly recover from injury.

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Kalandarov M. M.
researcher
department of geomatics engineering
Samarkand State University of Architecture and Construction
named after Mirzo Ulugbek
University of Architecture and Construction

ORGANIZATIONAL AND TECHNICAL FOUNDATIONS OF LAND ACCOUNTING IN SETTLEMENTS

Abstract: *This article focuses on the ongoing reforms in land accounting and their practical implementation, particularly emphasizing the need to pay special attention to the principles of efficient use of land resources.*

Keywords: *Settlement, land accounting, residential areas, remote sensing, cadastral maps, and unauthorized land plots.*

The ongoing reforms in land accounting and their practical implementation in our republic, particularly the focus on principles of efficient land resource utilization, are yielding positive results. In this context, on December 21, 2021, President Shavkat Mirziyoyev held a meeting to discuss the formation of land records and state cadastres, as well as the introduction of digital technologies in the sector. During this meeting, it was reported that 412,000 previously unaccounted real estate objects were added to the cadastral database, additional structures were identified in 478,000 objects, and their cadastral values were reassessed. Furthermore, numerous issues were found in the cadastral documents for roads, electricity and gas supply, water management, landscaping facilities, and areas adjacent to multi-story buildings. While the residential areas in these territories account for 223,000 hectares in the land balance, in reality, they exceed one million hectares. Consequently, a task has been set to inventory such real estate objects, create an electronic map based on the results, and make it available on an open online platform for public access. This process introduces the concept of accounting for various objects closely related to the overall territorial settlement.

When registering territories by mahalla, working groups are equipped with the following measuring and technical tools, depending on the inventory direction:

Working group for the 1st direction: GPS, Tacheometer, and Drones;

Working groups of the 2nd direction: a map printed on paper from a satellite image, a tape measure, a laser meter, and a compass.

Work will be carried out to prepare maps depicting all real estate objects, agricultural land plots, and other categories of objects located within the mahalla territory, including the boundaries of the mahalla.

Topographers will fully compile maps of MFYs (mahalla citizens' assemblies) based on all categories of data on settlement lands and real estate objects, as well as taking into account other features such as roads, ditches, streets, and others. When creating topographic maps of mahallas using UAV flights, pre-existing (Google) satellite imagery is prepared and used in field conditions for land accounting.

After examining each household or non-residential property, relevant recommendations are given to the owner or heirs of the residential premises, based on the following circumstances:

- if there are additions to the construction part compared to the cadastral passport;

- if, despite having a cadastral passport and legal basis, the property has not undergone state registration;

- in the complete absence of a cadastral passport or legal basis, and when other circumstances are identified (the process of applying through the Public Services Center as prescribed by law is explained);

When summarizing land accounting results and preparing summary data, the responsible employee must enter the daily recorded results into the database and provide daily information on the work done to the head of the working group. The entered data will be used by specialists maintaining the land balance in the formation of the land fund. Currently, the total area of the land fund of the Republic of Uzbekistan as of January 1, 2025, is 44.9 million hectares. Of this, 9.6% is irrigated agricultural land, 1.7% is rainfed land, 46.8% is desert and semi-desert pastures, and 24.9% is forest fund land. The lands of settlements are an administrative-territorial unit, and their specific features compared to the land fund categories established in our republic are that they are distinguished by their legal status and management purpose. These include lands of cities (towns) and villages, settlements established by legislation for these purposes. As of January 1, 2021, the total land area of settlements is 223.5 thousand hectares, or 0.50% of the total land area (Table 11).

Table 1

Information on land fund categories of the Republic of Uzbekistan

№	Ер фонди тоифаларининг номи	Умумий ер майдони (минг. га)
1	қишлоқ хўжалигига мўлжалланган ерлар	24057.1
2	аҳоли пунктларининг (шаҳарлар, посёлкалар ва қишлоқ аҳоли пунктларининг) ерлари	223.5
3	саноат, транспорт, алоқа, мудофаа ва бошқа мақсадларга мўлжалланган ерлар	876.3
4	табиатни муҳофаза қилиш, соғломлаштириш ва рекреация мақсадларига мўлжалланган ерлар	728.4
5	тарихий-маданий аҳамиятга молик ерлар	14.7
6	ўрмон фонди ерлари	12021.4
7	сув фонди ерлари	827
8	захира ерлар	6144
Жами:		**44892.4**

In the process of economic sector development, the distribution of land resources among various branches of the national economy takes place. Within each sector, land use is carried out by different enterprises, organizations, and institutions. Within the boundaries of certain land holdings (land users), land serves either as the primary means of production (in agriculture) or as a spatial foundation independent of its fertility, according to experts in the field. Therefore, targeted efforts are currently underway to reform settlement lands.

Table 2

Changes in land area allocated to settlement lands across the republic (thousand hectares)

T/P	Республика, шаҳар ва вилоятларнинг	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	Қорақалпоғистон Республикаси	29,7	29,8	29,8	37,1	37,1	36,7	36,6	36,4	36,2	36,4	36,8
2	Андижон	12,3	12,3	12,3	12	12	12	11,9	11,9	11,8	11,9	11,9
3	Бухоро	7,7	7,8	7,8	7,8	7,8	7,8	7,8	7,8	7,7	7,8	7,6
4	Жиззах	10,3	10,4	10,4	10,3	10,3	10,3	10,3	10,3	10,3	10,3	10,4
5	Қашқадарё	11,7	11,7	11,8	11,4	11,4	11,5	11,5	11,5	11,5	11,5	12,4
6	Навоий	15,5	15,9	15,9	15,8	15,8	15,7	15,6	15,6	15,7	15,6	15,5
7	Наманган	18,4	18,1	18,1	17,6	17,6	17,4	19,4	19,5	19,6	19,5	20,4
8	Самарқанд	15,8	19,2	19,2	19,2	19,2	19,2	19,7	19,7	19,6	19,7	19,3
9	Сурхондарё	10	10	10	10,6	10,6	10,6	10,5	10,7	10,9	10,7	11,3
10	Сирдарё	8,1	8,1	8,1	8	8	8,1	8,1	8,1	8,1	8,1	7,8
11	Тошкент	40	40	48,8	38,2	38,2	38,3	37,8	37,9	37,9	37,9	37,9
12	Фарғона	16,8	16,8	17,1	16,7	16,7	16,7	16,7	16,7	16,9	16,7	16,8
13	Хоразм	6,3	6,3	6,3	6,4	6,4	6,4	6,4	6,3	6,4	6,3	6,4
14	Тошкент ш.	17,8	9,6	8,5	8,5	8,5	8,5	8,5	8,8	8,9	8,8	9,2
	Жами	220,4	216	224,1	219,6	219,6	219,2	220,8	221,2	221,4	221,2	223,5

As can be seen from the tables and diagram above, there has been a lack of systematic approach in accounting for settlement lands, with figures for 2012-2013 not corresponding to the general trend. The increase in settlement lands from 2019 to 2021 necessitates the pre-selection of territories to be designated as settlement lands and ensuring all necessary conditions for granting settlement status. These analyses indicate the need to regulate the accounting of both the quantity and usage of settlement lands. This calls for proper organization of control measures and prevention of deficiencies and serious issues in the formation of operational information.

In conclusion, it should be emphasized that among natural resources, land allocation stands out as a material basis due to its economic potential for the population. Special attention should be paid to remote sensing of land during the monitoring and accounting of settlement lands. Remote sensing of land implies that monitoring of residential areas and accounting of buildings and structures should be carried out using satellite imagery and UAVs.

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Karimova K. K.
phd student (basic doctoral program)
in theory and methodology of education
and upbringing (primary education)
faculty of preschool and primary education
Bukhara State Pedagogical Institute

COHERENT SPEECH AS A LEADING FACTOR IN DEVELOPING SPEECH COMPETENCE OF PRIMARY SCHOOL STUDENTS

Abstract: *Ensuring the quality and effectiveness of the educational process is considered one of the primary tasks set by society. Providing education and upbringing to students, especially primary school pupils, in accordance with modern requirements is an initial, challenging, yet essential process. This article discusses the role of coherent speech in developing the speech competence of primary school students, its didactic potential, and the current state of its implementation.*

Keywords: *coherent speech, speech competence, subject, exercise, "Word Chain".*

Today, one of the most emphasized aspects in the field of education is the relationship between the teacher and the student, the correct and high-quality organization of the educational process, and transforming students from passive objects of the process into active subjects. Achieving significant success in the education system depends not only on providing knowledge through simple memorization, but also on engaging students in small research activities and problem-solving tasks, shaping them into strong personalities capable of independent thinking, expressing their own opinions, and demonstrating acquired knowledge, skills, and competencies in practice.

Students demonstrate their acquired knowledge, skills, and abilities primarily through speech competence. Only a student who has their own speech and viewpoints can correctly assess a situation and express appropriate solutions, suggestions, and ideas. Developing such skills requires systematic work from an early age. In this regard, coherent speech plays an invaluable role in developing the speech competence of primary school students.

In developing coherent speech among primary school students, taking into account their anatomical, physiological characteristics, as well as their level of physical development, is a key factor for success. The formation of coherent speech influences the student's lifestyle, social position, and role within the classroom and family environment. The student's primary task becomes learning, acquiring knowledge, skills, and abilities, mastering the laws of nature and society, and verbally expressing their ideas.

Coherent speech requires a certain level of aspiration, volitional effort, activity, and goal-oriented behavior. Gradually, spontaneous actions are replaced by deliberate, planned intellectual activity [2].

As education advances to a new stage, students' thinking abilities expand and access to information becomes easier. In such conditions, failure to use innovative technologies to develop independent thinking and coherent speech skills significantly reduces the effectiveness of education. When lesson topics are connected with real-life events and innovative teaching methods are applied, lessons become more memorable. Only by integrating interdisciplinary approaches and innovative methods based on modern requirements can teachers form students' knowledge, skills, competencies, and foster their personal development.

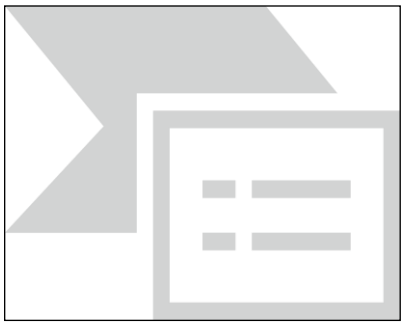
Methodological literature emphasizes that literary language is primarily based on monologic speech. Therefore, speech development holds an important place in the education system. Monologic speech represents a structured system of logically consistent statements related to a specific topic and aimed at influencing others [1].

Each academic subject plays a role in developing coherent speech; however, mother tongue and reading literacy lessons provide the most effective opportunities for systematic and rapid development. Especially in mother tongue lessons, various targeted exercises allow for comprehensive development of coherent speech. In grades 1–2, developing coherent speech is identified as a leading objective of many exercises.

Before focusing on exercises, the proportion of coherent speech development tasks in grades 1–2 mother tongue lessons can be presented as follows:

	Coherent speech development tasks	**Proportion**
1.	Grade 1	20%
2.	Grade 2	45%

Although the objectives of these exercises are unified, the expected outcomes are achieved through diverse methods.

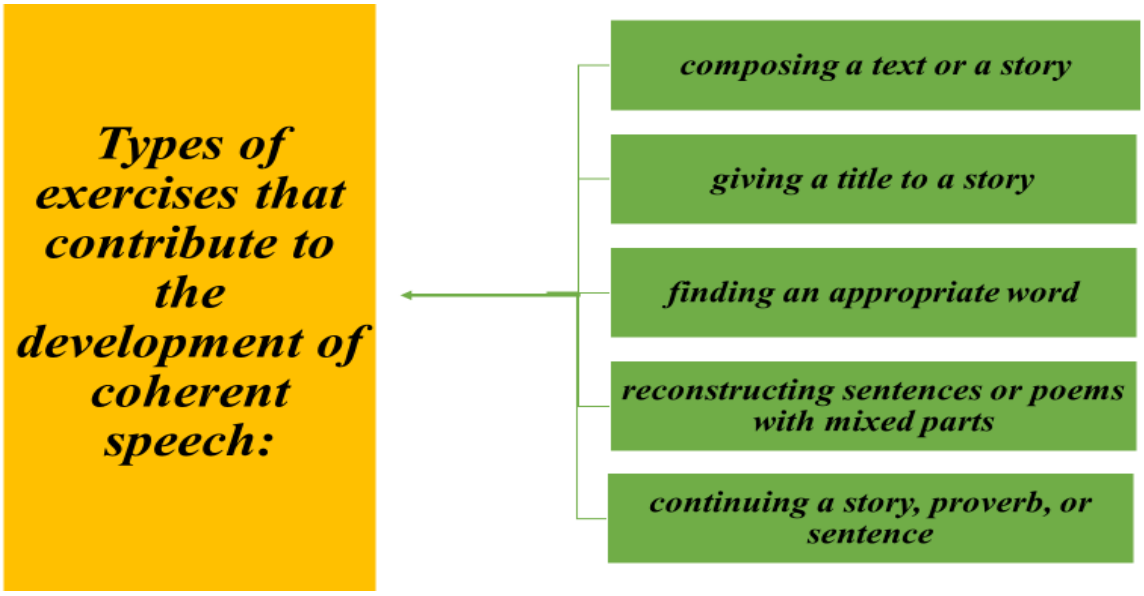


For example, one exercise requires students to write about how their favorite national dish is prepared. This not only develops coherent speech but also enhances students' knowledge of cultural traditions. The sequential preparation of ingredients helps students form logical connections in speech. Such exercises are engaging because they are closely related to students' lives and interests.

A significant portion of textbook exercises involves composing stories or short texts. Additionally, tasks that require describing a person, object, or event help overcome difficulties in coherent expression and enrich speech content.

Many exercises aimed at developing coherent speech are based on answering questions related to a given text. These tasks significantly contribute to speech development, as many students struggle to express ideas orally as fluently as in written form. Question-and-answer activities encourage interconnected and complementary thinking. They also prompt students to analyze advantages and disadvantages, imagine processes, and articulate ideas related to practical activities, thus preventing mere rote memorization and repetition of texts.

Work on coherent speech begins during the literacy instruction stage. Students compose short texts and present oral stories. However, relying solely on storytelling is insufficient and may cause boredom due to monotony, especially among young learners. Therefore, mother tongue lessons include various types of exercises aimed at improving coherent speech. These exercises become increasingly complex across grade levels. Based on the analysis of exercises aimed at improving coherent speech in Grade 4 mother tongue lessons, the exercises can be classified into the following types:



By grade 4, students demonstrate higher abilities to work with texts and express ideas, so exercises become multifunctional. One such activity, the “Word Chain,” requires students to add appropriate case endings to given words and construct sentences that are logically connected.

In one of the exercises presented in the textbook, students are required to read a fairy tale and retell its content; therefore, a sufficiently developed level of coherent speech is essential. Students must be able to construct a text by logically and semantically connecting sentences to one another.

Another exercise, based on preparing an interview on the topic “I Love My Motherland”, promotes students’ work with dialogic texts and contributes to the development of their communicative competence. For many students, initiating communication and expressing extended ideas within a given topic remains a challenging task.

The majority of coherent speech development exercises in textbooks involve composing texts or expressing personal opinions based on a given topic or existing knowledge.

In conclusion, only a student with well-developed coherent speech can organize words and sentences systematically to clearly and accurately express their thoughts. Although coherent speech may seem like a simple speaking skill, it is closely linked to cognitive capacity and the ability to integrate knowledge.

To effectively develop coherent speech among primary school students, the following recommendations should be considered:

taking into account students' psychological and age characteristics;

applying an individual approach to each student;

teaching students to work collaboratively within a group.

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Khakimova Kh. Kh.
department of public health and healthcare management
Samarkand State Medical University
Ganieva N. S.
lecturer
skin and genital diseases
Abu Ali ibn Sina Technical College of Public Health in Kattakurgan

MARKETING MANAGEMENT IN THE HEALTHCARE SYSTEM: MANAGEMENT MECHANISMS AIMED AT IMPROVING POPULATION HEALTH AND REDUCING THE RISK OF DISEASES (ON THE EXAMPLE OF STATE AND NON-STATE HEALTHCARE INSTITUTIONS)

Annotation: *This article examines the role of marketing management in the healthcare system as an effective management mechanism aimed at improving population health and reducing disease risks. Using the example of state and non-state healthcare institutions, the study analyzes modern marketing approaches applied in healthcare management, including patient-oriented strategies, health promotion programs, and preventive marketing tools. Particular attention is given to the integration of marketing mechanisms into public health policy, the formation of healthy lifestyle values, and the improvement of medical service quality and accessibility. The research highlights the differences and similarities in marketing management practices between public and private healthcare institutions and evaluates their impact on disease prevention and health outcomes. The findings emphasize that the effective use of marketing management tools contributes to increasing public health awareness, optimizing healthcare services, and reducing the overall burden of diseases in society.*

Keywords: *Marketing management, healthcare system, public health, disease prevention, population health, healthcare services, state and non-state medical institutions, health promotion, preventive healthcare.*

Introduction

In the contemporary landscape of healthcare, effective marketing management has emerged as a pivotal mechanism for enhancing population health and mitigating disease risk. This necessity grows from the increasing complexity of healthcare systems, where both state and non-state institutions strive to navigate the evolving needs of patients and communities. By implementing strategic marketing practices, healthcare organizations can better communicate their value propositions, improve patient engagement, and foster healthier lifestyles. For instance, the integration of advanced technologies such as Artificial Intelligence and Blockchain can not only streamline operations but also strengthen patient trust and data security, fundamentally reshaping health delivery models (Patil PK et al., 2025)(Chowdhury RH, 2025). Furthermore, a comprehensive understanding of the

economic burdens associated with diseases—illustrated vividly within the aquaculture sector, for example—can inform more targeted and effective marketing strategies to prioritize public health interventions (A Asha et al., 2025). As such, marketing management plays an integral role in operational excellence, ultimately redefining how healthcare institutions meet community health challenges and enhance outcomes (Salvatore D et al., 2025).

The definition of marketing management in healthcare involves strategic planning, implementation, and evaluation of marketing strategies that aim to promote health services and improve patient outcomes. This comprehensive approach is essential as it not only addresses the promotion of services but also encompasses the assessment of population health needs and the development of interventions tailored to meet those needs. Effective marketing management in healthcare institutions, both state and non-state, relies on understanding consumer behavior and leveraging data to enhance service delivery. For instance, advancements in technology, like artificial intelligence, significantly contribute to marketing strategies by enabling precise identification of health trends and efficient patient targeting, thereby streamlining resource allocation (R Aswini et al., 2025). Moreover, integrating ethical considerations, as seen in immune-modulating therapies, ensures that marketing practices align with patient welfare and informed consent, fostering trust and transparency (Rizvi M, 2025). Ultimately, marketing management serves as a pivotal mechanism to improve accessibility and reduce disease risk in diverse populations (Shepherd A, 2025)(Dessap AM et al., 2025).

The significance of population health and disease risk reduction cannot be overstated, especially in the context of comprehensive marketing management within healthcare systems. By prioritizing the health of populations, healthcare institutions can mitigate the financial burdens associated with diseases, as evidenced by studies highlighting the substantial economic impact of health issues, such as the estimated US$ 2.48 billion loss in the Indian aquaculture sector due to disease (Jalilzadeh M et al., 2025). Effective communication strategies are instrumental in increasing public awareness about preventative measures and health risks, thereby fostering informed decision-making among consumers (Davenport C et al., 2025). Moreover, addressing socio-cultural determinants reveals critical insights that can guide interventions aimed at reducing obesity and related health risks, as these factors play a significant role in shaping health behaviors (Patil PK et al., 2025). In this way, integrating population health strategies into marketing frameworks serves to enhance health outcomes and decrease the incidence of preventable diseases, promoting overall community well-being (Robin T Higashi et al., 2025).

In the complex landscape of healthcare delivery, both state and non-state institutions play pivotal roles in shaping population health outcomes. State healthcare systems, often funded and regulated by government entities, aim to provide universal access to care, ensuring that basic health services are available to all, particularly vulnerable populations. Conversely, non-state healthcare

institutions, including private facilities and non-profit organizations, contribute to a diverse array of services, frequently targeting specific health issues or demographic groups. The interplay between these sectors is crucial; for instance, collaboration between public health initiatives and private providers can enhance disease prevention strategies, addressing health disparities reflected in various community contexts. Effective marketing management within these institutions must leverage insights from consumer behavior and community needs to foster intergenerational well-being, as highlighted in the concept of responsible aging, which accommodates individuals across the lifespan (Heinonen K et al., 2025). Further, integrated care models addressing comorbidities like depression and diabetes demonstrate the necessity of holistic approaches in both sectors (Fanelli G et al., 2025).

The Role of Marketing Management in State Healthcare Institutions

Effectively implemented marketing management within state healthcare institutions plays a crucial role in promoting health and improving patient outcomes by enhancing accessibility to necessary services. With the rise of digital health technologies, state healthcare institutions must harness these innovations to bridge gaps in service delivery, particularly among underserved populations, as evidenced by disparities between Spanish and English-speaking individuals in utilizing digital tools ((Robin T Higashi et al., 2025)). Furthermore, strategic marketing management can facilitate the dissemination of information regarding self-test devices, ensuring that patients make informed decisions about their health, consequently empowering individuals to seek timely care and follow up effectively ((Robin T Higashi et al., 2025)). This aligns with the increasing need for regulatory oversight to mitigate consumer misinterpretation that can arise from inadequate information ((Davenport C et al., 2025)). Moreover, addressing economic determinants of health through targeted marketing initiatives can reduce the burden of diseases on healthcare systems, thus promoting a healthier population (). Ultimately, a comprehensive marketing strategy is imperative to achieving desired health outcomes within state healthcare institutions.

Effective strategies for promoting public health initiatives must leverage the strengths of both state and non-state healthcare institutions, focusing on collaboration and resource optimization. The integration of circular economy principles into healthcare can enhance sustainability and improve overall health outcomes by aligning entrepreneurial innovation with institutional support, as evidenced in recent studies (Mamash A et al., 2025). Additionally, comprehensive approaches addressing co-occurring conditions, such as diabetes and depression, highlight the necessity for integrated care models that consider the complexities of patient health and lifestyle factors (Fanelli G et al., 2025). Furthermore, the design of inclusive social protection frameworks can mitigate risks and foster resilience among vulnerable populations, emphasizing the importance of equity in public health strategies (Rustamova N et al., 2025). Lastly, the application of artificial intelligence in agriculture presents innovative solutions for food security, thereby contributing to public health by ensuring nutritional accessibility (Ozor N et al.,

2025). Together, these strategies illustrate the multifaceted nature of effective public health promotion.

The utilization of data analytics in targeted health campaigns has become a pivotal element in marketing management within healthcare systems, enhancing the ability to identify at-risk populations and tailor interventions accordingly. By leveraging robust data analytics, healthcare institutions can analyze demographic trends, health behaviors, and socio-economic factors that influence health outcomes. This analytical approach not only aids in the segmentation of populations for effective outreach but also empowers institutions to allocate resources efficiently, ensuring that health messages resonate with specific groups. For instance, insights gained from data can elucidate the perceived costs of health behaviors, ultimately refining campaign strategies that address affordability and accessibility, as highlighted in extensive studies on consumer adoption behaviors in technology (Addula SR, 2025). Furthermore, addressing algorithmic biases in digital health communication is crucial, as these biases can skew campaign effectiveness and reinforce health disparities (Romanishyn A et al., 2025). As the need for integrated and context-sensitive marketing strategies intensifies, continuous adaptation and ethical scrutiny of data utilization are essential (Christou E et al., 2025)(Bierecki D et al., 2025).

Effective collaboration with community organizations serves as a pivotal strategy in enhancing outreach efforts within the healthcare system, ultimately improving population health outcomes. Such partnerships are crucial for bridging gaps in healthcare access, especially in underserved areas where public health infrastructures may be lacking. This collaborative approach draws on the strengths of local organizations to foster community engagement, exemplified in Baguio City, where local leadership partnered with various stakeholders to implement proactive health measures during the COVID-19 pandemic (Eloise J M Agbayani, 2025). Additionally, integrating community-driven initiatives with financial models like Takaful can further amplify outreach by providing accessible health financing tailored to the cultural context of community members (Shehu FM, 2025). By leveraging resources and expertise from these organizations, healthcare institutions can implement targeted health promotion and disease prevention strategies that resonate with community needs, thereby fostering sustainable health improvements and reducing the overall risk of diseases (Teagan J Weatherall et al., 2025)(Henry JA, 2025).

Marketing Mechanisms in Non-State Healthcare Institutions

In the realm of non-state healthcare institutions, marketing mechanisms play a pivotal role in enhancing service delivery while simultaneously addressing public health concerns. Unlike their state counterparts, which often prioritize universal access and affordability, non-state entities leverage strategic marketing to differentiate their services and target specific demographics. This approach fosters competition, compelling healthcare providers to innovate and improve their offerings, ultimately enhancing patient outcomes. For instance, contemporary marketing strategies can facilitate patient engagement through advanced digital

platforms that incorporate Artificial Intelligence and Blockchain technology, ensuring secure and effective health management solutions (A Asha et al., 2025). Moreover, the economic implications of diseases, highlighted in various sectors, underscore the necessity of tailored marketing strategies that prioritize disease prevention and management, allowing such institutions to allocate resources effectively and enhance overall population health (Patil PK et al., 2025). This dynamic interplay between marketing and healthcare outcomes is crucial for non-state institutions striving to meet the evolving needs of diverse patient populations.

In the contemporary healthcare landscape, branding plays a pivotal role in shaping patient trust and engagement, serving as a decisive factor in healthcare marketing management. A well-crafted brand not only communicates a healthcare institutions values and quality of care but also fosters a sense of safety among patients. Research indicates that individuals are more likely to engage with healthcare providers that present a strong, cohesive brand identity, as trust is inherently linked to perceived credibility and reliability (Tsang H, 2025). Moreover, effective branding strategies can facilitate a more personalized patient experience, enhancing engagement by making patients feel valued and understood (Dzreke SS et al., 2025). For instance, the integration of empathetic communication in branding has been shown to positively influence patient perceptions and satisfaction levels (Meier C zu Biesen, 2025). As healthcare markets become increasingly competitive, institutions that prioritize robust branding are better positioned to navigate challenges and cultivate long-term patient relationships (Liao C-H, 2025).

In the evolving landscape of healthcare, digital marketing strategies have emerged as fundamental tools for enhancing patient acquisition and retention within both state and non-state healthcare institutions. By leveraging data-driven approaches, institutions can effectively target specific demographics, fostering a deeper connection with potential patients. For instance, personalized content marketing and automated communication strategies enable healthcare providers to engage individuals on a more personal level, thereby increasing patient loyalty and satisfaction. Furthermore, integrating artificial intelligence into these marketing efforts has proven beneficial; organizations leveraging AI can optimize their outreach through predictive analytics, identifying trends and tailoring services accordingly (SATHYADEVI R et al., 2025). Such strategies reflect the shift towards a more adaptive marketing model that balances technology with human interaction, ensuring that patients receive both relevant information and personal care (Chowdhury RH, 2025). Ultimately, successful digital marketing not only contributes to effective patient management but also leads to improved health outcomes, aligning with broader public health objectives (Tanaka S, 2025)(Bakker C et al., 2025).

In the evolving landscape of healthcare, patient feedback has become indispensable for shaping service offerings that are aligned with consumer needs. By actively soliciting and incorporating patient perspectives, healthcare institutions can enhance their service delivery models and improve population

health outcomes. The strategic use of feedback mechanisms enables institutions to identify gaps in care, address disparities in access, and tailor interventions to diverse patient populations. For instance, studies have shown that understanding the barriers faced by Spanish-speaking patients in utilizing digital health technologies can lead to more inclusive service designs that enhance engagement and adherence (Robin T Higashi et al., 2025). Moreover, the integration of advanced technologies, such as AI-driven tools for early cancer detection, can be guided by patient insights to ensure that these innovations meet patient expectations and improve diagnostic accuracy (Tusher MI et al., 2025). Thus, leveraging patient feedback not only fosters a patient-centered approach but also drives operational efficiency and effectiveness in health management practices.

Comparative Analysis of State vs. Non-State Healthcare Marketing Strategies

In the competitive landscape of healthcare, the marketing strategies employed by state and non-state institutions reveal notable disparities in approach and efficacy. State healthcare organizations often prioritize public health messaging, focusing on community-wide benefits and population health improvement, as highlighted in the concept of responsible aging, which emphasizes well-being across generations and contexts (Heinonen K et al., 2025). Conversely, non-state institutions leverage targeted marketing techniques, utilizing advanced analytics and artificial intelligence to predict health trends and enhance service delivery, resembling approaches noted in other sectors where technology drives efficiency (Tusher MI et al., 2025). This dichotomy is further underscored by the need for comprehensive public health interventions that address obesity and other chronic conditions, which are multifaceted and require a collaborative response from both types of organizations (Jalilzadeh M et al., 2025). Additionally, the implementation of AI technologies in oral cancer diagnosis showcases the transformative potential of non-state healthcare marketing strategies (Vinay V et al., 2025). Such differences illustrate the varying adaptability and resource allocation inherent in state versus non-state healthcare marketing efforts.

The disparities in funding and resource allocation significantly impact the effectiveness of healthcare marketing management, particularly in enhancing population health and mitigating disease risks. State and non-state healthcare institutions exhibit pronounced differences in financial backing, leading to varied capabilities in service delivery and preventive care initiatives. For instance, while comprehensive strategies are often hampered by limited resources in public facilities, private institutions may leverage better funding to implement advanced technologies and innovative practices (Rahman MM et al., 2025). Moreover, the inequity in regional healthcare funding further exacerbates health disparities; northern regions typically receive greater investment compared to the underfunded southern regions in Italy, affecting access to clinical trials and innovative therapies (Polignano M et al., 2025). These inequities not only reflect differences in market responsiveness but also impede the development of proactive health management

policies, creating a pressing need for reforms that enhance resource distribution frameworks (Y Zhang et al., 2025)(Michnik J, 2025).

The intricacies of target demographics and their corresponding health needs necessitate a nuanced marketing approach within both state and non-state healthcare institutions. Recognizing the heterogeneity among populations is essential, as variations in age, socioeconomic status, and cultural backgrounds profoundly influence health behaviors and outcomes. For example, the rise of responsible aging highlights the importance of integrating well-being across generations, emphasizing collaborative practices that cater to older adults while promoting intergenerational support (Heinonen K et al., 2025). Furthermore, understanding dietary preferences rooted in these demographics can guide healthcare marketing; studies show that adherence to national dietary guidelines varies significantly with ultraprocessed food consumption influencing noncommunicable disease risks (Samuel J Dicken et al., 2025). Tailoring services to fit these demographic profiles requires financial institutions to adopt flexible strategies that consider social influences and perceived costs, particularly for younger consumers, thereby cultivating greater accessibility and acceptance of health services (Addula SR, 2025). Ultimately, the ethical application of AI in healthcare marketing can support these tailored efforts by addressing common challenges such as algorithmic bias and privacy risks, thereby ensuring equitable access to health information (Ismail OH et al., 2025).

The effectiveness of marketing approaches in healthcare can significantly influence health outcomes by aligning organizational strategies with public health needs. As healthcare systems increasingly adopt innovative technologies, it is essential to incorporate these advancements into targeted marketing initiatives that enhance patient engagement and education. For instance, technologies such as Artificial Intelligence and Digital Analytics allow healthcare providers to tailor messages that resonate with specific populations, ultimately driving behavior change and improving adherence to treatment protocols. However, the marketing strategies must address broader systemic challenges, including economic burdens associated with diseases, as evidenced by the findings which indicate that treatment costs and production losses can be staggering in managing health issues like diabetes and depression. Integrated care models that promote collaboration across sectors are crucial in addressing these challenges, as they can improve treatment efficacy and patient outcomes, thoroughly demonstrating the value of adept marketing management in healthcare settings (Ungar-Sargon J, 2025)(Chowdhury RH, 2025)(Patil PK et al., 2025)(Fanelli G et al., 2025).

Conclusion

In conclusion, effective marketing management within healthcare systems plays a pivotal role in enhancing population health and mitigating disease risk. This analysis has elucidated the necessity for both state and non-state healthcare institutions to adopt innovative management mechanisms that align with evolving consumer needs and technological advancements. The integration of evidence-based strategies, as noted in recent studies, is crucial in formulating effective

interventions that can facilitate public health education and promote healthier choices among the population (Samuel J Dicken et al., 2025). Furthermore, the reliance on artificial intelligence tools for communication can inadvertently contribute to information distortion, thereby necessitating vigilant oversight in marketing practices (Romanishyn A et al., 2025). Additionally, the prevailing focus on pharmaceutical profitability over public health imperatives underscores the imperative for structural reforms within the healthcare sector (Ungar-Sargon J, 2025). Ultimately, fostering a culture of adaptability and informed decision-making among healthcare stakeholders is essential for achieving lasting improvements in public health outcomes (Chowdhury RH, 2025).

The analysis of marketing management in healthcare reveals several key findings that underscore the need for strategic approaches aimed at enhancing population health while mitigating disease risk. Effective marketing management within both state and non-state healthcare institutions necessitates a comprehensive understanding of the interconnectedness of various health conditions, as demonstrated by the intricate relationship between diabetes and depression, which emphasizes the importance of integrated treatment models for better patient outcomes (Fanelli G et al., 2025). Furthermore, the economic burden of healthcare-associated diseases, such as those impacting aquaculture, illustrates the vast costs incurred from ineffective disease management, necessitating prioritization in resource allocation for health interventions (Patil PK et al., 2025). As the concept of responsible aging emerges, the focus shifts toward promoting intergenerational well-being, which aligns with effective marketing strategies that can engage healthcare providers and stakeholders in fostering inclusive practices (Heinonen K et al., 2025). Collectively, these insights highlight that a dynamic and collaborative marketing approach is crucial for improving health outcomes in diverse populations (Rustamova N et al., 2025).

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Khakimova Kh. Kh.
department of public health and healthcare management
Samarkand State Medical University
Murodova S. D.
science teacher
Abu Ali ibn Sino Technical School of Public Health
Surkhandarya

THE ROLE OF MARKETING STRATEGIES IN PUBLIC HEALTH MANAGEMENT: ISSUES OF INCREASING THE EFFECTIVENESS OF PREVENTIVE PROGRAMS

Abstract: *This article examines the role and significance of marketing strategies in public health management, with a particular focus on increasing the effectiveness of preventive programs. The study analyzes how social marketing, population-oriented approaches, and health communication mechanisms contribute to promoting healthy lifestyles and preventing diseases. It highlights the potential of marketing tools to improve public awareness, enhance participation in preventive initiatives, and strengthen overall population health. In addition, the paper discusses key challenges associated with the implementation of marketing strategies in public health institutions and proposes possible solutions for improving the management and impact of preventive health programs in both public and non-public healthcare sectors.*

Keywords: *public health management, marketing strategies, preventive programs, social marketing, health promotion, healthcare communication, population health.*

INTRODUCTION

The effectiveness of preventive programs in public health hinges on a nuanced understanding of human behavior and the strategic implementation of marketing methodologies. As global health challenges become increasingly complex, the necessity for innovative marketing strategies to foster healthier lifestyles has never been more critical. These strategies encompass various communication and social marketing approaches that not only raise awareness but also promote engagement with health initiatives. For instance, the concept of responsible aging illustrates how marketing can facilitate well-being across generations by emphasizing individuals active roles in supporting communal health, as detailed in the comprehensive framework presented in (Heinonen K et al., 2025) . Moreover, in addressing critical issues such as antimicrobial resistance, effective marketing can galvanize public support for necessary health interventions, highlighting the intersecting roles of regulation and consumer behavior explored in (Gargate N et al., 2025) . Thus, harnessing these marketing strategies within public health management is essential for successfully enhancing the reach and impact of preventive programs, especially in light of emerging

global health trends, as noted in (Cooke FL, 2025) and (Аліна Осинцева, 2025) .

DEFINITION OF MARKETING STRATEGIES IN PUBLIC HEALTH

Effective communication is essential in shaping public health initiatives and increasing engagement with preventive programs. Central to this endeavor are marketing strategies that focus on promoting healthy lifestyles and behaviors within diverse communities. These strategies leverage social marketing and audience segmentation to tailor messages and interventions that resonate with specific demographics. A comprehensive approach to defining these marketing strategies encompasses the principles of responsible aging, where proactive engagement encourages healthier choices across generations, supporting overall societal well-being (Heinonen K et al., 2025) . Moreover, the integration of technology, such as mobile health solutions, highlights the importance of understanding consumer perspectives to foster long-term health behavior changes, as evidenced by studies examining the dynamics of cohort-specific adoption (Addula SR, 2025) . Additionally, drawing from sustainability discourse within HRM, public health marketing can also evolve to consider a broader range of stakeholder interests, ultimately enhancing community impact (Cooke FL, 2025) and ensuring sustainable outcomes (Tamburi Jć et al., 2025) .

IMPORTANCE OF PREVENTIVE PROGRAMS IN HEALTH MANAGEMENT

Effective health management hinges on a proactive approach, which is exemplified by the implementation of preventive programs that target various health challenges within communities. These initiatives not only mitigate the impact of chronic diseases but also foster a culture of wellness and responsibility. For instance, the framework of responsible aging underscores the importance of individual and collective actions toward well-being, highlighting how such practices can benefit diverse demographics ((Heinonen K et al., 2025)). Furthermore, addressing barriers related to antibiotic resistance reveals the critical need for preventive measures in curbing health threats on a broader scale ((Gargate N et al., 2025)). Additionally, as explored in regulatory assessments, the complexities surrounding health and technology necessitate the adoption of comprehensive strategies, focusing on both innovation and compliance in preventive care ((Bo Nørregaard Jôrgensen et al., 2025)). Thus, understanding determinants of health, including sociocultural and economic factors, is vital in crafting effective public health interventions related to obesity and overall health management ((Jalilzadeh M et al., 2025)).

OVERVIEW OF THE RELATIONSHIP BETWEEN MARKETING AND PUBLIC HEALTH EFFECTIVENESS

Effective public health initiatives hinge significantly on the integration of targeted marketing strategies that resonate with diverse audiences. By leveraging communication and social marketing approaches, health organizations can more effectively promote healthy lifestyles and preventive behaviors within

communities. This relationship becomes particularly evident when considering the breadth of factors influencing health outcomes; for instance, the identification and classification of determinants such as sociocultural, economic, and environmental elements can inform tailored marketing campaigns that address specific community needs and barriers to health (Jalilzadeh M et al., 2025) . Moreover, the development of innovative strategies like the deployment of artificial intelligence enhances the ability to reach and engage individuals through personalized messaging, thus increasing overall program effectiveness (Аліна Осинцева, 2025) . Consequently, aligning marketing tactics with public health objectives not only facilitates the dissemination of vital health information but also fosters community-wide engagement and ownership of health initiatives, leading to more sustainable health outcomes (Heinonen K et al., 2025) .

UNDERSTANDING MARKETING STRATEGIES IN PUBLIC HEALTH

A multifaceted approach to promoting health necessitates a nuanced understanding of how marketing strategies can effectively influence behavior and drive public engagement in preventive programs. Communication plays a pivotal role in shaping perceptions about health practices, particularly when addressing complex issues such as obesity and antimicrobial resistance. By integrating targeted messaging with social marketing techniques, public health initiatives can resonate more deeply with diverse audiences, facilitating behavior change and improved health outcomes. For instance, understanding the social and cultural factors that contribute to obesity can help design interventions that are not only informative but also appealing to specific demographics, encouraging healthier lifestyle choices (Jalilzadeh M et al., 2025) . Furthermore, addressing the challenges posed by antimicrobial resistance requires strategic marketing that communicates the urgency of responsible antibiotic use while also exploring innovative solutions in drug development (Gargate N et al., 2025) . In sum, a comprehensive marketing strategy is essential for fostering community engagement, enhancing the effectiveness of preventive measures, and ultimately promoting a healthier society (Аліна Осинцева, 2025) (Heinonen K et al., 2025) .

TYPES OF MARKETING STRATEGIES USED IN PUBLIC HEALTH

Effective marketing strategies are pivotal in shaping public health initiatives that aim to promote healthy lifestyles and preventive programs. Social marketing, which applies commercial marketing principles to influence behaviors for social good, plays a critical role in this context by utilizing a deep understanding of target audiences to tailor messages and interventions effectively. Communication strategies that emphasize community engagement foster a sense of ownership among participants, thereby enhancing the likelihood of sustained behavioral change. For instance, campaigns that educate the public on the risks associated with obesity (as outlined in (Jalilzadeh M et al., 2025)) can leverage socio-cultural, economic, and environmental factors to drive comprehensive lifestyle

changes. Additionally, the integration of digital communication methods allows for broader reach and personalization, ensuring that important messages resonate with diverse populations ((Bo Nørregaard Jôrgensen et al., 2025)). In this manner, public health marketing strategies are not merely promotional tools but are essential in orchestrating systemic shifts toward healthier societies.

THE ROLE OF SOCIAL MARKETING IN HEALTH PROMOTION

In the evolving landscape of public health management, effective communication strategies are crucial for advancing health promotion initiatives. Social marketing emerges as a pivotal tool in this regard, focusing on behavior change through targeted messaging and community engagement. By addressing the socio-cultural determinants of health, as highlighted in the findings of the comprehensive scoping review on obesity (Jalilzadeh M et al., 2025) , social marketing not only raises awareness but also fosters an environment conducive to healthy choices. Furthermore, leveraging technological advancements, such as artificial intelligence, can enhance these efforts by providing personalized health information and resources, thereby improving accessibility to preventive programs (Аліна Осинцева, 2025) . This multifaceted approach resonates with the principles of responsible aging and intergenerational well-being, suggesting a need for collaborative, inclusive health strategies that engage diverse populations (Heinonen K et al., 2025) . Ultimately, the integration of social marketing frameworks can significantly elevate the effectiveness of preventive health initiatives.

CASE STUDIES OF SUCCESSFUL PUBLIC HEALTH MARKETING CAMPAIGNS

Effective public health marketing campaigns exemplify the vital role of communication strategies in fostering healthier lifestyles across diverse populations. By employing tailored messaging that resonates emotionally, such campaigns can catalyze behavioral change. For instance, the integration of fear appeals with actionable coping strategies has proven successful in breast cancer awareness initiatives, demonstrating how emotional engagement can enhance message efficacy ((Ungar-Sargon J, 2025)). Furthermore, a systems thinking approach in campaign design allows for an understanding of the complex interdependencies within public health challenges, facilitating improved stakeholder collaboration and evidence-based policy creation ((Skandali D et al., 2025)). Illustratively, the tension between profit-driven pharmaceutical practices and public health outcomes underscores the need for marketing strategies that prioritize patient welfare over financial gain ((Silburn A, 2025)). Ultimately, these case studies reflect the importance of innovative marketing approaches in addressing public health issues and enhancing the effectiveness of preventive programs ((Heinonen K et al., 2025)).

CHALLENGES IN IMPLEMENTING MARKETING STRATEGIES

The complexity of implementing effective marketing strategies in public health management is often exacerbated by various organizational and societal challenges. For instance, the integration of sustainability into health marketing

necessitates a comprehensive understanding of stakeholder needs while navigating the restrictions imposed by limited resources and competing priorities, as emphasized in the growing discourse on common good HRM, which highlights opportunities alongside inherent challenges (Chowdhury RH, 2025) . Additionally, the emergence of antimicrobial resistance has underscored the urgent need for innovative communication methods to educate the public, yet scientific and economic hurdles persist, deterring progress (Gargate N et al., 2025) . Moreover, as digital technologies evolve, organizations face the pressing task of leveraging these tools to engage effectively with diverse populations, thus necessitating a balance between technological adoption and organizational learning to foster comprehensive health promotion strategies (Cooke FL, 2025) . Such obstacles underline the necessity of collaborative approaches in the ongoing quest to enhance preventive health programs (Heinonen K et al., 2025) .

BARRIERS TO EFFECTIVE COMMUNICATION IN PUBLIC HEALTH

In a landscape increasingly shaped by technological advancements, the challenge of fostering effective communication in public health remains pressing. This is particularly crucial as disciplines like social marketing strive to engage diverse populations around healthy lifestyle choices. One significant barrier stems from biophobias, which can influence perceptions of health initiatives negatively, leading to resistance in adopting recommended practices. Furthermore, the advent of delivery platforms raises contextual hurdles, as observed in studies linking frequency of food delivery to deteriorating nutritional habits, highlighting how convenience can undermine health awareness (Yang T, 2025) . Additionally, the psychological impacts of crises like the COVID-19 pandemic reveal that perceived uncertainty can amplify vulnerability, complicating public health messaging and consumer resilience (Lucie K Ozanne et al., 2025) . Therefore, innovative communication strategies, informed by a synthesis of behavioral insights and technological integration, are essential to overcoming these barriers and enhancing the effectiveness of preventive programs (Chowdhury RH, 2025) .

MISCONCEPTIONS AND STIGMA SURROUNDING HEALTH ISSUES

Effective public health management necessitates a nuanced understanding of the complex interplay between perceptions and realities regarding health issues. Misconceptions surrounding conditions such as eating disorders often stem from cultural stigma and a lack of education, which can significantly hinder individuals from seeking appropriate care, particularly within marginalized communities (Plesons M et al., 2025) . Furthermore, the integration of preventive health measures into syringe service programs has highlighted the barriers faced by populations like people who inject drugs, who often manage misconceptions about vaccines and healthcare systems that further complicate their health outcomes (Cooper M, 2025) . Marketing strategies aimed at promoting awareness and understanding are crucial for dispelling myths and reducing stigma, thus fostering healthier communities. Educational initiatives that convey accurate information

and empower individuals to challenge harmful narratives can be transformative (Sheikh Y et al., 2025) . Ultimately, addressing these misconceptions is key to enhancing the effectiveness of preventive programs in diverse populations (Ying Z et al., 2025) .

RESOURCE LIMITATIONS AND FUNDING CHALLENGES

In the realm of public health, the efficacy of preventive programs is significantly hampered by resource limitations and funding challenges. These constraints often lead to inadequate outreach and support for campaigns aimed at promoting healthy lifestyles, as organizations grapple with competing financial priorities. Without sufficient funding, innovative marketing strategies that could enhance public engagement and encourage proactive health behaviors frequently remain underdeveloped or underutilized. For instance, the pharmaceutical sector has faced scrutiny for prioritizing profits over public health, resulting in subpar investment in essential preventive measures that address pressing community needs ((Ungar-Sargon J, 2025)). Consequently, the gap widens between the demand for effective health communication and the resources available to implement such strategies. This scenario emphasizes the necessity for a collaborative approach among stakeholders, leveraging diverse resources to embrace sustainable health marketing initiatives that not only address immediate fiscal challenges but also foster long-term public well-being ((Cooke FL, 2025) , (Angeliki N Menegaki, 2025)).

ENHANCING THE EFFECTIVENESS OF PREVENTIVE PROGRAMS

The complexity of public health challenges necessitates innovative strategies that engage diverse communities in preventive health measures. Effective marketing strategies are pivotal in promoting healthy lifestyles through targeted communication that resonates with specific populations. Utilizing insights from behavioral science, public health initiatives can leverage social marketing approaches to create tailored messages that not only inform but also motivate individuals to adopt healthier behaviors. For instance, the framework of responsible aging emphasizes the importance of community and intergenerational well-being, demonstrating that aging is a collaborative process requiring engagement from all age groups (Heinonen K et al., 2025) . Furthermore, a thorough understanding of the determinants of obesity reveals how multi-sectoral collaboration can address factors influencing health behaviors (Jalilzadeh M et al., 2025) . By integrating these insights, public health campaigns can foster environments that support sustained health improvements, ultimately enhancing the effectiveness of preventive programs across various demographics (Bo Nørregaard Jôrgensen et al., 2025) (Gargate N et al., 2025) .

TARGET AUDIENCE IDENTIFICATION AND SEGMENTATION

Understanding the specific needs and preferences of the target audience is crucial in developing effective public health marketing strategies. By segmenting the population based on demographic, psychological, and behavioral factors, health programs can tailor their messages to resonate with distinct groups, thus

enhancing engagement and compliance. For instance, the identification of predictors, such as attitudes and perceived behavioral control regarding health practices, can significantly inform campaign design aimed at reducing child poisoning accidents, as demonstrated in recent studies (Qiao S, 2025) . Furthermore, the integration of emerging technologies within communication strategies, along with traditional cultural elements, can enrich public health messages and appeal to various segments, leading to greater acceptance of preventive behaviors (Berlekamp M et al., 2025) (Qiao S, 2025) . As the landscape evolves with digital advancements, leveraging data-driven insights into audience preferences remains imperative to maximize outreach effectiveness and foster healthier communities (Liu Y et al., 2025) .

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Khusainov O.Dj., PhD in economics
associate professor
department of economics and engineering
Karshi International University

THE IMPACT OF BIOSECURITY IN LIVESTOCK FARMING ON THE ECONOMIC EFFICIENCY OF THE INDUSTRY

Abstract: *Biosecurity in livestock farming is defined as a set of managerial and technological measures aimed at reducing the risks of introduction and spread of infectious diseases. This article examines the impact of biosecurity on the economic efficiency of the sector using a cost–benefit analysis approach. The findings indicate that the implementation of biosecurity measures contributes to the stabilization of productivity, reduction of treatment costs and animal mortality, improvement of product quality, and a lower probability of large-scale economic losses. Empirical evidence confirms a positive relationship between biosecurity practices and key economic indicators.*

Keywords: *biosecurity, vaccination, prevention, disease risk, large-scale losses, value chain, investment returns, sustainability, healthcare system, reproduction, production costs*

Xusainov O. Dj., iqtisodiyot fanlari falsafa doktori (PhD)
dotsenti
“iqtisodiyot va muhandislik” kafedrasi
Qarshi xalqaro universiteti

CHORVACHILIKDA BIOXAVFSIZLIKNING SOHA IQTISODIY SAMARADORLIGIGA TA’SIRI

Annotatsiya: *Bioxavfsizlik chorvachilikda kasalliklarning kirib kelishi va tarqalishi xavfini kamaytirishga qaratilgan boshqaruv hamda jismoniy choralar majmui hisoblanadi. Ushbu maqolada bioxavfsizlikning iqtisodiy samaradorlikka ta’siriga asoslangan yondashuv va xarajat-foyda baholash orqali izohlanadi. Natijalarga ko‘ra, bioxavfsizlik mahsuldorlikni barqarorlashtiradi, davolash va nobud bo’lish xarajatlarini qisqartiradi, mahsulot sifati va bozor ishonchini oshiradi hamda yirik ko’lamli yo‘qotishlar ehtimolini kamaytirib pul oqimini barqarorlashtiradi. Empirik manbalar bioxavfsizlik amaliyotlari (vaksinatsiya, profilaktika va nazorat) bilan yalpi daromad va iqtisodiy ko‘rsatkichlar o‘rtasida ijobiy bog‘liqlik borligini ko‘rsatadi.*

Kalit so‘zlar: *bioxavfsizlik, vaksinatsiya, profilaktika, kasalliklar xavfi, ko’lamli yo’qotish, qiymat zanjiri, investitsion daromad, chidamlilik; sog’lik tizimi, reproduksiya, tannarx*

Chorvachilikda samaradorlikka ta’sir qiluvchi eng katta “yashirin” omillardan biri – chorva hayvonlarininig kasallanish xavfi hisoblanadi. Kasalliklar nafaqat o‘lim va davolash xarajati bilan, balki subklinik yo‘qotishlar (yem samaradorligi, sut-go‘sht chiqimi, nasl olish imkoniyatlarining pasayishi) orqali ham tannarxni oshiradi.

Hayvonlar salomatligini global darajada himoya qilish va nazorat qilish bilan shug‘ullanuvchi xalqaro tashkilot bioxavfsizlikni hududlarga xavfning kirib kelishi va tarqalishini kamaytiruvchi choralar majmui sifatida belgilaydi. [34] Birlashgan millatlar tashkilotining oziq-ovqat va qishloq xo‘jaligi tashkiloti bioxavfsizlikni qiymat zanjiri bo‘ylab, “daladan-dasturxongacha” tamoyili asosida uzluksiz qo‘llash zarurligini ta’kidlaydi[35]. Biz ushbu maqolada bioxavfsizlik va iqtisodiy natijalarning bog‘liqligini tizimlashtirishga va amaliy baholashga harakat qildik.

Maqola Birlashgan Millatlar Tashkilotining oziq-ovqat va qishloq xo‘jaligi tashkiloti hamda hayvonlar salomatligini global darajada himoya qilish va nazorat qilish bilan shug‘ullanuvchi xalqaro tashkilotlarining ma’lumotlariga asoslangan tahlil va sintez yondashuvida yozildi. Bunda bioxavfsizlikni 3 darajada,
korxona (ferma) – hudud – milliy tizim darajasida ko’rildi va har bir darajada xavfnini baholash hamda boshqarish choralari tavsiya etildi.

Bioxavfsizlikni iqtisodiy baholashda kutiladigan yo‘qotishning modeli qo‘llanadi: $E(L)=p\times D$

bu yerda p – kasallanish ehtimoli, D – kasallanish sodir bo‘lganda ko’riladigan zarar.

Bioxavfsizlik kasallanish ehtimolini (p), kasallanish sodir bo‘lganda ko’riladigan zararni (D) va yoki har ikkisini (p va D) kamaytiradi. Agar bioxavfsizlikka sarflanadigan yillik xarajat kasallanish sodir bo’lgandagi yo’qotishlardan kichik bo’lsa, bioxavfsizlikni ta’minlashga qilinadigan investitsiya ma’qul bo‘ladi ($\Delta E(L)>C$ (C – bioxavfsizlikka ketadigan yillik xarajat)). Ushbu tadbirlarning asosiy samaradorlik ko’rsatgichlari sifatida kasallanish va o‘lim foizi, 1 bosh chorva hayvoniga veterinariya xarajati, nobud bo’lish ulushi, sut yoki g’o’sht sifati, 1 birlik mahsulot tannarxi, 1 bosh chorva hayvoni hisobidan ko’riladigan sof foyda kabi ko’rsatgichlarni muntazam nazorat qilib boorish zarur bo’ladi.

Umumiy holda bioxavfsizlikning iqtisodiy ta’siri birnechta yo’nalishlar orqali shakllanadi. Bular jumlasiga mahsuldorlik, xarajatlar, sifat, barqarorlik va qo’shimcha foyda kabilarni kiritish maqsadga muvofiq. Xususan, chorvachilik fermalariga kirish-chiqish nazorati, karantin va sanitariya talablariga rioya etilishi kasalliklar bosimini pasaytirib, sut-go‘sht chiqimi va ozuqadan foydalanish samaradorligini barqarorlashtiradi. Xorijiy sut fermalarida bioxavfsizlik darajasi, sut sifati va iqtisodiy ko‘rsatkichlar o‘rtasida bog‘liqlik mavjudligini ko’rsatgan[36].

[34] https://www.woah.org/fileadmin/Home/eng/Health_standards/tahc/current/glossaire.pdf
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2022 yilda olimlar Osawe, O.W., Läpple, D., Mee, J.F. Irlandiya sut fermalari ma'lumotlariga asosan chorva hayvonlarini profilaktik va reproduktiv davolash, antibiotik vositalar bilan emlash, nobud bo'lish va ishlab chiqarish uzilishlarini kamaytirishini hisob-kitob qilib berishgan. Ularning tadqiqotlarida Irlandiya sut fermalarida vaksinatsiya va "bulk tank milk testing" (bu fermadagi umumiy sut yig'iladigan idish ichidagi sutdan namuna olib, fermadagi sutning holatini baholash uchun laboratoriya tahlili) amaliyotlari yalpi foydaning yuqoriligi bilan sezilarli bog'liq ekani ko'rsatilgan[37].

Fermalardagi gigiyena holati va nazorat mahsulot sifatini yaxshilab, realizatsiyada diskont va rad etishlarni kamaytiradi. Birlashgan millatlar tashkilotining oziq-ovqat va qishloq xo'jaligi tashkiloti bioxavfsizlik choralarini qiymat zanjiri bo'ylab bajarish bozor ishonchi va oziq-ovqat xavfsizligi uchun zarurligini ta'kidlaydi.

Bioxavfsizlik yirik ko'lamli yo'qotishlar ehtimolini pasaytirib, pul oqimi volatilligini kamaytiradi va investitsion qarorlarni barqarorlashtiradi. Soha miqyosida bosqichma-bosqich kuchaytirish uchun "FAO-PMP-TAB stepwise" yondashuvi tavsiya etiladi. Bunda, 1-bosqichda umumiy vaziyat baholanadi va manfaatdorlarni jalb qilinadi. Sohada qaysi sektorning ustuvorligini tanlash, manfaatdor tomonlar (davlat, xususiy sektor, xizmatlar)ni saralash, mavjud amaliyotlar va oldingi ishlar natijasini yig'ish, siyosiy-huquqiy muhitni baholash amalga oshiriladi. 2-bosqichda hamkorlik tuzilmasi "davlat-xususiy" sektor ishchi guruhi dastlabki loyiha hamda maqsadlarni ishlab chiqishadi. Dastlabki loyihani amaliyotga qo'llash, jarayonida aniqlangan kamchiliklarni yaxshilash, xususiy sector tomonidan avval kelishilgan bioxavfsizlik amaliyotlarini joriy etish, davlat tomonidan qo'llab-quvvatlash chora-tadbirlari 3-bosqichning mazmunini tashkil etadi. 4-bosqich jarayonlarning natija va saboqlar asosida takomillashtirishni o'z ichiga oladi. So'nggi 5-bosqichda bioxavfsizlik barqaror tizimga aylanadi, ya'ni institutsionallashtiriladi. Bioxavfsizlik bilan bog'liq jarayonlar: qoidalar, xizmatlar, moliyalashtirish, nazorat mexanizmlari barqarorlashadi.

Xorij amaliyotida bioxavfsizlikni resursga mos "paketlar" ko'rinishida joriy etish kuzatiladi. Odatda, bioxavfsizlik paketlari minimal, o'rtacha va maksimal paketlarga bo'linadi. Minimal paketga kirish-chiqish nazorati, dezobaryer, yangi hayvon karantini, kasal hayvonni ajratish, dezinfeksiya rejasi kiradi. O'rtacha paket ishchi-xodim yo'riqnomasi, transport va inventarlar ajratish, ozuqa va suv gigiyenasi, rejali monitoring va emlash rejalarini ko'zda tutadi. Maksimal paket tarkibi fan-texnika taraqqiy etishi bilan doimiy takomillashib bormoqda. Unga izlenebilirlik (mahsulotlarni paydo bo'lishidan iste'mol natijasiga qadar kuzatish), taftish, laboratoriyalar bilan muntazam ishlash, favqulodda vaziyat rejasi, zanjirli bioxavfsizlik va boshqalar kiradi.

Kasalliklarning oldini olish antibiotiklardan noo'rin foydalanishni kamaytiradi. Hayvonlar salomatligini global darajada himoya qilish va nazorat qilish bilan shug'ullanuvchi xalqaro tashkilot gigiyena va bioxavfsizlik

[37] https://doi.org/10.1093/jas/skac218

tamoyillarini joriy etish patogenlar tarqalishini cheklab, tirikchilikka tahdidni kamaytirishini qayd etadi.[38] BMTning oziq-ovqat va qishloq xo‘jaligi tashkiloti qishloq xo’jaligi mahsulotlari ishlab chiqarish tizimida mikroblarga chidamlilik, ya’ni bakteriya, virus, zamburug‘ va parazitlar dorilarga chidamli bo‘lib qolishi bo‘yicha 2021-2025 yillarga mo’ljallangan dastur qabul qilgan va loyiha bugungi kunda ham o’z dolzarbligini yo’qotmagan.

Bioxavfsizlikning iqtisodiy foydasi chorva hayvonlarini davolash, nobud bo’lish va ko’lamli yo’qotishlar xavfining oldini olish yoki kamaytirish yig‘indisidan iborat. Ko‘pincha ko’lamli yo’qotishlar katta qiymatli bo’ladi, chunki u biznesning yashab qolish layoqatiga ta’sir qiladi. Bioxavfsizlikni joriy etishdagi asosiy to‘siqlar – infratuzilma, ishchilar intizomi va aylanma mablag‘lar cheklovidir. Shu bois bioxavfsizlikning minimal paketidan boshlab, o’rta va maksimal paketlariga o‘tish amaliy va iqtisodiy jihatdan maqsadga muvofiq bo’ladi. Bioxavfsizlik chorvachilikda mahsuldorlikni barqarorlashtirib, tannarxni pasaytiradi, bozor hamda ko’lamli yo’qotish xavflarini kamaytiradi.

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[38] https://www.woah.org/en/what-we-do/global-initiatives/antimicrobial-resistance/

UDK: 911.5
10.24412/2225-1545-2026-1-1140-220-224

Mahmudova N. T.
master's student
Bukhara State University
Ergasheva M. K., Doctor of philosophy, (PhD)
in geographical sciences
associate professor

ROLE AND DIFFERENTIATION OF LANDSCAPE SCIENCE IN THE SYSTEM OF NATURAL GEOGRAPHICAL SCIENCES

Annotation: *This article analyzes the emergence of landscape fanining, the formation of landscape science as a science, the role of landscape fanining in the list of natural geographical sciences. It also explores the formation and development of scientific ideas in landscape science. Uzavtosanoat to be transformed*

Keywords: *Landscape, landscape studies, "Green space", natural resource, landscape dynamics, forecasting, geosystem, geoecology geosystem, geoecology, geoecology, science school, research center, anthropogenic landscapes, theoretical landscape studies, cultural landscape, assessment, forecasting.*

Introduction

Extensive reforms are being carried out in the Republic on the publication of modern literature reflecting the science of landscape studies and its history of its development, and significant results are being achieved in this area. The development strategy of New Uzbekistan for 2022-2026 and goal 80 of the "Draft President of the Republic of Uzbekistan providing for the approval of the road map" for its implementation in 2022 set important tasks in the implementation of the national project "Green space". In this regard, in particular, nature conservation, rational use of natural resources, in which the knowledge of landscape science plays a special role.

Literature review and methods

Most scholars have noted that as a result of the differentiation of the science of geography, a system of geographical sciences was formed. About its structural structure, the role of landscape studies in it S.V.Kalesnik, I.M.Zabelin, F.N.Milkov, A.M.Ryabchikov, Yu.K.Yefremov, P.S.Kuznetsov, K.K.Markov, V.B.Sochava, A.G.Isachenko, B.N.Semevsky, U.I.Mereste, S.Ya.Nimmik, N.K.Mukitanov, Sh.S.Zokirov, A.Abdulkasimov, I.Q.Nazarov, A.A.Nigmatov, O.S. Q.Abdunazarov, M.T.Mirakmalov, Sh.M.Sharipov, R.A.Ibragimova, A.A.Ibragimov, H.R.Toshov reflected on the published works.

Results and discussion

It should be noted that in the works of the authors who spoke about the system of geographical sciences and whose names are mentioned one by one,

there are also contradictory opinions that cause sharp debate and controversy, which is especially evident in the question of the relationship between natural geography and economic geography. In the process of searching for a positive solution to this issue, two different (eye to eye) attitudes emerged. In the first of these, the laws of society inherent were considered the only laws in the development of society, and the laws of nature and their impact on society were not taken into account.

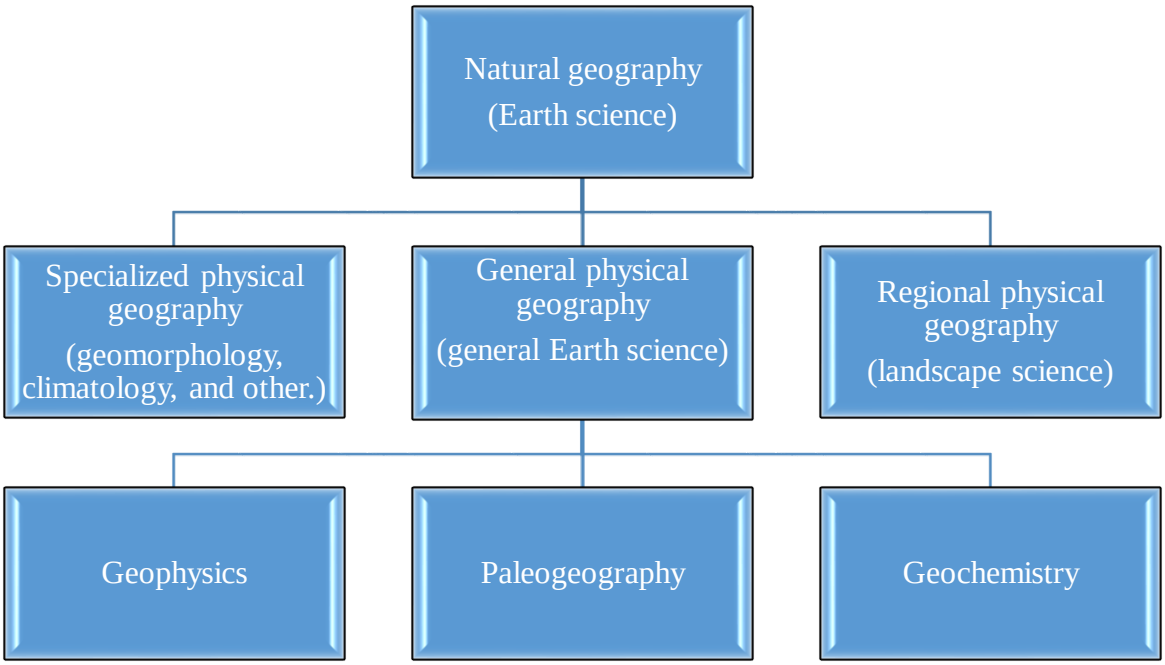
On the other hand, it was believed that only the laws of nature prevail in nature and society, ignoring the qualitative differences between nature and human society and, depending on it, the laws of nature determine their development. This view, inherited from the distant past, came to be known as determinism.

The interactions and interconnectedness that occur between nature and society have been exacerbated by the scientific and technological revolution. Not taking them into account, separating society and nature is completely wrong, even dangerous, began to manifest significantly. The emergence of the concept of ecological degradation at this time is a prime example of this.

The recognition of qualitative differences between the laws of nature and the laws of society was reflected in the fact that the sciences were initially divided into two main groups, namely the natural sciences and the social sciences. This general state of affairs in science was especially vividly manifested in geography. Important qualitative differences between natural geography and economic geography, based on the subject of these sciences, could be the basis for calling one a natural science and the other a social science. On the one hand, natural geography, which studies nature and its laws, and on the other hand, economic geography, which obeys the laws of society, studies social phenomena, blindly turns into a whole geography, without taking into account the qualitative differences between them, has also led to unscientific conclusions. In order to correctly illustrate such a situation that has arisen in the science of geography, it is appropriate to cite as an example some of the classification schemes drawn up by different authors. Relevant information in this regard is provided in the textbooks, monographs of I.Q. Nazarov (2013), A. Nigmatov (2018) and H.R. Toshov (2021) [3,4] We tried to analyze them once again, considering that the classification of disciplines is one of the most important factors in the development of landscape science.

A more or less complete classification scheme was proposed by S.V. Kalesnik (1959). Back then, this scientist called geography a system of closely interrelated natural and social sciences. Later, in 1972, academician S.V. Kalesnik presented his scheme as a separate theoretical article, somewhat completing it.

The role of landscape studies in the classification of natural geography proposed by the famous geographer K.K.Markov can be described in the form of Figure 1 below



[2].

Figure 1. The role of landscape science in the classification of natural geography (according to K.K. Markov, 1960)

In the classification of natural geography of the famous scientist N.A.Gvozdetsky, general and regional landscape studies are distinguished (Figure 2).

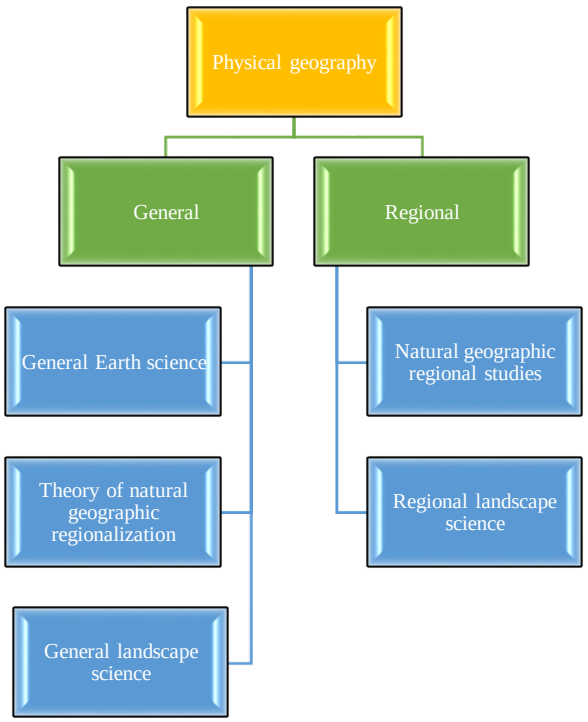


Figure 2. The role of landscape science in the classification of natural geographical sciences (according to N.A.Gvozdetsky, 1979)

I.Q.Nazarov (2013) in the textbook entitled "The main problems of geographical science", in the monograph of A.A.Nigmatov (2018) "Theory of natural geography and geoecology", O. The textbook "General Natural Geography" prepared by Q. Abdunazarov and b. (2018) also expresses views on the classification of disciplines and the role of landscape studies in it. I.Q. Nazarov in his textbook "The main problems of geography" noted that "at the present time the science of geography consists of a system of disciplines consisting of more than 20 disciplines and directions" [5,6].

A.A. Nigmatov (2018) monograph "Natural geography and theory of geoecology", which considers it expedient to divide natural geographical sciences into 3 large groups (complex, network and applied synthetic).

A. Abdulkasymov, who is recognized as a leading landscape scientist in the CIS countries, noted: "Research works in all branches and scientific directions of landscape studies are carried out by landscape geographers and are based on scientifically based principles and methods".

Also, A. Abdulkasimov, Yu. Abdurakhmonova and Q. Davronov (2017) divided landscape studies into 3 main sections, taking into account the global and regional problems of landscape studies, its main tasks, the composition of the subject, the diversity of the research [1]. These are:

1. General laws of global and regional differentiation of the landscape sphere

2. Landscape Education, Landscape Systematization, Mapping, and Landscape Ecology

3. Natural, geographical, and landscape ecological (geoecological) zoning

Conclusion

Thus, in all the classification schemes of geography that have been created up to date, we see that at the outset, natural geographical sciences were separated separately, and economic geographical sciences were separated. Landscape studies is a science that studies the origin, structure, performance of special activities, dynamics and laws of development of landscapes that are part of the geographical crust and their division into morphological parts.

In the 130 years since the emergence of landscape sciences and more than 60 years in Uzbekistan, a number of scientific theories were formed, developed and improved as important areas, and some as new branches of science[7]. As a result, concepts such as traditional and modern landscape studies became popular. The beginning of modern landscape painting dates back to the mid-60s in the twentieth century. Landscape studies as an independent science was initially placed on a par with private disciplines such as geomorphology, biogeography, hydrology, climatology, etc.

In order to further strengthen the theoretical foundations of landscape studies, it is necessary to establish stationary and semi-stationary researches of scientists, to radically improve the work in this area.

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Makhmudova G. R., Ph.D.
associate professor
Guliston State University

THE IMPACT OF THE DEVELOPMENT OF ELECTRONIC COMMERCE ON CONSUMER PURCHASE DECISIONS

Abstract. *This article analyzes the rapid development of electronic commerce and its impact on consumer purchasing decisions. The study examines the impact of online trading platforms on consumer behavior, including convenience, pricing policy, information transparency, customer reviews, and digital marketing tools. It also identifies the advantages and disadvantages of electronic commerce over traditional trade, and highlights factors that affect consumer trust and satisfaction. The results of the study are important in improving marketing strategies for electronic trading entities.*

Keywords: *electronic commerce, consumer behavior, purchase decision, online trading platforms, digital marketing, consumer trust, market competition*

Introduction

In recent years, as a result of the rapid development of information and communication technologies, electronic commerce (e-commerce) has become an important component of the global and national economy. The widespread popularity of the Internet, the development of mobile devices and digital payment systems have created a new form of trade relations and fundamentally changed the consumer purchasing process. Today, consumers have the opportunity to purchase products and services via online platforms anywhere and at any time, without visiting traditional retail outlets.

The development of electronic commerce has also significantly changed the factors influencing consumer purchasing decisions. Price comparisons, detailed product information, user reviews, ratings and online advertising tools are becoming increasingly important in consumer choice. At the same time, factors such as trust, security, delivery quality and level of service also determine consumers' attitude to electronic commerce.

Research methodology

In this study, a number of research methods were used to determine the impact of e-commerce on consumer purchasing decisions. In particular, the methods of analysis and synthesis, comparison, generalization, and logical inference were used. Also, secondary data analysis was carried out based on statistical data and scientific sources related to the field of e-commerce. During the research, the factors influencing consumer online shopping behavior were systematically studied, and the impact of e-commerce on purchasing decisions was assessed.

Literature review

The issue of the impact of e-commerce on consumer purchasing decisions has been widely studied by foreign scholars. In particular, F. Kotler emphasizes in his studies that in digital marketing conditions, information openness, brand image, and online advertising tools have a significant impact on consumer purchasing decisions. E. Turban and co-authors evaluated e-commerce as an important direction of the modern economy and scientifically substantiated that the convenience of online trading platforms, price transparency and quality of service are the main factors in consumer choice. Also, the Technology Acceptance Model (TAM) developed by F. Davis is widely used in the e-commerce environment, proving that the usefulness and ease of use of technology directly affect users' online shopping decisions.

In the scientific studies of local scientists, special attention is paid to the role of e-commerce in the economy of Uzbekistan and its impact on consumer behavior. In particular, the scientific works of Sh. Gulyamov, B. Khodiev and A. Rakhmonov emphasize that the development of e-commerce in the digital economy increases the activity of the domestic market and leads to positive changes in consumer purchasing habits. In local studies, online payment systems, logistics services and consumer trust are also indicated as important factors determining the effectiveness of e-commerce.

Analysis and results

The study found that the development of e-commerce significantly affects consumers' purchasing decisions. The analysis shows that the convenience and time savings of online shopping platforms are the main motivating factors for consumers. Compared to traditional shopping, e-commerce allows consumers to quickly compare products, make choices based on price and quality indicators, which contributes to a quick and informed purchase decision. Also, detailed information about products, user reviews and rating systems play an important role in building consumer confidence. According to the results of the analysis, products with positive feedback and high ratings are more likely to be chosen by consumers. This confirms that information transparency in e-commerce directly affects consumer behavior. The study results showed that the development of electronic payment systems and the quality of delivery services also significantly affect consumer decisions. Secure payment mechanisms and fast logistics services increase trust in e-commerce and increase the likelihood of repeat purchases. At the same time, the analysis also revealed that some consumers have concerns about the security of personal data and product quality. Overall, the analysis showed that the development of e-commerce is an important factor in shaping consumer purchasing decisions. Convenience, price advantage, information openness and service quality were identified as the factors that most strongly influence consumer choice. These results are of great importance for e-commerce entities in developing strategies focused on consumer needs.

As part of the study, a survey was conducted among 200 respondents to determine the impact of e-commerce on consumer purchasing decisions. Respondents covered different age and social groups. The survey questions were aimed at identifying the level of use of e-commerce, factors influencing the purchase decision, and trust issues.

Table 1
Survey questions and results

№	Survey question	Answer options	Percentage (%)
1	How often do you shop online?	Frequently	72
		Rarely	18
		I don't at all.	10
2	The main reason for choosing e-commerce	Convenience and time saving	65
		Cheap price	54
		Wide selection	41
3	Do customer reviews influence your purchasing decision?	Yes	48
		Partially	32
		No	20
4	Do you believe in the security of online payments?	I completely believe.	60
		I partly believe	28
		I don't believe it.	12
5	Does the quality of delivery affect your decision?	Yes	67
		No	33

Analysis of the survey results

As can be seen from the table, 72% of respondents regularly use e-commerce. This indicates that e-commerce has deeply penetrated the daily lives of the population. Convenience and time savings (65%) stand out as the most important factors. At the same time, price advantage (54%) and customer reviews (48%) also have a significant impact on the purchase decision. Although 60% of respondents assessed online payment systems as safe, a certain part still expressed distrust.

The empirical analysis studied the relationship between consumer purchase decisions and the factors influencing them.

Dependent variable:

- Y – consumer purchase decision

Independent variables:

- X_1 – convenience
- X_2 – price advantage
- X_3 – consumer confidence
- X_4 – information transparency (comments, ratings)

The regression model formula is as follows:

$$Y=\beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\varepsilon$$

Table 2

Correlation analysis results

Variables	Correlation coefficient (r)
Y va X_1 (convenience)	0,68
Y va X_2 (price advantage)	0,61
Y va X_3 (consumer confidence)	0,73
Y va X_4 (information transparency (comments, ratings)	0,59

The results show that all factors have a positive relationship with purchase decisions. The strongest relationship was observed with consumer trust (r = 0.73), confirming that trust is an important determinant in e-commerce.

Table 3

Results of multivariate regression analysis

Variable	β-coefficient	t-statistic
X_1 (Convenience)	0,34	4,21
X_2 (Price)	0,27	3,68
X_3 (Trust)	0,41	5,02
X_4 (Information)	0,22	3,11

Model specifications:

- $R^2 = 0,62$
- The model is statistically significant ($p < 0,05$

The regression results show that the independent variables can explain 62% of the consumer purchase decision. The largest impact is attributed to the factors of consumer trust (β = 0.41) and convenience (β = 0.34). This indicates that a reliable environment and convenient services are of strategic importance in e-commerce. The results of the questionnaire and empirical analysis are consistent with each other, confirming that the development of e-commerce has a positive and statistically significant impact on consumer purchase decisions. Convenience, trust, and price factors emerged as the main factors determining the effectiveness of e-commerce.

Conclusion

This study showed that the development of e-commerce has a significant and statistically significant impact on consumers' purchasing decisions. The results of the survey and empirical analyses confirmed that e-commerce provides convenience, time savings, and price advantages for consumers. In particular, consumer trust, the security of online payment systems, and the quality of delivery services were shown to be decisive factors in the purchase decision.

The results of correlation and regression analyses revealed that consumer trust and convenience factors have the strongest impact on the purchase decision. The study shows that e-commerce is changing consumer behavior and creating a new digital shopping culture compared to traditional shopping. At the same time,

the continued uncertainty about data security and product quality among some consumers limits the full potential of e-commerce.

In general, the development of e-commerce is an important factor shaping consumer purchasing decisions in the digital economy, and in-depth study and improvement of this process is of great importance for e-commerce entities and the economy.

Practical suggestions

Based on the results of the research, the following practical suggestions were developed to improve the efficiency of e-commerce and strengthen consumer confidence:

1. Increase consumer confidence. E-commerce platforms should pay special attention to strengthening the security of online payments, improving personal data protection mechanisms, and operating in an open and transparent manner.

2. Improve platform usability. Simplifying the interface of websites and mobile applications, developing quick search and product comparison functions will facilitate the consumer's shopping process.

3. Develop customer reviews and a rating system. Increasing information transparency by expanding real and verified user reviews will have a positive impact on consumer decisions.

4. Improve logistics and delivery services. The introduction of fast, reliable, and affordable delivery services increases the likelihood of repeat purchases and enhances competitiveness.

5. Develop digital marketing strategies. Strengthening marketing activities through targeted advertising, personalized offers, and social media is effective in attracting consumers.

6. Strengthen government support. Improving the legal and regulatory framework, creating incentives for small businesses, and increasing digital literacy are important for the development of e-commerce.

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Mamarajabov D. S.
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“informatsion texnologiyalar, biofizika va tibbiy fizika” kafedrasi
Samarqand davlat tibbiyot universiteti

TIBBIYOT OLIY TA’LIMIDA “IONLASHTIRUVCHI NURLANISHLARNING TIRIK ORGANIZMLARGA TA’SIRI” MAVZUSINI MULTIMEDIALI VOSITALAR YORDAMIDA O‘QITISH VA USHBU USULNING AFZAL JIHATLARI

Annotatsiya: *Ushbu maqolada tibbiyot oliy ta’lim muassasalarida “Yadro texnologiyalari” fanining “Ionlashtiruvchi nurlanishlarning tirik organizmlarga ta’siri” mavzusini o‘qitishda multimediyali vositalardan foydalanishning yutuqlari, o‘quv jarayonidagi metodik yondashuvlar hamda innovatsion texnologiyalarni joriy etish imkoniyatlari yoritilgan. Ushbu usullar talabalarning nazariy bilimlarini chuqurlashtirish, amaliy ko‘nikmalarni shakllantirish va radiatsion xavfsizlik madaniyatini rivojlantirishda muhim rol o‘ynaydi.*

Kalit so‘zlar: *ionlashtiruvchi nurlanish, multimediya, yadro texnologiyasi, VR/AR, raqamli ta’lim usullari*

Mamarajabov D. S.
assistant
department of "information technologies, biophysics and medical physics"
Samarkand State Medical University

TEACHING THE TOPIC "IMPACT OF IONIZING RADIATION ON LIVING ORGANISMS" IN HIGHER MEDICAL EDUCATION USING MULTIMEDIA AND THE ADVANTAGES OF THIS METHOD.

Abstract: *This article highlights the advantages of using multimedia tools in teaching the topic "The Effect of Ionizing Radiation on Living Organisms" in the subject of "Nuclear Technologies" in medical higher education institutions, methodological approaches in the educational process, and the possibilities of implementing innovative technologies. These methods play an important role in deepening students' theoretical knowledge, forming practical skills, and developing radiation safety culture.*

Keywords: *ionizing radiation, multimedia, nuclear technologies, VR/AR, digital learning methods*

Kirish

Ionlashtiruvchi nurlanishlar zamonaviy tibbiyotda diagnostika (rentgen, KT, PET,) va davolash (radioterapiya, braxiterapiya) jarayonlarida keng qo‘llaniladi. Shu sababli, kelajakdagi shifokorlar va tibbiyot mutaxassislari bu jarayonlarning

fizik-biologik mohiyatini chuqur bilishlari zarur. “Ionlashtiruvchi nurlanishlarning tirik organizmlarga ta’siri” mavzusi tibbiyot yo‘nalishida o‘qitiladigan eng muhim fanlardan biri bo‘lib, talabalarni radiatsion xavfsizlik, nurlanishning hujayra darajasidagi ta’siri, va biologik oqibatlarini tushunishga o‘rgatadi.

“Ionlashtiruvchi nurlanishlarning tirik organizmlarga ta’siri” mavzusi tibbiyot oliy ta’lim muassasalarida o‘qitiladigan “Yadro texnologiyalari” fanining muhim bo‘limlaridan biridir. Ushbu mavzu inson organizmida nurlanishning fizik, biologik va genetik oqibatlarini tushunishga, radiatsion xavfsizlik madaniyatini shakllantirishga xizmat qiladi.

An’anaviy o‘qitish usullarida bu mavzudagi murakkab jarayonlarni talabalarga yetkazish qiyin bo‘lgani sababli, multimediyali vositalardan foydalanish ta’lim samaradorligini oshiradi.

Multimediyali vositalarning o‘rni

Multimedia — bu matn, grafik, audio, video, animatsiya va interaktiv simulyatsiyalarni o‘z ichiga olgan o‘qitish usulidir.

Ushbu mavzuda multimedia vositalari yordamida:

- Nurlanish turlari (α, β, γ, rentgen, neytron)ni vizual ko‘rinishda tushuntirish;
- Hujayralarga nurlanishning ta’siri (DNK uzilishi, mutatsiyalar, apoptoz)ni 3D animatsiyalar orqali namoyish etish;
- Virtual laboratoriya va simulyatorlarda xavfsiz tajriba o‘tkazish;
- Interaktiv testlar orqali bilimni nazorat qilish mumkin bo‘ladi.

An’anaviy ma’ruza uslublari bu kabi murakkab jarayonlarni to‘liq tushuntirishda ko‘p hollarda yetarli bo‘lmaydi. Shu sababli multimediyali o‘qitish – ya’ni video, 3D animatsiyalar, virtual laboratoriyalar, interaktiv simulyatsiyalar va onlayn platformalardan foydalanish – zamonaviy tibbiyot ta’limining ajralmas qismiga aylangan.

1. Ionlashtiruvchi nurlanishlarning biologik ta’siri

Ionlashtiruvchi nurlanishlar (α, β, γ, rentgen nurlari, neytronlar) tirik organizmlarda atom va molekulalarni ionlashtirib, hujayra tuzilmasiga ta’sir ko‘rsatadi.

1.1. To‘g‘ridan-to‘g‘ri ta’sir

Nurlanish energiyasi to‘g‘ridan-to‘g‘ri DNK va hujayra tuzilmasiga ta’sir qilib, genetik o‘zgarishlar, mutatsiyalar yoki hujayra o‘limiga olib keladi.

1.2. Bilvosita ta’sir

Suv molekulalarining radiolizi natijasida hosil bo‘lgan erkin radikallar hujayra ichidagi biomolekulalarga zarar yetkazadi. Aynan shu jarayonlar tufayli radiatsion kasalliklar, genetik nuqsonlar va hujayra degeneratsiyasi sodir bo‘ladi.

1.3. Biologik oqibatlar

- Hujayra regeneratsiyasining sekinlashuvi;
- DNKning ikki spiralining uzilishi;
- Mutatsiyalar va apoptoz jarayonlari;
- To‘qimalarning sezuvchanligiga qarab turlicha reaksiya.

Ushbu jarayonlarni 3D animatsiyalar, mikroskopik video effektlar orqali ko‘rsatish talabaga tushunishni osonlashtiradi.

2. Multimediyali o‘qitishning didaktik ahamiyati

Multimediyali vositalar o‘quv jarayonida ko‘rgazmalilik, interaktivlik, eslab qolish samaradorligini oshiradi.

Afzallik jihatlari:

1. Murakkab fizik jarayonlarni vizual ifodalash;
2. Hujayra darajasidagi ta’sirlarni animatsiya orqali tushuntirish;
3. Masofaviy o‘qitish imkoniyati (Moodle, Google Classroom, Edmodo);
4. Virtual laboratoriyalar orqali xavfsiz tajriba o‘tkazish;
5. Talabalarning o‘zlashtirish darajasini 40–50% gacha oshirish.

3. O‘qitishda qo‘llaniladigan multimedia turlari

3.1. Video darslar

Ionlashtiruvchi nurlanish turlari va ularning biologik ta’siri haqidagi videodarslar talabaga mavzuni real misollar bilan tushuntiradi.

3.2. 3D animatsiyalar

DNK buzilishi, hujayra o‘limi, regeneratsiya jarayonlari animatsion shaklda ko‘rsatiladi.

3.3. Virtual laboratoriyalar

Masalan, “Radiation Effects Simulator” dasturi orqali nurlanish dozasini o‘zgartirib, natijani virtual tarzda kuzatish mumkin.

4. O‘qitish metodikasi

1-bosqich – Tayyorlov

Talabalarga video, slayd va elektron darsliklar beriladi. Ular oldindan mavzu bilan tanishadilar.

2-bosqich – Ma’ruza

Talaba interaktiv taqdimot yordamida nurlanishning fizik asoslarini va biologik mexanizmlarini tushuntiradi.

3-bosqich – Virtual laboratoriya mashg‘uloti

Talabalar simulyatsion muhitda nurlanish ta’sirini modellashtiradilar.

4-bosqich – Mustahkamlash

“Case study” (muammoli holatlar) asosida tahlil ishlari olib boriladi.

5-bosqich – Baholash

Interaktiv testlar, amaliy topshiriqlar va og‘zaki savollar orqali bilim darajasi aniqlanadi.

5. Amaliy natijalar

Samarqand davlat tibbiyot universitetida o‘tkazilgan tajriba mashg‘ulotlari quyidagi natijalarni ko‘rsatdi:

Talabalarning o‘zlashtirish darajasi 45% ga oshgan;

- Fanga bo‘lgan motivatsiya 2 barobar ortgan;
- Radiatsion xavfsizlik bo‘yicha xatoliklar 25% ga kamaygan;
- Talabalar tahliliy fikrlash va mustaqil qaror qabul qilish ko‘nikmalarini rivojlantirgan.

6. Multimediyali o‘qitishda uchraydigan muammolar va ularni bartaraf etish

1. Texnik baza yetishmasligi – o‘quv muassasalarida zamonaviy kompyuterlar, 3D dasturlar yetarli emas.

→ Yechim: AR/VR laboratoriyalarini bosqichma-bosqich joriy etish.

2. Talabalarning malakasi – barcha pedagoglar multimedia dasturlaridan foydalanishni bilmaydi.

→ Yechim: pedagoglar uchun “Digital Skills in Medicine Education” kurslarini tashkil etish.

7. Kelajak istiqbollari

Kelgusida VR/AR texnologiyalari yordamida radiatsion jarayonlarni to‘liq simulyatsiya qilish imkoniyati yaratiladi. Talaba virtual muhitda nurlanish manbasini boshqarib, hujayra reaksiyalarini kuzatishi mumkin bo‘ladi.

Shuningdek, sun’iy intellekt (AI) asosida talabaga moslashtirilgan o‘quv materiallarini taklif etuvchi tizimlar yaratilmoqda.

Xulosa

“Ionlashtiruvchi nurlanishlarning tirik organizmlarga ta’siri” mavzusini multimediyali vositalar yordamida o‘qitish quyidagi natijalarga olib keladi:

- talabalar bilimini chuqurlashtiradi va mustahkamlaydi;
- radiatsion xavfsizlik madaniyatini shakllantiradi;
- tibbiy ta’limda innovatsion pedagogik yondashuvlarni keng joriy etadi.

Shunday qilib, multimediyali o‘qitish nafaqat dars sifatini oshiradi, balki talabaning tibbiy fikrlash, mantiqiy tahlil va mustaqil qaror qabul qilish ko‘nikmalarini ham rivojlantiradi.

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Meliev B. A., geografiya fanlari bo'yicha falsafa doktori, dotsent
Sharof Rashidov nomidagi Samarqand davlat universiteti
Achilova A. S.
doktorant
Isoqulov U. A., magistr
Eshonqulov L. A., magistr

O'ZBEKISTONDA GIDROEKOLOGIYA MUAMMOLARI VA ULARNING YECHIMLARI HAQIDA

Annotatsiya: *Mazkur maqolada gidroekologiyaning hozirgi zamon muammolari, suv obyektlarini muhofaza qilish, atrof-muhit muhofazasi hamda gidroekologik muammolarning yechimlariga atroflicha to'xtalib o'tilgan.*

Kalit so'zlar: *gidroekologiya, suv ekotizimlari, gidrobiontlar, suvdan foydalanish madaniyati, akvafermalar, tashlama ko'llar, suv monitoringi.*

Meliev B. A., doctor of philosophy in geography, associate professor
Samarkand State University named after Sharof Rashidov
Achilova A. S.
PhD student
Isoqulov U. A., master
Eshonkulov L. A., master

ON HYDROECOLOGY PROBLEMS AND THEIR SOLUTIONS IN UZBEKISTAN

Abstract: *This article discusses in detail the current problems of hydroecology, protection of water bodies, environmental protection and solutions to hydroecological problems.*

Keywords: *hydroecology, water ecosystems, hydrobionts, water use culture, aquafarms, collector-discharge lakes, water monitoring.*

Kirish

Gidroekologiya geografik ekologiyaning bir qismi bo'lsada, sifat jihatdan juda yirik bo'lim sanaladi. Gidroekologiyani umumiy ekologiya geoekologiyaning bo'linishi mahsuli deyish mumkin. Mazkur yo'nalishdagi tadqiqotlar gidrologiya, biologiya, ekologiya hamda geografiyaning oralig'ida olib boriladi. Shu sababli gidroekologiyani yuqoridagi fanlar integratsiyasi natijasida yuzaga kelganligini ko'rish mumkin.

Umuman olganda, gidrologiyadan gidrologik ekologiyani birinchi marta ajratish R.A.Nijexovskiy (1990) tomonidan amalga oshirilgan [8]. Muallif o‘zining *“Suv xo‘jaligining gidrologik-ekologik asoslari”* nomli kitobi muqaddimasida yozishicha, quruqlik gidrologiyasining an’anaviy ravishda quyidagi bo‘limlarga ajratilishi qabul qilingan: gidrometriya, gidrologik hisob-kitoblar, gidrologik prognozlar, ko‘llarni o‘rganish (ko‘lshunoslik), botqoqlar gidrologiyasi va gidrofizika.

R.A.Nijexovskiyning mazkur asari gidrologiya faniga yangi ekologik yo‘nalishni kiritish borasidagi dastlabki ilmiy urinishlardan biri sifatida baholanadi. Muallif ta’kidlashicha, gidrologiyada ekologik yondashuvning shakllanishi bugungi kunda jamiyat ehtiyojlaridan kelib chiqadigan ijtimoiy buyurtma sanaladi. Ushbu yo‘nalishning rivojlanishi suv xo‘jaligi sohasidagi murakkab va ko‘p omilli masalalarni hal etishda gidrologiya fanining ahamiyatini yanada oshiradi.

Zamonaviy sharoitda har bir mutaxassis – gidrolog, ekolog va unga yaqin soha vakillari – suv resurslaridan foydalanishning asosiy tamoyillari, suv va qirg‘oqbo‘yi ekotizimlarining rivojlanish qonuniyatlari, shuningdek, daryo va suv havzalarining gidrologik, muzlik, termik hamda kimyoviy rejimlarining ushbu ekotizimlarga ta’siri haqida yetarli bilimga ega bo‘lishi lozim.

Adabiyotlar tahlili va metodlar

Avvallari yuzaga kelgan gidroekologik muammolar asosan lokal xarakterga ega edi. So‘nggi yillarda esa ushbu muammolar umumiy, hatto global ko‘lam kasb eta boshladi (masalan, Markaziy Osiyoda daryo suvlarining kamayishi va ifloslanishi jarayoni). Bunday holat gidrologiya va boshqa ko‘plab fanlarning ekologiyalashuviga turtki berdi.

Suv ekotizimlarini o‘rganadigan gidrobiologlar o‘z tadqiqotlarida suvning fizik-kimyoviy xususiyatlarini - haroratini, suv almashinuvi intensivligini, undagi gazlar miqdorini va boshqalarni - ma’lum darajada hisobga oladilar. Biroq gidrolog mutaxassis ham ushbu omillarning suv va suv atrofi ekotizimlarining hayotiy faoliyatidagi rolini chuqur tushunishi lozim.

Shu bilan birga, Markaziy Osiyoda antropogen gidrologiya (F.E.Rubinova, 1991), mintaqaning yer usti suvlarining gidrokimyosi (E.I.Chembarisov, 1988, 1989; V.A.Nikolaenko, 2003), yer osti suv resurslarini baholash va ularning xalq xo‘jaligidagi qo‘llanish imkoniyatlarini aniqlashga doir tadqiqotlar (V.A.Borisov, 1990), sanoat oqova suvlarining hajmi va sifatini baholash ishlari (V.T.Lev, Z.A.Artukmetov, 1990), shuningdek, mintaqadagi ijtimoiy ekologiya muammolarining chuqurlashuvi (Yu.Sh.Shadimetov, 1992) arid hududlar gidroekologiyasining rivojlanishi uchun ilmiy asos yaratdi va ushbu yo‘nalishning ustuvor masalalarini o‘rganishga ehtiyoj tug‘dirdi [2–11].

Albatta, ko‘rsatilgan mualliflar tomonidan ayrim gidroekologik masalalar ilgari ham ko‘rib chiqilgan va ularning bir qismi hal etilgan. Masalan, F.E.Rubinova (1991) Markaziy Osiyoda antropogen gidrologiyaning rivojlanish xususiyatlarini tahlil qilar ekan, suv melioratsiyasi natijasida daryo suvlarining mineralizatsiyasi va ion tarkibidagi o‘zgarishlar, antropogen ta’sir ostida

mineralizatsiyani baholash metodlari, shuningdek, daryolarning yakuniy suv qabul qiluvchilarida suv va tuz rejimining shakllanishiga doir tadqiqotlar sharhini keltiradi [2].

E.I.Chembarisov (1988, 1989) tomonidan Orol dengizi havzasidagi sug‘oriladigan hududlarning gidrokimyoviy muammolari keng yoritilgan bo‘lib, tadqiqotlarda asosan irrigatsiya rayonlari kollektor-drenaj suvlarining suv rejimi va gidrokimyoviy ko‘rsatkichlarini baholash hamda tahlil qilishga alohida e’tibor qaratilgan [6,7].

V.A.Borisov (1990) tomonidan O‘zbekistonning mintaqaviy va hududlararo suv ta’minoti tizimlari uchun chuchuk yer osti suvlari konlarining holatini baholash hamda ularni istiqbolda foydalanish imkoniyatlariga bag‘ishlangan ko‘p yillik tadqiqotlarning natijalari keltirilgan [3].

Yu.Sh.Shadimetov (1992) esa hozirgi kunda dunyoning aksariyat mamlakatlarida kuzatilayotgan ilmiy-texnik taraqqiyot hududlardagi ijtimoiy ekologiya muammolarini chuqur o‘rganishni taqozo etayotganini qayd etadi. Ijtimoiy ekologiya - insonning ekotizimdagi o‘rnini va unga ta’sir etuvchi omillarni o‘rganadigan sotsiologiyaning yangi bo‘limi - sifatida shakllanayotgan bu yo‘nalishning dolzarbligi ortib bormoqda.

Mazkur monografiyada antropogen yuklamaning biosferaga ta’sirini tahlil qilish asosida Markaziy Osiyo mintaqasidagi ijtimoiy-ekologik hamda tibbiy-biologik vaziyatlarning rivojlanish tendensiyalari aniqlangan. Shuningdek, tabiatni muhofaza qilish, uning resurslaridan oqilona foydalanish hamda ijtimoiy-gigiyenik va ekologik prognozlashning metodologik jihatlari tahlil qilingan [5].

V.A.Nikolaenko (2003) «Murakkab gidro-ekotizimlar klassifikatsiyasi»ni (MGƏK) ishlab chiqqan bo‘lib, u Markaziy Osiyo davlatlaridagi turli genezisga ega suv obyektlarining ekologik va xo‘jalik sifatini baholash imkonini beradi. Taklif etilgan MGƏK suv obyektlarini uchta bir-biriga bog‘langan bo‘limga ajratadi: 1) sho‘rlik darajasi (mineralizatsiya); 2) ion tarkibi; 3) ekologik-sanitariya parametrlari [11].

So‘nggi yillarda gidroekologiya sohasidagi ayrim tadqiqotlar Irrigatsiya va suv muammolari bo‘yicha Ilmiy-tadqiqot instituti «Gidroekologiya va suv resurslarini muhofaza qilish» laboratoriyasi xodimlari tomonidan I.A.Usmanov rahbarligida amalga oshirilmoqda [9].

Shu bilan, Markaziy Osiyo gidrologiyasi doirasida gidroekologiya (gidro-ekologik yo‘nalish)ning yangi bo‘limini ajratish hayotiy zarurat va shu soha bilan bog‘liq boshqa fanlar muammolaridan kelib chiqqanini qayd etish mumkin.

Natijalar

Gidroekologik masalalar ichida birinchi navbatda hal etilishi zarur bo‘lganlari quyidagilar hisoblanadi. Jumladan, daryo suvlarining kamayishi va ifloslanishi, kollektor-drenaj suvlarining mintaqaning gidroekologik holatiga salbiy ta’siri, antropogen irrigatsiya va tashlama ko‘llarining holati hamda ulardan foydalanish imkoniyatlari, mintaqaning pestitsidlar bilan ifloslanishi, ichimlik suviga doir muammolar va gidroekologik jarayonlarning kartografik tasvirini rivojlantirish zaruriyati kabi masalalar bugungi kunda dolzarblik kasb etadi. Shu

sababli gidroekologiyada muammoni tizimli belgilash hamda yo‘nalishlarga ajratish muhim sanaladi. Gidroekologiya doirasidagi asosiy tadqiqot yo‘nalishlari quyidagilardan iborat:

1. Suvning gidrokimyoviy va fizik-kimyoviy parametrlarini, shu jumladan suv bilan qoplanish darajasini tahlil qilish.
2. Gidrobiontlarning ekzo-metabolitlarini, birinchi navbatda toksik moddalari monitoringi.
3. Toksik birikmalar hosil bo‘lishiga sabab bo‘luvchi omillar kompleksini o‘rganish.
4. Toksik bo‘lmagan, ammo xavfli gidrobiontlarning o‘sishi va rivojlanishini monitoring qilish.
5. Gidrobiontlarning virusli, bakterial, mikrologik va parazitar shakllarini monitoring qilish.
6. Suv obyektlarida yangi invaziv turlar paydo bo‘lishi va tarqalishini monitoring qilish.
7. Suvda yashovchi invaziv turlarning suv obyektlariga ta’sirini tahlil qilish.
8. Suv obyektlarining kimyoviy moddalar bilan ifloslanishini monitoring qilish.
9. Suv obyektlarining radioaktiv moddalarga ifloslanishini monitoring qilish.
10. Suv obyektlarining termik ifloslanishini monitoring qilish.
11. Suv sathining pastlash jarayonlarini monitoring qilish.
12. Suv toshqinlarini monitoring qilish.
13. Suv toshqinlari va sathning pastlashining oqibatlarini baholash.
14. Suv obyektlarida noxush sharoitlar shakllanishini prognoz qilish.
15. Biologik resurslarning zahiralari va ularni oqilona foydalanishni baholash.

Ushbu muammolarni hal qilishda qator ishlarni amalga oshirish talab etiladi. Shulardan biri ochiq tabiiy suv havzalarida amaliy jihatdan muhim yo‘nalishlardan biri suv fototroflarining mahsuldorligini xavfsiz va mahalliy tarzda oshirish usullarini ishlab chiqish hamda ushbu jarayonni boshqarish mumkin bo‘lgan mexanizmlarni izlashdir. Hosil bo‘lgan mahsulot turli sanoat sohalarida, shuningdek, tabiiy suv havzalari va suv tozalash inshootlarini tozalash maqsadida ishlatilishi mumkin.

Shu bilan birga, mamlakat iqtisodiyoti uchun dolzarb va istiqbolli yo‘nalishlardan biri akvafermalarni tashkil etish bo‘lib, unda mollyusklar, boshqa umurtqasizlar va makroalgalarni yetishtirish ko‘zda tutiladi. Mazkur yo‘nalish doirasida turli sohalarda, jumladan energiya, oziq-ovqat va farmakologiya sanoati hamda suv obyektlarini tozalash sohalarida talab yuqori bo‘lgan gidrobiontlarning akvakultura loyihalari ishlab chiqilishi lozim.

Umuman olganda mamlakatimizda gidroekologik muammolar vaqt o‘tgan sari dolzarbligi yaqqolroq namoyon bo‘lib bormoqda.

Muhokama

Barchamizga ma’lumki, turli kimyoviy elementlarning o‘simlik dunyosi, gidrobiontlar, hayvonlar va odam hayotidagi tutgan o‘rni juda ulkandir. Shu sababli, suvlarning ifloslanish indeksi (SII) ko‘rsatkichlarini bilish orqali suv sifatini aniqlash muhimdir.

Bugungi kunda dunyo suvlari faqatgina sug’orish uchun emas, balki ichimlik suvi sifatida ham foydalanilayotganini ham hisobga olib, daryolarning butun uzunligi bo‘yicha suv sifati monitoringini olib borish hamda sifatini yaxshilash bo‘yicha yechimlar ishlab chiqish zarurdir.

Shuni ta’kidlash kerakki, O‘zbekistonni ko‘plab mintaqalarida gidroekologik sharoitning yomonlashishida asosiy rolni kollektor-drenaj oqimlari o‘ynaydi. Bu faqatgina kollektor suvlarini daryolarga qayta tashlanishida emas, balki ularni sun’iy irrigatsiya-tashlamali ko‘llar maydonini kengayishida ham ko‘rish mumkin. Aynan shu ko‘llarda barcha zaharli moddalar to‘planadi hamda ular atrof-muhitga zarar yetkazadi.

Shuningdek, bizning taqdiqot hududimiz sanaladigan Zarafshon havzasi, undagi yuza oqimi simob, surma, ftor, strontsiy, alyuminiy, qo‘rg’oshin, uglevodorodlar va boshqa kimyoviy elementlar bilan ifloslangan bo‘lib, ular hayvonlar va insonlar salomatligiga jiddiy salbiy ta’sir ko‘rsatadi [10]. Shuni inobatga olib, yuqoridagi masalalarni yechishda quyidagi vazifalarni bajarish muhimdir:

1) Aholini suvdan foydalanish madaniyatini takomillashtirish va rivojlantirish;
2) Gidrobiontlar (ayniqsa molyuskalar) ni ko‘paytirish uchun akvafermalar faoliyatini kuchaytirish;
3) Qishloq xo‘jaligini yuritishda zaharli pestisidlarni biologik kurash usullariga almashtirish;
4) Sug’orishni suv tejamkor, zamonaviy usullariga o‘tish;
5) Suv tozalash inshoatlarini faoliyatini takomillashtirish.

Ushbu vazifalar umumiy xarakterdagi yechimlar uchun bo‘lib, lokal muammolar uchun alohida yechimlar talab etiladi.

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Mirzaev E. S.
associate professor
Karshi State Technical University
Karshi, Republic of Uzbekistan

DRILLING TECHNOLOGY OF OIL AND GAS WELLS: OPERATIONAL PRACTICES AND EFFICIENCY OPTIMIZATION

Abstract: *Drilling technology plays a crucial role in oil and gas production, directly impacting operational efficiency, safety, and environmental compliance. This study presents an integrated analysis of drilling techniques, equipment, and operational parameters used in oil and gas wells in Uzbekistan. Emphasis is placed on directional drilling, mud circulation, wellbore stability, and metrological control. Experimental data, supported by graphical representation of penetration rates and pressure trends, illustrate optimal operational practices. The results underline the importance of adherence to national (O'zDSt) and international (ISO/API) standards for reliable hydrocarbon extraction.*

Keywords: *Drilling technology, oil and gas wells, directional drilling, mud circulation, metrological standards.*

Introduction

The global energy demand and domestic production needs in Uzbekistan necessitate efficient and safe drilling technologies. Well drilling determines not only the success of hydrocarbon exploration but also long-term production rates. Modern technologies, including top-drive rotary rigs, downhole motors, and measurement-while-drilling (MWD) tools, allow precise trajectory control and reduced formation damage.

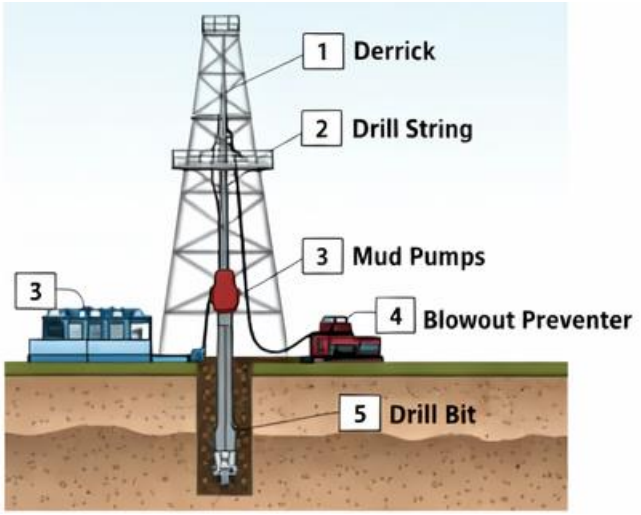


Figure 1: Schematic of a modern rotary drilling rig

Materials and Methods

1. Drilling Methods

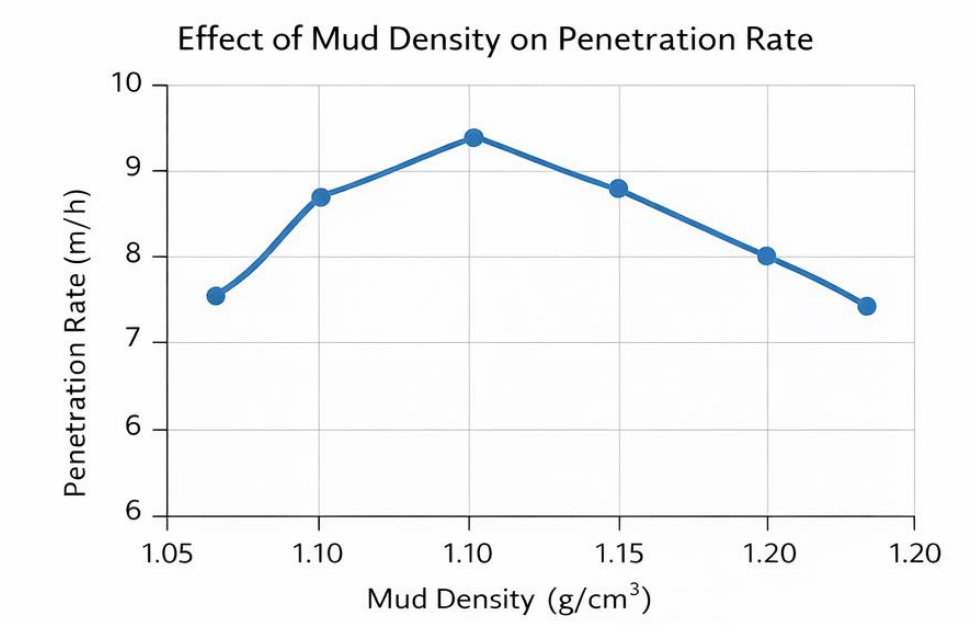
- Rotary Drilling: Conventional vertical wells using rotary rigs.
- Directional and Horizontal Drilling: Deviation control using MWD and rotary steerable systems.
- Mud Circulation Systems: Mud density (10–18 ppg) optimized for wellbore stability; circulation rate 300–600 l/min.
- Blowout Prevention: Surface BOP rated for 5,000 psi with pressure sensors and metrological calibration.

2. Equipment Metrological Control All measurement devices follow:

- National standards: O‘zDSt 8.001, O‘zDSt 20287
- International standards: ISO 10012, API RP 13B-1, ISO 10423 Calibration and periodic verification ensure measurement reliability for pressure and flow sensors, mud density and viscosity instruments, and well trajectory instruments.

3. Data Collection Operational data collected from 10 exploratory and production wells in southern Uzbekistan:

- Penetration rate (m/h)
- Wellbore inclination and azimuth (°)
- Mud density and rheology
- Borehole pressure (psi)



- Drill string torque and rotation speed

Figure 2: Graph of penetration rate versus drilling depth for vertical and directional wells

4. Sample Analysis

- Core and cuttings samples analyzed for porosity, permeability, and lithology.
- Mud filtrate analyzed for chemical composition.
- Measurements repeated three times to determine standard deviation.

Results

Parameter	Vertical Wells	Directional Wells
Average Penetration Rate (m/h)	10.2	8.7
Max Inclination Deviation (°)	1.5	2.9
Mud Density (ppg)	12.5 ±0.2	12.8 ±0.3
Borehole Pressure (psi)	2,450 ±30	2,470 ±40

Observations:

1. Directional wells require lower penetration rate due to trajectory adjustments.
2. Borehole stability maintained with mud density control ±0.2 ppg.
3. No blowout incidents due to reliable BOP and pressure monitoring.
4. Discussion Combining conventional rotary drilling with directional control and metrologically verified equipment enhances efficiency and safety.

5.

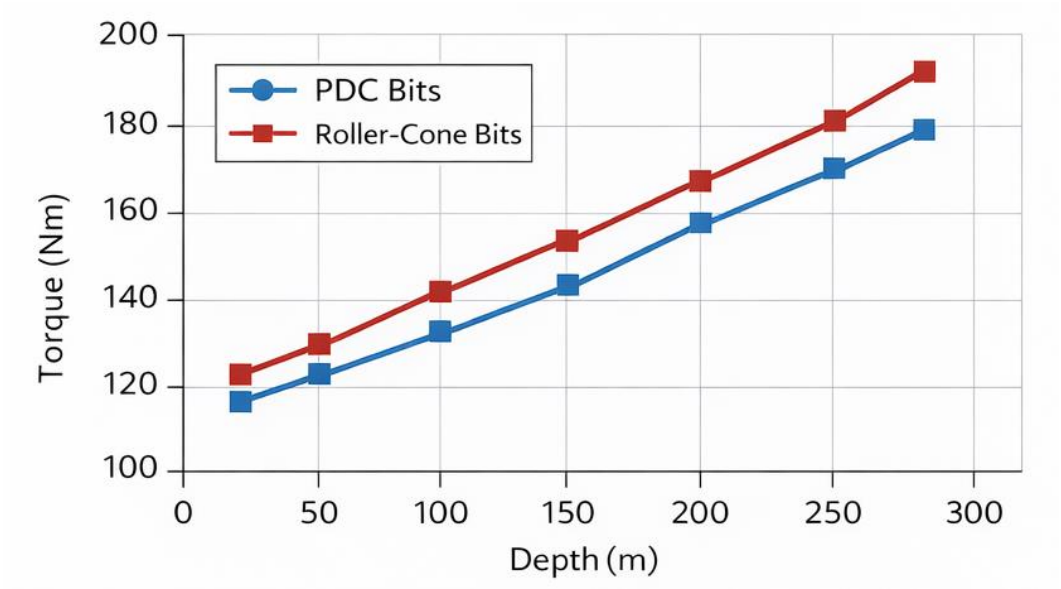


Figure 3: Borehole pressure versus depth with real-time MWD overlay

- Metrological Assurance: Regular calibration of sensors ensures data accuracy.
- Operational Efficiency: Optimized mud systems reduce drilling time by ~12%.
- Environmental Safety: Proper cuttings handling reduces contamination.

Challenges:

- Training personnel on MWD/LWD tools.

- Initial capital costs for automation and metrological equipment.
- Maintaining reliability under HTHP conditions.

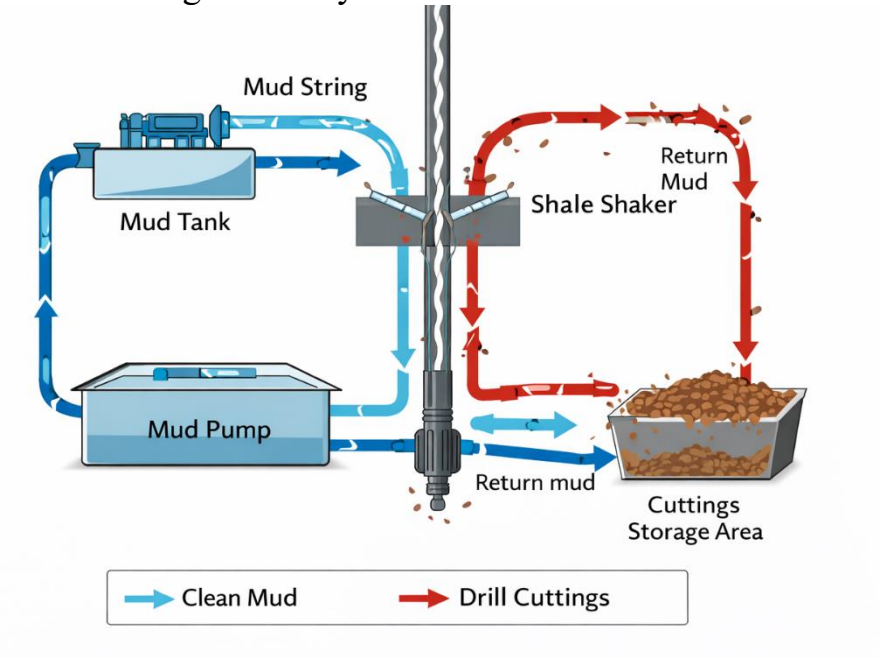


Figure 4: Flow diagram of drilling operations with real-time measurement and control points

Conclusion

Modern drilling practices in Uzbekistan, adhering to O‘zDSt, ISO, and API standards, enable reliable trajectory control, reduced wellbore instability, and consistent penetration rates. Metrological control ensures drilling parameters are within allowable tolerances, supporting scientifically justified operational decisions.

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Mo`minova Ch.
o‘qituvchisi
o‘zbek va rus tili kafedrasi
University of economics and pedagogy

SUN’IY INTELLEKT TERMINLARINING GENETIK QATLAMLARI: RUSCHA O‘ZLASHMALAR, YEVROPA MANBALARI VA ICHKI YASALISH

Annotatsiya. *Mazkur maqolada o‘zbek tilida sun’iy intellekt sohasiga oid terminlarning shakllanishi va kelib chiqish manbalari “genetik qatlamlar” nuqtayi nazaridan tahlil qilinadi. Tadqiqotda terminlarning uch asosiy qatlami ajratiladi: rus tili orqali kirib kelgan o‘zlashmalar, bevosita (yoki bilvosita) yevropa tillaridan o‘zlashgan birliklar hamda o‘zbek tilining ichki imkoniyatlari asosida yasalgan terminlar.*

Kalit so‘zlar:*sun’iy intellekt, terminologiya, genetik qatlam, ruscha o‘zlashma, yevropa manbasi, ichki yasalish.*

Mo`minova Ch.
teacher
department of uzbek and russian languages
University of Economics and Pedagogy

GENETIC LAYERS OF ARTIFICIAL INTELLIGENCE TERMS: RUSSIAN ASSUMPTIONS, EUROPEAN SOURCES AND INTERNAL FORMATION

Annotation. *This article analyzes the formation and sources of origin of terms related to the field of artificial intelligence in the Uzbek language from the point of view of “genetic layers”. The study distinguishes three main layers of terms: appropriations that came through the Russian language, units directly (or indirectly) absorbed from European languages, and terms created based on the internal capabilities of the Uzbek language.*

Keywords: *artificial intelligence, terminology, genetic layer, Russian appropriation, European source, internal formation.*

Kirish

So‘nggi o‘n yilliklarda sun’iy intellekt texnologiyalari ilm-fan, iqtisodiyot, ta’lim, tibbiyot va kundalik kommunikatsiya sohalariga tezkor kirib kelishi natijasida o‘zbek tilida ham mazkur yo‘nalishga oid terminlar qatlamining jadal kengayishi kuzatilmoqda. Har qanday yangi ilmiy-texnik soha avvalo tushunchalar tizimini, demakki, nomlash tizimini shakllantiradi. Nomlash tizimi esa tildagi mavjud resurslar, boshqa tillar bilan aloqa, tarjima tajribasi, ommaviy axborot

vositalari va ilmiy adabiyotlar orqali yuzaga keladi. Sun'iy intellekt terminologiyasi ham ayni shu jarayonlarning mahsuli sifatida bir tomondan xalqaro terminlar oqimini qabul qilayotgan bo‘lsa, ikkinchi tomondan o‘zbek tilining ichki imkoniyatlari asosida muqobil atamalarni yaratish zaruratini ham yuzaga chiqarmoqda.

Materiallar va metodlar

Mazkur tadqiqotda sun'iy intellekt sohasiga oid terminlarning o‘zbek tilida shakllanishi va kelib chiqish manbalarini aniqlash hamda ularni "genetik qatlamlar" nuqtayi nazaridan tasniflash maqsad qilingan. Tadqiqot materiali sifatida o‘zbek tilida so‘nggi yillarda nashr etilgan ilmiy maqolalar, darslik va o‘quv qo‘llanmalar, terminologik lug‘atlar, axborot texnologiyalari va sun'iy intellektga oid rasmiy va norasmiy onlayn manbalar, shuningdek, ommaviy axborot vositalarida va ilmiy-texnik matnlarda faol qo‘llanilayotgan terminlar tanlab olindi. Umumiy hisobda tahlil uchun sun'iy intellekt sohasiga oid yuzdan ortiq terminologik birliklar saralab olindi.

Tadqiqot jarayonida deskriptiv-tahliliy metod asosiy metod sifatida qo‘llanildi. Ushbu metod yordamida terminlarning kelib chiqishi, shakllanish yo‘li, fonetik-grafik va morfologik moslashuvi, semantik xususiyatlari izchil tavsiflandi. Shuningdek, terminlarning rus tili orqali yoki yevropa tillaridan (asosan ingliz tilidan) o‘zlashganligi, yoxud o‘zbek tilining ichki imkoniyatlari asosida yasalganligi aniqlanib, ularning har biri alohida genetik qatlam doirasida ko‘rib chiqildi.

Qiyosiy-tahliliy metod terminlarning turli variantlarini aniqlash va solishtirishda muhim ahamiyat kasb etdi. Xususan, ruscha o‘zlashmalar bilan o‘zbekcha muqobil terminlar ("klassifikatsiya" – "tasnif", "optimizatsiya" – "maqbullashtirish", "prediktsiya" – "bashorat" va boshqalar) qiyoslab o‘rganildi hamda ularning amaliy nutqda qo‘llanish chastotasi va funksional qulayligi baholandi. Shu asosda termin variantlarining raqobati va normativ barqarorlik masalalari tahlil qilindi.

Tadqiqotda strukturaviy-semantik tahlil metodi ham qo‘llanildi. Bu metod orqali terminlarning ichki tuzilishi, so‘z yasash modellari, affiksatsiya va kalkalash jarayonlari aniqlanib, o‘zbek tilining termin yaratish imkoniyatlari yoritildi. Ayniqsa, rus tili va ingliz tilidan o‘zlashgan terminlarning o‘zbek tiliga moslashuv darajasi, ularning so‘z turkumlari va hosila yasashdagi faolligi alohida e'tiborga olindi.

Asosiy qism

"Genetik qatlam" tushunchasi terminologiyada birliklarning kelib chiqish manbalarini, shakllanish yo‘lini va qabul qilinish mexanizmlarini tavsiflashga xizmat qiladi. Sun'iy intellekt terminlari o‘zbek tilida asosan uch yo‘nalishda paydo bo‘lmoqda: (1) rus tili vositasida o‘zlashgan terminlar; (2) yevropa tillaridan, ayniqsa ingliz tilidan bevosita yoki bilvosita kirgan terminlar; (3) o‘zbek tilining ichki so‘z yasash imkoniyatlari asosida yasalgan terminlar. Mazkur maqolada ana shu uch qatlam alohida tahlil qilinib, ularning afzallik va

muammolari, normativlashtirish zarurati hamda termin tanlash mezonlari haqida umumlashtirilgan ilmiy xulosalar ilgari suriladi [1].

O‘zbek ilmiy-texnik terminologiyasining katta qismi tarixan rus tili vositasida shakllanganligi ma’lum. Bu hol sun’iy intellekt terminologiyasida ham aniq ko‘zga tashlanadi. Ayniqsa, sovet davridan boshlab texnika, matematika, kibernetika va informatika bilan bog‘liq tushunchalarning ko‘pchiligi ruscha shakl yoki ruscha tarjima modeli orqali o‘zbek tiliga kirgan. Sun’iy intellektning “klassik” tarkibiy yo‘nalishlari (algoritm, model, tizim, funksiya, optimallashtirish va boshqalar) bilan bir qatorda, amaliy informatika va kompyuter texnologiyasi terminlari ham ko‘pincha ruscha vositachilik izini saqlab qolgan.

Ruscha o‘zlashmalarning muhim belgilaridan biri — ularning o‘zbek tilida fonetik-grafik moslashuv darajasi turlicha bo‘lishidir. Masalan, ayrim terminlar asosan lotin yozuvida ruscha shaklga yaqin ko‘rinishda qo‘llanadi (masalan, “neyron”, “matritsa”, “klaster”), ayrimlari esa o‘zbek talaffuziga nisbatan moslashtiriladi (“algoritm”, “graf”, “signal”). Bu qatlamdagi terminlar ko‘pincha morfologik jihatdan ham o‘zbek tili qo‘shimchalari bilan faol birikadi: “modellashtirish”, “klassifikatsiya qilish”, “optimallashtirish”, “segmentatsiya”, “klasterlash” kabi shakllar tilning hosila yasash imkoniyatiga mos ravishda barqarorlashgan [2]. Biroq muammo shundaki, ruscha terminlardan ko‘chirilgan ayrim birliklar o‘zbek tilining so‘z yasalish me’yorlariga to‘liq mos kelmagan holda, ikki xil variantda yuradi: biri ruscha shaklni saqlagan, ikkinchisi esa o‘zbekcha yasama ko‘rinishda. Masalan, “klassifikatsiya” – “tasnif”, “optimizatsiya” – “maqbullashtirish”, “prediktsiya” – “bashorat” kabi juftliklar amaliy nutqda raqobat holatida turadi. Bunday variantlilik esa ilmiy matnlarda izchillikni pasaytiradi, o‘quvchi uchun tushunishni qiyinlashtiradi va terminologik normalashuvga ehtiyojni kuchaytiradi.

Rus tili orqali o‘zlashgan terminlar tarkibida kalkalash (so‘zma-so‘z tarjima) yo‘li bilan kirgan birliklar ham uchraydi. Masalan, ruscha “искусственный интеллект” modelining o‘zbekchaga “sun’iy intellekt” sifatida o‘girilishi, “машинное обучение”ning “mashinali o‘qitish” yoki “mashina o‘rganishi”, “нейронная сеть”ning “neyron tarmoq” shaklida qo‘llanishi shular jumlasidandir. Biroq kalkalarning hammasi ham bir xil darajada muvaffaqiyatli emas: ba’zi kalkalar semantik noaniqlik tug‘dirishi yoki o‘zbekcha sintaktik tabiatga to‘liq mos tushmasligi mumkin. Shu bois ruscha qatlamni tavsiflashda nafaqat kelib chiqish, balki funksional qulaylik, terminning qisqaligi, semantik aniqligi va normativ barqarorligi kabi mezonlar ham hisobga olinishi kerak [3].

Sun’iy intellektning zamonaviy rivoji global miqyosda asosan ingliz tilidagi ilmiy muhit va texnologik platformalar bilan bog‘liq. Shu sababli o‘zbek tilida aynan ingliz tilidan bevosita yoki rus tili orqali bilvosita kirib kelayotgan terminlar oqimi tobora kuchaymoqda. “Dataset”, “prompt”, “fine-tuning”, “token”, “embedding”, “transformer”, “benchmark”, “pipeline”, “deployment”, “latency” kabi ko‘plab birliklar soha mutaxassislari nutqida tez-tez qo‘llanmoqda. Bu terminlarning ayrimlari o‘zbek tiliga transliteratsiya orqali kiradi (“token”, “prompt”), ayrimlari esa qisman tarjima qilinadi (“ma’lumotlar to‘plami” –

dataset; “o‘rnatish/ishga tushirish” – deployment), yana bir qismi esa ikki tillilik holatida parallel yuradi.

Yevropa manbali terminlar qatlamining asosiy muammosi — variantlilik va tarjima me’yorining bir xil emasligidir. Masalan, “machine learning” tushunchasi “mashina o‘rganishi”, “mashinali o‘qitish”, “mashina ta’limi” tarzida turlicha berilib keladi. “Deep learning” uchun “chuqur o‘rganish”, “chuqur ta’lim”, “chuqur o‘qitish” variantlari uchraydi. “Neural network” ko‘proq “neyron tarmoq” shaklida barqarorlashgan bo‘lsa-da, “neyronli tarmoq” kabi variantlar ham istisno emas. Bunday holatda termin tanlashda quyidagi mezonlar muhim: (1) xalqaro atama bilan semantik moslik; (2) o‘zbek tili sintaktik-grammatik tabiatiga mos kelish; (3) qisqalik va qulay talaffuz; (4) ilmiy uslubdagi xolislik; (5) sohada bir xillashuvga erishish [4].

Xulosa

Sun’iy intellekt terminologiyasi o‘zbek tilida shakllanayotgan dinamik tizim bo‘lib, unda terminlarning kelib chiqish manbalari bo‘yicha uch asosiy genetik qatlam ajralib turadi: rus tili vositasida o‘zlashgan terminlar, yevropa tillaridan (asosan ingliz tilidan) kirib kelayotgan terminlar hamda o‘zbek tilining ichki imkoniyatlari asosida yasalayotgan terminlar. Ruscha qatlam tarixiy jihatdan barqaror bo‘lsa-da, unda variantlilik, kalkalarning to‘liq mos kelmasligi va uslubiy uyg‘unlik muammolari ko‘zga tashlanadi. Yevropa manbali terminlar esa sohaning global rivojiga hamohang ravishda tez kirib kelmoqda, biroq ularning transliteratsiya, tarjima va me’yoriy qo‘llanishida bir xillashuv yetarli darajada emas. Ichki yasalish yo‘li esa milliy ilmiy tilni mustahkamlash, tushunarlilikni oshirish va terminologik mustaqillikni kuchaytirish imkonini beradi, ammo u tizimlilik, semantik aniqlik va derivatsion izchillik talablarini qat’iy qo‘yadi.

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Muminov Q. A.
assistant
department of "pathology and forensic medicine"
Central Asian Medical University
Akhmedov A. K.
assistant
department of propaedeutics of internal medicine
Fergana Public Health Medical Institute

THE RELATIONSHIP BETWEEN SKIN AND RESPIRATORY SYSTEM DISEASES

Annotation: *This study examines the interrelationship between skin and respiratory system diseases, focusing on their epidemiology, pathophysiology, immunological mechanisms, clinical manifestations, diagnostic approaches, treatment strategies, and preventive measures. Evidence shows a strong correlation between chronic dermatological conditions such as atopic dermatitis and psoriasis, and respiratory disorders including asthma, allergic rhinitis, and chronic bronchitis. The study highlights the role of systemic inflammation, Th2-mediated immune responses, and environmental factors in the comorbidity of these diseases. Integrated diagnostic and therapeutic approaches are emphasized to improve patient outcomes, reduce exacerbations, and enhance quality of life. Early detection, personalized management, and multidisciplinary care are essential for effective prevention and long-term prognosis.*

Keywords: *Skin diseases, respiratory system, comorbidity, immunology, pathophysiology, atopic dermatitis, asthma, inflammation, prevention, integrated treatment.*

Introduction

The skin and the respiratory system are two vital and interconnected functional systems of the human body. The skin, as the largest organ, serves as a protective barrier against microbes, toxins, and external environmental factors, while also playing a crucial role in thermoregulation and maintaining water balance. The respiratory system, on the other hand, ensures the exchange of oxygen and carbon dioxide, providing essential energy to all cells and supporting overall physiological activity. Recent studies have demonstrated that diseases affecting the skin and respiratory system are often interrelated, with pathological conditions in one system potentially influencing the function of the other. For example, atopic dermatitis, psoriasis, or allergic skin reactions frequently coexist with asthma, chronic bronchitis, and other respiratory disorders. Additionally, immune responses manifested through the skin can exacerbate or modulate inflammatory processes in the airways. The complex interactions between the skin and respiratory system are underpinned by biological, immunological, and genetic mechanisms, making their study crucial for the development of effective

prevention and treatment strategies. This article aims to scientifically analyze the interrelationship between skin and respiratory system diseases, exploring their clinical manifestations and pathophysiological mechanisms.

Relevance

The interrelationship between skin and respiratory system diseases is a growing area of concern in modern medicine. Epidemiological studies indicate a high prevalence of comorbid conditions such as atopic dermatitis and asthma, suggesting a common immunological and inflammatory pathway. Understanding this link is particularly important as it affects patient quality of life, treatment outcomes, and the development of integrated therapeutic strategies. With the increasing incidence of allergic and chronic inflammatory disorders worldwide, research into the skin-respiratory axis is crucial for early diagnosis, effective prevention, and personalized treatment plans. This study addresses a significant gap in the literature by examining how dermatological and respiratory conditions influence each other, providing insight into their shared pathophysiological mechanisms and clinical implications.

Objective

The primary objective of this study is to investigate the relationship between skin and respiratory system diseases, focusing on the clinical, immunological, and pathophysiological interactions. Specifically, the study aims to:

1. Analyze the prevalence and patterns of comorbidity between dermatological and respiratory disorders.
2. Examine the underlying mechanisms linking skin and respiratory system pathologies, including immune responses and inflammatory pathways.
3. Evaluate the impact of coexisting skin and respiratory conditions on patient health outcomes.
4. Identify potential strategies for integrated prevention, diagnosis, and treatment to improve overall patient care.

Main part

The skin and respiratory system are integral organs that serve protective, regulatory, and metabolic functions. The skin, as the largest organ, consists of three primary layers: epidermis, dermis, and subcutaneous tissue, each performing specific physiological roles. It acts as a physical barrier against environmental hazards, regulates body temperature through sweat glands and blood vessels, and participates in immune surveillance by hosting specialized immune cells such as Langerhans cells and mast cells. The respiratory system comprises the upper and lower airways, including the nasal cavity, pharynx, larynx, trachea, bronchi, and lungs, ensuring gas exchange and maintaining acid-base balance. Both systems have extensive vascular networks and immune components that interact with external antigens. Understanding the anatomy and physiology of these systems is essential for identifying how pathological processes in one can influence the other. For instance, inflammatory mediators released in the skin can enter systemic circulation and affect airway function, while respiratory infections can trigger dermatological manifestations through immune dysregulation. A comprehensive

knowledge of structural and functional interdependencies is critical for clinicians and researchers studying comorbid skin and respiratory conditions. Additionally, shared immunological pathways, such as Th2-mediated inflammation, highlight the intrinsic connection between these organ systems. Environmental exposures, allergens, and pollutants impact both the skin and respiratory tract, emphasizing their interconnectedness. Research indicates that maintaining homeostasis in one system supports overall systemic health, including the other. Clinicians should consider these interactions when diagnosing, managing, or preventing diseases affecting either system. This section establishes the foundation for understanding subsequent pathophysiological mechanisms linking skin and respiratory disorders.

Skin and respiratory disorders, particularly those with allergic or inflammatory origins, exhibit a high prevalence globally. Epidemiological data reveal that atopic dermatitis, psoriasis, and chronic urticaria frequently coexist with asthma, allergic rhinitis, and chronic bronchitis. Studies suggest that up to 30–40% of patients with atopic dermatitis develop asthma or other respiratory conditions, a phenomenon referred to as the “atopic march.” Geographic, environmental, and genetic factors influence disease distribution and incidence rates. Urbanization, industrial pollution, and climate changes contribute to increased prevalence and severity of both dermatological and respiratory diseases. Childhood onset is particularly significant, as early immune dysregulation can predispose individuals to lifelong comorbidities. Gender differences have also been observed, with females showing higher susceptibility to certain autoimmune skin conditions and males to specific respiratory disorders. Understanding epidemiological patterns provides insight into population health risks and guides preventive and therapeutic strategies. Epidemiological studies also emphasize the importance of early intervention and monitoring for comorbid conditions to reduce disease burden and improve patient outcomes. Public health policies should consider the interrelation of skin and respiratory disorders for effective healthcare planning. Longitudinal studies are necessary to track disease progression and identify at-risk populations. Data-driven interventions, including education, allergen management, and lifestyle modifications, are crucial for disease prevention. The epidemiological link further underscores the need for multidisciplinary care approaches.

The immune system plays a pivotal role in the interconnection between skin and respiratory diseases. Both systems contain specialized immune cells capable of initiating and propagating inflammatory responses. In conditions like atopic dermatitis and asthma, Th2-type immune responses dominate, resulting in increased IgE production and eosinophil activation. Cytokines such as IL-4, IL-5, and IL-13 mediate inflammation in both skin and airways. Mast cells and dendritic cells act as antigen-presenting cells, triggering hypersensitivity reactions that can manifest in either organ system. Systemic immune dysregulation may amplify symptoms in both the skin and respiratory tract simultaneously. Additionally, genetic polymorphisms affecting immune regulation can predispose individuals to comorbid conditions. Environmental triggers, including allergens, pollutants, and

microbial antigens, stimulate immune pathways that connect the skin and lungs. Understanding these immunological interactions is essential for developing targeted therapies and preventing disease progression. Research indicates that modulation of systemic immune responses can improve outcomes for patients with combined dermatological and respiratory disorders. Biologics targeting cytokines and immune mediators have shown efficacy in managing both atopic dermatitis and asthma. The interplay between innate and adaptive immunity further highlights the complexity of these comorbid conditions. Clinicians must consider immune status and inflammatory profiles when selecting therapeutic interventions. Monitoring biomarkers and immune activity can guide personalized treatment strategies. Immunological insights also facilitate early identification of high-risk patients.

Pathophysiological mechanisms link dermatological and respiratory diseases at cellular and molecular levels. Inflammatory pathways, particularly Th2-mediated responses, drive tissue damage and symptom manifestation. Barrier dysfunction in the skin, such as filaggrin deficiency, increases allergen penetration and systemic sensitization, contributing to airway hyperresponsiveness. Conversely, chronic respiratory inflammation can induce systemic immune activation, leading to dermatological flare-ups. Oxidative stress, cytokine imbalance, and neuroimmune signaling further exacerbate disease severity. These mechanisms explain the frequent coexistence of atopic dermatitis and asthma or psoriasis and chronic bronchitis. Epigenetic modifications and environmental exposures also influence disease onset and progression. Understanding pathophysiology is crucial for identifying therapeutic targets and designing integrative treatment plans. Clinical manifestations, including pruritus, erythema, wheezing, and airway obstruction, result from overlapping inflammatory processes. Systemic circulation of inflammatory mediators creates a feedback loop between the skin and lungs. Early recognition of shared pathophysiological pathways allows for preventive interventions and improved patient management. Advanced research utilizing molecular biology and immunohistochemistry continues to uncover novel mechanisms linking these organ systems. Identifying biomarkers associated with comorbidity can support diagnosis and treatment efficacy assessment.

Patients with combined skin and respiratory conditions often exhibit overlapping clinical features. Dermatological symptoms include pruritus, erythema, excoriations, lichenification, and chronic lesions. Respiratory symptoms include wheezing, cough, shortness of breath, and nasal congestion. The severity of skin lesions often correlates with the intensity of respiratory symptoms, suggesting interconnected disease activity. Pediatric patients may demonstrate a progression from atopic dermatitis to asthma and allergic rhinitis. Adults with psoriasis may experience comorbid chronic obstructive pulmonary disease (COPD) or recurrent bronchitis. Exacerbations in one system frequently trigger flare-ups in the other, complicating clinical management. Early recognition of comorbid patterns is essential for timely intervention and prevention of chronic

complications. Physicians should perform thorough assessments, including dermatological and respiratory evaluations, to capture the full spectrum of disease. Comprehensive clinical documentation aids in monitoring disease progression and response to therapy. Patient education regarding symptom management and trigger avoidance is critical. Multidisciplinary care, involving dermatologists, pulmonologists, and allergists, improves treatment outcomes. Clinical guidelines increasingly emphasize integrated approaches to comorbid skin and respiratory diseases. Treatment efficacy depends on addressing both systems simultaneously. Clinical trials evaluating dual-system therapies provide evidence for best practices.

Accurate diagnosis of comorbid skin and respiratory conditions requires a combination of clinical evaluation, laboratory tests, and imaging studies. Dermatological assessment includes detailed skin examination, lesion characterization, and severity scoring. Respiratory evaluation includes spirometry, peak flow measurement, imaging (X-ray or CT scan), and allergy testing. Laboratory tests, including total IgE, eosinophil counts, and cytokine profiling, provide insight into systemic inflammatory status. Skin prick tests and patch testing identify allergen sensitivities contributing to comorbidity. Molecular and genetic testing can detect predispositions to atopic or autoimmune conditions. Integrated diagnostic protocols help establish the temporal and causal relationships between skin and respiratory symptoms. Early and accurate diagnosis guides individualized treatment plans and prevents progression of comorbidities. Diagnostic algorithms often involve multidisciplinary collaboration for comprehensive assessment. Patient history, including family history of allergies or chronic diseases, is essential for risk stratification. Emerging biomarkers facilitate early detection of systemic immune activation. Personalized diagnostics support targeted therapy selection. Follow-up assessments monitor disease trajectory and therapeutic response. Advanced imaging techniques, such as high-resolution CT or dermoscopy, enhance detection of subtle pathological changes.

Management of comorbid skin and respiratory diseases involves pharmacological and non-pharmacological interventions. Topical therapies, including corticosteroids, calcineurin inhibitors, and emollients, address dermatological symptoms. Systemic treatments, such as biologics targeting IL-4, IL-5, and IL-13, can simultaneously alleviate skin and airway inflammation. Inhaled corticosteroids, bronchodilators, and antihistamines control respiratory symptoms. Lifestyle modifications, including allergen avoidance, dietary adjustments, and environmental control, are essential for long-term management. Patient education enhances adherence and empowers self-management. Multidisciplinary care ensures coordinated interventions and monitoring of adverse effects. Regular follow-up is necessary to assess therapeutic efficacy and adjust treatment regimens. Emerging therapies, including immunotherapy and gene-targeted treatments, offer potential for improved outcomes. Management strategies should consider patient age, comorbidity severity, and psychosocial factors. Early intervention reduces risk of chronic complications and

hospitalizations. Integrative approaches combining dermatological and respiratory care optimize patient quality of life. Monitoring inflammatory biomarkers guides personalized therapy. Preventive measures, such as vaccination and skin barrier protection, complement treatment strategies. Psychological support addresses the emotional impact of chronic comorbid conditions.

Prevention of comorbid skin and respiratory diseases involves early recognition of risk factors and implementation of protective measures. Avoidance of allergens, pollutants, and irritants reduces the incidence of disease flare-ups. Maintaining skin barrier integrity and managing mild dermatological conditions can prevent progression to systemic sensitization. Respiratory hygiene, vaccination, and monitoring environmental exposures support airway health. Genetic counseling and early interventions in at-risk populations contribute to primary prevention. Prognosis depends on disease severity, comorbidity, and treatment adherence. Patients with well-managed conditions exhibit reduced symptom severity, fewer exacerbations, and improved quality of life. Long-term monitoring and integrated care plans enhance outcomes. Research indicates that addressing both skin and respiratory systems concurrently improves prognosis compared to isolated treatment. Preventive strategies are most effective when combined with patient education, lifestyle modifications, and regular medical supervision. Prognostic assessment should include evaluation of inflammatory markers, comorbidity patterns, and psychosocial factors. Early intervention and comprehensive care significantly reduce long-term morbidity and healthcare costs. Emerging evidence supports the development of personalized preventive programs. Awareness campaigns and public health initiatives promote early detection and risk reduction. Ultimately, prevention and prognosis are interlinked, emphasizing proactive management of comorbid conditions.

Discussion and Results

The analysis of the interrelationship between skin and respiratory system diseases demonstrates a significant overlap in pathophysiological mechanisms, clinical manifestations, and immunological pathways. Epidemiological data confirm that a large proportion of patients with chronic dermatological conditions, such as atopic dermatitis or psoriasis, concurrently develop respiratory disorders including asthma, allergic rhinitis, and chronic bronchitis. This comorbidity is strongly associated with systemic immune dysregulation, predominantly Th2-mediated inflammation, elevated IgE levels, and eosinophilic activity. Clinical evaluation reveals that the severity of skin lesions often correlates with the intensity of respiratory symptoms, indicating a bidirectional influence between these organ systems. Diagnostic investigations, including spirometry, laboratory markers, and skin assessment, provide objective evidence of this correlation and highlight the need for integrated evaluation protocols. Therapeutic interventions that target shared inflammatory pathways, such as biologics against IL-4, IL-5, and IL-13, have demonstrated efficacy in improving both dermatological and respiratory outcomes. Lifestyle modifications, allergen avoidance, and patient education further enhance treatment effectiveness and reduce disease

exacerbations. The results indicate that early identification of comorbid conditions allows for timely intervention, preventing progression and improving quality of life. Moreover, the study underscores the importance of a multidisciplinary approach, combining dermatology, pulmonology, and immunology expertise to optimize patient care. Overall, the findings highlight that recognizing and managing the complex interactions between the skin and respiratory system is essential for effective prevention, personalized treatment, and long-term prognosis improvement. This comprehensive approach not only reduces symptom burden but also mitigates systemic inflammatory impact, emphasizing the necessity of integrated clinical strategies for patients with overlapping dermatological and respiratory disorders.

Conclusion

The study results clearly demonstrate the close interrelationship between skin and respiratory system diseases. Epidemiological, clinical, and immunological evidence indicates that chronic dermatological conditions often coexist with respiratory disorders. This comorbidity is associated with systemic inflammation, Th2-mediated immune responses, and immune dysregulation. Clinical observations reveal that the severity of skin lesions often correlates with the intensity of respiratory symptoms, confirming the bidirectional influence between these two systems. Integrated diagnostic and therapeutic approaches involving dermatologists, pulmonologists, and immunologists play a crucial role in improving patient quality of life. Biologic therapies, allergen avoidance, lifestyle modifications, and patient education enhance treatment efficacy and reduce disease exacerbations. The study emphasizes that early identification and comprehensive management not only alleviate symptoms but also reduce systemic inflammatory impact. Furthermore, preventive measures, early interventions, and individualized treatment plans are essential to improve prognosis. Overall, understanding and effectively managing the complex relationship between skin and respiratory system diseases is a key factor in achieving long-term health benefits and enhancing the overall well-being of patients.

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Muminov Q. A.
assistant
department of "pathology and forensic medicine"
Central Asian Medical University
Akhmedov A. K.
assistant
department of propaedeutics of internal medicine
Fergana Public Health Medical Institute

ALLERGIC DISEASES: CONCURRENT INVOLVEMENT OF THE SKIN AND RESPIRATORY TRACT

Abstract: *This article examines allergic diseases characterized by the simultaneous involvement of the skin and the respiratory tract. Particular attention is paid to the systemic nature of allergic inflammation and the shared immunopathological mechanisms underlying cutaneous and respiratory manifestations. The role of epithelial barrier dysfunction, immunoglobulin E–mediated hypersensitivity, and chronic inflammatory responses is analyzed. The interrelationship between skin and airway allergies is discussed in the context of disease progression and clinical severity. The study emphasizes the importance of early diagnosis and integrated therapeutic approaches. Understanding the unified mechanisms of allergic diseases may contribute to improved prevention strategies and more effective clinical management.*

Keywords: *Allergic diseases, skin involvement, respiratory tract, immunoglobulin E, epithelial barrier.*

Introduction

Allergic diseases represent one of the most common chronic health conditions in modern medicine, with a steadily increasing prevalence worldwide. These disorders often involve multiple organ systems, particularly the skin and the respiratory tract, which are frequently affected simultaneously. In clinical practice, conditions such as atopic dermatitis, allergic contact dermatitis, bronchial asthma, and allergic rhinitis are commonly observed to coexist, reflecting the systemic nature of allergic inflammation. The combined involvement of the skin and respiratory pathways is largely explained by shared immunopathological mechanisms, including immune system dysregulation, immunoglobulin E–mediated hypersensitivity reactions, and the activation of inflammatory mediators. Disruption of epithelial barrier function in the skin facilitates allergen penetration, which may subsequently enhance sensitization of the respiratory mucosa. This interconnected progression of allergic manifestations is often described within the framework of the "atopic march." Understanding the mechanisms underlying the concurrent damage to the skin and respiratory tract is essential for early diagnosis, effective disease monitoring, and the development of integrated therapeutic and preventive strategies. A comprehensive scientific analysis of this combined

allergic involvement contributes to improved clinical management and better long-term outcomes for patients suffering from allergic diseases.

Relevance

The growing incidence of allergic diseases affecting both the skin and the respiratory tract has become a significant public health concern worldwide. The simultaneous manifestation of cutaneous and respiratory allergic conditions leads to a more severe clinical course, increased risk of chronicity, and reduced quality of life for patients. Despite advances in allergology and immunology, the complex interactions between epithelial barriers, immune responses, and environmental allergens remain insufficiently understood. In particular, the lack of integrated diagnostic and therapeutic approaches addressing the combined involvement of the skin and respiratory system contributes to delayed diagnosis and suboptimal treatment outcomes. The increasing exposure to environmental pollutants, lifestyle changes, and genetic predisposition further exacerbate the burden of allergic diseases. Therefore, studying the interconnected mechanisms of skin and respiratory allergic manifestations is highly relevant for improving clinical practice and developing effective prevention strategies.

Aim

The aim of this study is to analyze the clinical and immunopathological features of allergic diseases characterized by the combined involvement of the skin and respiratory tract. The research seeks to identify shared pathogenic mechanisms, assess their clinical significance, and highlight the importance of an integrated approach to diagnosis, treatment, and prevention of these conditions.

Main part

Allergic diseases involving both the skin and respiratory tract represent a growing global health problem with increasing prevalence across all age groups. Epidemiological studies indicate that atopic dermatitis often appears in early childhood and is frequently followed by allergic rhinitis and bronchial asthma later in life. This sequential development highlights the close relationship between cutaneous and respiratory allergic disorders. Urbanization, environmental pollution, and changing lifestyles have significantly contributed to the rising incidence of these conditions. Children living in industrialized regions show higher rates of combined allergic manifestations compared to those in rural areas. Genetic predisposition also plays a crucial role, as individuals with a family history of atopy are more likely to develop multisystem allergic diseases. The coexistence of skin and respiratory allergies increases disease burden, healthcare costs, and long-term complications. Epidemiological data emphasize the importance of early identification and comprehensive management of allergic diseases. Understanding prevalence patterns allows clinicians to predict disease progression. Therefore, epidemiological analysis is essential for planning preventive and therapeutic strategies.

The simultaneous involvement of the skin and respiratory tract in allergic diseases is driven by shared pathophysiological mechanisms. Central to this process is immune system dysregulation, particularly an imbalance between T

helper cell subtypes. Increased activity of T helper 2 cells leads to excessive production of cytokines that promote allergic inflammation. Immunoglobulin E plays a key role by mediating hypersensitivity reactions to environmental allergens. Mast cells and eosinophils become activated, releasing inflammatory mediators that damage tissues. Epithelial barrier dysfunction in the skin allows allergens to penetrate more easily, initiating systemic sensitization. Once sensitization occurs, the respiratory mucosa becomes more reactive to the same allergens. This interconnected immune response explains why allergic diseases rarely remain confined to a single organ system. Chronic inflammation further aggravates tissue damage and symptom severity. These mechanisms underline the systemic nature of allergic diseases.

Epithelial barrier integrity is a critical factor in the development of allergic diseases affecting both the skin and respiratory tract. In healthy individuals, the skin and airway epithelium serve as protective barriers against environmental allergens and pathogens. In allergic patients, structural and functional abnormalities weaken this barrier function. Reduced expression of structural proteins leads to increased permeability of the skin and respiratory mucosa. As a result, allergens gain easier access to immune cells, triggering sensitization. Barrier disruption also promotes chronic inflammation by sustaining immune activation. The impaired barrier allows repeated allergen exposure, worsening disease severity. This dysfunction is considered a primary event in the initiation of allergic disorders. It also explains the progression from skin-limited allergies to respiratory involvement. Addressing epithelial barrier repair has become an important therapeutic target. Barrier-focused interventions may prevent disease progression.

The immunological connection between skin and respiratory allergic diseases is well established. Antigen-presenting cells in the skin capture allergens and migrate to lymph nodes, initiating systemic immune responses. These responses are not limited to the initial site of exposure. Circulating immune cells and mediators influence distant organs, including the respiratory tract. Cytokines released during skin inflammation can alter airway immune responses. This systemic immune activation increases susceptibility to respiratory allergies. The concept of a unified allergic airway highlights the shared immune environment. IgE antibodies generated during skin sensitization can later react in the respiratory tract. This immunological cross-talk explains the frequent coexistence of atopic dermatitis and asthma. Understanding this link is essential for comprehensive patient management. Immunological studies provide insight into disease progression and treatment opportunities.

Clinically, allergic diseases involving both the skin and respiratory tract present with diverse and often overlapping symptoms. Skin manifestations include itching, erythema, dryness, and chronic inflammation. Respiratory symptoms range from nasal congestion and sneezing to wheezing and shortness of breath. The severity of symptoms often increases when both systems are affected simultaneously. Disease progression commonly follows a predictable pattern,

beginning with skin involvement and later extending to the airways. This progression reflects underlying immunological changes rather than isolated organ pathology. Patients with combined manifestations experience more frequent exacerbations. Chronic disease leads to impaired daily functioning and reduced quality of life. Early recognition of this progression is critical for timely intervention. Clinical assessment should always consider multisystem involvement. Comprehensive evaluation improves diagnostic accuracy.

Accurate diagnosis of allergic diseases affecting both the skin and respiratory tract requires an integrated approach. Clinical history remains a fundamental diagnostic tool. Skin examination and assessment of respiratory symptoms provide initial clues. Laboratory tests such as serum immunoglobulin E measurement help confirm allergic sensitization. Skin prick tests identify specific allergens responsible for disease manifestations. Pulmonary function tests are essential for evaluating respiratory involvement. Imaging and endoscopic procedures may be required in selected cases. Early diagnosis allows prompt initiation of targeted therapy. Delayed recognition often leads to disease progression and complications. Multidisciplinary evaluation improves diagnostic precision. Integrated diagnostic strategies are essential for optimal patient care. Management of allergic diseases involving both the skin and respiratory tract requires a comprehensive and coordinated approach. Treatment aims to control symptoms, reduce inflammation, and prevent disease progression. Topical therapies are commonly used for skin manifestations. Inhaled medications are essential for respiratory symptoms. Systemic therapies may be required in moderate to severe cases. Allergen avoidance plays a critical role in disease control. Immunotherapy has shown promise in modifying disease course. Patient education is essential for long-term management. Integrated treatment plans address both systems simultaneously. Failure to treat one component may compromise overall outcomes. Personalized therapy improves effectiveness. Combined management strategies yield better clinical results.

Prevention of allergic diseases with combined skin and respiratory involvement remains a major challenge. Early identification of at-risk individuals is crucial. Strengthening epithelial barrier function may reduce allergen sensitization. Environmental control measures help minimize exposure to allergens. Advances in immunology offer new preventive strategies. Biological therapies targeting specific immune pathways show promising results. Ongoing research aims to clarify disease mechanisms further. Understanding gene–environment interactions may improve prevention. Future approaches focus on personalized medicine. Integrated prevention strategies are essential to reduce disease burden. Continued scientific research is necessary to improve outcomes.

Discussion

The results of this study reinforce the growing body of evidence supporting the interconnected nature of allergic diseases affecting the skin and respiratory tract. The high prevalence of respiratory allergic conditions among patients with allergic skin disorders confirms the concept of a shared pathogenic pathway. This

relationship is best explained by systemic immune dysregulation and epithelial barrier dysfunction, which together facilitate multisystem allergic involvement. Epithelial barrier impairment appears to be a pivotal initiating factor in disease development. Disruption of the skin barrier allows allergens to penetrate and trigger immune sensitization, which subsequently predisposes the respiratory tract to allergic inflammation. The systemic dissemination of inflammatory mediators and allergen-specific immunoglobulin E further amplifies immune responses in distant organs. This mechanism provides a biological explanation for the clinical progression observed in allergic patients. The elevated immunoglobulin E levels and enhanced activity of inflammatory cells highlight the role of chronic immune activation in sustaining allergic disease. These findings emphasize the limitations of treating allergic conditions as isolated organ-specific disorders. Management strategies focusing exclusively on either skin or respiratory symptoms may fail to address the underlying systemic pathology, resulting in incomplete disease control and increased risk of progression. From a clinical perspective, the results underscore the importance of early recognition of allergic skin diseases as potential predictors of respiratory involvement. Early intervention aimed at restoring epithelial barrier function and modulating immune responses may reduce the likelihood of disease progression. Integrated diagnostic and therapeutic approaches, involving dermatologists, allergists, and pulmonologists, are therefore essential for effective patient management. Furthermore, these findings have important implications for future research and clinical practice. Understanding the molecular mechanisms linking skin and respiratory allergic diseases may facilitate the development of targeted therapies and personalized treatment strategies. Continued investigation into gene–environment interactions and immune modulation is necessary to improve long-term outcomes for patients with combined allergic disorders.

Results

The comprehensive analysis of clinical observations and recent scientific literature revealed a consistent and clinically significant coexistence of allergic diseases affecting the skin and the respiratory tract. Patients presenting with chronic allergic skin disorders, particularly atopic dermatitis, demonstrated a markedly increased incidence of respiratory allergic conditions, including allergic rhinitis and bronchial asthma. This association was observed across different age groups, with a higher prevalence in pediatric and adolescent populations, suggesting early-life sensitization as a critical contributing factor. Immunological evaluations consistently showed elevated total and allergen-specific immunoglobulin E levels in patients with combined allergic involvement. Increased activation of mast cells, eosinophils, and T helper 2 lymphocytes was noted, indicating persistent systemic allergic inflammation. Additionally, alterations in cytokine profiles were detected, with increased expression of pro-inflammatory mediators that contribute to tissue damage and symptom severity. Structural and functional impairment of epithelial barriers was identified as a common feature in both cutaneous and respiratory tissues. Reduced barrier

integrity facilitated increased allergen penetration and enhanced immune sensitization. Clinical assessment further demonstrated that patients with simultaneous skin and respiratory manifestations experienced more frequent exacerbations, prolonged disease duration, and greater symptom severity compared to individuals with isolated allergic conditions. Therapeutic outcome analysis indicated that patients receiving integrated treatment approaches targeting both skin and airway inflammation achieved improved disease control. Combined therapeutic strategies resulted in reduced symptom frequency, decreased need for emergency interventions, and improved quality of life. These findings collectively support the concept that allergic diseases involving the skin and respiratory tract constitute a unified systemic disorder rather than separate clinical entities.

Conclusion

Allergic diseases involving the simultaneous involvement of the skin and the respiratory tract represent a complex and interconnected pathological process driven by shared immunological and pathophysiological mechanisms. The findings discussed in this study demonstrate that cutaneous and respiratory allergic manifestations are not isolated conditions but components of a systemic allergic response. Epithelial barrier dysfunction, immune system dysregulation, and immunoglobulin E–mediated hypersensitivity play central roles in disease initiation and progression. The close clinical and immunological relationship between skin and respiratory allergies highlights the importance of early diagnosis and comprehensive patient assessment. Recognition of allergic skin diseases as potential precursors to respiratory involvement allows timely intervention aimed at preventing disease progression and reducing long-term complications. Integrated diagnostic and therapeutic approaches that address both skin and airway inflammation are essential for achieving effective disease control. Furthermore, the implementation of multidisciplinary management strategies improves treatment outcomes and enhances patients' quality of life. Continued research focusing on molecular pathways, immune modulation, and barrier restoration is necessary to advance preventive and therapeutic options. Overall, a unified and systematic approach to allergic diseases affecting the skin and respiratory tract is crucial for improving clinical practice and long-term patient outcomes.

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Murodova D. S.
teacher
Karshi State University

SOCIO-ECONOMIC DEVELOPMENT AND FUTURE PROSPECTS OF THE CITY OF KARSHI

Abstract*: The article analyzes the demographic indicators of the city of Karshi, the state and prospects of economic and social development of the city of Karshi, the use of labor resources, and the city's social infrastructure.*

Keywords: *large city, industrial hub, labor resources, migration, employment, infrastructure, social sphere, diversification, industrial production, service sector.*

Geourbanism, or urban geography, is the most developed area of study of population and settlements, and in general, economic and social geography. Cities are distinguished from other economic geographical objects by their holistic, immediate visibility. The reason for this is their unique representation of production, socio-economic reality in the territory, on a geographical map.

As is known, economic maps mainly show three territorial forms: lines correspond to roads, areas or fields - to agricultural sectors, and points and nodes (nodes) reflect industrial centers, cities. Therefore, it can be said that the main object of study of economic and social geography is this triad, territorial or geographical geometry, and their analysis is the fundamental problem of this science.

The functions of cities within the framework of economic and social geography are reflected in the following. First of all, it should be noted that cities are territorial units; secondly, they are a complex socio-economic category; thirdly, in cities, the environment, the socio-economic activity of this territory, as if reflected in a mirror, are integrated; fourthly, cities serve as the fulcrums, "pillars" of the economic and social geographical system of each state, region. Cities are our past, our present power, and our potential for development in the future.

The city of Karshi is located in the southwestern part of our country, on the banks of the Kashkadarya River, at an altitude of 378 meters above sea level. In some places, namely from the east, it has a noticeable undulating appearance.

The current total area of the city of Karshi is 8.3 thousand hectares. Due to the growing population and economy of the city, it is planned to expand the territory in stages in the coming years. According to the project: by 2030, the area of Karshi is planned to exceed 11 thousand hectares, and by 2042 - to 16 thousand hectares. As part of the expansion, areas will be allocated for new housing estates, road infrastructure, industrial areas and social service facilities.

Karshi is a large city in Southern Uzbekistan, ranked 8th among the cities of the republic in terms of population according to 2025. The economic and

geographical location of the city is very favorable. Almost in the center of the region and the developed Karshi steppe, at the intersection of the main railway and highway routes, there is an oasis with extensive pastures, where agriculture has been intensively developed since ancient times, between the Karshi-Zarafshon, Surkhan-Sherabad valleys and a convenient industrial hub. At the same time, the republic's production forces are located in a rapidly developing region.

In accordance with the Resolution of the President of the Republic of Uzbekistan "On measures to improve the processes of development and implementation of master plans for cities, towns and rural settlements", the master plan of the city of Karshi, the center of our region, was developed on September 13, 2013. According to it, the area of the city's boundary line is 7,551 hectares. According to data as of January 1, 2023, the housing stock is 3,314.75 thousand square meters, 16.7 square meters per person.

The master plan of the city of Karshi proposes to expand the city's territory at the expense of adjacent territories. The municipal districts of Karshi district: Gubdin, Shoykhodja, Kochkak, Uzumzor, Gulistan, Tinchlik, Batosh, Yangi Batosh, Jumbozor Istiqlol, Koratepa, Kat, Pakhtazor, Chaman, Bogobod, Yangi Bogobod have been transferred to the city of Karshi. In particular, according to the new master plan, it is proposed to add 434.2 hectares of land from the adjacent territory of the Karshi district to the city of Karshi. It is reported that 302.1 hectares of the area planned to be transferred from the Karshi district to the city of Karshi will be under construction, and 132.1 hectares will be irrigated farmland.

In the conditions of Kashkadarya, the correct and rational use of labor resources creates an opportunity for the development of productive forces and the effective use of natural resources. The growth of labor resources in the city, the growth of the population depends on its composition and migration. The growth of the city's population has been increasing rapidly since the 1960s. This can be seen from the following data. For example, according to the 1959 census, 33 thousand people lived in the city, while on 01.01.2025 it reached 300.8 thousand people. Such an increase in the population is primarily due to the development of the Karshi desert and the discovery of numerous natural resources in the region, which creates opportunities for the development of the city's economy, which has led to the settlement of many people in the city.

The permanent population of the city of Karshi, the center of Kashkadarya region, was 300.8 thousand people as of January 1, 2025, an increase of 2.6 thousand people or 0.9% since the beginning of the year.

With the increase in population, labor resources (178.8 thousand people) also increased. 47.1% of the total population is engaged in social work. The rest are young children, adolescents, and pensioners. Since 2023, the total number of working-age youth (168.7 thousand people) has been growing. Therefore, the formation of entrepreneurship in the city in order to provide employment for young people requires the development of medium and small businesses and other sectors. In this way, providing employment to the growing working-age population will create the opportunity to produce more consumer goods.

One of the characteristics of the cities of the southern region of Uzbekistan is the natural change of the population, which indicates that the living conditions of the city's population have improved due to the increase in birth rates. In the city of Karshi, the birth rate (per 1,000 people) was 24.6 per thousand, the death rate was 5.4 per thousand, and the natural increase was 19.2 per thousand. The number of people arriving in the city was 2,739, and the number of people leaving was 3,273.

Table 1

Demographic situation of the city of Karshi

Indicators	2002	2005	2007	2009	2010	2018	2022	2024
Natural population change (persons)								
Birth	3835	3783	4622	4937	4939	5567	8507	7338
Death	959	947	963	925	935	1158	1581	1606
Natural growth	2876	2836	3659	4012	4004	4409	6926	5732
Per 1000 people (per mille)								
Birth	17,9	17,0	20,2	20,7	20,4	20,7	29,7	24,6
Death	4,5	4,3	4,2	3,9	3,9	4,3	5,5	5,4
Natural growth	13,4	12,8	16,0	16,8	16,5	16,4	24,2	19,2

Source: *Data from the Kashkadarya Regional Statistics Department.*

As the city's population grows from year to year, it can be seen that labor resources are also increasing. In this case, in the conditions of market relations, it creates a problem of providing employment to the growing population. In order to avoid such problems, it is necessary to work on a program to ensure employment and create new jobs. For this, if new production facilities are launched, the modernization and expansion of existing enterprises are modernized, small enterprises and micro-firms are established, individual entrepreneurship is established, the development of production, social and market infrastructure is carried out, the restoration of the activities of some non-working enterprises is carried out, and other measures are taken, it is possible to create 8,706 new jobs in 2024.

According to the resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated September 23, 2013, the Master Plan of the city of Karshi for the period until 2030 was approved.

The city plans to build multi-storey buildings - 9-4 storeys, low-rise buildings - 2-3 storeys and individual 1-2 storeys. Depending on the population of each area, it is planned to create schools, kindergartens, neighborhood centers, small alleys. It is planned to create a protected area around the historical and architectural part of Karshi. The construction of advertising boards and various buildings that do not correspond to historical buildings near monuments will be banned. Road transport facilities (bus stations, bus stops, road service stations) will receive additional upgrades. It is planned to further expand the existing highways in the city, later to connect them to bypass roads on the outskirts of the city and transport passengers to other settlements in the region, such as Shahrisabz, Guzar, Koson, Yangi Nishon.

Today's Karshi is a multifunctional city. Light industry and food industry occupy a leading position in the industrial sectors of the city. A cotton ginning plant, an oil and dairy plant, a sewing factory, construction materials, and metal processing plants contribute to the development of the regional economy. Currently, more than 20 joint ventures operate in Karshi. The Uzbek-British "Mevalar kamalagi" and the Uzbek-Singapore "Karshiyog" joint ventures produce products by processing local raw materials. Enterprises such as cotton, silk, oil factories, metalworking enterprises, sewing factories, and a building materials plant have been built in and around Karshi, making Karshi an industrial hub. Karshi is a base for developing the desert. Railways and highways converge in Karshi. This develops the production links of cities and towns such as Nishon, Talimarjon, and Koson. The city has Karshi State University, Karshi Technical University, and other educational institutions.

To meet the population's demand for affordable housing, more than 3,000 affordable model housing units were built in rural areas this year, or twice as many as last year, as well as 14 multi-story buildings with a total of 630 apartments in the city of Karshi.

The Uzbek-Chinese joint venture "Radiant Silk", which began operating in the city of Karshi last year, is one of the largest industrial enterprises specializing in the processing of cocoon crops. Currently, the enterprise is actively processing the cocoon raw materials harvested this year.

This joint venture was established in accordance with the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated November 5, 2012 “On measures to organize modern production for processing raw silk on the basis of the property complex of the liquidated open joint-stock company “Karshi 16-Abusov Sarayi” in the city of Karshi, Kashkadarya region” and is equipped with modern equipment based on Chinese technology. The technological equipment has a capacity to process 420 tons of cocoons per year and produce 120 tons of raw silk from them; most importantly, 100 local young men and women are permanently employed here. They mastered the management of modern equipment in a short time. Therefore, the productivity and production rates in the workshops are high.

The processing processes at the joint venture are closely interconnected, and work is carried out in four existing workshops in a balanced manner. In one, the cocoons are sorted, in the next they are spun, and in the third, the silk fiber is wound onto special discs. The wound cocoons are then spun into yarn in the spinning workshop.

The products are currently being exported to the domestic market, as there are textile enterprises in our country that produce satin and adras fabrics from raw silk, and new ones are being built.

The city of Karshi has a significant place in the socio-economic potential of the Kashkadarya economic region. In 2022, the total number of enterprises and organizations was 7,075, including 1,304 newly established ones, and 4,695 enterprises, of which 567 were in industry, 127 in agriculture, 739 in construction,

1,035 in trade and catering, and 2,227 in others.

The main part of the output, or about 14.0 percent, falls on the southern region of Uzbekistan, where, along with light and food industries, some branches of fuel, construction and machine-building enterprises are developed. The geography of the production of consumer goods (CGI) in the region is also narrow, and the importance of the city of Karshi is very large (43.6%). In 2018, 127.1 thousand people were employed at the Kashteks factory, oil extraction and flour factories, fruit and vegetable processing enterprises, of which 30.8 thousand people were employed at state enterprises and organizations and 96.3 thousand people were employed at non-state enterprises and organizations.

In 2022, the volume of industrial production was 15.2%, and in terms of industrial product production, a significant increase in production volume was ensured in the city of Karshi by 109.1%. Analysis of the stratification of industrial product production per capita in the city of Karshi is 12,053.2 thousand soums, which is significantly higher than the average regional level indicator. (6,566.7 thousand soums). The share of small businesses in the production of industrial products in the city of Karshi is 60.0%. Today, more than 2,000 industrial enterprises operate in the region, of which 536 are located in the city of Karshi. 502 new industrial enterprises have been established in the region, of which more than 100 are in the city of Karshi.

Construction works amounted to 2278.3 billion soums, or 112.4%, including regional construction contracting organizations - 97.6 billion soums, with a growth rate of 64.3%. The volume of construction works was observed in the city of Karshi, and its share in the region was 26.2%. The highest growth rate of construction works was observed in the city of Karshi. In this region, the construction of a multi-purpose swimming pool by “Pudina Kuvonchbek” LLC ensured a growth rate of 108.3%.

The volume of services production is 4001.4 billion soums, an increase of 113.8% compared to the previous year, and Karshi accounts for 53.4% of the total volume of market services. The maximum growth in services provided per capita is 9.4%, per capita indicators are 13990.1 thousand soums, 114.7%. The volume of retail trade turnover is 4639.2 thousand soums, a growth rate of 111.6%. The share of large enterprises and small businesses in retail trade turnover is 75.4 and 24.6%. The share of large enterprises in the turnover structure by region is 7.4%, and the largest share is observed in Karshi, 24.6%.

The economic and geographical location of cities, their population, and the level of provision with transport and utility systems increase the interest of foreign investors in locating industrial enterprises in this region. The fact that most of the industrial enterprises established in Uzbekistan during the years of independence were built in urban areas is proof of our opinion.

o develop the city of Karshi economically and socially, the following should be implemented:

- It is necessary to provide the city with drinking and wastewater, for this purpose, canals (ditches) should be laid through three parts of the city;

- Develop a program to provide the city's population with natural gas and electricity;

- Develop new jobs in the development of medium and small businesses in order to provide the population with jobs;

- Develop construction, improvement and landscaping of modern housing;

- There are many ancient settlements in the city, and their preservation and preservation should be passed on to future generations as historical and archaeological monuments;

- In hot and dry climates, create recreation areas around the city (citizens go to Kitab and Shahrisabz districts for recreation);

- Find ways to attract foreign investment for the further development of the city by improving the infrastructure and investment climate, etc.;

- Along with the construction of modern housing, it is necessary to develop the utility sector.

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Murodova D. S.
o'qituvchisi
Qarshi davlat universiteti
Hamdamova I.
talabasi
Qarshi davlat universiteti

QASHQADARYO VILOYATI SHAHAR AHOLISI MANZILGOHLARINING IQTISODIY GEOGRAFIK XUSUSIYATLARI

Annotatsiya: *Ushbu maqolada Qashqadaryo viloyati shaharlari va shahar aholi manzilgohlari aholisi soni, shahar manzilgohlarining tarkib topishi, hududiy shakllanishi, Qashqadaryo viloyati urbanizatsiya ko'rsatkichlari, shaharlarda sanoat korxonalarini joylashtirishda hududning tabiiy-iqtisodiy, demografik va ekologik sharoitlari asosida sanoat ishlab chiqarishlarni majmuali tashkil qilish yo'llari batafsil yoritilgan.*

Kalit so'zlar: *aholi manzilgohlari, aholi punkti, qishloq, shahar, demografik salohiyat, urbanizatsiya, shaharcha, kichik shahar, tabiiy sharoit, sanoat ishlab chiqarish, sanoat korxonalari, infrastruktura*

Murodova D. S.
teacher
Karshi State University
Hamdamova I.
student
Karshi State University

ECONOMIC GEOGRAPHICAL CHARACTERISTICS OF THE URBAN POPULATION OF KASHKADARYA REGION

Abstract*: This article describes in detail the population of cities and urban settlements of the Kashkadarya region, the composition and territorial formation of urban settlements, urbanization indicators of the Kashkadarya region, and ways to comprehensively organize industrial production based on the natural, economic, demographic, and environmental conditions of the region when placing industrial enterprises in cities.*

Keywords: *population centers, settlement, village, city, demographic potential, urbanization, town, small town, natural conditions, industrial production, industrial enterprises, infrastructure*

Aholi manzilgohlari tizimini iqtisodiy geografik nuqtai-nazaridan o'rganish ilmiy-amaliy jihatdan katta ahamiyatga ega, chunki, aholi manzilgohlari ma'lum hududlarda ishlab chiqarishni hududiy shakllanishi va to'planishida tayanch nuqtalar hisoblanadi. Jamiyat hayotining asosini moddiy boyliklar ishlab chiqarish

tashkil etadi. Har qanday ishlab chiqarish faoliyati muayyan aholi manzilgohining vujudga kelishiga, rivojlanishiga zamin bo`lib xizmat qiladi. Turli kattalikdagi aholi manzilgohlari, ularning murakkab tizimlari aholining hududiy tashkil etish shakllaridir. Uning ijtimoiy tashkil etish shakllariga har xil yosh va jins, millat, elat, kasb - hunarga mansub kishilar uyushmasi kiradi. Mamlakat ijtimoiy – iqtisodiy rivojlanishida aholi manzilgohlari muhim o`rin egallaydi. U milliy iqtisodiy hududiy tizimida tabiiy resurslar, ijtimoiy ishlab chiqarish va infrastrukturani bir – birlari bilan bog`lovchi vazifani bajaradi.

Shaharlar yirik aholi manzilgohlari bo‘lib, unda yashaydigan kishilar qishloq xo‘jaligi bilan band bo‘lmasdan, boshqa ijtimoiy - iqtisodiy, madaniy sohalarda shug‘ullanishadi. Shaharlar turli makon va zamonlarda iqtisodiy, siyosiy, madaniy va boshqaruv markazi rolini o‘ynagan. Shahar aholi manzilgohlari o‘lchami jihatidan yirik va unda yashovchi aholi, qishloq aholi manzilgohlaridagiga nisbatan ko‘p sonliligi hamda zichligi bilan tavsiflidir. Shaharlarning qudrati ularda mujassamlangan iqtisodiy, intellektual va demografik salohiyat bilan belgilanadi.

Shahar aholi punktlari va ular aholisi soni doimo o‘sib, rivojlanishi natijasida, shaharlarning tobora murakkab tizimlari vujudga kelmoqda. Shahar turmush tarzi asta-sekinlik bilan Yer sharida yashovchilar barchasini qamrab ola boshlaydi. Shaharlarning taraqqiy etishi uning yonida turli o‘lchamdagi shaharlarning, ya’ni yirik shahar atrofida shahar va shaharchalarning to‘planishi, shahar aglomeratsiyalarining rivojlanishi shahar aholi punktlarining yangidan-yangi turlari paydo bo‘lishiga, hududning demografik sig‘im imkoniyatini oshirishga yordam beradi. Mazkur jarayonni boshidan o‘tkazayotgan aholi punktlari va ular aholisi soni, nafaqat yadro shaharga nisbatan ko‘payadi, zichligi ortadi, balki ijtimoiy-iqtisodiy, demografik, madaniy-maishiy, diniy va xulqiy munosabatlarida, yashash tarzi hamda fe’l-atvorida o‘zgarishlar kuzatiladi. Ayniqsa, aholi o‘sishi va joylanishini ta’minlaydigan demografik jarayonlarda urbanizatsiya ta’siri yanada faollashadi, aholi yosh-jinsiy tarkibi, ijtimoiy-kasbiy tuzilishi, urf-odatlar va an’analar o‘zgaradi, aholi hududiy harakatchanligi ortadi. Shuningdek, qishloq xo‘jaligi bo‘lmagan sohalarning ustuvor rivojlanishi (xususan axborot, servis, turizm va x.k.), shahar turmush tarzining keng tarqalishi kuzatiladi.

Odatda, urbanizatsiya darajasi faqat tabiiy emas, balki sun’iy ravishda ham ko‘tariladi. Sun’iy urbanizatsiya o‘sha hududlar ijtimoiy-iqtisodiy rivojlanishiga ijobiy ta’sir etadi (O‘zbekistonda 2009 yil 13 martdagi Vazirlar Mahkamasining 68–sonli qarori bilan urbanizatsiya darajasi sun’iy ko‘tarildi). Ammo aholi demografik mayli, munosabatlarida, bu hodisa birdaniga sezilmasada, ma’lum vaqtdan so‘ng demografik jarayonlarni ifodalovchi ko‘rsatkichlarda yanada pasayishga olib keladi. Biroq ijtimoiy-iqtisodiy va demografik jarayonlardagi o‘zgarishlar, keyinchalik shahar joylar aholisi demografik tarkibining buzilishiga sabab bo‘ladi. Chunki, qishloqlardan shaharlarga aholi harakati faollashuvi kuchayadi, oqibatda, shaharlarda qishloq aholisiga xos demografik munosabat, demografik mayl, demografik tarkib va qarashlar paydo bo‘ladi va ma’lum

vaqtgacha saqlanib qoladi. Bu esa, biroz muddatgacha shahar aholisida tabiiy harakat koʻrsatkichlarining jonlanishiga, aholi soni va salmogʻining ortishiga yordam beradi.

Shaharlarda sanoatning rivojlanishi, ularning siyosiy va madaniy funksiyalarining kengayishi, hududiy mehnat taqsimotining chuqurlashishi ana shu jarayon xususiyatlaridir. Urbanizatsiya uchun shahar atrofidagi qishloqlardan shaharlarga, kichik shaharlardan megapolislarga tebranishli migratsiya xosdir.

Oʻzbekistondagi amaldagi qonunchilikka koʻra, sanoat korxonalariga, ijtimoiy-iqtisodiy infratuzilmalarga, kommunal xoʻjaliklariga, davlat turarjoy fondiga, madaniy-maʼrifiy, taʼlim, davolash profilaktika, savdo, taʼminot, kommunikatsiya, transport va boshqa muassasalarning keng tarmogʻiga ega boʻlgan, kamida 7000 aholisi boʻlgan aholi punktlari shahar maqomini olishi mumkin. Aholisi kamida 2000 kishidan iborat boʻlgan, sanoat korxonalari, transport va boshqa hayotiy muhim obyektlar yaqinida joylashgan aholi punktlari shahar turidagi posyolka maqomini olishi mumkin. 2009 yilda mamlakat hukumatining qarori bilan respublikadagi aholisi kamida 2000 kishidan iborat boʻlgan 965 ta yirik aholi punktlariga shahar posyolkalari maqomi berildi, natijada Oʻzbekistonda shahar aholisi soni 4,4 million kishiga koʻpaydi.

Hukumat qaroriga muvofiq, jumladan, Qoraqalpogʻiston Respublikasida - 11 ta, Andijon viloyatida - 79 ta, Buxoro viloyatida - 59 ta, Jizzax viloyatida - 33 ta, Qashqadaryo viloyatida - 117 ta, Navoiy viloyatida - 29 ta, Namangan viloyatida - 108 ta, Samarqand viloyatida - 75 ta, Surxondaryo viloyatida - 106 ta, Sirdaryo viloyatida - 15 ta, Toshkent viloyatida - 78 ta, Fargʻona viloyatida - 198 ta, Xorazm viloyatida - 50 ta qishloq shahar posyolkalariga aylantirildi .

Oʻzbekiston Respublikasi Shaharsozlik kodeksining 12-moddasiga muvofiq, aholi punktlari eng yirik shaharlar (1 mln kishidan koʻp), yirik shaharlar (250 ming kishidan 1 mln kishigacha), katta shaharlar (100 ming kishidan 250 ming kishigacha), oʻrtacha shaharlar (50 ming kishidan 100 ming kishigacha), kichik shaharlar (50 ming kishigacha)ga boʻlinadi.

Bugungi kunda aholisining soni 20 ming kishigacha boʻlgan shaharlarning umumiy soni 35 ta boʻlib, ular mamlakat shaharlari tizimining 29,4 foizini tashkil etadi. Ularda respublika shaharlari aholisining salkam 5,4 foizi yashaydi. Aholisi 20 mingdan 50 minggacha boʻlgan shaharlar 48 tadir (shaharlar tizimining 40,3 foizi). Oʻrtacha shaharlarda (aholisi 50-100 ming boʻlgan 19 ta shahar) shahar aholisining 16,0 foizi istiqomat qiladi. Boshqacha aytganda, Oʻzbekiston shaharlarining koʻpchiligini (shaharlar tizimining 69,7 foizi) kichik va oʻrta shaharlar tashkil etadi. Ularda shaharlar jami aholisining 35,1 foizi yashaydi.

Qashqadaryo respublikaning boshqa viloyatlariga nisbatan iqtisodiy va ijtimoiy jihatdan sanoati kam taraqqiy etgan vohasidir. Keyingi 70 yilda Qashqadaryo ma'muriy jihatdan ancha vaqt boshqa viloyatlar tarkibida bo'ldi. Bu uning iqtisodiy va ijtimoiy taraqqiyotiga salbiy ta'sir qildi. Umuman, viloyat tabiiy zahiralarga boy o'lka bo'lsada, turli tarixiy davrlarda iqtisodiy, ijtimoiy tomondan sust rivojlandi.

Ma'lumki, mamlakatning iqtisodiy va ijtimoiy taraqqiyoti aholi manzilgohlarining rivojlanishiga ta'sir etdi va aholi manzilgohlarining bajaradigan vazifalarini o'zgartirib yuboradi. Natijada aholi manzilgohlariga ishlab chiqarishning rivojlanishi asosida qishloqlar o'rnida shaharlar shakllandi. O'zbekiston Respublikasi ayniqsa, Qashqadaryo voha shaharlari qishloq xo'jaligiga to'la bog'liq holda rivojlangan. Viloyatda shaharlar qishloqlar bazasida shakllangan. Bundan tashqari qishloqlar atrofidan yer osti tabiiy zahiralari topilishi bilan paydo bo'lgan aholi manzilgohlarida ishlab chiqarish sohalarining rivojlanishi bilan shaharlar paydo bo'ldi.

Shahar iqtisodiy, ijtimoiy va siyosiy - ma'muriy funksiyalarni amalga oshiradigan, aholi to'planadigan joydir. Shaharlar-qishloqlarga urbanizatsion jarayonning rivojlanishi bilan paydo bo'ladi. Shuning uchun qishloqlarni-qishloq xo'jaligisiz, sanoatni-shaharsiz tasavvur qilib bo'lmaganidek, qishloqlarni-shaharsiz tushunish ham mumkin emas. Bu ayniqsa, iqlimi issiq mintaqalar uchun to'la taalluqlidir. Ma'lumki, O'zbekistonda shaharliklar soni 1960 yillardan, Qashqadaryo viloyatida esa 1970 yillardan keyin ko'payib bordi. Masalan: 1959 yilda O'zbekistonda shahar aholisi umumiy aholiga nisbatan 33,9%, 1970 yilda 36,8%, 1990 yilda 40,2 %, 1996 yilda 38,2%, 2000 yilda 37,4%, 2006 yilda 36,1%, 2010 yilda 51,5 %, 2025 yilda 51,0 %ni tashkil qilgan bo'lsa, Qashqadaryoda shu yillarda ushbu raqamlar 13,2,16,5,26,5, 25,4, 25,1, 24,8, 24,6, 43,4,42,9,42,7 % ni tashkil qildi.

Qashqadaryoning 3639,3 ming aholisi 1170 aholi manzilgohlarida istiqomat qiladi. Shundan 1041 qishloqda 2083,5 ming, 12 shahar va 118 shaharchada 1555,8 ming aholi yashaydi. Bu viloyat shahar aholi manzilgohlarining shakllanishi va rivojlanishiga Qarshi dashtini o'zlashtirish, yoqilg'i zahiralarini ishga tushirish juda katta iqtisodiy ta'sir qildi. Shunga qaramasdan, Qashqadaryo respublikada sanoat mahsulotlari ishlab chiqarish va sanoatda ishlovchi aholi miqdori bo'yicha oxiridan ikkinchi, Surxondaryo viloyatidan oldingi o'rinda turadi. Mavjud korxonalar ham sanoqli bo'lib, ular viloyatning Qarshi, Shahrisabz, Muborak va Koson shaharlarida joylashgan. Qolgan 12 ta shahar va shaharchalarda faqat paxtani chigitdan ajratish sohasi bo'lgan sanoat korxonalari mavjud. 227,0 ming aholi yashaydigan yirik chorva va qurilish xomashyosiga boy Dehqonobod tumanida kaliy zavodi ishga tushirildi. 350,1 ming aholi istiqomat qiladigan Mirishkor va Kasbi tumanlari-viloyatning yirik paxta yetishtiruvchi, gaz va neft qazib oluvchi tumanlarida paxtadan chigitni ajratuvchi zavod va paxta punktlaridan boshqa sanoat korxonalari qurilmagan. Bu ikkala tumanda, 2009 yilda Mirishkorda 3 ta shaharcha, Kasbi tumanida 9 ta shaharcha shakllandi.

Keyingi paytda vohadagi ko'pgina shaharchalar shaharlar mezoniga to'g'ri kelmasada shaharga aylantirilgan. Bunday shaharlarga Kitob, Qamashi, G'uzor, Chiroqchi, Beshkent, Yangi Nishon va boshqalar kiradi. Ularda iqtisodiy, sotsial sohalar past darajada rivojlangan. Yangi shaharlarni barpo etish yoki qishloq manzilgohlarini shahar darajasiga ko'tarish uchun qanday mezonga asoslanish kerakligini bilish hamda shahar bilan qishloqni ajratib turuvchi farqni topish

hozirgi zamon urbanizatsiyasining asosiy dolzarb masalalaridan biridir. Hatto "shaharlar va shaharchalar orasidagi jarayonda ham qabul qilingan meyor yo'q". Hozirgi shaharlar faqat bir tomonlama ijtimoiy va demografik asoslarga bog'liq holda rivojlangan. Shaharlar barpo etish mezonning talablariga to'liq mos shaharni vujudga keltiruvchi omillar-shaharning bajarayotgan ma'muriy, ijtimoiy vazifalari, aholi soni va hokazolarning ayrimlari mavjudligi hisobga olingan holda ma'muriy tuman markazlarining aksariyati shaharlarga aylantirilgan.

Keyingi yillarda shaharliklar sonining ortishi asosan shaharlar yerining qishloqlar hisobiga kengayishi ta'sirida o'sgan. Yangi yerlarning o'zlashtirilishi natijasida yangi tumanlar tashkil topdi. Natijada 1970-1979 yillarda shahar va shaharchalar, Beshkent, Kitob, Qamashi, Koson, G'uzor, Muborak, Tallimarjon shaharga va Qashqadaryo-shaharchaga aylantirildi. 1979-1995 yillarda Chiroqchi, Yangi Nishon-shaharga, Qorashina shaharchaga aylantirilishi asosida yana ko'paydi. 1989-1996 yillarda shaharlar atrofidagi (Qarshi, Kitob, Shahrisabz, Muborak, Koson) qishloqlardan 33,0 ming aholi shaharga qo'shildi. Natijada shaharlar aholi sonining ortishi hisobiga ko'proq o'sdi. 1992 yilda Qarshi shahri atrofidagi 7 qishloq va uning 11,9 ming, Kitob shahriga 2961 kishi va Shahrisabz shahriga (1993) Oktabr shaharchasi birlashtirildi.

Hozirgi paytda viloyatda shaharchalar salmog`iga ko`ra Qarshi (15 ta), Yakkabog` va Koson (har birida 14 ta dan) Shahrisabz (13 ta), va Kitob (13 ta) tumanlari oldingi o`rinlarni band etadi. Ayni paytda Qamashi, G`uzor, Mirishkor va Dehqonobod tumanlarida 3 tadan 5 tagacha qishloq manzilgohlari shaharcha maqomiga ega bo`ldi.

1-jadval

Qashqadaryo viloyatidagi yangi shaharchalarning soni

№	Tuman	Jami shaharcha	Aholisi		
			10000 dan ziyod	5000-10000	2000-5000
1	Dehqonobod	**3**		**1**	**1**
2	Kasbi	**9**	**2**	**3**	**4**
3	Kitob	**13**		**1**	**13**
4	Koson	**14**		**2**	**12**
5	Mirishkor	**3**	**3**		
6	Muborak	**5**	**1**	**1**	**3**
7	Nishon	**9**		**8**	**1**
8	Qamashi	**5**		**1**	**4**
9	Qarshi	**15**	**1**	**1**	**13**
10	G‘uzor	**5**		**1**	**4**
11	Yakkabog‘	**14**			**14**
12	Shahrisabz	**13**			**13**
13	Chiroqchi	**5**	**2**	**6**	
14	Ko’kdala	**4**		**1**	
	Qarshi sh	**1**			**1**
	Viloyat	**118**	**9**	**26**	**83**

Manba: *Qashqadaryo viloyati statistika ma’lumotlari asosida tayyorlandi.*

Qahqadaryo viloyatida aholisi soni 10 mingdan ziyod bo`lgan shaharchalar toifasiga Maymanoq, Ayritom, Qarliq, Mirishkor, Fazli, Pomuq, aholisi 5-10 ming kishi bo`lgan shaharchalar toifasiga 26 ta shaharcha (Nishon, Guvalak, Po`lati, Xitoy, Qatag`an, Navruz, Samarqand va boshqalar) kiradi va viloyatdagi shaharchalarning 1/5 qismini tashkil etadi. Jami aholisi 123,1 ming kishi bo`lgan 33 ta shaharcha aholisi 3,0-4,9 ming kishi bo`lgan shaharchalar toifasiga, 66 tasi esa aholisi 2,0-2,9 ming kishi bo`lgan shaharchalar toifasiga kiradi. 2025 yilda Qashqadaryo viloyatida 118 ta shaharcha tipiga o'tkaziladigan aholi manzilgohlari belgilandi. Viloyat tumanlari ichida eng ko'p shaharcha tipiga o'tkazilgan 15 ta shaharcha tipidagi aholi punkti bilan Qarshi tumani turadi. Tuman shahar aholisi (101,2 ming kishi) viloyat shahar aholisining 6,4 %ini tashkil etadi. 14 ta shaharchalar ajratilgan tumanlar ikkita bo'lib, Koson va Yakkabog' tumanlaridir. Koson tumani shahar aholisi (167,6 ming kishi) viloyat shahar aholisining 10,7 % ga teng bo'lsa, Yakkabog' tumani shahar aholisi esa (93,9 ming kishi) 6,0 %ni tashkil etadi. Shaxrisabz tuman shahar aholisi 57,5 ming kishiga teng bo'lib, viloyat jami shahar aholisining (1555,8 ming kishi) 3,7 %ini tashkil etadi va Kitob tumanida shahar aholisi (106,7 ming kishi) viloyat jami aholisining 7,0 %ini tashkil etgan holda 13 ta shaharcha ajratilgan. Viloyatda eng kichik yer maydoniga ega Kasbi tumanida 9 ta shaharcha tipidagi aholi punkti belgilanib, tuman shahar aholisi (84,2 ming kishi) viloyat shahar aholisining 5,3%ini tashkil etadi. Nishon tumanida 9 ta, Chiroqchi tumanida 5 ta va Ko’kdala tumanlarida 4 tadan shaharchalar ajratilib, Nishon tumani shahar aholisi (101,6 ming kishi) 6,6 % ni, Chiroqchi tuman shahar aholisi esa (78,5 ming kishi), viloyat shahar aholisining 7,0%ini tashkil etadi. Viloyatda uchta tumanda: G'uzor, Qamashi va Muborak tumanlarida beshtadan aholi punktlari shaharcha tipiga aylantirilgan. Tumanlar shahar aholisi (G'uzor -53,4 ming; Qamashi-71,0 ming; Muborak-75,6 ming kishi) viloyat shahar aholisining 3,4%; 4,5 va 5,0%ini tashkil etadi. Viloyatning qishloq xo'jalik yaxshi rivojlangan tumanlaridan Mirishkor tumanida uchta shaharcha tipidagi aholi punkti ajratildi. Ajratilgan bu shaharchalar aholisi (49,7 ming kishi) viloyat shahar aholisining 3,2% iga teng. Maydoniga ko'ra viloyatda eng katta tuman Dehqonobod tumanida ikkita aholi punkti (Qarashina, Beshbuloq) shaharcha tipiga o'tkazilgan bo'lib, ularda 30,9 ming aholi istiqomat qiladi. Bu viloyat shahar aholisining eng kam - 2%ini tashkil etadi. Viloyat tumanlarida shaharcha tipiga aylantirilgan aholi manzilgohlari shahar aholisi bilan birga tumanlarning jami shahar aholisi viloyat shahar aholisining 70,9 %ini tashkil etadi. 19,4% esa viloyat markazi-Qarshi shahri aholisi (300,8 ming kishi) ga, 9,7 % i Shahrisabz shahri aholisi (150,1) ga to'g'ri keladi.

Viloyat shahar aholisining shakllanishi tabiiy ko’payish hisobiga o’smoqda.Masalan,2025 yilda aholining tabiiy ko’payishi respublika shaharlarida 23,7 promille bo’lsa,Qashqadaryoda esa bu ko’rsatkich 24,7 promilleni tashkil qiladi. Bu respublika viloyatlaridan shahar aholisining tabiiy ko’payish bo’yicha to’rtinchi o’rindadir.Lekin 1989-2025 yillarda shahar aholisining shakllanishida tabiiy ko’payish asosiy bo’lsada, migratsiyaning ta’siri ham sezilarlidir.Keyingi paytda boshqa respublikalar singari O’zbekistonda ham shahar aholisining

shakllanishida migratsiyaning ta’siri sezilarli kamaymoqda.Umuman,keyingi yillarda viloyat shaharlar aholisi tabiiy ko’payish hisobiga,ayrim hollarda shaharlarga qishloqlarning qo’shilishi hisobiga ham o’smoqda.Viloyat shaharlarida tashqi migratsiyaning ta’siri salbiy bo’lsada, viloyat hududidan va respublika viloyatlaridan aholining ko’chib kelish jarayoni faollashgan.

Viloyatda urbanizatsiyon jarayon aholi migratsiyasi tarkibida faol mehnat resurslarining kamayib ketishiga yaqin yillargacha ta’siri bo’ladi. Chunki respublikadan tashqariga ketayotgan migrantlarning aksariyati malakali mutaxassislardir.Ular asosan ilgari Rossiya, Ukraina va boshqa respublikadan kelganlar. Birgina 1993 yilda respublika va Qashqadaryo viloyatidan ketganlardan 98,2 foizi va kelganlarning 94 foizi oliy va o’rta ma’lumotlilardir.Respublika va uning janubiy viloyatlaridan ketganlar asosan malakali mutaxassislardir,kelganlar bo’lsa ko’proq o’qishdan, armiya xizmatidan hamda Markaziy Osiyodagi respublikalar o’zbeklaridir.1993 yilda respublika shaharlaridan ketganlar 137,6 ming (63,6 foiz) ni tashkil etadi,68,5 ming(41,8) kishi qishloqdan kelganlar tashkil qilgan.Qashqadaryo viloyati shaharlaridan ketganlarning 3311 ta (44%) si, shundan 1043 (15 %) tasi qishloqlardan kelgan kishilardir.Buning shahar aholisi o’sishiga ta’siri uncha sezilmasada, mavjud aholining tarkibiga va shaharning iqtisodiy hamda ijtimoiy taraqqiyotining pasayishiga ta’siri ma’lum davrgacha seziladi. Lekin janubiy viloyatlarda murakkab sanoat korxonalarining kamligi tufayli ularning ta’siri sezilmaydi. Viloyat shaharlarining 11 tasi tuman markazlari, qolganlari yangi yerlarni o'zlashtirish bilan shakllangan. Viloyat shaharlari asosan mikroshaharlardir. Viloyatda shaharlar taraqqiyoti sust rivojlanishining asosiy sababi mavjud sanoat korxonalari xom ashyoning bir tomonlama qayta ishlashi tufayli bu shaharlarning iqtisodiy taraqqiyotiga salbiy ta'sir qilmoqda.

Viloyatning 75,0%i - kichik shaharlardir. Ulardan 5,4-9,9 ming aholisi bo'lganlari 118 ta, 10-20 ming kishi yashaydiganlari 8 ta, 20-40 ming aholi yashaydiganlari 6 ta, aholisi 50-100 ming aholisi bo'lganlar 1 ta va 101-200 ming kishi bo'lgan shahar ikkitadir.

Ma'lumki, 2009 yil mamlakatimizda "Qishloq taraqqiyoti va farovonligi" yili deb belgilandi. Shu munosabat bilan respublikamiz qishloq manzilgohlarida sanoat (asosan yengil va oziq-ovqat) tarmoqlarini joylashtirish va shu asosda yangi ish o'rinlarini tashkil qilish, qishloqlarni toza ichimlik suvi, tabiiy gaz, transport va boshqa infratuzilma shaxobchalari bilan ta'minlanishini yanada yaxshilash maqsadida "Qishloq taraqqiyoti va farovonligi" yili Davlat dasturi qabul qilindi. Dasturda qishloq joylari aholisining turmush darajasini ko'tarish, ularga sifatli tibbiyot va maorif xizmatini ko'rsatish, shahar va qishloq o'rtasidagi ijtimoiy-iqtisodiy tafovvutlarini kamaytirish ko'zda tutilgan.

Qarshi dashtining o’zlashtirilishi, tabiiy gaz va neft konlaridan foydalanishning yo’lga qo’yilishi bilan respublikaning janubiy viloyatlarida ishlab chiqarish kuchlari rivojlandi.Vohada sanoatni hududlararo rivojlantirish uchun qator sanoat tugunlari: Qarshi, G’uzor, Shahrisabz, Muborak kabilar asosida Qarshi-G’uzor, Kitob-Shahrisabz sanoat tugunlari shakllandi.

Shaharshunos olimning fikricha ” urbanizatsiya jarayonining taraqqiyoti aholi o’sishi, joylashishi, ishlab chiqarishning taraqqiyotiga va ular miqdorining ko’payish sur’atlari bilan chambarchas bog’liqdir.Qashqadaryo viloyatida 3639,3 ming aholisi 28,6 ming kv.km hududga ega bo’lgan joyda atigi Shahrisabz paxta tozalash, konserva va Qarshi shahridagi paxta yog’ zavodlari bo’lgan,keyinchalik viloyatda qishloq xo’jalik mahsulotlarini qayta ishlovchi paxta tolasini ajratuvchi 8 ta paxta zavodi, Koson yog’, Qarshi vino, un kombinati, Muborak, Shurtangaz gaz tozalash zavodlari qurildi va Talimarjon GRESining 1-bloki ishga tushirildi.Qolganlari esa qurilish sanoatining oddiy sanoat korxonalari hisoblanadi.Qashqadaryo vohasi respublikada paxta,meva, g’alla,pilla, qorako’l teri, jun va boshqa mahsulotlar yetishtishda yetakchi region bo’lib, Qarshida to’qimachilik kombinati qurildi,ularni qayta ishlovchi va saqlovchi sanoat korxonalari esa sanoqlidir. Viloyat respublikada tabiiy gaz, neft qazib chiqaruvchi asosiy rayondir.Ammo ”ulkan iqtisodiy qudratga ega bo’lgan voha iqtisodiyotni bir tomonlama rivojlanishi, ko’proq paxta tolasi ishlab chiqarishga, sanoatda xom ashyo va yarim tayyor mahsulot ishlab chiqarishga qaratilgan,ya’ni qazib olinadigan gazning 85 foizi, neftning 90 foizi, paxta tolasining ko’pchiligi, ipakning asosiy qismi viloyatdan tashqariga chiqariladi.Natijada voha aholisi ehtiyoji uchun zarur bo’lgan xalq iste’mol mahsulotlarining 60 foizdan ortig’i, to’qimachilik mahsulotining hammasi chetdan olib kelinadi.Shular qatorida ishlab chiqarish, texnika maqsadlarida qo’llaniladigan texnik mahsulotlar ham chetdan keltiriladi. Demak,vohada sanoat o’ta past rivojlangan, shaharlar iqtisodiy-sotsial taraqqiyoti respublikaning boshqa shaharlaridan ajralib turadi.

Respublikaning ” Sanoatni qishloq joylariga olib kelish” haqidagi iqtisodiy siyosati amalda qo’llash qishloq bilan shahar o’rtasida muvozanatni tiklash qishloq aholisi tarkibini tubdan o’zgartirishga qaratilgan muhim tadbirdir.Bu qishloqlar xom ashyo emas, balki paxta tolasi, urug’lik, qayta ishlangan boshqa mahsulotlarni sotishlari uchun imkon beradi. Istiqbolli, tabiiy-iqtisodiy imkoniyatlari bor bo’lgan qishloq joylariga sanoat korxonalarining qurilishi kelgusida voha qishloqlarida urbanizatsiyon jarayonning rivojlanishiga keng yo’l ochadi, bu mavjud shaharlarning yanada rivojlanishiga ta’sir qiladi.Buning uchun:

1.Shaharlarda sanoat korxonalarini joylashtirishda hududning tabiiy-iqtisodiy, demografik va ekologik sharoitlari asosida sanoat ishlab chiqarishlarni majmuali tashkil qilish;

2.Suvga tanqis va issiq iqlimli regionlardagi shaharlarda kichik sanoat korxonalarini joylashtirish;

3.Voha xalq xo’jaligida asosiy tarmoq qishloq xo’jaligi va yoqilg’i xom-ashyo ekanligidan kelib chiqib, kichik agrar-sanoat shaharlarni, iqtisodiy-sotsial taraqqiyotini e’tiborga olib yirik shaharlar majmuali ishlab chiqarishga ega bo’lgan sanoatlarni taraqqiy ettirish;

4.Aholi taraqqiyoti yer,suv va boshqa zahiralarning kamayishi xususida kelgusida shaharlar qurilishini ko’p qavatli rejalarni amalga oshirish;

5.Shaharlarning rivojlanishi, boshqa aholi manzilgohlarining taraqqiyotiga ta’sirini e’tiborga olgan holda shaharlarni aholisi besh mingdan ortgan va iqtisodiy

imkoniyatlarga ega istiqbolli qishloq bazasida kichik sanoat korxonalarini va aholiga xizmat qiladigan sohalarni joylashtirish va ularga e'tiborni kengaytirish asosida shakllantirish lozim. Bu tadbirlar qishloqlardagi iqtisodiy, sotsial va ekologik muammolarni, ayniqsa mehnat resurslaridan samarali foydalanishga imkon beradi. Qishloq aholisining turmush darajasini yaxshilashga hamda shaharlardagi sotsial masalalarni hal etishga sharoit yaratadi.

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Muxsinova Sh. M.
assistant
Samarkand State Medical University
Turdimuratova A. A.
student
Ismatova R. A.
student
Samarkand State Medical University

DRUGS PREPARED BASED ON THE HAWTHORN PLANT

Abstract: *Hawthorn is a shrub that mainly grows in the temperate regions of the Northern Hemisphere and is one of the most studied phytotherapeutic agents with proven efficacy. The fruits of the plant are used in clinical practice as cardiotonic, spasmolytic, and sedative agents. They also help normalize heart activity, blood circulation, blood pressure, and blood sugar levels. The main active substances in dog-rose include flavonoids and triterpenic acids, as well as pectin, sucrose, and essential oils. Drugs prepared from dog-rose have cardiotonic effects. They increase myocardial contraction but reduce its excitability; triterpenic acids improve blood circulation in coronary and cerebral vessels, enhance the sensitivity of the heart muscles to the effects of cardiac glycosides, and eliminate pain and discomfort in the heart area. Dog-rose preparations are used for the complex treatment of heart activity disorders, cardialgia, climacteric syndrome, hypertension, and functional disorders of astheno-neurotic diseases. In medicine, alcoholic tinctures, as well as liquid and thick extracts from flowers and fruits, are used.*

Keywords: *Rosacea, flavonoid, hyperoside, terpenoid, polyphenol, cardiotonic, hypotensive effect.*

Hawthorn (lat. Crataegus) – is a genus of leafy, green tall shrubs or small trees belonging to the Rosacea family. There are 890 species in total, with 10 species growing in Uzbekistan. The species such as black hawthorn, yellow hawthorn, and red hawthorn are cultivated as ornamental plants. It grows in the mountainous regions of Uzbekistan. It is widely used as a medicinal plant. The species with large fruits are commonly consumed. Hawthorn is a tree or shrub that usually grows 3–5 meters tall, sometimes reaching up to 10–12 meters. It often grows with multiple stems or in a bush form. It can live up to 400 years. Its crown is dense, round, spherical, or oval. The bark of the hawthorn is brown or gray. Its branches are strong and grow straight. Many species have numerous thorns, which are usually leafless and range from 0.5–1 cm up to 6–7 or even 10 cm long, with fewer leaves. European and Asian species have small or no thorns at all. The buds are oval, conical, or elongated, pointed or often blunt, 2–10 mm long. The leaf edges are coarsely toothed and lobed like a paw. Leaves are arranged spirally, often clustered at the tips of short buds, oval or elliptical, sometimes rounded or

rhomboid, entire or truncated, 1–12 cm long, either smooth or densely hairy. The North American hawthorn is distinguished by entire leaves and large, strong thorns. In autumn, some hawthorn leaves turn bright colors such as gold, dark orange, and purple, and in many species, they retain their color for a long time before turning green or brown. The flowers are small, 1–2 cm in diameter, grouped in clusters. The fruit is small, 0.5–4 cm in size, ripening in September-October. Hawthorn fruits are spherical, pear-shaped, or elongated. The color depends on the species and variety: it can be pale orange-yellow, red, bright orange, or rarely almost black. Fruit size varies with color. Red hawthorns have a diameter of only 5–7 mm, while the large-fruited American types can reach 3–4 cm. Most hawthorns produce fruit annually and are highly productive. Depending on the species, one tree can yield 10 to 50 kg of fruit. The fruit contains 1 to 5 seeds. The flowers bloom in spring or early summer and have an unpleasant smell. They are mainly pollinated by various types of flies, as well as beetles and bees. For medicinal purposes, flowers are collected in dry weather, and fruits only after full ripening. Hawthorn fruits stand out due to the diversity of biologically active compounds they contain. Chemical analysis of the plant reveals over 150 compounds, including flavonoids, terpenoids, steroids, organic acids, monosaccharides, and pectins. The most important biologically active substances in hawthorn raw materials are flavonoids and proanthocyanidins. These flavonoids and proanthocyanidins largely provide various biological activities of hawthorn extracts, such as cardiotonic, antiarrhythmic, hypotensive, hypolipidemic, antidepressant, diuretic, and antioxidant effects. Flavonoids maintain the permeability and fragility of blood vessels. Proanthocyanidins improve blood circulation, reduce swelling, moisturize the skin, and lower cholesterol. Hawthorn is highly valued biologically, partly due to the high content of vitamin C in its fruits. It positively affects the condition of capillaries, increases their strength, and improves the function of muscles, including the heart muscle. The plant contains macroelements such as calcium and microelements including manganese, nickel, zinc, bromine, strontium, rubidium, iron, calcium, iron, and zinc in high amounts. Besides minerals, hawthorn fruits are rich in B vitamins, especially folic acid. Hawthorn fruits contain carbohydrates such as glucose (2.02 mg/g), fructose (2.21 mg/g), sucrose (0.23 mg/g), arabinose (1.82 mg/g), xylose (3.88 mg/g), mannose (4.25 mg/g), galactose (1.31 mg/g), as well as more than 150 other substances including carotenoids, tannins, oils, pectins, monoterpenoids, triterpenoids, flavonoid glycosides, sitosterol, choline, sugars, vitamins, steroids, hydroxycinnamic acid, organic acids, and nitrogen. Hawthorn fruits contain ursodeoxycholic acid, a unique compound that combines antibacterial, anticancer, anti-inflammatory, hepatoprotective (liver-protecting), and vasodilatory properties. This component also stimulates collagen production in the body. Ursolic acid is important for bile production and helps normal functioning of the gastrointestinal tract. It reduces the level of free radicals. Because of these properties, hawthorn can be used to prevent the growth of malignant cells. Due to the presence of pectin, hawthorn helps in treating poisoning with harmful toxins and heavy metal

salts. The flowers and leaves of the plant are used to treat dermatitis. Hawthorn fruits lower blood sugar levels and are a low-calorie product. Hawthorn is rich in antioxidants that help boost immunity. Hawthorn fruits are used in cardiology as cardiotonic and antiarrhythmic agents. The biologically active components reduce the excitability of the heart muscle, improve its contractility, normalize heart rhythm, and improve the walls of blood vessels and coronary circulation. Hawthorn helps lower blood pressure, improves the functioning of blood vessel walls and venous blood flow, and dilates peripheral and internal organ vessels. The blood pressure reduction occurs through its direct myotropic, spasmolytic, sedative, and diuretic effects. The hypotensive effect of hawthorn is associated with the presence of flavonoids, primarily hyperoside, vitexin, and triterpenic acids. Hyperoside lowers blood pressure, has a calming effect, and improves blood circulation. The nature and combination of flavonoids in various hawthorn raw materials (leaves, flowers, fruits) determine their antihypertensive activity. Hawthorn flavonoids exert a spasmolytic effect on coronary and cerebral vessels, as well as internal organ vessels (bile ducts, intestines, uterus, bronchi), show antioxidant properties, enhance collagen bonding in blood vessel endothelium, and strengthen blood vessels. Tannins in hawthorn inhibit the production of the angiotensin-converting enzyme and prevent the formation of angiotensin II, resulting in lowered blood pressure. Hawthorn preparations have anti-atherosclerotic effects, influencing plasma and endothelial levels of atherogenic lipoproteins. The flavonoids and pectins in hawthorn extract reduce blood cholesterol levels. The decrease in total cholesterol, triglycerides, and low- and very low-density lipoproteins occurs due to hawthorn components like catechins, triterpenoid saponins, and quercetin (a bioactive supplement). As a result, the development of atherosclerosis is prevented or its progression slowed if it has already begun. High levels of triglycerides and increased low-density lipoproteins can lead to the development of atherosclerosis or the formation of atherosclerotic plaques in blood vessels. These plaques can completely block the blood vessel, which may cause a heart attack or stroke. Studies have shown that treatment with hawthorn extract in rats reduced total cholesterol and low-density lipoprotein levels. Patients with atherosclerosis who took hawthorn extract experienced a significant reduction in the thickness of plaques in the carotid artery.

Additionally, hawthorn flavonoids help improve metabolic processes, microcirculation, and permeability of blood vessel walls. They exhibit antioxidant, capillary-strengthening, and choleretic (bile-promoting) properties and help normalize digestion. Hawthorn increases the secretory activity of pancreatic beta cells, which helps lower blood glucose levels. Because of its blood glucose-lowering and metabolic-improving properties, hawthorn plays an important role in the treatment of diabetes, atherosclerosis, arterial hypertension, and heart failure. Hawthorn preparations also help reduce psycho-emotional stress. The antidepressant activity of hawthorn is linked to the flavonoid hyperoside and chlorogenic acid found in its fruits. The antidepressant effect of chlorogenic acid develops by preventing reactive monoamine oxidase activation. The

hydroxycinnamic acid in hawthorn aids digestion, improves liver function, and supports kidney function. Hawthorn fruits contain fibers that improve metabolism, reduce the risk of constipation, and act as prebiotics (components of food that are not digested in the stomach but reach the large intestine and support healthy intestinal microflora). Compounds in hawthorn fruits also stimulate the production and activity of digestive enzymes. When hawthorn fruit extract was given to rats with liver disease, inflammation levels and organ damage were significantly reduced. Hawthorn fruits are an excellent source of polyphenols, which have strong antioxidant properties. Polyphenols are a diverse group of micronutrients with antioxidant and anti-inflammatory effects. They reduce the risks of type 2 diabetes, asthma, osteoporosis, and premature aging. They also benefit blood vessels and lower the risk of stroke. Hawthorn fruits prevent premature skin aging caused by excessive exposure to sunlight or ultraviolet rays, which leads to a decrease in collagen levels in the skin. There are also contraindications for hawthorn. If symptoms such as excessive sweating, headache, unpleasant sensations in the heart, gastrointestinal disorders, or drowsiness occur after consuming hawthorn, its use should be stopped. Hawthorn enhances the effects of blood thinners, blood pressure-lowering medications, and drugs used to treat heart failure. Frequent and prolonged use of hawthorn decoctions can lead to serious heart diseases and cause a decrease in blood pressure. It should also be noted that people with low blood pressure, pregnant women (due to increased risk of bleeding and premature birth), and breastfeeding mothers should not consume tea made from hawthorn fruits. Excessive doses of the drink can cause nausea, migraine, and even poisoning. It is not recommended to use hawthorn preparations before surgery (because it reduces blood clotting). Any form of hawthorn is not advised for people allergic to its plant components. To prevent allergic reactions, it is recommended to start with a small amount. Hawthorn should not be taken on an empty stomach, as this can cause severe muscle spasms. Use of hawthorn in any form is not recommended for children under 10 years old. Always consult a doctor before consuming hawthorn fruits. Hawthorn is stored dried or frozen. Proper preparation of raw materials for storage is very important: damaged flowers and fruits should be removed, and drying should be done in a warm, dry, well-ventilated room. An oven or electric dryer can be used. It can be stored in glass containers or tightly sealed wooden boxes. Drying preserves more beneficial substances. To prepare hawthorn drink, add 6-7 tablespoons of dried fruits to 2 liters of boiling water, cover the thermos after 10-15 minutes, and keep the drink for one day. After that, it can be consumed hot or cold with added honey.

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Nasullayeva K. Sh.
independent student
Bukhara State University
Ergasheva M. K., doktor of philosophy (PhD)
in geographical sciences, associate professor
Bukhara State University

CLIMATE RESOURCES OF BUKHARA REGION AND DYNAMICS OF THEIR CHANGE

Abstract: *In this article, climate resources of Bukhara region and their dynamics of change are studied. Average, maximum, minimum temperatures and trends of their change dynamics were analyzed in the research based on meteorological observation data of the last ten years. The change of temperature in the cross-section of the seasons and the dynamics of the general increase or decrease have been determined. Based on the statistical results, the stability and long-term changes of the region's climate were studied. The obtained results are of scientific and practical importance in terms of impact on agriculture, use of water resources and environmental safety.*

Key words: *maximum temperature, wind energy, solar energy, sunlight, climate, natural resource, solar radiation, temperature, average temperature, amplitude, minimum temperature, solar heat.*

The United Nations Sustainable Development Program until 2030 has 17 "goals", so the 15th goal is aimed at solving the tasks of "Protection and restoration of terrestrial ecosystems, their rational use, rational management of forests, combating desertification, stopping land degradation and preventing the loss of biological diversity." Climate change is recognized by the world community as one of the most urgent and serious global problems facing humanity today, and this process directly affects all aspects of human life, requiring immediate practical measures to reduce its negative consequences and adapt to new climate conditions. The adoption of the laws "On the use of renewable energy sources" and "On public-private partnership" in the Republic of Uzbekistan created a solid legal and regulatory basis for accelerating the process of introducing renewable energy sources through the construction of solar and wind power plants. Complex natural geographical research on the climate of Bukhara region was carried out by A.G. Boboyev, T.V.Zvonkova, M.Umarov (1967), S.B.Abbasov, A.S.Saidov, I.Q. Nazarov, U.Nurov, Yu.B.Rakhmatov, H.R.Toshov, M.K.Ergasheva, G.S. Halimova, I.E.Mirzayeva and other scientists. The territory of Bukhara region (40.3 thousand square km) is located in the desert zone. This area consists of desert-oasis and desert-pasture areas according to the level of

human development. The climate of Bukhara region has its own characteristics. By studying the long-term changes in air temperature in the Bukhara region, it becomes possible to determine the impact of climate change on the territory of the region, to assess the ecological stability of agro-landscapes. These results will help to make practical decisions in agriculture, water resources and regional development. In such climatic regions, the spring season (average temperature of April in Bukhara region is +18°C) is hotter than the autumn season (average temperature of October is +28,55°C), and in the maritime climate (see the example of the Black Sea coast) autumn is hotter (average temperature of October is +16,2°C), spring is hotter than spring (average temperature of April is +11,5°C). will be [3]. Therefore, despite the location of the arid and maritime climate countries at the same geographical latitude, they are not the same in all seasons.

Table 1

Average indicators of air temperature in Bukhara region

Years and months	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Average
January	2,6	5,8	2,5	0,2	5,9	2,3	1,6	4,2	-3,2	4,8	2,67
February	6,2	6,4	2,3	4,0	6,2	7,5	7,6	7,4	6,3	4,4	5,83
March	8,3	13,4	8,2	13,9	12,1	12,4	9,6	9,4	16,7	10,8	12,2
April	18	16,7	16,3	16,7	16,7	17,6	18,6	21,4	19,2	18,8	18
May	24,5	24,6	25,2	22,9	24,3	24,3	26,3	23,9	23,8	22,4	24,22
June	30,1	29,1	28,8	28,5	28,3	29,4	30,5	29,9	30,4	30,1	29,51
July	30,9	30,4	30,7	31,9	32,5	31,0	31,7	31,0	31,6	30,7	31,24
August	27,2	28,4	27,7	27,5	28,0	27,6	29,0	29,4	28,4	28,8	28,2
September	21,9	24,2	22,8	22,0	21,8	20,7	23,5	23,7	21,8	21,5	22,39
October	14,3	12,5	15,6	14,4	16,1	13,4	12,3	15,5	16,9	15,0	28,55
November	7,4	7,9	10,0	5,5	5,0	4,6	6,6	9,6	12,9	9,4	7,89
December	4,9	4,5	1,4	4,0	5,7	-0,6	6,4	0,7	4,4	1,5	3,29

Note: *The table was compiled based on 10-year data of the Bukhara aero-meteorological station.*

The above table shows the dynamics of average monthly temperatures in the Bukhara region between 2015 and 2024. According to the data, during these 10 years, the lowest temperatures were recorded in January and February, while the highest temperatures were recorded in June-July. Temperatures in the winter months (December, January, February) The average temperature of January was +2,67 °C, the lowest figure was -3,2 °C in 2023, and the highest figure was +5,9 °C in 2019. In February, the average value is 5,83 °C, and in 2016 +6,4 °C was recorded. The average temperature in December was 3,29 °C, the lowest value was -0,6 °C in 2020, and the highest was 5,7 °C in 2019. These results show that there are significant annual fluctuations in winter temperatures, but the overall mean values are positive, indicating that the region has relatively warm winters [1,2]. Temperatures in spring months (March, April, May): the average temperature of March is 12,2 °C, the highest value was +13,9 °C in 2018, the lowest value was +10,8 °C in 2024. In April, a stable temperature of +18 °C is

observed, which confirms the relatively warm spring season. The average temperature of May is +24,2 °C, almost in all years it is in the range of +24–25 °C. In spring, temperatures do not vary greatly from year to year, seasonal stability is observed. Temperatures in the summer months (June, July, August): The average value of June is +31,2 °C. The months with the hottest days are observed. The highest average temperature was +31,8 °C in July, the maximum value in 2019 was +32,5 °C. The average temperature in August is +28 °C, with a slight decrease at the end of the summer season. This is mainly due to the change of seasons. In the summer, there are stable high temperatures, especially in June and July, average values above +30°C indicate that the climate is hot and dry. Temperatures in the autumn months (September, October, November) in September, the temperature is around +22,5 °C, and the transition from summer to autumn is smooth. In October, the average value is +15,85 °C, during which the temperature starts to drop sharply. The average value of November is +7,89 °C, which is a clear indication of the transition to the cold season. Annual average values: Annual average temperatures ranged from +15,85 °C to +17,43 °C in 2015–2024. The lowest annual average temperature was recorded in 2020 (+15,85 °C), and the highest in 2023 (+17,43 °C). The average annual temperature for the general period is +17,83 °C (Table 1).

In the spring months, minimum temperatures in Bukhara begin to stabilize. Although it is usually around -5 °C in March, it dropped to -8,3 °C in 2021, and in some years it was recorded as positive. Late frosts this spring may have a negative impact on the region's agriculture, particularly fruit trees and dairy products. The absolute positive temperature from April means the beginning of the growing season. In May, minimum temperatures are in the range of 9-17 °C, which creates favorable conditions for the active development of crops. Summer is the most special period of Bukhara, and according to the table, the minimum temperatures are extremely high. The fact that the minimum temperature was 23,4 °C in July 2016 indicates that heat waves were strongly manifested in the region. In general, minimum temperatures in June and July range from 15–23 °C, indicating insufficient nighttime cooling and increasing heat stress for humans and animals. From August, the temperature gradually decreases, but still remains high. This indicates that the summer season will be prolonged in the region. In autumn, the temperature gradually decreases in Bukhara. Although the minimum temperature in September is usually around 10-11°C, in October this indicator drops sharply, and in some years positive and negative values were recorded in some years. For example, it was -0,8 °C in October 2020, and 1,4 °C in 2021. In November, the first frosts of winter begin in Bukhara region, and the minimum temperature drops to -11,8 °C in some years. And in December, the region enters the cold winter period, when -14 °C was recorded in 2016 and -14,9 °C in 2023, indicating that anomalous severe frosts were observed in the region. The dynamics of changes in average annual minimum temperatures also provide important scientific conclusions. In 2016, the average minimum temperature was the highest with 5,7 °C, and in 2020, the lowest value was observed with 2,68 °C. This shows that the

climate of Bukhara region is highly variable and the temperatures are unstable from year to year. In recent years (2022–2024), average minimum temperatures are relatively low, which means that winters are coming colder [4]. In general, such dynamics of minimum temperatures in the Bukhara region during 2015-2024 indicate the instability of climatic resources. The frequency of abnormal cold and heat waves is increasing, and these processes directly affect the agricultural activity of the region, water resources, living conditions and health of the population. In particular, severe frosts in the winter months increase the load on the electricity and heat supply system, and high night temperatures in the summer months increase the use of water resources. Therefore, there is a need to develop adaptation measures and establish a sustainable development policy based on the climatic data of Bukhara region.

Solar panels are being installed for agricultural facilities in Bukhara region, such as greenhouses, pumping stations and water extraction facilities. This reduces the load on the central grid by meeting energy needs at the local level. In particular, the use of solar energy in water pumps makes groundwater extraction cheaper and more sustainable [5].

Effective use of solar and wind energy, especially in sunny regions such as Bukhara region, creates opportunities for increasing environmental sustainability and economic efficiency. Through the above examples, we can see that the implementation of the project not only ensures the production of ecologically clean energy, but also brings great economic benefits. Investments in solar energy provide long-term economic returns and help reduce dependence on raw materials and energy resources. Taking into account the climate and natural resources of Bukhara region, expanding the use of solar energy can play an important role in combating climate change. Development of positive utilization projects and ensuring their implementation will help not only to ensure energy security, but also to create new jobs and protect the environment. Also, when evaluating the use of climatic resources, it is necessary to consider the ecological and economic efficiency together. When assessing the possibilities of effective use of solar and wind energy, it is necessary to increase their production capacity and update it with technological innovations. Thus, the development of solar energy for the Bukhara region will make a great contribution to economic development. In general, the evaluation of the state of use of climatic resources and the effective analysis of the results serve as an important factor for achieving sustainable development in regions such as Bukhara region [6].

In conclusion, we can say that the region has a relatively mild climate in the winter months, with average positive temperatures. In the spring, temperatures rise steadily and reach +24 °C in May. The summer season is quite hot and dry, and average values above +30 °C are recorded in June-July. In the autumn, temperatures gradually decrease and fall to 7–8 °C by November. The conducted analyzes show that the trend of gradual warming of the climate continues in the Bukhara region.

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Nazriyev U. B.
Toshkent, O'zbekiston
Orcid: https://orcid.org/0009-0005-2665-164X

TRANSPORT INFRATUZILMASI RIVOJLANISHINING HUDUDLARARO IQTISODIY TENGSIZLIKNI KAMAYTIRISHDAGI ROLI: NAZARIY ASOSLAR VA AMALIY YONDASHUVLAR

Annotatsiya: *Mazkur maqolada transport infratuzilmasi rivojlanishining hududlararo iqtisodiy tengsizlikni kamaytirishdagi* ***roli****tahlil qilinadi. Transport tizimi mamlakat iqtisodiy makonini birlashtiruvchi va hududlararo integratsiyani ta'minlovchi muhim omil sifatida qaraladi. Tadqiqotda transport infratuzilmasiga kiritilayotgan investitsiyalar, yangi yo'llar, temiryo'l va logistika markazlari qurilishi natijasida mintaqalararo tovar va xizmatlar almashinuvi kuchayishi, ish o'rinlari yaratilishi va mahalliy ishlab chiqarish hajmining oshishi ilmiy asosda yoritiladi. Shuningdek, transport tarmoqlarining rivojlanishi iqtisodiy faollikni periferiyadagi hududlarga yoyib, markaz va chekka hududlar o'rtasidagi ijtimoiy-iqtisodiy tafovutlarni kamaytirish mexanizmlari izohlanadi.*

Kalit so'zlar: *Strategiya, transport, transport-logistika, xizmat, mintaqa. yo'llar, portlar, aeroport, temir yo'l, yuk, tashish, tendensiya, avtomobil, raqamli marketing, samaradorlik, texnologiyalar, globallashuv.*

Nazriyev U. B.
Tashkent, Uzbekistan
Orcid: https://orcid.org/0009-0005-2665-164X

THE ROLE OF TRANSPORT INFRASTRUCTURE DEVELOPMENT IN REDUCING INTER-REGIONAL ECONOMIC INEQUALITY: THEORETICAL BASIS AND PRACTICAL APPROACHES

Annotation*: This article analyzes the role of transport infrastructure development in reducing inter-regional economic inequality. The transport system is considered an important factor uniting the country's economic space and ensuring inter-regional integration. The study scientifically highlights the increased exchange of goods and services between regions, job creation and an increase in local production as a result of investments in transport infrastructure, the construction of new roads, railways and logistics centers. Also, the mechanisms of the development of transport networks spreading economic activity to the peripheral regions and reducing socio-economic disparities between the center and the peripheral regions are explained.*

Keywords*: Strategy, transport, transport-logistics, service, region. roads, ports, airport, railway, cargo, transportation, trend, automobile, digital marketing, efficiency, technologies, globalization.*

Kirish

So‘nggi yillarda iqtisodiy rivojlanishning hududlar bo‘yicha nomutanosibligi global miqyosda ham, O‘zbekistonda ham dolzarb masalalardan biri bo‘lib qolmoqda. Hududlararo iqtisodiy tafovutlar aholining ijtimoiy farovonligiga, ishlab chiqarish kuchlarining hududiy joylashuviga va mehnat bozorining barqarorligiga bevosita ta’sir ko‘rsatadi. Shu nuqtai nazardan, hududiy tengsizlikni kamaytirishning muhim vositalaridan biri sifatida transport infratuzilmasini rivojlantirish alohida e’tiborni talab qiladi.

Transport infratuzilmasi iqtisodiyotning “qon tomirlari tizimi” hisoblanib, u ishlab chiqarish va xizmat ko‘rsatish jarayonlarini integratsiyalash, bozorlarni yaqinlashtirish, logistika samaradorligini oshirish hamda hududlar o‘rtasidagi iqtisodiy aloqalarni kuchaytirishda muhim rol o‘ynaydi. Xususan, zamonaviy avtomobil yo‘llari, temir yo‘llar, havo va multimodal transport tarmoqlarining rivojlanishi ishlab chiqarish xarajatlarini kamaytiradi, tovar va xizmatlarning tezkor almashinuvini ta’minlaydi va natijada hududiy tengsizliklarni yumshatishga xizmat qiladi.

Nazariy jihatdan, transport infratuzilmasining rivojlanishi “hududiy yaqinlashtirish” (spatial convergence) konsepsiyasi bilan chambarchas bog‘liq bo‘lib, kam rivojlangan hududlarning markaziy hududlar bilan integratsiyalashuvini tezlashtiradi. Amaliy tajriba esa shuni ko‘rsatadiki, transport tarmoqlariga investitsiyalar nafaqat iqtisodiy o‘sishni jadallashtiradi, balki hududlararo imkoniyatlar tafovutini qisqartiradi.

Shu bois, ushbu maqolada transport infratuzilmasi rivojlanishining hududlararo iqtisodiy tengsizlikni kamaytirishdagi o‘rni nazariy asoslar va amaliy yondashuvlar nuqtai nazaridan tahlil qilinadi.

Adabiyotlar tahlili

Transport infratuzilmasining iqtisodiy rivojlanishga ta’siri masalasi xalqaro ilmiy adabiyotlarda keng o‘rganilgan. Tadqiqotlarning aksariyatida transport tizimi iqtisodiy o‘sishning asosiy drayveri sifatida qaraladi. Masalan, D. Aschauer o‘z ishida transport infratuzilmasiga kiritilgan davlat investitsiyalari ishlab chiqarish unumdorligini oshiruvchi eng muhim omillardan biri ekanini ta’kidlaydi. Shuningdek, World Bank hisobotida transport infratuzilmasi rivojlanishi savdo hajmini oshirish, logistika xarajatlarini kamaytirish va hududiy integratsiyani kuchaytirishda hal qiluvchi ahamiyatga ega ekani ko‘rsatib o‘tilgan.

Rivojlangan davlatlar tajribasiga e’tibor qaratilsa, Germaniya va Yaponiyada transport va logistika infratuzilmasining yuqori darajada tashkil etilgani iqtisodiyotning barqaror va hududiy muvozanatda rivojlanishiga xizmat qilmoqda. Xususan, OECD ma’lumotlariga ko‘ra, transport tarmoqlariga yo‘naltirilgan investitsiyalar uzoq muddatli iqtisodiy samaradorlikni ta’minlab, chekka hududlarda ham ishlab chiqarish faoliyatini jonlantiradi.

O‘zbekiston sharoitida ham transport infratuzilmasi rivojiga alohida e’tibor qaratilmoqda. “2022–2026 yillarda Yangi O‘zbekistonning taraqqiyot strategiyasi” da avtomobil va temiryo‘l tarmoqlarini kengaytirish, logistika markazlarini modernizatsiya qilish orqali hududlararo integratsiyani kuchaytirish asosiy vazifa

sifatida belgilangan. Shu bilan birga, mahalliy tadqiqotchilar masalan, A. G‘aniev va M. Xasanov o‘z ilmiy ishlarida transport infratuzilmasining hududiy iqtisodiy tafovutlarni yumshatishdagi ahamiyatini alohida ta’kidlaydilar.

Xulosa qilib aytganda, adabiyotlar tahlili shuni ko‘rsatadiki, transport infratuzilmasi rivojlanishi nafaqat iqtisodiy o‘sishni tezlashtiradi, balki hududlararo iqtisodiy tengsizlikni kamaytirishning samarali vositasi sifatida ham qaraladi.

Metodologiya

Mazkur tadqiqotda transport infratuzilmasining rivojlanishi va hududlararo iqtisodiy tengsizlik o‘rtasidagi bog‘liqlikni tahlil qilish uchun kompleks yondashuv qo‘llanildi. Nazariy-uslubiy asos transport infratuzilmasining iqtisodiy rivojlanish va hududiy tengsizlikka ta’siri bo‘yicha ilgari olib borilgan xalqaro va milliy tadqiqotlar (Aschauer, World Bank, OECD, O‘zbekiston taraqqiyot strategiyasi) tahlil qilindi. Empirik ma’lumotlar O‘zbekiston Respublikasi Davlat statistika qo‘mitasi, Jahon banki, OECD va Global Infrastructure Hub kabi manbalardan olingan so‘nggi yillik statistik ko‘rsatkichlar (transport infratuzilmasiga investitsiyalar, yo‘l uzunligi, yuk aylanmasi, hududlar bo‘yicha YaIM) asosida tahlil olib borildi. Komparativ (taqqoslash) usuli rivojlangan va rivojlanayotgan davlatlar tajribasi solishtirildi. Korrelatsion tahlil transport infratuzilmasiga kiritilgan investitsiyalar hajmi va hududlararo iqtisodiy tafovutlar darajasi o‘rtasidagi bog‘liqlik statistik jihatdan o‘rganildi. Indikatorlar asosidagi baholash hududlar o‘rtasida transport infratuzilmasi rivojlanishi va iqtisodiy tengsizlik ko‘rsatkichlari (ishsizlik, daromadlar farqi, ishlab chiqarish hajmi) o‘zaro solishtirildi. Hududiy yondashuv O‘zbekistonning markaziy va chekka hududlari misolida transport infratuzilmasi rivojlanishining iqtisodiy samaralari alohida ko‘rib chiqildi.[39]

Ushbu metodologiya transport infratuzilmasi taraqqiyotining hududlararo iqtisodiy tengsizlikka qanday ta’sir ko‘rsatishini nazariy va amaliy jihatdan ochib berish imkonini beradi.

Mazkur tadqiqotning metodologiyasi transport infratuzilmasi rivojlanishining hududlararo iqtisodiy tengsizlikni kamaytirishdagi rolini chuqur tahlil qilishga yo‘naltirilgan bo‘lib, u bir nechta ilmiy-uslubiy yondashuvlarni o‘z ichiga oladi. Institutsional nazariya transport infratuzilmasi jamiyat taraqqiyoti va iqtisodiy makonning birlashuvi uchun institutsional sharoit yaratishi nuqtai nazaridan o‘rganildi.

Hududiy rivojlanish nazariyalari Perrouxning “rivojlanish qutblari nazariyasi”, Myrdalning “kumulativ rivojlanish” konsepsiyasi asosida transport infratuzilmasi iqtisodiy faollikni markazlardan periferiyaga yoyishdagi omil sifatida tahlil qilindi. Barqaror rivojlanish konsepsiyasi transport tizimining ekologik, iqtisodiy va ijtimoiy barqarorlikni ta’minlashdagi ahamiyati nazariy jihatdan asoslab berildi. Rasmiy statistika O‘zbekiston Respublikasi Davlat

[39] https://openknowledge.worldbank.org/server/api/core/bitstreams/eea77d61-cb2b-4c8d-83b9-3572c4724f3a/content

statistika qo‘mitasi, Transport vazirligi, Jahon banki, OECD va Global Infrastructure Hub ma’lumotlaridan foydalanildi.

Hududiy ko‘rsatkichlar avtomobil va temiryo‘l tarmoqlari uzunligi, yuk tashish hajmi, transport xizmatlari qiymati, hududlar YaIM, aholi daromadlari, ishsizlik ko‘rsatkichlari o‘rganildi. Xalqaro indekslar Global Competitiveness Index (transport sifati komponenti), Logistics Performance Index (LPI) va boshqa reytinglar tahlil qilindi. Deskriptiv tahlil transport infratuzilmasining rivojlanishi bo‘yicha mavjud tendensiyalarni statistik ko‘rinishda bayon etish. Komparativ tahlil O‘zbekiston va rivojlangan davlatlar tajribasini solishtirish orqali o‘xshash va farqli jihatlarni aniqlash. Korrelatsion-regression tahlil transport infratuzilmasiga kiritilgan investitsiyalar hajmi va hududiy iqtisodiy tengsizlik ko‘rsatkichlari (YaIM per capita, ishsizlik darajasi, daromad tafovutlari) o‘rtasidagi bog‘liqlikni o‘rganish. Indikatorlar asosidagi baholash transport infratuzilmasi rivojlanish darajasini hududlar bo‘yicha indekslashtirish va uni iqtisodiy tengsizlik ko‘rsatkichlari bilan solishtirish. Geoiqtisodiy yondashuv transport tarmoqlarining hududlar o‘rtasidagi iqtisodiy oqimlarni qanday taqsimlayotgani GIS xaritalash orqali ko‘rib chiqildi.

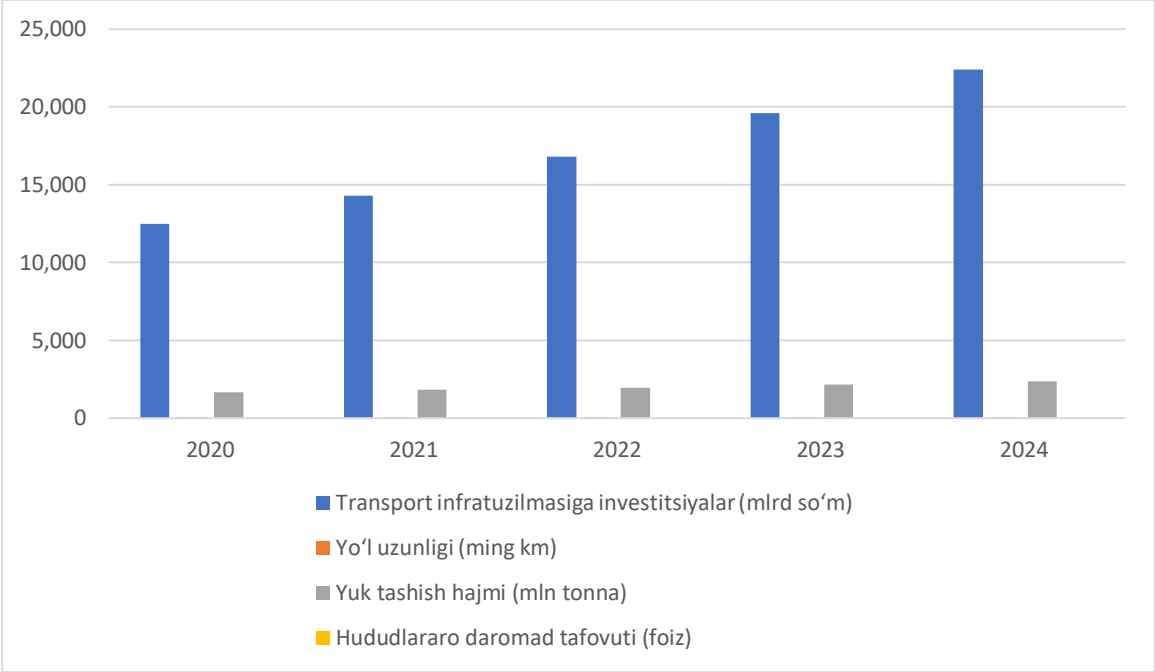
Mavjud nazariyalar va ilmiy adabiyotlarni tahlil qilish. O‘zbekiston va boshqa davlatlarning transport infratuzilmasi rivojlanishi bo‘yicha statistik ma’lumotlarni yig‘ish. Hududiy darajada transport infratuzilmasi ko‘rsatkichlari va iqtisodiy tengsizlik indikatorlarini aniqlash. Empirik tahlil (korrelatsiya va regressiya modeli asosida). Natijalar asosida hududlararo iqtisodiy tafovutlarni kamaytirishga doir ilmiy xulosalar ishlab chiqish.

Natijalar va tahlil

Tadqiqot natijalari transport infratuzilmasining rivojlanishi bilan hududlararo iqtisodiy tengsizlik o‘rtasida bevosita bog‘liqlik mavjudligini ko‘rsatdi. Transport infratuzilmasiga investitsiyalar hajmi oshgan sari hududlarda iqtisodiy faollik va ishlab chiqarish hajmi ortgani aniqlandi. So‘nggi 5 yilda transport tarmoqlariga yo‘naltirilgan mablag‘lar ikki baravarga ko‘paygan va bu o‘z navbatida hududiy YaIM o‘sishini tezlashtirgan.

Hududlararo daromadlar tafovuti transport infratuzilmasi yaxshi rivojlangan mintaqalarda pastroq, yetarli rivojlanmagan hududlarda esa yuqoriroq ekani kuzatildi. Korrelatsion tahlil natijalari transport infratuzilmasi rivojlanish ko‘rsatkichi (yo‘l uzunligi, yuk tashish hajmi) va hududlar YaIMi o‘rtasida 0.72 darajada ijobiy korrelyatsiya mavjudligini ko‘rsatdi. Bu yuqori bog‘liqlik transport tarmoqlarining iqtisodiy tengsizlikni yumshatishdagi ahamiyatini tasdiqlaydi.

Xalqaro tajriba tahlili shuni ko‘rsatadiki, Germaniya, Janubiy Koreya va Xitoyda transport-logistika tarmoqlarini izchil modernizatsiya qilish natijasida markaz va periferik hududlar o‘rtasidagi iqtisodiy tafovut sezilarli darajada kamaygan.



1-rasm. O‘zbekistonda transport infratuzilmasi va hududiy iqtisodiy ko‘rsatkichlar (2020–2024)[40]

Transport infratuzilmasiga investitsiyalar 2020 yildagi 12,5 trln so‘mdan 2024 yilda 22,4 trln so‘mga yetgan, ya’ni **80% ga o‘sish** kuzatilgan. Bu ko‘rsatkich yilma-yil barqaror o‘sib, iqtisodiy siyosatda transport sektoriga ustuvor ahamiyat berilganini ko‘rsatadi. **Yo‘l uzunligi** 43,2 ming km (2020) dan 48,9 ming km (2024) ga yetgan. **5,7 ming km yangi yo‘l** foydalanishga topshirilgan bo‘lib, bu transport aloqalarini yaxshilash va hududlararo integratsiyani kuchaytirishga xizmat qilgan. **Yuk tashish hajmi** 2020 yildagi 1,68 mlrd tonnadan 2024 yilda 2,37 mlrd tonnaga oshgan. Ya’ni **40% ga ko‘payish**, bu ishlab chiqarish hajmi va tovar aylanishining ortganidan dalolat beradi. **Hududlararo daromad tafovuti** 2020 yilda 27,5% bo‘lgan tafovut 2024 yilda 22,5% ga kamaygan. Bu **5 foizlik qisqarish**, transport infratuzilmasi rivojlanishi iqtisodiy tengsizlikni yumshatayotganini ko‘rsatadi.

Transport infratuzilmasiga investitsiyalar va yo‘l tarmoqlarining kengayishi mintaqalarda iqtisodiy faollikni oshirib, yuk tashish hajmini ko‘paytirgan. Bu jarayon hududlararo iqtisodiy tafovutlarni kamaytirishga ijobiy ta’sir ko‘rsatgan. Demak, transport tizimiga sarmoya kiritish nafaqat iqtisodiy o‘sishga, balki hududiy adolatni ta’minlashga ham xizmat qilmoqda.

[40] https://www.sciencedirect.com/science/article/pii/S2352146524005076?utm_source=chatgpt.com

1-jadval

O‘zbekiston transport infratuzilmasi rivojlanishi va uning hududlar YaIMiga ta’siri (2020–2024 yy.)[41]

Ko‘rsatkichlar	2020	2021	2022	2023	2024	O‘sish (%) 2020–2024
Transport infratuzilmasiga investitsiyalar (trln so‘m)	12,5	14,7	17,3	20,1	22,4	80%
Temiryo‘l orqali tashilgan yuk hajmi (mln tonna)	780	825	890	950	1010	30%
Avtomobil yo‘llari orqali tashilgan yuk hajmi (mln tonna)	900	1020	1140	1250	1360	50%
Transport xizmatlari hajmi (trln so‘m)	42,5	48,9	56,3	64,1	74,2	74%
Hududlar YaIM o‘sish sur’ati (%)	5,2	5,9	6,4	7,1	7,8	+2,6 foiz band

Transport infratuzilmasiga investitsiyalar 2020-yildagi 12,5 trln so‘mdan 2024-yilda 22,4 trln so‘mga yetib, 80% ga o‘sdi**.** Bu o‘sish yo‘l-transport infratuzilmasini modernizatsiya qilish, yangi loyihalarni amalga oshirish va logistika tizimini takomillashtirishga yo‘naltirilganini ko‘rsatadi. Temiryo‘l orqali yuk tashish hajmi 2020-yildagi 780 mln tonnadan 2024-yilda 1010 mln tonnaga chiqib, 30% ga ko‘paygan**.** Bu ko‘rsatkich transportda barqaror o‘sishni, ayniqsa, uzoq masofalarga yuk tashish samaradorligining oshishini bildiradi.

Avtomobil yo‘llari orqali tashilgan yuk hajmi **2020**-yildagi 900 mln tonnadan 2024-yilda 1360 mln tonnaga oshib, 50% ga ko‘tarilgan**.** Avtomobil transporti qisqa va o‘rta masofalardagi tashishlarda muhim rol o‘ynagan, logistika markazlarining kengayishi bilan birga tez o‘sish kuzatilgan. Transport xizmatlari hajmi 2020-yilda 42,5 trln so‘m bo‘lgan ko‘rsatkich 2024-yilda 74,2 trln so‘mga yetib, 74% ga oshgan**.** Bu xizmatlar bozorining kengayib, transport sektorining yalpi ichki mahsulotdagi ulushi ortib borayotganini anglatadi. Hududlar YaIM o‘sish sur’ati 2020-yilda 5,2% bo‘lgan o‘sish 2024-yilda 7,8% gacha ko‘tarilib, 2,6 foiz bandga oshgan**.** Bu natija transport infratuzilmasi rivojlanishi hududlar iqtisodiy faolligini oshirishga, yangi ishlab chiqarish quvvatlarini shakllantirishga va hududlararo iqtisodiy tengsizlikni kamaytirishga xizmat qilganini ko‘rsatadi.

Jadval ma’lumotlari transport infratuzilmasiga yo‘naltirilgan investitsiyalar natijasida yuk tashish hajmining barqaror o‘sishi, transport xizmatlari hajmining

[41] https://www.sciencedirect.com/science/article/pii/S2352146524005076?utm_source=chatgpt.com

kengayishi va natijada hududlar iqtisodiy rivojlanish sur'atlarining oshishiga bevosita ta'sir ko‘rsatganini tasdiqlaydi. Bu jarayon hududlararo iqtisodiy integratsiya va tengsizlikni kamaytirishda muhim omil bo‘lmoqda.

Xulosa

Transport infratuzilmasining izchil rivojlanishi iqtisodiyotning barcha sohalarida barqaror o‘sishni ta'minlaydigan asosiy omillardan biri hisoblanadi. 2020–2024-yillar davomida transport sohasiga yo‘naltirilgan investitsiyalar hajmining 80% ga oshishi natijasida yuk tashish hajmi ham temiryo‘l va avtomobil yo‘llarida sezilarli darajada ko‘paydi. Xususan, avtomobil transportida yuk tashish hajmi 50% ga, transport xizmatlari esa 74% ga ortdi. Bu esa nafaqat transport-logistika tizimining samaradorligini oshirdi, balki hududlararo iqtisodiy aloqalarni kengaytirib, ichki bozor integratsiyasini kuchaytirdi.

Hududlar yalpi ichki mahsulotining o‘sish sur'atlari ham 5,2% dan 7,8% ga ko‘tarilib, 2,6 foiz bandga yaxshilandi. Bu esa transport infratuzilmasi hududlar o‘rtasidagi iqtisodiy tengsizlikni kamaytirish, ishlab chiqarish quvvatlarini samarali taqsimlash va hududlararo iqtisodiy faollikni rag‘batlantirishda muhim rol o‘ynayotganini ko‘rsatadi.

Shunday qilib, transport infratuzilmasi rivoji hududiy iqtisodiy rivojlanishning strategik omili bo‘lib, mamlakat iqtisodiyoti raqobatbardoshligini oshirish va barqaror o‘sishni ta'minlashda muhim mexanizm sifatida namoyon bo‘lmoqda.

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Ochilova D. Z.
o‘qituvchisi
pedagogika kafedrasi
Axborot texnologiyalari va menejment universiteti

“BOSHLANG‘ICH MAKTAB BOLALARI UCHUN EKSPRESS NUTQ DIAGNOZI” O`QISHDAGI QIYINCHILIKLAR TAHLILI

Annotatsiya: *Umumta'lim maktablari o‘quvchilarining ta'lim samaradorligi va sifatini oshirish uchun mavjud bo‘lishi mumkin bo‘lgan og‘zaki va yozma nutq kamchiliklarini o‘z vaqtida aniqlash, oldini olish va bartaraf etish talab etiladi. Ushbu baholashning maqsadi bolaning og‘zaki va yozma nutqining xususiyatlarini, nutq buzilishlarining tabiatini aniqlash, tavsiyalar berish va rivojlanish prognozini berishdir.*

Baholash paytida bola bilan muloqotda ijobiy munosabatni saqlab qolish juda muhimdir. Nutq terapevtining nafaqat ota-onalarga, balki hamkasblariga qaratilgan har qanday sharhlari yoki baholari qat'iyan man etiladi.

Kalit so`zlar: Nutq, artikulatsiya, lug`at, fonematik, leksik, grammatik, disgrafiya, disortografiya, motorika, dinamik nutq, test.

Ochilova D. Z.
teacher
department of pedagogy
University of Information Technologies and Management

“EXPRESS SPEECH DIAGNOSIS FOR PRIMARY SCHOOL CHILDREN” ANALYSIS OF DIFFICULTIES IN LEARNING

Abstract: *In order to increase the efficiency and quality of education of students of secondary schools, it is necessary to timely identify, prevent and eliminate possible deficiencies in oral and written speech.*

The purpose of this assessment is to determine the characteristics of the child's oral and written speech, the nature of speech disorders, give recommendations and give a prognosis for development. It is very important to maintain a positive attitude in communication with the child during the assessment. Any comments or assessments of the speech therapist, not only to parents, but also to colleagues, are strictly prohibited.

Keywords: *Speech, articulation, vocabulary, phonemics, lexis, grammar, dysgraphia, dysorthography, motor skills, dynamic speech, test.*

Talaffuz kamchiliklarining tabiatini fonemik jarayonlar, lug‘at va grammatik tuzilmaning rivojlanish darajasi bilan taqqoslash bizga og‘zaki nutq buzilishining umumiy manzarasida talaffuz kamchiliklarining rolini aniqlash imkonini beradi. Shunday qilib, agar talaffuz kamchiliklari faqat individual (yoki bir nechta)

tovushlarning buzilgan talaffuzi sifatida namoyon bo‘lsa, unda aksariyat hollarda bu alohida fonetik nuqsonni ko‘rsatadi. Bu shuni anglatadiki, maktab yoshiga kelib, turli sabablarga ko‘ra, bola o‘zining artikulyatsion tuzilishini ona tilining fonetik tizimidagi ma'lum tovushlarning talaffuziga moslashtirishga ulgurmagan. Fonemik jarayonlarning rivojlanishi kechikmaydi; ularning asosida tovush tuzilmalarini tahlil qilish va sintez qilishni o‘zlashtirish uchun o‘z-o‘zidan paydo bo‘ladigan shart-sharoitlar tezda rivojlanadi. Keyinchalik, bola yozish va o‘qishni erkin o‘zlashtiradi va butun o‘quv dasturini to‘liq o‘zlashtiradi. [1,2].

Nutqni rivojlantirishni baholash quyidagi parametrlarga asoslanadi:

- ✓ artikulyatsion tizim va talaffuz
- ✓ lug‘at
- ✓ nutqning grammatik tuzilishi
- ✓ izchil nutq
- ✓ fonematik jarayonlarning rivojlanishi
- ✓ yozma tilning rivojlanishi.

Og‘zaki nutq buzilishlarini tahlil qilish nutq faoliyatining tizimli tuzilishi nuqtai nazaridan va rivojlanish tamoyilini hisobga olgan holda ko‘rib chiqilishi kerak.

Tekshiruv davomida lingvistik vositalarning rivojlanish darajasini aniqlash bizga quyidagilarni aniqlash imkonini beradi:

A) nutq nuqsoni yetilmagan talaffuz bilan cheklanganmi;

B) u nutqning butun tovush jihatiga (tovush talaffuzi va fonemik jarayonlar) taalluqlimi;

C) nuqson nutq tizimining asosiy tarkibiy qismlarini qamrab oladimi (nutqning tovush jihati va leksik va grammatik tuzilishi).

Talaffuzdagi kamchiliklar asosan turli so‘zlarni aralashtirish va almashtirish shaklida namoyon bo‘ladigan hollarda tashxis qo‘yish uchun boshqacha yondashuv qo‘llanilishi kerak.

Qarama-qarshi tovushlar (akustik va artikulyatsion xususiyatlarga asoslangan). Ushbu turdagi talaffuz buzilishi fonemik jarayonlarning rivojlanmaganligining ko‘rsatkichi bo‘lganligi sababli, bolalarda ularning rivojlanish darajasini aniqlash kerak. Bunday bolalarda so‘zlarning tovush tarkibini tahlil qilish va sintez qilish uchun o‘z-o‘zidan paydo bo‘ladigan shart-sharoitlar sekin va ma'lum qiyinchiliklar bilan rivojlanadi, bu esa savodxonlikni o‘rganishga va keyinchalik ona tilini umuman o‘zlashtirishga jiddiy to‘sqinlik qiladi.

Yozish jarayoni odatda ma'lum nutq va nutqdan tashqari funktsiyalarning yetarli darajada rivojlanishi asosida sodir bo‘ladi: tovushlarning eshitish differentsiatsiyasi, ularning to‘g‘ri talaffuzi, lingvistik tahlil va sintez, nutqning leksik va grammatik jihatlarini rivojlantirish, vizual tahlil va sintez, shuningdek, fazoviy tasvirlar. Ushbu funktsiyalarning birortasida ham rivojlanmaganlik yozishni o‘zlashtirish jarayonida buzilishga, disgrafiyaga olib kelishi mumkin. [3,4].

Disgrafiya (yozish buzilishi) oddiy maktab o‘quvchilarida uchraydigan boshqa nutq buzilishlarining katta qismini tashkil qiladi. Bu o‘quvchilarning ta'limning dastlabki bosqichlarida, keyinchalik esa ona tilining grammatikasiga savodxonlik rivojlanishiga jiddiy to‘sqinlik qiladi. Baholash jarayonida nafaqat bolaning hozirgi malakasini, balki mavjud qobiliyatlarini ham hisobga olish muhimdir.

Ba'zi o‘qituvchilar disgrafik xatolarni o‘quvchilarning shaxsiy xususiyatlaridan kelib chiqadigan bema'nilik deb hisoblashadi: o‘qituvchining tushuntirishlarini tinglay olmaslik, yozishda beparvolik, ishga beparvo munosabatda bo‘lish va boshqalar. Aslida, bunday xatolar jiddiyroq sabablarga ko‘ra yuzaga keladi: nutqning fonetik-fonemik va leksik-grammatik tizimining yetilmaganligi.Unli va undosh tovushlarning tushirib qolishi fonematik idrokning yetilmaganligi va unga bog‘liq so‘z tahlili va sintezi bilan bog‘liq.

Fonematik idrokning yetilmaganligi o‘quvchilarning o‘z ona tilidagi fonemalarni ajrata olmasligiga olib keladi. Yozuvda bu harflarni chalkashtirish va almashtirish orqali ifodalanadi.Ba'zi o‘quvchilar urg‘uli unlilarni taniy olmaydilar va shuning uchun urg‘usiz unlilarni aniqlashda va sinov so‘zini tanlashda qiynalishadi, undoshlarni talaffuz qilish uchun sinov so‘zini tanlashda xato qilishadi. To‘g‘ri test so‘zini tanlagandan keyin ham, bola xato qiladi.Qoidalarni bilish ularga yordam bermaydi. Old qo‘shimchalar, prefikslar va bog‘lovchilarning imlosida ko‘plab xatolar mavjud.

Leksik va grammatik nutq rivojlanishidagi kechikish agrammatizmga olib keladi. Yozuvda bu o‘zini nutqning turli qismlarini noto‘g‘ri kelishish va boshqarish sifatida namoyon qiladi. O‘quvchilar sifatlarni,fel bilan muvofiqlashtira olmaydilar: ular fe'l + ot birikmalaridagi otlarning kelish shaklini noto‘g‘ri tanlaydilar, masalan: biz savat bilan bordik, chanada sayr qildik. Bolalar gaplarda intonatsiya va semantik muntazamlikni his qilishmaydi, shuning uchun ular yozma ravishda gap chegaralarini to‘g‘ri belgilay olmaydilar. Natijada, ular gaplar oxirida nuqta va boshida bosh harflardan to‘g‘ri foydalanmaydilar.

Lug‘at boyligining kamligi, o‘z fikrlarini kengaytirilgan gaplarda ifoda eta olmaslik va sabab-oqibat munosabatlarini tushunmaslik o‘quvchilarning keyinchalik ta'limda insho va hisobotlar yoza olmasliklariga olib keladi.

Logopedning asosiy vazifalaridan biri yozuv buzilishlarining asosiy sabablarini to‘g‘ri aniqlashdir, chunki bu tuzatish ishlarining usullari va davomiyligini belgilaydi.

Aniqlangan barcha yozuv xatolarini diqqat bilan tahlil qilish kerak.

Shuningdek, haqiqiy disgrafiyani nutqning rivojlanmaganligi sababli emas, balki turli omillar tufayli kelib chiqqan noto‘g‘ri yozuvdan ajratish kerak. Bu omillarga quyidagilar kiradi: rus tili o‘quv dasturini yetarli darajada o‘zlashtirmaslik, pedagogik e'tiborsizlik va ikki tillilikning ta'siri.

Turli xil yozma ishlardagi xatolarni o‘rganish kerak: nusxa ko‘chirish, diktantdan yozish va ijodiy yozish.

Bugungi kunga qadar bolada disgrafiyani qaysi yoshda yoki maktab bosqichida aniqlash mumkinligi, shuningdek, buzilish darajasi qanday bo‘lishi

borasida yakdil fikr mavjud emas. Shuning uchun, "yozishni o‘zlashtirishdagi qiyinchiliklar" va "disgrafiya" tushunchalarini farqlash, maktab bosqichida, yozish "texnikasi"ni o‘zlashtirish to‘liq deb hisoblanganda, bolaning yozish jarayonidagi doimiy buzilish sifatida tushuniladi, bu ko‘proq mos keladi. S.F. Ivanenko (1984) tomonidan taklif qilingan nuqsonning rivojlanishi nuqtai nazaridan farqlash disgrafiyani tashxislash uchun juda muhimdir. Muallif bolalarning yoshi, savodxonlikni o‘rganish bosqichi, buzilishlarning og‘irligi va ularning namoyon bo‘lish xususiyatlariga asoslanib, quyidagi to‘rtta yozish buzilishlari guruhini aniqladi.

1. Yozishni o‘zlashtirishdagi qiyinchiliklar.

Ko‘rsatkichlar: alifbo harflarini noaniq bilish; tovushlarni harflarga va aksincha, bosma grafemalarni yozma grafemalarga tarjima qilishda qiyinchiliklar; tovush-harf tahlili va sintezida qiyinchiliklar; aniq o‘rganilgan bosma belgilar bilan alohida bo‘g‘inlarni o‘qish; alohida harflarni diktantdan yozish. O‘quv yilining birinchi semestrida tashxis qo‘yilgan.

2. Yozish jarayonining rivojlanishidagi buzilishlar.

Ko‘rsatkichlar: turli xususiyatlarga qarab yozma va bosma harflarning chalkashligi;

Harflar ketma-ketligining semantik tuzilishini saqlab qolish va takrorlashda qiyinchilik; harflarni bo‘g‘inlarga birlashtirish va bo‘g‘inlarni so‘zlarga birlashtirishda qiyinchilik; qo‘lda yozilgan harflar yordamida bosma matndan nusxa ko‘chirish allaqachon boshlangan, ammo mustaqil yozish hali ham rivojlanish bosqichida. Odatdagi yozuv xatolari: unlilarsiz so‘zlarni yozish, bir nechta so‘zlarni birlashtirish yoki ularni ajratish. Birinchi kursning ikkinchi semestrida va ikkinchi kursning boshida tashxis qo‘yilgan.

3. Disgrafiya.

Ko‘rsatkichlar: bir yoki bir nechta turdagi doimiy xatolar. Ikkinchi kursning ikkinchi semestrida tashxis qo‘yilgan.

4. Disortografiya.

Ko‘rsatkichlar: maktab o‘quv dasturiga muvofiq yozma ravishda imlo qoidalarini qo‘llay olmaslik, tegishli o‘qish davriga muvofiq; yozma ishlarda ko‘p sonli imlo xatolari. Uchinchi kursda tashxis qo‘yilgan.

Baholash individual ravishda, an'anaviy formatda, dastur talablarini hisobga olgan holda o‘tkaziladi. Diagnostika jarayoni 20-30 daqiqa davom etadi. Tekshiruv ma'lumotlari hisobot shakliga yozib qo‘yiladi va yozma ish namunalari ilova qilinadi.

Tekshiruv natijalari asosida nutq terapiyasi hisoboti beriladi, unda bolaning rivojlanishning ushbu bosqichidagi og‘zaki va yozma nutqi tahlil qilinadi va nutqni tuzatish va rivojlantirish bo‘yicha tavsiyalar beriladi. [5,6].

Boshlang‘ich maktab o‘quvchilarining og‘zaki va yozma nutqini nutq terapiyasi bilan baholash.

1. Artikulyatsion apparatning anatomik tuzilishi.

Strukturaviy anomaliyalarning mavjudligi va tabiatiga e'tibor bering.

- lablar (qalin, ingichka, yoriq, chandiqlar)

- tishlar (siyrak, qiyshiq, kichik, jag‘ yoyidan tashqarida, tishlar yo‘q)
- tishlash (prognatizm, nasl, ochiq lateral, ochiq old)
- qattiq tanglay (baland, tor, yassi, yoriq, qisqartirilgan)
- til (katta, kichik, qisqargan tilsimon bog‘lam bilan)

Artikulyatsiya apparati tuzilishidagi og‘ishlar vizual ravishda aniqlanadi, ya'ni nutq terapevti artikulyatsiya apparati qismlarini tashqi va ichki tomondan tekshiradi.

II. Nutq motorikasi.

Yuz mushaklarining holati.

Vazifalar:

• Qoshlarni ko‘tarish ("ajablanib")
• Yonoqlarni shishirish ("semiz")
• Yonoqlarni chizish ("ozg‘in")

Artikulyatsiya motorikasi holati (harakatni taqlid qilish):

lablar - "tabassum", "qulupnay".

til - keng, tor, yuqoriga-pastga, "mayatnik".

Quyidagi harakat parametrlariga e'tibor bering:

- harakatning mavjudligi yoki yo‘qligi;
- ohang (normal taranglik, sustlik, haddan tashqari taranglik).
- harakat diapazoni (to‘liq, to‘liq emas)
- bir harakatdan ikkinchisiga o‘tish qobiliyati.
- harakat almashtirishlari
- qo‘shimcha va ortiqcha harakatlar (sinsenez)
- titroq, gipersalivatsiya, til uchining og‘ishi mavjudligi.

III. Nafas olish va ovoz chiqarish funksiyasi.

Nutqsiz va nutqiy nafas olishning ravonligi, nutq chiqarish davomiyligi.

Ovoz xususiyatlari

- balandlik (normal, jim, haddan tashqari baland)
- burun ohangining mavjudligi yoki yo‘qligi
- yaltiroq modulyatsiya (monotonlikning mavjudligi yoki yo‘qligi)

IV. Dinamik nutq xususiyatlari (agar frazeologik nutq mavjud bo‘lsa).

Temp (normal, tez, sekin)

Pauzalardan to‘g‘ri foydalanish.

Asosiy intonatsiya turlaridan foydalanish (hikoya, so‘roq, buyruq)

V. So‘zlarning talaffuzi va bo‘g‘in tuzilishi.

1. Nutq tovushining talaffuz buzilishining xususiyatini aniqlang: yo‘qlik, almashtirish, chalkashlik, deduksiya, artikulyatsiya.

Tekshiruv metodologiyasi: Boladan nutq terapevtidan keyin so‘zlar va iboralarni takrorlash so‘raladi.

2. So‘zning bo‘g‘in tuzilishini tekshirish.

Tajriba usuli: Boladan nutq logopedning so‘zlarini aks ettirish so‘raladi:

ayiq, o‘rik, akvarium

eshik, xiyobon, namoyish

tramvay, dasturxon, chorraha

tuya, qaldirg‘och, televizor
shakar idishi, cho‘tka, yo‘l harakati nazoratchisi
VI. Lug‘atni rivojlantirish.
Faol lug‘at
Maqsad: Faol lug‘at doirasini aniqlash.
1. Mavzu lug‘ati.
a) Rasmlardan obyektlarni nomlash: "Bu nima?"
Tavsiya etilgan materiallar:
Karam, daftar, sabzavotlar, ruchka, turp, kitob, cho‘mich, likopcha, stakan, choynak, likopcha, qalam, chizg‘ich, bog‘cha, qovoqcha, o‘simlik.
VII. Nutqning grammatik tuzilishi.
Maqsad: So‘zlarning grammatik ma'nolariga asoslanib ma'nolarni farqlash qobiliyatini o‘rganish.
1. So‘zlarning o‘zgarishi.
a) Otlarning nominativ birlik va ko‘plikda ishlatilishi:
"Biri stol, agar ko‘p bo‘lsa, biz ularni stollar deymiz."
Tavsiya etilgan materiallar:
stol - …stollar stul - …stullar
quloq - …quloqlar daraxt - …daraxtlar
yeng - …yenglar deraza - …derazalar
og‘iz - …og‘izlar peshona - …peshonalar
b) Otlarning ko‘plik shaklidan foydalanish.
"Nimaning ko‘pi?"
uy - …uylar mushukcha - …mushukchalar
qo‘g‘irchoq - …qo‘g‘irchoqlar qarag‘ay daraxti - …qarag‘aylar
qo‘ng‘iz - …qo‘ng‘iz poya - …poyalar
2. So‘z yasalishi.
a) Kichiklashtiruvchi qo‘shimchali otlarning yasalishi.
"Mehr bilan ayting"
qoshiq - ...qoshiq
olma daraxti - ...olma daraxti
b) ● Otlardan nisbiy sifatlarning shakllanishi.
"U nimadan yasalgan?"
olxo‘ri sharbati - ...
sabzi sharbati - ...
ipak ko‘ylak - ...
● Otlardan egalik sifatlarining shakllanishi. "Kimniki? Kimniki? Kimniki?"
Onaning sumkasi - Onaning sumkasi
Buvining sviteri - ...buvining sviteri
Sigirning boshi - ...sigirning boshi
Qushning tumshug‘i - ...qushning tumshug‘i
Xulosalarda agrammatizmlarning mavjudligi va tabiati ajralib turadi.
3. Mantiqiy va grammatik konstruksiyalarni tushunish.
Savollarga javob bering:

• Idishlarni onasining qizi yuvdi. Idishlarni kim yuvdi?
• O‘g‘il bolani qiz qutqardi. Kimni kim qutqardi?
• Ona qizining sviterini kiyib olgan. Kim svitersiz qoldi?
• Bolalar yomg‘ir to‘xtashi bilan o‘rmonga kirishdi. Ular yomg‘irdan oldin o‘rmonda bo‘lishganmi yoki keyinmi?

Bunday konstruksiyalarni tushunish tahlil qilinadi.

Xulosalarda bolaning murakkab syujetni tushunishini, hikoyaning izchilligi va mazmunliligini, berilgan syujet uchun nom tanlash qobiliyatini, agrammatizmlarning mavjudligi va tabiatini, shuningdek, izchil nutq rivojlanish darajasini qayd eting.

IX. Fonemik jarayonlarning holati (Fonemik eshitish, tahlil, sintez).

1. Fonemik eshitish.

Maqsad: Eshitish qobiliyatini va berilgan ketma-ketlikda bo‘g‘inlarni qayta tiklash qobiliyatini sinab ko‘rish. Sinov metodologiyasi: Boladan quyidagi bo‘g‘in ketma-ketliklarini takrorlash so‘raladi:

pa – pa – ba
pa – ba – pa – pa
sa – sha – za – zha
sa – za – tsa – za

Vazifani ko‘rsatmalarga muvofiq bajarish qayd etiladi.

2. Til tahlili va sintezi;

Maqsad: Fonemik eshitishning rivojlanishini va so‘zlarning tovush tahlilini amalga oshirish qobiliyatini baholash.

a) Fonemik tahlil va sintez.

Rasmlardagi birinchi tovushlarga asoslanib so‘zga nom bering.

Kema, deraza, quyon, to‘q sariq: [k] + [a] + [z] + [a]

Qor odam, avtobus, qaychi, kit, igna: [s] + [a] + [n] + [k] + [i].

• So‘zlardagi oxirgi tovushni nomlang:

ko‘knori, qalam, barmoq

• So‘zlardagi 2-tovushni nomlang:

laylak, uy, qo‘l.

b) bo‘g‘in tahlili va sintezi.

• So‘zlardagi bo‘g‘inlar sonini aniqlang:

fil, devor, bolg‘a.

c) gap tuzilishini tahlil qilish

• Gapdagi so‘zlar sonini, ketma-ketligini va o‘rnini aniqlang.

Kuz keldi.

Kuzda ko‘pincha yomg‘ir yog‘adi.

O‘rmondan katta savat bilan bir chol chiqdi.

Bolaning lingvistik tahlil va sintezni amalga oshirish qobiliyati qayd etiladi.

X. Yozish jarayonini o‘rganish.

Ish daftarlari va test daftarlaridagi yozma ish tahlil qilinadi. Agar kerak bo‘lsa, har qanday xatolarni aniqlash uchun xatni diktant (eshitish diktanti) bilan yozib qo‘yish mumkin.

2-sinf: "Yuring."

Mana katta o‘rmon. O‘rmonning narigi tomonida daryo bor. Daryo yaqinida ko‘plab gullar bor. Kapalak gulga qo‘ndi. Laylo uni to‘r bilan ushladi. Feruza qo‘ziqorin qidirmoqda. Ahmad va Salim chuvalchang topdilar. Temur chortan baliq tutdi.

3-sinf: "Kuz."

Kuz keldi. Sovuq shamol esa boshladi. Tez-tez yomg‘ir yog‘moqda. Ayvon yonida katta ko‘lmaklar turibdi. Gulzordagi gullar so‘lib qoldi. Daraxtlardan barglar tushmoqda. Daryodagi suv qoraygan. Akmal va Artur o‘rmonga kirishdi. U yerda qo‘ziqorin qidirmoqdalar.

4-sinf: "Kuz."

Tez-tez yomg‘ir yog‘moqda. Dalada shamol motam bilan uvillaydi. Kuzgi o‘rmonda sezgir sukunat hukm surmoqda. Yiqilgan barglar so‘lib qolgan. Faqat vaqti-vaqti bilan yalang‘och shoxda kichik bayroqni topish mumkin. Bu oxirgi barg. Yer ustida g‘amgin bulutlar suzib yuradi. Qor yog‘ishga yaqin.

Xulosa larda biz yozish jarayonining mohiyatini, ya'ni bola so‘zni fonetik jihatdan darhol to‘g‘ri yoza oladimi yoki talaffuz qila oladimi, tuzatishlar kiritadimi (chizib tashlaydimi, qayta o‘qiydimi va yana tuzatadimi) yoki buni qila olmaydimi va xatolarni topishga urinmaydimi, deb ta'kidlaymiz.logoped boladagi kamchiliklarni aniqlab ish dastur rejasini to`g`ri yuritib olib borsa har bir o`quvchi chorak yakuniga qadar bartaraf etib boriladi bolalarda artikulatsion mashqlar chiroyli imloviy xatosiz yozish diktantlari olib borish mobaynida har bir o`quvchi rag`batlantirib borilsa erta bartaraf etish imkoni yuqori darajada bo`ladi.

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Olimjonova D. U.
morfologiya yo'nalishi magistr talabasi
Samarkand Davlat tibbiyot universiteti
Ilmiy raxbari: Tastanova G. Y., tibbiyot fanlar doktori

KALAMUSHLARDA YO'G'ON ICHAK SHILLIQ QAVATI EPITELIYSINING ENDOKRIN APPARATI GISTOTOPOGRAFIYASI

Abstrakt. *Ushbu maqolada normal kalamushlarda yo'g'on ichak shilliq qavati epiteliysining endokrin apparatining gistotopografiyasi o'rganiladi. Umumiy tekshirish uchun to'qimalar gematoksilin va eozin bilan bo'yalgan. Endokrin apparatni o'rganish uchun Grimelius va Masson usullari qo'llanilgan. Kalamush yo'g'on ichakning barcha bo'limlaridagi endokrin hujayralarning gistotopografiyasi tasvirlangan. Kalamush yo'g'on ichakning bo'limlari bo'yicha EK hujayralarining nisbiy ko'pligi aniqlangan.*

Kalit so'zlar: *Kalamushlar, tajriba, normal, yo'g'on ichak, gematoksilin va eozin, Grimelius va Masson usullari, EK hujayralari.*

Olimjonova D. U.
master's student in the direction "morphology"
Samarkand State Medical University
Scientific supervisor: Tastanova G. E., doctor of medical sciences

HISTOTOPOGRAPHY OF THE ENDOCRINE APPARATUS OF THE EPITHELIUM OF THE COLON MUCOSA IN RATS

Abstract*. This article investigates the histotopography of the endocrine apparatus of the epithelium of the colon mucosa in rats under normal conditions. For general tissue examination, hematoxylin-eosin staining was used. For studying the endocrine apparatus, the Grimelius and Masson methods were applied. The histotopography of endocrinocytes across all departments of the rat colon is described. The relative numbers of EC-cells in different departments of the rat colon have been clarified.*

Keywords: *rats, experiment, norm, large intestine, hematoxylin-eosin, Grimelius and Masson methods, EC-cells.*

Kirish

Zamonaviy morfologiyada eng muhim masalalardan biri to'qimalarning genezi, differentsirovkasi, tuzilishi va sitofiziologiyasi masalalari normal faoliyat sharoitidagi holatida o'rganishdir [1]. Ushbu muammolarni o'rganish sitologiya, gistologiya, endokrinologiyaning yanada rivojlanishiga va klinikda patologiya kechayotgan jarayonlarni chuqurroq tushunishga imkon beradi [2]. Shu nuqtai nazardan, odam va umurtqali hayvonlarning ichak epiteliysi endokrinotsitlarining shakllanishi va differentsirovkasi bilan bog'liq masalalar, yo'g'on ichak endokrin

apparatining normada, eksperimental ta’sirlarda va oshqozon-ichak yo’llarining ba’zi patologiyalaridagi holati katta qiziqish uyg’otadi [3]. So’nggi yillardagi hujayra biologiyasining asosiy yutuqlaridan biri norma, eksperimental va klinik patologiya sharoitida umumiy va mahalliy gomeostaz mexanizmlarini nazorat qiluvchi diffuz endokrin tizim (DET) to’g’risidagi tasavvurning yaratilishi bo’ldi [4]. DET tarkibida asosiy ulush (75%) oshqozon-ichak yo’llari (OIY) endokrinotsitlariga to’g’ri keladi, ular me’da osti bezining inkretor hujayralari bilan birga gastroenteropankreatik (GEP) endokrin tizimni tashkil qiladi [5]. So’nggi vaqtlarda elektron mikroskopiya va immunotsitoximiya usullarining keng qo’llanilishi tufayli GEP tizimi gormonlari sintezi va sekretsiyasi manbalarini o’rganishda sezilarli yutuqlarga erishildi [6]. Biroq hozirgacha OIYning ba’zi bo’limlaridagi endokrin hujayralar turlari, ularning genezi va regeneratsiya yo’llari haqida yakdil fikr yo’q. Bu nuqtai nazardan yo’g’on ichak ovqat hazm qilish tizimining eng kam o’rganilgan qismi hisoblanadi. Endogen va ekzogen salbiy omillar ta’sirida gomeostaz buzilgan sharoitda yo’g’on ichak endokrin tizimi holatini o’rganish ham qiziqish uyg’otadi. Chop etilgan ishlarning ko’pchiligi me’da va ingichka ichak endokrinotsitlarining rivojlanishi masalalariga bag’ishlangan bo’lsa, yo’g’on ichak shilliq qavati epiteliysiga nisbatan bu muammo faqat alohida ishlarda ko’rib chiqilgan. U epiteliy plastinkasi tarkibida diffuz tarqalgan inkretor elementlarning dinamik populyatsiyasini tashkil etadi [7].

Bu nuqtai nazardan endokrinotsitlarning gistotopografiyasi muayyan ahamiyatga ega, chunki u ushbu hujayralar funktsiyasi bilan uzviy bog’liqdir [8]. Bu jihatdan endokrinotsitlar sitogenezi manbalarini o’rganish yo’nalishi alohida qiziqish uyg’otadi, chunki OIY tizimida endokrinotsitlar gistotopografiyasi organizm yaxlitlik darajasiga va shilliq qavat tuzilishiga qarab o’zgarib turadi.

Tadqiqot maqsadi

Ushbu ishning maqsadi kalamushlarda norma sharoitida yo’g’on ichak shilliq qavati epiteliysining endokrin apparati gistotopografiyasini o’rganishdir.

Materiallar va tadqiqot usullari

Voyaga yetgan sog’lom (160-180 og’irlikdagi) 15 ta kalamushlar tanlab olindi. Umumiy narkoz ta’sirida qorin bo’shlig’i qorinning oq chizig’idan kesib ochildi. Material yo’g’on ichakning qisimlari bo’lgan ko’r ichak, ko’taruluvchi qismi, ko’ndagang qismi va tushuvchi qisimlaridan 0,3-0,6 sm qalinlikda to’qima olindi. Olingan materallar Kornua eritmasida va 10 % li neytral formalinda qotirildi. Gistologik tekshirish material uchun parafinga joylashtirildi. Mikrotomda 5-7 mkm qalinlikda kesilib preparatlar tayorlandi.To’qimalarni umumiy tekshirish uchun Gemotoksilin - Eozin usullarida bo’yaldi. Endokirin apparatlarni tekshirish uchun gistologik tekshirishlardan Grimelius va Masson usullari qo’lanildi. Mikroskop ostida okulyar - mikrometr yordamida endokirin apparatlari hisoblandi. Olingan ma’lumotlar Fisher St’yudent usulida xisoblandi.

Tadqiqot natijalari

Ushbu ishda o’tkazilgan kalamushning yo’g’on ichak shilliq qavati epiteliysi endokrin apparatining tuzilishi, sitofiziologiyasi va differentsirovkasini norma sharoitida o’rganish yo’g’on ichak endokrin apparati endokrin

elementlarining gistotopografiyasi, identifikatsiyasi, tuzilishi va differentsirovkasi bo'yicha aniq ilmiy natijalar olishga imkon berdi. Kalamushda o'rganilgan yo'g'on ichak shilliq qavati epiteliysining endokrin apparati epiteliyning boshqa hujayralari orasida yakka-yakka tarqalgan endokrinotsitlar bilan ifodalangan. Hujayralar asosan kriptalarning o'rta va pastki uchdan bir qismida joylashgan. Endokrinotsitlarning yo'g'on ichak bo'limlari bo'yicha shilliq qavat kesmasining 1 mm ga taqsimlanishi notekis joylashgan. Kalamushda endokrinotsitlar sonini o'rganish birinchidan, yo'g'on ichak endokrin apparatining funktsional labilligi haqida guvohlik beradi, ikkinchidan, turli to'qima va organlarga xos bo'lgan shakl yaratish jarayonlarining geteroxroniyasining xususiy misolini taqdim etadi.

Shunday qilib, kalamushda endokrinotsitlar sitogenezi yo'llari turli darajada ifodalangan. Kalamushda kam differentsiallangan hujayralar va ekzo-endokrin hujayralar juda kam miqdorda uchraydi. Kalamushning yo'g'on ichak endokrin hujayralarini o'rganish natijalarini xulosa qilib aytganda, ushbu masalani o'rganish bir qator umumiy qonuniyatlarni aniqlash bilan birga, bu nuqtai nazardan amaliy ravishda kam o'rganilgan muammolar mavjudligini ham ko'rsatdi deb ta'kidlash o'rinlidir. Ichak epiteliysi uchun bir to'qima doirasida turli ixtisoslashuvga ega enterotsitlar va endokrin elementlarning mavjudligi nafaqat funktsional xususiyatga ega biologik fenomen sifatida ko'rinadi, balki juda muhim jihati shundaki, ekzokrin va endokrin tabiatli hujayra elementlarining o'zaro ta'siri sifatida namoyon bo'ladi. Ular yagona gistogenetik asos – kambial hujayraning hosilasi sifatida amalga oshiriladi.

Xulosa

Bir tadqiqot doirasida kalamushning yo'g'on ichakning barcha bo'limlari bo'yicha endokrinotsitlarning umumiy gistotopografiyasi tahlil qilindi. Shu bilan birga, ilk bor kalamushning yo'g'on ichakning barcha bo'limlari bo'yicha endokrinotsitlar gistotopografiyasi tasvirlandi. Kalamushning yo'g'on ichak bo'limlari bo'yicha YeS-hujayralarining nisbiy miqdori aniqlashtirildi.

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Omonturdiev A. M., doctor of philosophy in geography (PhD)
senior lecturer
department of geography
Termez State University
Kuchiyev M. Sh.
bachelor's student
Termez State University
Ro'ziyev E. A.
bachelor's student
Termez State University
Termez, Uzbekistan

NATURAL-GEOGRAPHICAL DESCRIPTION OF THE CENTRAL KAZAKHSTAN PROVINCE

Abstract: *This article is devoted to the natural-geographical features of the Central Kazakhstan province. According to Babushkin's classification, the province includes the Kazakh lowlands, the Torgay plateau-like region, the deserts of the Aral and Aral Sea coast, as well as the Betpak-Dala and Ustyurt areas. The region is characterized by a diverse landscape, including steppes, semi-deserts, sandy deserts, and low mountain ranges. Its climate, soil types, and water resources play a significant role in shaping the local flora, fauna, and human activities.*

Keywords: *Central Kazakhstan, province, Turan, Mangyshlak, Torgay, Aral Sea region, Karakum, low mountains, plateaus, steppe.*

Introduction

Central Kazakhstan is one of the largest natural-geographical regions in the Republic, distinguished by rich mineral resources, extensive steppe areas, major industrial centers, and complex ecological processes. The region's natural conditions play a crucial role in economic development, population distribution, the formation of transport networks, and agricultural activities. In recent years, the rapid expansion of industry, the growth of mining complexes, and the increasing ecological load have made a thorough study of Central Kazakhstan's natural geography particularly important.

Factors such as the region's sensitivity to climate change, limited water resources, and the intensification of desertification processes represent particularly urgent issues in terms of maintaining the natural balance. In addition, a scientific study of the interactions among natural components, the formation characteristics of natural landscapes, and their changes related to human activities provides an important scientific and practical foundation for the sustainable development of Central Kazakhstan.

L.N. Babushkin and N.A. Kogay, after carefully studying and analyzing previous regionalization research, developed a new scheme for the natural-geographical regionalization of the area based on a thorough investigation of Central Asia's natural environment. They regarded Central Asia as a unique and distinct natural-geographical region within the Eurasian continent. At the same time, the authors divided the territory into the Turan, Central Kazakhstan, and Dzungaria-Tian Shan provinces.

The Central Kazakhstan province encompasses a variety of regions with different ages and origins, including the Mangistau low mountains and plateau, the alluvial plains of the Syr Darya, the dried areas of the Aral Sea, the Aral Sea Karakum, the Irgiz-Chelkar and Torgay plateau-like residual plains, as well as the low mountains of Central Kazakhstan.

The Central Kazakhstan province differs from the Turan and Tian Shan provinces. The region is primarily composed of Paleozoic sedimentary and clastic rocks, which were folded during the Caledonian and Hercynian orogenetic processes and uplifted onto the land, later subsiding onto the platform as a result of denudation (except for the Mugalzhar Mountains).The climate of the Central Kazakhstan province is highly continental, with long, cold winters and summers that are not as hot compared to the Turan plain. The Siberian anticyclone predominantly governs the region. During the winter months, the northern part of the province remains exposed, allowing Arctic cold air masses to enter and combine with the Siberian anticyclone, occasionally lowering temperatures to as low as -50 °C. This climatic characteristic also affects other components of the natural environment.

The strong continentality and aridity of the province's climate influence the formation of surface waters. The largest rivers in Central Kazakhstan include the Syr Darya, Torgay, Irgiz, Sarysu, Tobol, and Nura. At the same time, the province is relatively rich in groundwater resources.

The province also exhibits distinct latitudinal zones and prominent elevation regions. These include temperate dry and arid steppes, as well as semi-desert and desert zones within the temperate region.

The soil composition in the Central Kazakhstan province varies depending on the region's climate, relief, and landscape. In the northern areas, soils are relatively moist, while approaching the south, dry and saline soils become more common. In the steppe and semi-desert zones, southern chernozems and dark chestnut soils are widespread, with an organic matter content of 3–7%, making them suitable for agriculture. The southern carbonate chernozems are composed of calcareous clays, with an organic matter content reaching 5–7%, showing low signs of salinization, and supporting well-developed plant communities such as *festuca sulcata, stipa, red stipa* and others

Along river valleys and around lakes, meadow-chernozem soils are present, with an organic matter content of 8–10%. In saline areas, low-lying and swampy sites are occupied by saline soils, while in the semi-desert zones, light chestnut

soils are common. On residual mountains and slopes, stony soils are found, and in desert zones, gray-brown soils occur, with a humus content of 1–1.5%.

In the Torgay region, southern chernozems and light chestnut soils are widespread, while meadow-alluvial soils are found in river valleys and saline-marsh soils around lakes. In the Mangyshlak desert region, saline desert-brown and gray-brown soils predominate. Most of the Ustyurt relief is flat, with gray-brown soils that have low organic matter content (0.5–0.8%) but a high gypsum content.

In the Aral Sea region, brown soils are predominant, while soils in saline areas are dry and saline. In the Aral Sea Karakum, desert-sandy soils and sand formations occupy large areas. The pastures can be used throughout the year, with an average productivity of 2.2 centners per hectare.

The fauna of the region is well adapted to local natural conditions. In the northern and central steppe areas, species such as marmots, jerboas, field mice, saiga antelope, wolves, foxes, and brown hares are commonly found. In the desert zones, goitered gazelle, kulan, corsac fox, badger, striped hyena, and spotted wild cat occur.

Among birds, larks, rooks, ducks, geese, and fishing birds are widespread. Reptiles include lizards, agamas, tortoises, geckos, and whip snakes. Venomous invertebrates such as scorpions, solifuges (camel spiders), and black widow spiders are also present. In high mountain areas, argali sheep and the Mongolian pika can be found.

The most important natural resources of the Kazakh low mountains include mineral resources, climatic resources, fertile soils, and meadow–pasture lands. The region contains major coal deposits (Karaganda, Ekibastuz, Maytuben), oil fields (in the Emba basin, including Makat, Dossor, Karaton, Koschagyl, and Prorva), as well as metallic mineral resources such as iron, manganese, nickel, copper, gold, lead–zinc, phosphorite, potassium salts, and rock salt.

In the Torgay region, deposits of iron and bauxite, brown coal, and various salts are found. In Mangyshlak, oil and gas represent the most important natural resources, with major fields such as Uzen, Zhetybai, Shohpakhta, and Prorva.

The region’s climatic resources are also considered rich. In the northern areas, the average temperature is around +10 °C, while toward the south the accumulated heat reaches up to 3200 °C. These conditions are favorable for the cultivation of wheat, maize, sugar beet, and other crops. Annual sunshine duration amounts to 2600–2700 hours, which provides significant potential for energy use.

Fertile chernozem and chestnut soils are widely distributed in the central and northern parts of the region. Although their full utilization is limited by water scarcity, water supply has been improved through the construction of the Irtysh–Karaganda Canal. Pasture lands in the region also represent an important resource for livestock farming.

Protected natural areas are also present in the region. The Naurzum Nature Reserve in the Torgay Depression covers an area of about 100,000 hectares and provides protection for approximately 150 bird species. In the Ustyurt region,

several endangered animals occur, including the Ustyurt leopard, Ustyurt sheep, saiga antelope, honey badger, caracal, and goitered gazelle, making their conservation essential. The area also contains oil and gas fields, as well as fodder plants for livestock such as Atriplex, Salsola, wormwood, and saxaul.

Conclusions

According to Babushkin's classification of natural-geographical regions, the Central Kazakhstan province is one of the large and structurally complex areas of the Kazakh natural-geographical region. This province includes the Kazakh low mountains, the Mangyshlak Peninsula, the Ustyurt Plateau, the Torgay Depression, and the Aral Sea region. These areas are interconnected due to the similarity of their natural conditions, arid climate, and belonging to internal drainage basins.

In conclusion, the Central Kazakhstan province is characterized by diverse relief, climate, and landscapes, the predominance of arid natural conditions, and the extensive development of steppe and desert zones. This province holds significant scientific and practical importance for understanding the natural-geographical structure of Kazakhstan.

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Panjiyev M. A.
yo‘nalishi talabasi
moliya va moliyaviy texnologiyalar
iqtisodiyot va turizm fakulteti
Termiz davlat universiteti

BOZOR SHAROITIDA INFLYATSIYA VA UNI JILOVLASH YO‘LLARI

Annotatsiya. *Mazkur maqola inflyatsiyani - narxlar umumiy darajasining doimiy oshishi, shakllanishi va uni jilovlash vositalarini (monetar, fiskal hamda tarkibiy-islohot choralari) tahlil qiladi. Tadqiqotning maqsadi O‘zbekiston sharoitida inflyatsiyani barqarorlashtirish mexanizmlarini aniqlash va amaliy tavsiyalar ishlab chiqishdan iborat. Ishda tahliliy va taqqosiy metodlar, statistik kuzatuv hamda milliy va mintaqaviy tajribalar qo‘llanildi. Tadqiqot natijasida Markaziy bankning inflyatsion targetlash siyosati hamda asosiy stavkaning roli, import diversifikatsiyasining ahamiyati ta’kidlandi. Maqola nazariy va amaliy tavsiyalarni jamlab, narx barqarorligini ta’minlash uchun muhim choralarni belgilaydi.*

Kalit so‘zlar: *Inflyatsiya, inflyatsion targetlash, pul-kredit siyosati, fiskal siyosat, tarkibiy islohotlar, Markaziy bank, asosiy stavka, narx barqarorligi, import diversifikatsiyasi, tashqi iqtisodiy ta’sirlar, remittansiyalar, ta’minot zanjiri, iqtisodiy xavfsizlik.*

Panjiyev M. A.
student
finance and financial technologies program
faculty of economics and tourism
Termez State University

INFLATION IN MARKET ECONOMY CONDITIONS AND WAYS TO CURB IT

Abstract. *This article analyzes inflation — the continuous rise in the general price level, its formation, and the tools for its containment (monetary, fiscal, as well as structural-reform measures). The purpose of the study is to identify mechanisms for stabilizing inflation in the conditions of Uzbekistan and to develop practical recommendations. Analytical and comparative methods, statistical observation, as well as national and regional experiences were applied in the work. The research results emphasize the role of the Central Bank's inflation targeting policy and the key interest rate, as well as the importance of import diversification. The article combines theoretical and practical recommendations and outlines key measures to ensure price stability.*

Keywords: *Inflation, inflation targeting, monetary policy, fiscal policy, structural reforms, Central Bank, key interest rate, price stability, import*

diversification, external economic impacts, remittances, supply chains, economic security.

Inflyatsiya iqtisodiyotning eng muhim makroiqtisodiy ko‘rsatkichlaridan biri bo‘lib, narxlar umumiy darajasining doimiy o‘sishi sifatida tavsiflanadi. U nafaqat aholining xarid qobiliyatini pasaytiradi, balki iqtisodiy o‘sish sur’atini sekinlashtirib, investitsiyalar va ishlab chiqarishga salbiy ta’sir o‘tkazadi. Shu sababli, inflyatsiyani jilovlash davlatning makroiqtisodiy siyosatining eng muhim maqsadlaridan biri hisoblanadi. Zamonaviy iqtisodiy nazariya va amaliyotida inflyatsiyani boshqarishning asosiy vositalari monetar va fiskal siyosatning hamda tarkibiy-islohotlarning asosiy maqsadlaridan biridir. Ushbu vositalar bir-birini to‘ldiruvchi xarakterga ega bo‘lib, narx barqarorligini ta’minlashda muhim rol o‘ynaydi. Shuningdek, O‘zbekistonning inflyatsion targetlash tajribasi va 2022-yilda Rossiya-Ukraina voqeyalarining mintaqaviy ta’siri misolida Qozog‘iston bilan qiyosiy tahlilini amalga oshirganimizda mamlakatimizning tashqi ta’sirlarga chidamliligi va tashqi iqtisodiy xavflarni boshqarish yo‘llari samarali ekanligini aniqlandi.

Inflyatsiyani jilovlashda keng foydalaniladigan monetar va fiskal siyosat hamda tarkibiy chora tadbirlarni bo‘yicha ko‘rib chiqamiz. Markaziy bank pul-kredit siyosatini narxlar barqarorligini ta’minlash maqsadidan kelib chiqqan holda ishlab chiqadi va amalga oshiradi. Narxlar barqarorligi, past va barqaror inflyatsiya darajasini anglatadi. O‘zbekiston Respublikasi Prezidentining 2019 yil 18 noyabrdagi PF-5877-sonli “Inflyatsion targetlash rejimiga bosqichma-bosqich o‘tish orqali pul-kredit siyosatini takomillashtirish to‘g‘risida”gi Farmoniga asosan inflyatsiya bo‘yicha doimiy maqsad (target) 5 foiz etib belgilangan va ushbu maqsadga erishish vazifasi Markaziy bank zimmasiga yuklatilgan. Markaziy bank birinchi navbatda asosiy stavka orqali ta’sir o‘tkazadi. Bunda qayta moliyalash foiz stavkasini ko‘tarish orqali inflyatsiya darajasi yuqori, ya’ni narxlar tez o‘sayotgan bo‘lsa, aholining xarajatlari ortib borishi va xarid qobiliyatining sezilarli darajada kamayib ketishini oldini olish uchun qo‘llaniladi. Asosiy stavka har yili 8 marta qayta ko‘rib chiqilib, bu orqali tijorat banklarining kunlik qarz olish va berish jarayonida pul likvidligini saqlash uchun asosiy boshqaruv vazifasi ta’minlanadi. Asosiy stavka talab va taklif muvozanatiga ham ta’sir qiladi. Ishlab chiqaruvchilar va iste’molchilar kamroq kredit olishni boshlaydi. Natijada, pul taklifi hajmi qisqaradi va inflyatsiya darajasi tusha boshlaydi. Import qilinadigan tovar va xom-ashyolarning ta’minot zanjiri ham inflyatsiya darajasiga sezilarli ta’sir o‘tkazadi. Misol sifatida Qozog‘iston va O‘zbekiston inflyatsiya darajalarining dinamikasini ko‘rib o‘tamiz.

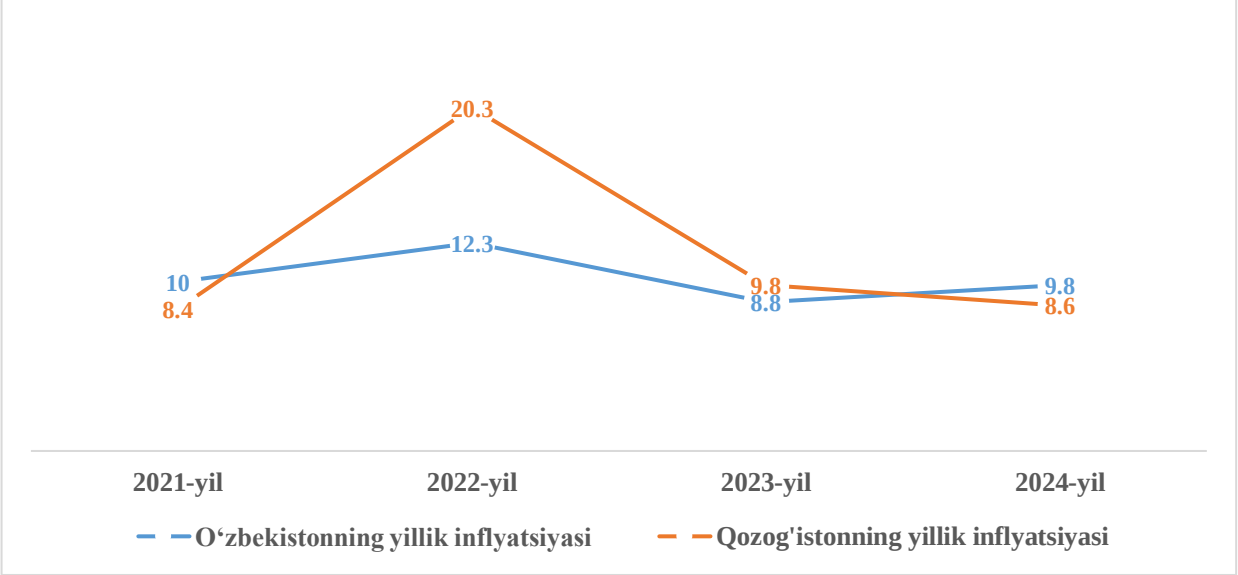
1-diagrammadagi ma’lumotlarga e’tibor qaratadigan bo‘lsak, Qozog‘istondagi inflyatsiya darajasi 2022-yilda keskin oshib ketgan. Bunga asosiy sabablardan biri sifatida Rossiya-Ukraina mojarosi sababli iqtisodiy sanksiyalar qo‘llanilishi, import tovarlar narxining oshishi, tranzit yo‘llarning o‘zgarishi, inflyatsiyaning oshishiga olib kelgan. O‘zbekistonga ham bu holat ta’sir qilgan, ammo sezilarli darajada emas. Sababi, 2022-yilda O‘zbekiston importining

Rossiya ulushiga to‘g‘ri keladigan qismi 20.2% ga teng bo‘lgan[42]. Bu ko‘rsatgich Qozog‘istonda 28.5% ni tashkil qilgan[43].

Bu mamlakatlar temir-po‘lat, o‘g‘it, yoqilg‘i, ayrim agro-mahsulotlar va sanoat buyumlarini Rossiyadan oladi. Qozog’istonda ushbu turdagi mahsulot va xom-ashyolarning iqtisodiyotidagi ulushi hamda bozorga ta’siri sezilarli darajada katta bo‘lgan. Yanada chuqurlashsak, metal va energiya sanoati Qozog‘istondagi iqtisodiy faoliyat va infratuzilmaning kattagina qismini tashkil qiladi. Bu sohalardagi narxlar o‘zgarishi, iste’mol narxlari indeksiga tez va yuqori ta’sir o‘tkazgan. Remittansiyaning yuqori bo‘lganli esa O‘zbekistonga ijobiy ta’sir ko‘rsatgan. Birlashgan millatlar tashkilotining Oziq-ovqat va qishloq xo‘jaligi tashkilotining ma’lumotlariga ko‘ra 2022-yilda oziq-ovqat narxlari indeksi o‘rtacha 143,7 ballni tashkil etgan. Shu tariqa, oziq-ovqat narxlarining rekord darajada oshganligi ma’lum bo‘lgan. Ushbu holat Qozog‘iston va O‘zbekistonga sezilarli darajada salbiy ta’sir o‘tkazdi. Qozog‘iston hukumati 20.3% dan 9.8%ga tushurish uchun 2022-yil davomida asosiy stavkani yuqoriga ko‘tardi va 2022-yilning oktyabr oyida 16.0% etib belgilandi. Yil oxirida bu ko‘rsatgich 16.75% ni tashkil etgan. Bu monetar siyosat orqali inflyatsiyani jilovlay oldi. Albatta bularga qo‘shimcha tarzda, tashqi narxlar tushushi ham inflyatsiya darajasining pasayishiga olib keldi.

1-diagramma.

Qozog‘iston va O‘zbekistonning 2021-2024 yillardagi inflyatsiya darajasi



[42] O‘zbekiston Respublikasi Tashqi savdo ko‘rsatkichlari [Elektron resurs] // O‘zbekiston Respublikasi Prezidenti huzuridagi Statistika agentligi rasmiy sayti. – URL: https://www.stat.uz/uz/rasmiy-statistika/merchandise-trade-2 (murojaat sanasi: 04.12.2025)

[43] Diversifying Kazakhstan’s Exports [Elektron resurs] // OECD Publishing, Paris, 2024. – URL: https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/06/diversifying-kazakhstan-s-exports_6db7322e/7f9cd8aa-en.pdf (murojaat sanasi: 04.12.2025).

Inflyatsiyani boshqarishda faqatgina ichki iqtisodiy siyosat emas balki tashqi omillar ham muhim o‘rin egallaydi. Buning asosiy sabablaridan biri makro darajada tovar va xom-ashyo yetkazib beruvchi davlatlardagi o‘zgarishlar, katta miqdorda import qilayotgan davlatlarning iqtisodiyoti yirik eksportyor davlatlarning iqtisodiyotiga bevosita ham bilvosita ham bog‘langan bo‘lishi mumkinligi sababli, import qiluvchi davlatlarning ichki iqtisodiyotida tebranish hosil qiladi. Yuqoridagi xavfni boshqarish maqsadida bir davlatdan umumiy import hajmining 20% idan yuqori bo‘lmagan hajmda amalga oshirish kerakligi va aynan bir turdagi tovar va xom-ashyoning hajmini ham aynan bir davlatdan 30%dan oshirmagan holda xarid qilish orqali ijobiy import divesifikatsiyasini amalga oshirish kerak. Bu esa kutilmaganda narxlar tez o‘sishi orqali keladigan yuqori inflyatsiya xavfini kamaytiradi.

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Qalandarov F. A., pedagogika fanlari bo‘yicha falsafa doktori
Qarshi Davlat Texnika Universiteti
O‘zbekiston Respublikasi Qashqadaryo viloyati

POLIETILEN SINTEZ QILISH TEXNOLOGIYASI HAMDA UNING AHAMIYATI

Annotatsiya. *Ushbu maqolada polietilen haqida shuningdek, ui sintez qilish jarayoni hamda texnoloiyasi haqida fikr va mulohazalar keltirilgan.*
Kalit so’zlar. *Polietilen, modda, temperature, suyuqlik, plyonka, sintez, texnologiya, termoplast.*

Qalandarov F. A., doctor of philosophy in pedagogical sciences
Karshi State Technical University
Kashkadarya region, Republic of Uzbekistan

POLYETHYLENE SYNTHESIS TECHNOLOGY AND ITS IMPORTANCE

Abstract. *This article presents ideas and observations about polyethylene, as well as the process and technology of its synthesis.*
Keywords. *Polyethylene, substance, temperature, liquid, film, synthesis, technology, thermoplastic.*

Polietilen, politen, polieten [-CH2-CH2-]l - karbozanjirli polimer. Rangsiz, yarim shaffof modda. Suyuqlanish temperaturasi olinish usuliga ko'ra 105-130°, zichligi 920 - 970&kg/m3. Elastikligi va cho'zilishga mustahkamligi yuqori. Ishqorlar, xlorid, sulfat, ftorid va organik kislotalar ta’siriga chidamli; xlor va ftor ta’sirida parchalanadi. 80°dan yuqorida uglevodlar va ularning xlorli hosilalarida eriydi; radioaktiv nurlar ta’siriga chidamli; fiziologik jihatdan zararsiz. Polietilen - jahon miqyosida termoplastlar ishlab chiqarishda birinchi o’rinda turadigan eng arzon polimerlardan biri. Sanoatda 3 xil usulda: etilenni yuqori bosimda (1200-1500 at), o'rtacha bosimda (30-40 at) va past bosimda (1-7 at) polimerlab olinadi. Elektr izolyasiya qoplamalari, plyonkalar, yemiruvchi muhitlardan saqlovchi materiallar, sinmaydigan idishlar va boshqa tayyorlashda qo’llanadi.

Polietilen birinchi marta 1922 yilda Britaniyaning ICI kompaniyasi tomonidan sintez qilingan. 1933 yilda Britaniyaning Bnemen Chemical Industries kompaniyasi etilen yuqori bosim ostida polimerlanib, polietilen hosil qilishi mumkinligini aniqladi. Bu usul 1939 yilda sanoatlashgan va odatda yuqori bosim usuli sifatida tanilgan. 1953 yilda Germaniya Federativ Respublikasidan K.Zigler TiCl4-Al (C2H5)3 katalizator sifatida etilenni pastroq bosimlarda ham polimerlash mumkinligini aniqladi. Ushbu usul 1955 yilda Federal Germaniya kompaniyasi Hoechst tomonidan sanoat ishlab chiqarishiga kiritilgan, odatda past bosimli polietilen sifatida tanilgan. 50-yillarning boshida Amerika Qo'shma Shtatlarining

Filipp Oil kompaniyasi katalizator sifatida xrom oksidi-kremniy alyuminiy gelidan foydalangan holda etilenning o'rta bosim ostida polimerlanishi va yuqori zichlikdagi polietilen hosil qilishini aniqladi va 1957 yilda sanoat ishlab chiqarishiga erishdi. 60-yillarda DuPont. Kanadada etilen va eritmada - olefinlardan past zichlikdagi polietilen ishlab chiqarila boshlandi. 1977 yilda Amerika Qo'shma Shtatlari Union Carbide kompaniyasi va Dow Chemical kompaniyasi past bosimli usulni ketma-ket ravishda past zichlikli polietilenni ishlab chiqarish uchun qo'lladilar, bu chiziqli past zichlikli polietilen deb ataladi, ulardan Union Carbide kompaniyasining gaz fazasi usuli eng muhimi edi. Chiziqli past zichlikli polietilen past zichlikdagi polietilenga o'xshash xususiyatlarga ega, ammo ishlab chiqarishda kam energiya iste'moli bilan birga yuqori zichlikdagi polietilenning ba'zi xususiyatlarini birlashtiradi, shuning uchun u juda tez rivojlandi va eng qiziqarli yangi sintetik materiallardan biriga aylandi. qatronlar.

Past bosimli usulning asosiy texnologiyasi katalizatorda yotadi. Germaniyada Ziegler tomonidan ixtiro qilingan TiCl4-Al (C2H5)3 tizimi poliolefin katalizatorlarining birinchi avlodi bo‘lib, past katalitik samaradorlikka ega va har bir gramm titanga minglab gramm polietilen to‘g‘ri keladi. 1963 yilda Belgiyaning Solvay kompaniyasi tashuvchi sifatida magniy birikmali ikkinchi avlod katalizatorini yaratdi, uning katalitik samaradorligi har bir gramm titan uchun o'n mingdan yuz minglab gramm polietilenni tashkil qiladi. Ikkinchi avlod katalizatorlaridan foydalanish, shuningdek, katalizator qoldiqlarini olib tashlash uchun keyingi ishlov berish zaruriyatini ham yo'q qiladi. Keyinchalik gaz fazasi bo'yicha yuqori samarali katalizatorlar ishlab chiqildi. 1975 yilda Italiyaning Monte Edison Group kompaniyasi uchinchi avlod katalizatori sifatida tanilgan granulyatsiyasiz to'g'ridan-to'g'ri sferik polietilen ishlab chiqaradigan katalizatorni ishlab chiqdi, bu yuqori zichlikdagi polietilen ishlab chiqarishdagi yana bir o'zgarishdir.

O’zbekistonda 2020-yil 1-yanvardan polietilen paketlarni bepul tarqatish taqiqlangandi. Albatta, plastik paketlar ixtirosi oziq-ovqat mahsulotlari do’konlari xaridorlari hayotiga birmuncha yengillik olib kelgan bo’lsa-da, ammo vaqt o’tgach bu paketlar atrof-muhitga qanchalik zarar yetkazishi aniqlandi. Sintetik polimerlarning eng “ko’hna”lari, masalan yoshi 60dan oshganlari ham tabiiy sharoitlarda yo’q bo’lgani yo’q. Pessimistik prognozlarga ko’ra, ularning tabiiy holatda chirishi 400 yilni tashkil qiladi. Okeanni ifloslantiradigan plastiklar esa polietilen bo’laklarini ozuqa sifatida qabul qiluvchi dengiz hayvonlari o’limiga sabab bo’ladi. Butunjahon yovvoyi tabiat jamg’armasi xabariga ko’ra, har yili 100 ming tyulen, kit va dengiz toshbaqalarini xuddi shunday qismat kutadi. O’zbekiston Davlat ekologiya qo’mitasiga manfaatdor vazirlik va idoralar bilan birga xorij tajribasi va jamoatchilik muhokamasini hisobga olib, 2020-yilning 1-yanvariga qadar foydalanish xususiyatini yo’qotganidan so’ng atrof-muhitga zarar yetkazadigan, ishlab chiqariladigan va import qilinadigan tovarlar guruhiga ekologik yig’imni joriy qilish yuzasidan asoslangan takliflar kiritish vazifasi topshirilgan.

Hozirgi kunda dunyo miqiyosida uch xil polietiilen (PE) ishlab chiqarilmoqda: yuqori zichlikdagi PE, past zichlikli PE va past zichlikka ega bo'lgan chiziqli PE. Ularning har birini o'nlab turlari mavjud. Polimerlarning xossalari qo'llanilgan katalizatorlar, zanjirdagi somonomerlarga bog'liq ravishda oz bo'lsada bir-biridan farq qiladi va ishlatish sohasi ham shunga yarasha o'zgarib turadi. Adabiyotlardan ma'limki PE ni olishda quyidagi sintezlarni amalga oshirish mumkun: 1) Etilenni polimerlash yo'li bilan: nC2H4-CH3-CH2-(C2H4)n-2- CH=CH2 2) Diazometandan nCH2N2→CH3-CH2(CH2)n-2-CH=CH2+nN2 3) Vodorod va uglerod (II) oksididan NCO+2nH2→CH2-CH2-(CH2)n-4-CH=CH2+nH2O Sanoatda PE ni ishlab chiqarish faqat birinchi yo'l bilan amalga oshiriladi, chunki bunda hosil bo'lgan mahsulotning tannarxi past, sifati esa yuqori. 2-3- reaksiyalar esa labaratoriya sharoitda yuqori molekulyar parafinlarning fizikaviy xossalari bilan ularni kimyoviy tuzulishini bog'liqligini aniqlash uchun tadqiqot ishlari sifatida o'tkazilgan.

Etilenni nisbatan past molekulali polimeri rus olimi Gustavson tomonidan 1884-yilda olingan bo'lib u suyuq holatda edi. Gustovsonning tajribalardan so'ng yana 50 yil davomida yuqori molekulali PE olish ustida harakatlar qilindi. Ular sintetik surkovchi moylar sifatida ishlatilishi mumkun bo'lganligi uchun sanoat miqiyosida Germaniyada ikkinchi jahon urushi vaqtida ishlab chiqarilgan. 1933-1936-yillarda ingliz tadqiqotchilari Fosett va Djibson va sovet olimi A.I.Dintsesslar bir-biridan bexabar 1000 atom. bosim, 2000 C haroratda va katalizator sifatida oz miqdorda kislorodni qo'shib yuqori yuqori molekulali qattiq polimerni olishga muvaffaq bo'ldilar.

Polietilen uglerod va vodorod atomlaridan tashkil topgan oddiy uglevodorod polimeridir. Uning asosiy zanjiri–CH_2–CH_2–birikmalaridan iborat bo‘lib, bu zanjirlar uzunligi va tarvaqaylab ketish darajasiga qarab farqlanadi. Polietilenning xususiyatlari uning molekulyar massasi, zichligi va kristallanish darajasiga bog‘liq. Polimerning zichligi va kristallanishi esa ishlab chiqarish jarayonida qo‘llaniladigan katalizatorlar va sharoitlarga bog‘liqdir.

Polietilen odatda uchta asosiy toifaga bo‘linadi:

Yuqori zichlikdagi polietilen (PE-HD): Zanjirlarning minimal tarmoqlanib ketishi va yuqori kristallanish darajasi tufayli qattiq va mustahkam xususiyatga ega. Zichligi 0,94–0,97 g/sm³ oralig‘ida bo‘ladi.

Past zichlikdagi polietilen (PE-LD): Ko‘proq tarmoqlanib ketgan zanjirlarga ega bo‘lib, kristallanish darajasi past. Zichligi 0,91–0,94 g/sm³ oralig‘ida joylashgan.

Chiziqli past zichlikdagi polietilen (PE-LLD): Tarmoqlanib ketish darajasi LDPE ga qaraganda kamroq, ammo HDPE ga qaraganda moslashuvchanroq. Bu xususiyat uni maxsus qadoqlash materiallarida qo‘llashga yaroqli qiladi.

Polietilen etilenning polimerizatsiya jarayoni orqali sintezlanadi. Etilen odatda neft va gazni qayta ishlash jarayonida olinadi. Polimerizatsiya jarayoni bir necha usulda amalga oshirilishi mumkin:

Yuqori bosimli polimerizatsiya: Bu usul asosan LDPE ishlab chiqarishda qo‘llaniladi. Jarayon 1000–3000 atm bosim va 200–300°C haroratda organik peroksidlar kabi erkin radikallar ishtirokida sodir bo‘ladi. Yuqori bosim tufayli zanjirlarning tarmoqlanib ketishi ko‘p bo‘ladi.

Past bosimli polimerizatsiya: HDPE va LLDPE ishlab chiqarishda Ziegler-Natta katalizatorlari yoki metallocen katalizatorlari qo‘llaniladi. Bu usul 1–100 atm bosimda va 70–150°C haroratda amalga oshiriladi, natijada zanjirlarning chiziqli tuzilishi saqlanadi.

Gaz fazali polimerizatsiya: Bu zamonaviy usul bo‘lib, energiya tejamkorligi va yuqori sifatli mahsulot olish imkonini beradi.

Polietilen sintez qilish texnologiyasi, asosan, ikki asosiy jarayon orqali amalga oshiriladi: birinchi jarayon – polimerizatsiya, ikkinchi jarayon esa – katalitik polimerizatsiyadir. Polietilen, ehtimol, eng keng tarqalgan plastik materiallaridan biri bo'lib, uning ko'plab turli turlari mavjud: past zichlikli polietilen (LDPE), yuqori zichlikli polietilen (HDPE) va liniyali yuqori zichlikli polietilen (LLDPE).

1. Polimerizatsiya jarayoni

Polietilen sintezining asosiy jarayoni etilen gazidan boshlanadi. Etilenning polimerizatsiyasi quyidagi usullar bilan olib boriladi:

a. Boshlanuvchi agentlar:

- Radikal usuli: Bu usulda etilen molekulalari radikallar yordamida birlashadi.

- Katalitik usul: Bu metodda metallocen yoki Ziegler-Natta katalizatorlari ishlatiladi.

b. Sharoitlar:

- Harorat: 60°C dan 300°C gacha

- Bosim: 1 bar dan 3000 bar gacha

2. Katalitik Polimerizatsiya

Katalitik polimerizatsiya jarayoni ko'pincha yuqori sifatli polietilen olish uchun ishlatiladi va bu jarayonda maxsus katalizatorlar qo'llaniladi:

a. Ziegler-Natta Katalizatori:

Bunday katalizatorlar etilenni yuqori zichlikdagi polietilenga aylantirish uchun ishlatiladi.

b. Metallocene Katalizatori:

Metallocene katalizatordan foydalanish orqali qattiq va silliq tuzilmaga ega bo'lgan liniyali yuqori zichlikdagi polietilen ishlab chiqariladi.

3. Sintez qilish texnologiyasi

Polietilenni ishlab chiqarish jarayonida quyidagi bosqichlarni o'z ichiga oladi:

1. Etilen tayyorlash: Etilen odatda neft yoki gazdan kraklash orqali olinadi.

2. Polimerizatsiya: Etilen monomerlarini radikal yoki katalitik usullar yordamida polymerlash.

3. Tugallangan mahsulotni qayta ishlash: Olingan polietilen granula yoki boshqa shakllarga keltirilishi mumkin.

4. Mahsulotni tozalash va qadoqlash: Tayyorlangan mahsulotlarni tozalash va qadoqlash — bu oxirgi bosqichdir.

Xulosa qilib aytganda polietilen sintez qilish texnologiyasi zamonaviy kimyo sanoatining muhim qismidir va keng qo'llaniladigan turli xil mahsulotlarning tayyorlanishida muhim ahamiyatga ega. Turli xil metodlar va sharoitlarni qo'llagan holda, ishlab chiqaruvchilar turli xildagi xususiyatlarga ega bo'lgan polietilen turlarini yaratishi mumkin.

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Qo‘chqorov G‘. F.
professori
Qarshi davlat universiteti
O’zbekiston

MEHNAT RESURSLARIDAN SAMARALI FOYDALANISHGA TA’SIR ETUVCHI OMILLAR

Annotatsiys: *Ushbu maqola milliy iqtisodiyot tarmoqlarida mehnat resurslaridan samarali foydalanish imkoniyatlari aniqlashga bag’ishlanadi. Qishloq xo‘jaligi ishlab chiqarish tarmoq korxonalarida mehnat resurslaridan foydalanish va unga ta’sir etuvchi omillar o’rganilgan.*

Kalit so’zlar: *Mehnat resurslari, bandlik, ish vaqti, ish soati, texnologiya innovatsiya, omillar.*

Kuchkarov G. F.
professor
Karshi State University
Uzbekistan

FACTORS AFFECTING THE EFFECTIVE USE OF LABOR RESOURCES

Abstract: *This article is dedicated to identifying the possibilities of efficient use of labor resources in the sectors of the national economy. The use of labor resources at agricultural production enterprises and the factors influencing it were studied.*

Keywords: *Labor resources, employment, working hours, working hours, technology, innovation, factors.*

Respublikada hozirgi milliy iqtisodiyot sharoitida qishloq xo‘jaligi ishlab chiqarish tarmoq korxonalarida mehnat resurslaridan foydalanish darajasini aniqlash ma’lum qiyinchiliklar bilan bog‘liq. Qishloq xo‘jaligi ishlab chiqarish subyektlarida mehnat resurslaridan foydalanish darajasini aniqlash eng dolzarb muammo deb hisoblash mumkin. Mehnat resurslaridan foydalanish darajasini qanday usul bilan aniqlash mumkin.

Qishloq xo‘jaligi tarmoqlarida mehnat resurslaridan samarali foydalanish imkoniyatlaridan biri mehnatni mavsumiyligi davrini qisqartirish hisobiga ulardan yil davomida barqaror foydalanilishiga erishish mumkin. Demak mehnat resurslaridan samarali foydalanishni asosiy yo‘li mehnat qilishning mavsumiylik darajasini qisqartirish hisoblanadi. Mehnatni mavsumiylik davrini qisqartirish hisobiga mehnat resurslarining ish kunlari bandligini oshirishga erishish mumkin.

Biz yuqorida keltirgan fikrlarini to‘liq tushunish uchun uni misolda ifodalaymiz. Masalan mehnat resurslarini mehnat jarayonida ularni bandligini bir

yilda 2586 ming soat deb belgilasak keyingi yilda bu ko‘rsatkich 2106 ming soatni tashkil etgan bo‘lsa, bandlikni aniqlashda umumiy bir yildagi ish kunini o‘rtacha 290 deb hisoblasak, bir yil ichida ish soatini aniqlashda 2586 ming. ish soatini 2106 ming ish soatiga teng bo‘lgan bo‘lsa ikki yil ichida ish kuni soati 8,9 soat 7,2 soatga yoki 1,7 soatga kamayganini ko‘rish mumkin.

Bu ko‘rsatkich mehnat unumdorligini umumiy holatini ifodalovchi ko‘rsatkich deb hisoblasak to‘g‘ri bo‘ladi. Chunki ish kuni soatini 1,7 soatga kamayishi mehnat unumdorligidan samarali foydalanayotganini ko‘rsatadi. Bu iqtisodiy xolatda tejalgan mehnat resurslaridan foydalanish samaradorligini aniqlash uchun ishlab chiqarish xajmini kengaytirish yoki ortiqcha mehnat resurslaridan boshqa tarmoq sohalarida foydalanish zarur.

Qishloq xo‘jaligi ishlab chiqarishida mehnat resurslaridan samarali foydalanishni asoslovchi ko‘rsatkichlaridan biri jon boshiga yoki ish kuni soatiga natural va qiymat shaklida yalpi mahsulot ishlab chiqarish orqali aniqlash mumkin. Kishi boshiga yoki ish soatiga qishloq xo‘jaligi mahsulotlarini ishlab chiqarish tarmoq tarkiblarini o‘zgarishiga ham bog‘liq. Agarda serhosil va xarid qilish qiymati yuqori bo‘lgan o‘simlikshunoslik tarmog‘ida o‘simlik ekilsa va yetishtirilsa albatta u kishi boshiga yoki ish kuni soatiga nisbatan mahsulot ishlab chiqarish qiymatini o‘sishiga ta’sir etadi. Shu bilan birga o‘simliklarning xosildorligini oshirish bilan bog‘liq bo‘lgan agrotexnik shart-sharoitlarni tashkil etishga e’tibor berishni kuchaytirish zarur deb hisoblaymiz. Agrotexnik tadbirlarni amalga oshirish kishi boshiga yoki ish soatiga mahsulot ishlab chiqarishda qishloq xo‘jaligida o‘simlikshunoslik tarmoqlarida ularni joylashtirishda agrotexnik tadbirlarni amalga oshirish nuqtai nazaridan e’tiborga olish bilan birga mehnat haqlarini to‘lashda xar bir mehnat resurslarini yakuniy bajargan ishi natijalarini e’tiborga olish zarur deb hisoblaymiz. Mehnat resurslaridan samarali foydalanishga ta’sir etuvchi omillarni quyidagi: texnik-texnologik omillarga, tashkiliy omillarga, iqtisodiy-ijtimoiy omillarga, tarkibiy omillarga va tabiiy omillarga bo‘lish mumkin. Bu omillarni o‘rganish asosida qishloq xo‘jaligida mehnat resurslaridan samarali foydalanish yo‘lini belgilab olish mumkin.

Mehnat resurslaridan foydalanishga ta’sir etuvchi omillar umumiy majmua shaklida mehnat unumdorligiga o‘z ta’sirini o‘tkazadi qachonki ishlab chiqarishning asosiy omili bo‘lgan inson mehnatini to‘g‘ri tashkil qilib uning tadbirkorlik darajasini oshirishni o‘zaro bog‘liqlikda olib borilsa.

Qishloq xo‘jaligi ishlab chiqarishida mehnat resurslaridan samarali foydalanishda agrotexnologik talablar asosida bajariladigan ishlarini og‘ir, yengil, oddiy va murakkabligiga qarab mehnat qilish normativlariga asosan band bo‘lgan mehnat resurslarini manfaatdorlik talablari darajasiga mos kelsagina ularning mehnatlarini unumdorlik darajasi yuqori bo‘lishi mumkin.

Bozor munosabatlari sharoitida bo‘ladigan ishlab chiqarishni tarkibiy tuzilishini bozor talablari asosida takomillashtirib borish talab va taklifga asoslangan xoldagina band bo‘lgan mehnat resurslaridan samarali foydalanishga, ishlab chiqarish unumdorligini o‘sib borishiga o‘z ta’sirini o‘tkazadi. Qishloq xo‘jaligi ishlab chiqarish tarmoq tarkiblarining o‘zgarishi obyektiv ravishda

iste’mol bozori talablari asosida amalga oshirilishi umumiy ijtimoiy mehnat xarajatlarini kamaytirishga iqtisodiy-ijtiomiy yo‘nalishda qishloq xo‘jaligini barqaror rivojlanishini ta’minlaydi. Buning uchun :

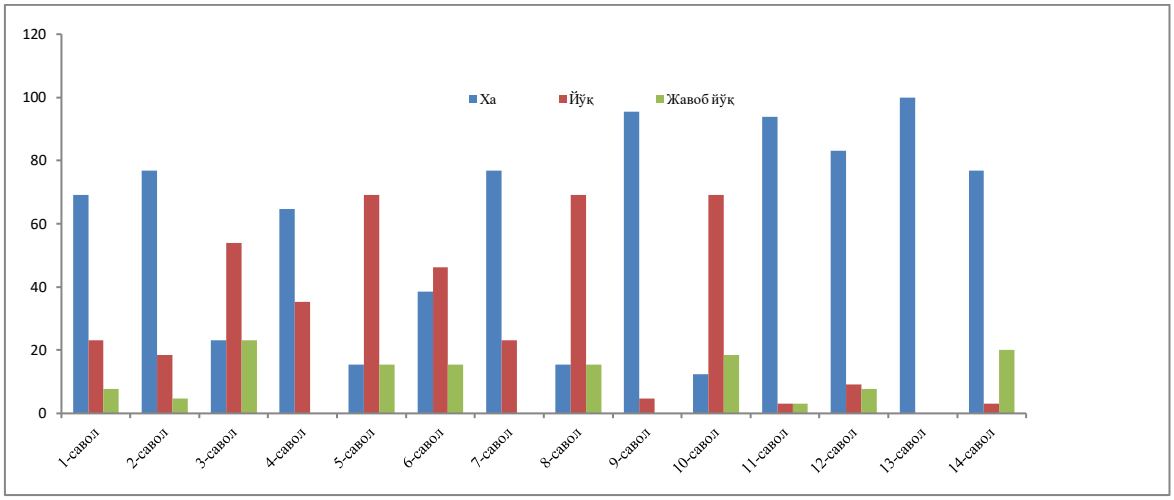
- qishloq xo‘jaligi ishlab chiqarishda uning tarkibiy tuzilishi na faqat tarmoqlar o‘rtasida emas balki dehqon va fermer xo‘jaliklari o‘rtasida ichki xo‘jaliklari o‘rtasida ham bo‘lishiga;

- xo‘jaliklar darajasida ishlab chiqarilgan mahsulotni yakuniy iste’mol va yalpi jamg‘arma darajasida bo‘lishiga;

- texnik-iqtisodiy yo‘nalishda esa qishloq xo‘jaligi tarmoqlari yoki ishlab chiqarish korxonalari yo‘nalishlariga qarab tarmoqlar nisbatini ishlab chiqarish jarayonini mexanizatsiyalash, elektr quvvatlaridan foydalanish, ularni asosiy ishlab chiqarish fondlari bilan ta’minlash yoki ishlab chiqarishni yiriklashtirish va ixtisoslashtirish asosida amalga oshirish mumkin.

Qashqadaryo viloyati Kasbi tumani fermer xo‘jaliklarida ishlab chiqarish va ularning samaradorligini oshirish bo‘yicha 14 savolga asosan
65 ta fermer xo‘jaliklarida 2023 yil oktabrda so‘rovnoma o‘tkazildi. So‘rovnomada qatnashgan 65 ta fermer xo‘jalik rahbarlarining 60,1 foizi berilgan savollarga “xa” deb javob bergan, 30,5 foizi “yo‘q” deb, kolgan 9,4 foizi javob bermagan.

So‘rovnomada fermer xo‘jaligi xo‘kuqiy jihatdan to‘liq ta’minlangan savoliga 69,2 foiz, faoliyatini olib borishda yuqori mahaliy tashkilotlar bilan kelishish shartmi savoliga 76,9 foiz, xo‘jaligi ishchilarini yer normativlari asosida ishga qabul qilishga 23,0 foiz, investitsiya mablag‘i yetishmaganda xo‘jalik a’zolari mablag‘laridan foydalanishga 64,6 foiz, kredit tulovlariga belgilangan foiz 15,3 foiz, qishloq xo‘jaligi maxsulotlarini iste’mol bozoriga chiqarishda davlat va nodavlat korxonalari bilan shartnoma tuzishga 38,4 foiz, qishloq xo‘jaligi maxsulotlarini sanoat asosida qayta ishlashga 76,9 foiz, fermer ishlab chiqarishni tashkil etish uchun qishloq xujaligi mutaxassislarning zarurligiga 15,3 foiz, oliy malakali mutaxassis kadrlar tayyorlash fondini tashkil etishga 95,3 foiz, fermer xo‘jalik oila a’zolarini sihat salomatligini ta’minlash mahsus sog‘liqni saqlash fondini tuzishga 12,3 foiz, xo‘jalik yillik faoliyati bo‘yicha xo‘jalik rahbari hisobotini tinglash va baho berishga 83,0 foiz, fermer xo‘jaligida ishlab chiqarishni klaster usulida tashkil etishga 83 foiz, fermer xo‘jaliklararo mashina, traktor va qishloq xo‘jaligi texnikalari bilan ta’minlashga bilan bog‘liq bo‘lgan korxonalar zarurligiga 100 foiz, fermer xo‘jaliklarida mehnatni natural va qiymat shaklida motivatsiyalashga 76 foiz respondentlar ijobiy munosabat berilgan. Qolgan savollarga yo‘q yoki munosabat bildirilmagan.Umuman xulosa qiladigan bo‘lsak fermer xo‘jaliklarini malakaviy, iqtisodiy-ijtimoiy va kasbiy darajalarini davlatning iqtisodiy va ijtimoiy siyosatidan kelib chiqan xolda oshirib borish zarur.



1-rasm. Fermer xo‘jaliklarida ishlab chiqarish va ularning samaradorligini oshirish bo‘yicha so‘rovnoma tahlili

Fermer xo‘jaliklarida ishlab chiqarish va ularning samaradorligini oshirish bo‘yicha so‘rovnoma savollari ilovada keltirilgan. Umuman xulosa qiladigan bo‘lsak fermer xo‘jaliklarini malakaviy, iqtisodiy-ijtimoiy va kasbiy darajalarini davlatning iqtisodiy va ijtimoiy siyosatidan kelib chiqan xolda oshirib borish zarur.

Qishloq xo‘jaligida mehnat resurslarini ishlab chiqarish talabiga nisbatan ortiqligini oldini olish, uni yumshatish uchun quyidagi ishlarni amalga oshirish zarur:

- qishloq xo‘jaligi tarmoqlarida ishlab chiqarishni samarali olib borish uchun zarur bo‘lgan mehnat resurslarini xar ish kuchiga belgilangan yer maydonidan kelib chiqqan xolda tashkil etishga;
- mehnat resurslaridan samarali foydalanishni ta’minlash uchun qishloq xo‘jaligi mahsulotlarini sanoat asosida qayta ishlab chiqarish kichik korxonalarni tashkil etishni rivojlantirishga;
- qishloq xo‘jaligida o‘simlikshunoslik tarmoqlarida ayollar mehnatidan xizmat ko‘rsatish sohalarida foydalanish hisobiga erkaklardan foydalanish nisbatini oshirishga e’tibor berish zarur.

Qishloq xo‘jaligi tarmoqlarida mehnat resurslaridan foydalanish imkoniyatlari yetarli darajada bo‘lib ular quyidagilardan tashkil topadi:

- qishloq xo‘jaligi mehnatini og‘ir va murakkab mehnat ekanligini tan olgan xolda mehnatga yaroqli ayollar mehnatidan mutaxassilar sifatida foydalanish yoki boshqa yengil ishlab chiqarish sohalarida foydalanish zarur;
- ayollar mehnatlaridan foydalanishni ta’minlash uchun qishloq xo‘jaligi mahsulotlarini qayta ishlab chiqarish korxonalarini qishloq joylarida tashkil etish va ularni rivojlantirish zarur;
- ayollar mehnatlaridan chorvachilik fermalarida yoki qishloq xo‘jaligi tarmoqlarida ishlab chiqarish bo‘limlarida hisob-kitob ishlarini olib borishda foydalanish maqsadga to‘g‘ri bo‘ladi;

- ayollar mehnat resurslaridan samarali foydalanishni ijtimoiy sohalarda zarur bo‘lgan madaniy –ma’naviy va maishiy shart-sharoitlarni yaratish asosida amalga oshirish mumkin.

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Qo‘chqorov G‘.F.
professori
Qarshi davlat universiteti
O’zbekiston

MEHNAT RESURSLARI SHAKLLANISHINING SIFATINI OSHIRISH YO‘NALISHLARI

Annotatsiya: *Ushbu maqolada milliy iqtisodiyot rivojlanishining innovatsion shakliga o‘tish sharoitida mehnat resurslarining sifat ko‘rsatkichlariga bo‘lgan talab oshadi. Mehnat resurslarining asosini tashkil etuvchi mehnatga layoqatli aholiga xos bo‘lgan xususiyat ularning takror barpo bo‘lishining barcha bosqichlarida o‘z-o‘zini rivojlantirib, takomillashtirib borishidir. Innovatsion iqtisodiyot sharoitida esa mehnat resurslari sifatining iqtisodiy qiymati oshib borishi yoritilgan.*

Kalit sozlar*: Mehnat resurslari, rivojlantirish, shakillantirish, innovatsiya, ta’lim, sog’likni - saqlash, bandlik, samarali foydalanish.*

Kuchkarov G. F.
professor
Karshi State University
Uzbekistan

DIRECTIONS FOR ENHANCING THE QUALITY OF LABOR RESOURCE DEVELOPMENT

Abstract: *In this article, the demand for quality indicators of labor resources increases in the context of the transition to an innovative form of national economic development. A characteristic feature of the working-age population, which forms the basis of labor resources, is their self-development and improvement at all stages of reproduction. In the context of an innovative economy, the increase in the economic value of the quality of labor resources is highlighted.*

Keywords: *Labor resources, development, formation, innovation, education, healthcare, employment, effective use.*

Iqtisodiyot rivojlanishining innovatsion shakliga o‘tish sharoitida mehnat resurslarining sifat ko‘rsatkichlariga bo‘lgan talab oshadi. Mehnat resurslarining asosini tashkil etuvchi mehnatga layoqatli aholiga xos bo‘lgan xususiyat ularning takror barpo bo‘lishining barcha bosqichlarida o‘z-o‘zini rivojlantirib, takomillashtirib borishidir. Innovatsion iqtisodiyot sharoitida esa mehnat resurslari sifatining iqtisodiy qiymati oshib boradi. Ishlab chiqarish jarayonining doimiy yangilanishi va takrorlanishining asosiy sharti nafaqat ishlab chiqarish jarayonida foydalanilgan ishlab chiqarish vositalarini tiklash, balki foydalanilgan ishchi

kuchini ham tiklash va takror barpo bo‘lishini taqozo etadi. Mehnat resurslarining takror barpo bo‘lish jarayoni ularning miqdor ko‘rsatkichlari bilan bir qatorda sifat ko‘rsatkichlarining ham doimiy ravishda yangilanib turish jarayonini nazarda tutadi.

- Mehnat resurslarining sifatini ifodalovchi ko‘rsatkichlar quyidagilarni o‘z ichiga oladi:
- Mehnat resurslarining alohida jihatlarini baholovchi ko‘rsatkichlar (ta’lim darajasi, salomatlik darajasi, aholining daromad ko‘rsatkichlari);
- Mehnat resurslarini umumlashtirgan holda baholovchi integral ko‘rsatkichlar (BMT tomonidan ishlab chiqilgan “Inson taraqqiyoti indeksi”, Jahon iqtisodiy forumi tomonidan hisoblanadigan “Inson kapitali indeksi”).

Ta’lim bilan birga aholining salomatligi ham mehnat resurslarining sifatini shakllantiruvchi omildir. Salomatlik ta’lim kabi mehnat resurslarining taklifini belgilab berish orqali iqtisodiy o‘sishni ta’minlashda muhim omillar qatoridan joy olgan (G. Becker (1964), D.Weil (2014)).

Salomatlik inson qobiliyatlari va bilimini rivojlantirish va yuzaga chiqarishda muhim omil sifatida yuzaga chiqadi. Inson egalik qilgan bilim, malaka va qobiliyatlari yig‘indisi uning mehnat unumdorligini va shuningdek, uning mehnatiga bo‘lgan talabni belgilab beradi. Inson salomatligining yomonlashuvi uning qobiliyatlari, bilim va malakasini namoyon qilishiga to‘sqinlik qilishi mumkin, yaxshi salomatlik esa iqtisodiy faollikni oshirib, iqtisodiy o‘sishga o‘z hissasini qo‘shish imkonini beradi. Shu bilan birga salomatlikning yomonlashuvi ishchining ishlagan soat xajmini tushirib, mehnat unumdorligini pasaytiradi va o‘z navbatida qo‘shimcha natijaning yo‘qotilishiga olib keladi..

Umuman olganda, fikrimizcha mehnat resurslarining sifati haqida gap borganda inson kapitali tushunchasi orqali tahlil qilish mantiqan to‘g‘ri bo‘ladi. Chunki “mehnat resurslari” va “inson kapitali” tushunchalarining mohiyatlari tadqiq etish natijasida “inson kapitali” “mehnat resurslari”ning aynan sifatini ifodalovchi iqtisodiy kategoriya sifatida amal qilishi ma’lum bo‘lgan.

«Inson kapitali» nazariyasining asoschilari insonga yo‘naltirilgan investitsiyaning asosiy shakllari sifatida ta’lim, ish joyida malaka oshirish (on – the job training), tibbiy xizmat, migratsiya, narx va daromad haqida ma’lumot izlash, bolalarning tug‘ilishi va ularning tarbiyasi kabilarni ko‘rsatishadi.

– ta’lim va kasbga tayyorgarlik insonning bilim darajasini oshiradi, ya’ni inson kapitali hajmini oshiradi;

– sog‘liqni saqlash kasallik va o‘limni qisqartirib insonning xizmat qilish muddatini oshiradi;

– migratsiya va ma’lumot izlash, ishchi kuchining mehnatga yuqoriroq to‘lanadigan, ya’ni inson kapitali qiymati yuqoriroq bo‘lgan joylarga va tarmoqlarga harakatlanishiga sabab bo‘ladi;

– bolalarning tug‘ilishi va tarbiyasi mehnat resurslarining kelajak avlodda «takror barpo bo‘lishiga» sabab bo‘ladi.

Mamlakatda mavjud mehnat resurslarini shakllantirish va rivojlantirish nuqtai nazaridan ta’lim sohasiga xarajatlar bilan bir qatorda sog‘liqni saqlash

xarajatlarini bir xil darajada shakllantirish tavsiya etiladi. Jahon sog‘liqni saqlash tashkilotining tavsiyalariga ko‘ra mamlakatda millat salomatligini yaxshilash va saqlash maqsadida sog‘liqni saqlash tizimini davlat tomonidan moliyalashtirilishi YAIMning 5-6%dan kam bo‘lmagan miqdorda o‘rnatilishi zarur. O‘zbekistonda sog‘liqni saqlashga ajratiladigan umumiy xarajatlar miqdori 4%dan oshiq bo‘lib, sog‘liqni saqlash tizimining davlat tomonidan yetarli darajada moliyalashtirilmasligi aholining individual xarajatlari tomonidan qoplanadi.

1-jadval

O‘zbekistonning inson taraqqiyoti indeksi bo‘yicha o‘zgarish tendensiyalari[44]

Ko‘rsatkich	***1998***	***2000***	***2003***	***2004***	***2010***	***2013***	***2014***	***2025***
ITI ko‘rsatkichi	0.686	0.727	0,694	0,696	0.617	0.661	0.69	0.74
ITI reytingi bo‘yicha o‘rni	106	95	111	113	102	116	114	107
Tug‘ilganda kutilayotgan umr davomiyligi		69	66,5	66,6	68,2	68.2	68,4	75,1
Ta’limning o‘rtacha davomiyligi*	-	-	-	-	10,0	10.0	10,9	12,2
Kutilayotgan ta’lim davomiyligi*	-	-	-	-	11,5	11,5	11,5	12
Jon boshiga YAMD (AQSH doll. SOP)		2441**	1744**	1869**	3085	5227	5567	5748
Reytingda ishtirok etgan umumiy davlatlar soni		173	177	177	182	187	188	188

* - 2010 yilda Inson taraqqiyoti indeksini hisoblash uslubiyotiga o‘zgartirish kiritilgan. Ungacha ta’lim indeksi aholining savodxonlik darajasi va oliy ta’lim bilan qamrov ko‘rsatkichlari asosida hisoblangan.

* - 2010 yilgacha aholining turmush darajasi indeksi aholi jon boshiga YAIM orqali hisoblangan.

Ishlab chiqilgan inson kapitali indeksi uzoq muddatli va keng qamrovli yondashuvni ifodalab, mamlakatda avval amalga oshirilgan tadbirlar natijasi sifatida aks etuvchi o‘lchovlar orqali mamlakat inson kapitali holatini aniqlash bilan birga, kelajakda ishchi kuchi shaklini oluvchi bugungi yosh avlodga ta’sir ko‘rsatuvchi strategik qarorlar natijasi sifatida ko‘rsatkichlarni o‘z ichiga oladi.

Ushbu ma’ruzada taqdim etilgan inson kapitalini baholash uslubi shu paytgacha qo‘llanilgan uslubiyotlarga qaraganda kengroq ko‘rsatkichlar ko‘lamini qamrab olgan bo‘lib, to‘rt yo‘nalish bo‘yicha: ta’lim va kasbiy tayyorgarlik,

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sog‘liqni saqlash va salomatlik, mehnat resurslari va bandlik, shuningdek, so‘nggisi yuqoridagilarning yuqori qiymatga aylanishiga asos yaratuvchi va inson kapitalining samarali amal qilishini ta’minlovchi «qulay muhit» ko‘rsatkichlari bo‘yicha baholangan. Indeks jami 51 ta ko‘rsatkich bo‘yicha hisoblanib, ularning 12 tasi ta’lim yo‘nalishi, 14 tasi salomatlik, 16 tasi ishchi kuchi va bandlik va 9 tasi institutsional muhit yo‘nalishi doirasida belgilangan. Ko‘rsatkichlar Jahon sog‘liqni saqlash tashkiloti, YUNESKO va Xalqaro mehnat tashkiloti kabi xalqaro tashkilotlar tomonidan taqdim etilgan ommaviy ochiq obyektiv statistik ma’lumotlar shuningdek, ularga qo‘shimcha ravishda asosan sifat ko‘rsatkichlarni ifodalovchi jahon iqtisodiy forumining jamoat fikrini o‘rganish so‘rovlari natijalari va Gallup ning salomatlik borasidagi so‘rov natijalari asosida shakllantirilgan.

Ta’lim yo‘nalishidagi ko‘rsatkichlar ta’limning barcha bosqichlarining miqdor va sifat jihatlarini aks ettiruvchi ko‘rsatkichlarni o‘z ichiga olgan.

Sog‘liq va salomatlik yo‘nalishidagi ko‘rsatkichlar ijtimoiy-madaniy, jo‘g‘rofiy, atrof-muhit va salomatlikning fiziologik omillarining inson kapitalining rivojlanishiga qanchalik ta’sir ko‘rsatishini ifodalovchi o‘lchovlarni o‘z ichiga olgan. Hayot yo‘nalishi yondashuviga asoslangan bo‘lib, kelajak ishchi kuchi salomatligiga asos bo‘luvchi ilk rivojlanish ko‘rsatkichlari bilan birga joriy ishchi kuchining qobiliyati va unumdorligiga ta’sir ko‘rsatuvchi yuqumli va yuqumsiz kasalliklar bilan kasallanish ko‘rsatkichlarini o‘z ichiga oladi.

Uchinchi yo‘nalish mehnat resurslari va bandlik doirasidagi ko‘rsatkichlarni qamrab olgan.

Yuqoridagi uchta yo‘nalishdagi ko‘rsatkichlar bilan bir qatorda indeksni hisoblashda mamlakatda mavjud inson kapitali o‘zini to‘liq namoyon eta olishi uchun shart-sharoitlarning mavjudligini ifodalovchi “Institutsional muhit” yo‘nalishidagi ko‘rsatkichlar kiritildi.

O‘zbekiston xalqaro miqyosda tan olingan yuqori ta’lim ko‘rsatkichlarga egaligi, shuningdek, sog‘liqni saqlash sohasidagi islohotlar natijasida salomatlik bilan bog‘liq ko‘rsatkichlarning yaxshilanishi mamlakatning reytingda munosib o‘rin egallashiga asos bo‘ladi.

Mehnat resurslarining sifatiga ta’sir ko‘rsatuvchi va uning oshishiga xizmat qiluvchi omillarni tadqiq etish natijasida mehnat resurslarining sifatini oshirishning quyidagi yo‘nalishlari aniqlandi:

- ta’lim tiziminingbarcha bosqichlarida ta’lim sifatini oshirish mezonlarini ishlab chiqish;
- malaka oshirish, ishga muhtoj kishilarni kasbga tayyorlash tizimini yanada takomillashtirish;
- sog‘liqni saqlash tizimining aholining barcha tabaqalari uchun imkonliligini va sifatini oshirish;
- sog‘liqni saqlash tizimining muqobil shakllarini rivojlantirish va tibbiy sug‘urta tizimini keng joriy etish;
- aholi orasida sog‘lom turmush tarzi olib borish bo‘yicha tarqibot va tashviqot ishlarini olib borish;

- mehnat qilish sharoitlarini yaxshilash, shuningdek mehnat faoliyati jarayonida jarohatlanish holatlarini qisqartirish;
- kishilarning ijtimoiy-maishiy turmushini yaxshilash, jumladan turar joylarni obodonlashtirish va ularning moddiy ta’minlanganlik darajasini oshirish.

Xulosa qilib aytganda, mehnat resurslari shakllanishi sifatini oshirish iqtisodiy o‘sishning muhim omili bo‘lib, u inson kapitaliga investitsiyalar samaradorligini bevosita belgilaydi. Ta’lim va kasbiy tayyorgarlikning mehnat bozori talablari bilan uyg‘unlashuvi, sog‘liqni saqlash va migratsiya siyosatining muvofiqlashtirilishi hamda bandlik institutlarining rivojlanishi mehnat unumdorligini oshirib, ishlab chiqarish xarajatlarini kamaytiradi. Natijada, iqtisodiyotning raqobatbardoshligi kuchayadi, yuqori qo‘shilgan qiymat yaratiladi va barqaror ijtimoiy-iqtisodiy rivojlanish uchun mustahkam zamin yaratiladi.

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Qurbonova B. R.
o‘qituvchisi
maktabgacha va boshlang‘ich ta’lim nazariyasi va amaliyoti kafedrasi
Chirchiq davlat pedagogika universiteti

ULUG‘BEK HAMDAMNING “NA’MATAK” ROMANINI TAHLIL QILISH METODIKASI

Annotatsiya: *Maqolada Ulug‘bek Hamdam ijodining yana bir romanidagi davr yangilanishi o‘zgarishlar, qahramonlar taqdirini aks ettirgan o’ziga xos jihatlari tahlilga tortilgan. Bunda yozuvchining “Na’matak” asari asosida badiiy tahlil qilish orqali ijodkor mahoratini ochib berilgan. Uch avlodning bir na’matak o‘simligi orqali uch xil taqdir haqida ma’lumot beriladi. Zero, bu dunyoda insonning taqdiridan qiziqroq narsaning o‘zi yo‘q.*

Kalit so’zlar: *Na’matak, avlod, taqdir, yoshlik, adovat, janjal, devor, o‘spirin, do‘stlik, dushmanlik, qirg‘inbarot, o‘tmish.*

Qurbonova B. R.
lecturer
department of theory and practice of preschool and primary education
Chirchiq State Pedagogical University

METHODOLOGY FOR ANALYZING ULUG‘BEK HAMDAM’S NOVEL “NA’MATAK”

Abstract: *The article analyzes the distinctive aspects of one of Ulug‘bek Hamdam’s novels that reflect the period of renewal and change, as well as the destinies of the characters. Based on the writer’s work “Na’matak,” the author’s creative mastery is revealed through literary analysis. The novel presents three different destinies of three generations through a single na’matak plant. Indeed, in this world, there is nothing more intriguing than a person’s fate.*

Keywords: *Na’matak, generation, fate, youth, enmity, quarrel, wall, adolescent, friendship, hostility, massacre, past.*

Kirish

Bugungi kunda o‘zbek adabiyoti vakillari orasida Ulug‘bek Hamdam o‘zining sermazmun roman va hikoyalari bilan xalq og‘iziga tushgan yozuvchilardan biridir. Ulug‘bek Hamdam zamonaviy o‘zbek adiblari orasida asarlari boshqa tillarga ko‘p o‘girilayotgan va O‘zbekistondan tashqarida e’tirof etilayotgan oz sonli ijodkorlardan biridir. Zamonaviy davr adabiyotining yirik namoyondasi bo‘lmish Ulug‘bek Hamdamning “Na’matak” mini romani bugungi kunimizda sevib o‘qilayotgan asarlardan biridir. Davr va adabiyot g‘oyat murakkab muommodir. Chunki, zamonning asosiy belgisi uning tinimsiz harakatdaligi, o‘zgarib turishi bo‘lsa, asl adabiyotning bosh xususiyati uning

tinimsiz harakatdaligi ,o‘zgarib turishi bo‘lsa, asl adabiyotning bosh xususiyati uning o‘zi yaratilgan zamonga qaraganda ko‘proq yashashga intilishi, barqarorroq bo‘lishga urinishdir”[45].Ulug‘bek Hamdam ijodi yangilikka, yangilanishlarga boy. Na’matak asari juda yaxshi asar sifatida baholandi. Buning asl sababi uning hajmi qisqa. Ammo, bu asar ma’no jihatidan keng maydonni egallagan. Badiiy adabiyot ijtimoiy ong shakli sifatida tarixiy taraqqiyot qonunlariga bo‘ysunadi. Jamiyatda yuz bergan o‘zgarishlar badiiy adabiyotda ham o‘zgarishlarni keltirib chiqaradi. Biror badiiy asarning tasvir nozikligini obrazlar tizimini to‘g‘ri tushunmoq, tili , jozibasini his etmoq uchun shu asar yaratilgan davr badiiy tafakkuriga xos xususiyatlarini bilish kerak bo‘ladi. Ulug‘bek Hamdam ham hozirgi davrga moslashtirilgan holda yozgan asarlarini o‘quvchilarga ancha tushunarli va hayotda uchraydigan obrazlar misolida keltirilgan. Zamonda turib, zamonni ko‘rish qiyin, uning biror jihatini baholash yanada mushkul. Shuning uchun istiqlol davri adabiyoti , unga xos belgilar haqida gapirish g‘oyat ma’suliyatlidir.[46]

Na’matak mini romanidagi naqorat qismiga e’tibor qarataylik. Qanday ko’z-la boqsa odam olamga, shunday javob aylar olam odamga degan ekan donishlar. Shu qisqa jumlalar orqali yozuvchi insonga qancha fikr-mulohaza berishini bir o’ylab ko’ring. Inson dunyoga kelganidan to o‘limga qadar hayotda nima qidirsa ,o‘shani topar ekan. Xalqimizda shunday gap bor hikmat izlaganga hikmat bu dunyo, kulfat izlaganga kulfat bu dunyo shunday ekan inson nima qilsa shunga yarasha javob oladi. Olamga Ulug’bek Hamdam nazari bilan boqsangiz hozirgi “Na’matak” romanining asl mohiyatini anglab yetishingiz oson bo‘ladi.

Na’matak ikkala hovlining qoq o‘rtasidagi ajriqzorga aylangan qattiq yerdan o‘sib chiqqandi. Butani hech kim ekkan emas, xuddi sirli taqdir yanglig‘ qo‘shnilarning umr yo‘llarida paydo bo‘lgandi. O‘z shoxlarini ikki qo‘shni tomonga tashlab o‘sgan na’matakni hech kim terib olmasdi. Ana shu zaylda fasllar bir-birlarini quvlab o‘taverishdi. Birinchi avlod vakili bo‘lgan yigit shahardan keldi va ketmon tutguncha bog‘ oralab ichkari yurgan edi. Bahor fasli bo‘lgani uchun na’matak qiyg‘os gullagan qarshisida qo‘shni qizni ko‘rdi. Avvaliga uni cho‘chitib yubormaslikka urindi va tomoq qirdi. Qiz xushini to‘plab olib salom berdi-yu “Qarang qanday chiroyli gullabdi” dedi. Yigit na’matakning chaman-chaman ochilgan oq qizg‘ish gullariga tikilgan ko‘yi qizga tobora yaqin keldi. Chindan ham buta rosa gulag kirgan, uning xush bo‘yi atrofni tutgan, arilar uchib-qo‘nib bol to‘plashardi. Yigit nimpushti gullardan birini avaylab hidladi. Shunda dimog‘iga na’matak hidi aralash yonginasida kiprik qoqmay mahliyolanib turgan tamomila yangi bir gul, gul bo‘lganidayam borliqdagi jamiki gullarning a’losi-yu ra’nosi – qo‘shni qizning sochlaridan ufirayotgan mushku anbar kelib urildi. Yigit va qiz o‘z hovlilarga osilib turgan na’mataklarni bir-birlari uchun terishdi. Na’matak atrofdagi xushbo‘y voqealardan xabar topib, ko‘ngillarida qudalashish istagi allaqachon kurtak yozgan onalar to‘yni ko‘klamda , na’matak avji gulga

[45] Shohsanam Yolqin qizi Samatova.” Ulug’bek Hamdam ijodida davr ruhiyati va talqin mahorati.”maqola. Academic Research in Educational Sciences.

[46] Yo’ldosh Qozoqboy.Yoniq so’z.T:Yangi asr avlodi, 2006.

kirgan fasli pallada qilishdi. Bu voqealar birinchi avlodning go‘zal turmushi ,baxtli oilasi bilan tugagan bo‘lsa endi ikkinchi avlod taqdiri nima bo‘larkin degan savol hammani o‘ylantiradi. Yigit va qiz endi o‘sha na’matak kabi yashab, novdalarini hayot kengliklari bo‘ylab baralla yozdilar, qaridilar ulardan ikki o‘g‘il, ikki qiz va o‘n bir nevara tug‘ildi. O‘sha yigit-u qiz ,o‘sha qiz allaqachon chol-u kampirga aylanib, yoshini yashab oshini oshab, nihoyat bu olamni tark etib ketgan. Ikkinchi avlodda chol-u kampirning kenja o‘g‘li u tomondan kampirning qarindoshlaridan biri yana o‘sha na’matak atrofida parvona bo‘lib qolishdi. Ikkinchi avlod o’rtasida na’matakni talashish boshlandi. O‘rtada nizo chiqdi, natijada qo‘shnilar yuzko‘rmas yovga aylanishdi. Bir qaro kun kelib o‘rtada devor ko‘tariladigan bo‘ldi. Qo‘shnilar jon achchig‘ida ilk, ikkala hovli o‘rtasida o‘sib chiqqan o‘sha na’matakni chopib tashladi. Necha zamondir tomirlarda adovat bilan oqqan qon qizib, yuraklarda vulqondek jo‘sh urdi. Natijada endigina daraxtlarning qattiq, ammo gunohsiz tanasiga urilib turgan bolataning bitta zarbi aylanib kelib, insonning yumshoq ammo, gunohkor bo‘yniga tushdi. Bir necha yil o‘tgach esa qamoqdagi qo‘shni ham o‘pka sili bilan og‘ir xastalanib, hayotdan ko‘z yumdi. Ikkinchi avlod hayoti ancha ayanchli yakun topdi. Qo‘shnilar orasidagi nizoga ham ana o‘sha na’matak sabab bo‘ldi. Bu avlod vakillarinig bir-biriga dushmanligi ularga faqat kulfat va xastalik olib keldi xolos. Bu asarni o‘quvchi har bir inson nega shu na’matakni deb boshqalarga zarar berganini hattoki o‘lim holatiga olib kelganini bu avlod vakillari taqdirning ayanchli yakunini o‘z qalbida his qilgan bo‘lsa ajab emas.[47]

Qirg‘inbarot janjalda qo‘shnilar har ikkalasi ham o‘lib ketishdi-yu o‘sha yili ko‘klam kelishi bilan na’matak yana o‘z ildizidan qayta nish urib chiqdi. Oradan yillar o‘tdi, shaboda ham yana o‘z tilida olamlar o‘tmishidan, odamlar kechmishidan shivirlar nimalarnidir zamzama qiladi. Uchinchi avlodda voqealar rivoj o'zgara boshladi. Yoshgina qizcha shitob bilan ayvondan tashqariga otilib chiqdi-da,negadir boqqa qarab chopdi. Qo'qqisdan narigi tarafdan tengdosh balki,bir-ikki yosh katta o'spirin paydo bo'lib shu yoqqa odimladi. Kelib,qizdan «Nim qilyapsan” deb so’radi. Otini bilmayman.Ammo guli chiroyli ekan, chiroyli ammo uning dastidan qizcha gapida davom eta olmadi yig‘laganicha uyi tomon yugurib ketdi.Ular hatto bu butaning nomini ham bilishmas, lekin bo‘lib o‘tgan voqealardan xabardan edilar. Ular shu ko‘yi o‘zlari bilmagan, tanimagan buta qarshisida anchagacha turib qolishdi. Bu ikki o‘spirin o‘y- xayollari haqida hech kim bilmas edi. Balki,bobolarini eslashayotgandir, balki otalarini, balki tamomila o‘ziga o‘y bordir. Bu avlod vakillarining taqdir yo‘llari haqida o‘quvchilarning shaxsiy fikri va asarlardan chiqargan xulosalari muhim ahamiyat kasb etadi.Yana shuni aytish joizki, uchunchi avlod vakillarining hayoti nima bilan tugaganini hech kim bilmaydi. Balki, Ulug’bek Hamdam ham A.Qahhordek asar oxirini o‘quvchi ixtiyoriga tashgandir. Kim hayotga qanday ko’zla boqsa, shunday javob oladi demoqchidir.Yana bir narsa salbiy va ijobiy yakunlarni ko’rib tahlil qildik.Endi uchunchi avlod qanday bo‘lishi kerak ular ham shu na’matak ostida sof

[47] Ulug’bek Hamdam .Na’matak.”Sharq yulduzi” jurnali,2013 yil,3-son.

tuyg‘ularga erishadi va yoshlarning ko‘nglida yana o‘sha musaffo tuyg‘u asta-sekin tomir otgandek bo‘ladi. Na’matak ildizi bilan chopib tashlansa ham yana o‘sib chiqqani kabi dunyoda ham har doim ijobiy tuyg‘ular qayta tug‘ilaveradi. Insonlar mehr-muhabbat bilan har doim o‘z baxtiga yetadi. Hayot shunisi bilan qiziq, inson biror narsani chin dildan istasa, ixlos qilib so’rasa va u albatta amalga oshadi. Adabiyotshunos Tal’at Solihov “ Har bitta badiiy asar dastlab milliydir ,milliy bo’lmagan adabiyot adabiyot emas” deb ta’kidlaydi. Hech bir asar o‘z – o‘zidan dunyoga kelmaydi. [48]Na’matak asari ham qandaydir bir voqea asosida paydo bo‘lgan.

Xulosa qilib shuni aytish joizki, yuqori sinf o‘quchilariga bu asarni o‘qish tavsiya qilishda tahlil qilishni ham o‘rgatish, o‘quvchilarda shaxsiy fikrlash qobiliyatini shakllantirish uchun turli xil metodlardan unumli foydalanish mumkin.Misol tariqasida, “Davra suhbati”, “Aqliy hujum” metodlari orqali o‘quvchilarda nutqni rivojlantirish ,o‘z fikrini bemalol bayon qila olish imkoni paydo bo‘ldi. Ulug‘bek Hamdamning asarlarini tahlil qilish va o‘rganish adabiyotshunoslik ilmi uchun yangi ma’lumotlar beradi.

Foydalanilgan adabiyotlar ro‘yxati.

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Qurbonova L. M.
assistent
odam anatomiyasi kafedrasi
davolash fakulteti
Ismatova R. A.
talabasi
Samarqand Davlat tibbiyot Universiti

TAJRIBA SHAROITIDA KALAMUSHLARDA O‘TKIR QON KETGANDA VAZODILYATATORLAR TA’SIRINING MORFOLOGIK XUSUSIYATLARI

Annotatsiya. *Maqolada tajriba sharoitida kalamushlarda umumiy narkoz ta’sirida o‘tkir qon ketgandan so‘ng ma’lum vaqtlar oralig‘ida jigar,yurak va o‘pkalarda anatoma-gistologik o‘zgarishlar o‘rganildi. Bunda qon ketganda dastlabki vaqtlarda o‘rganilayotgan a’zolarda shok holati kuzatildi. Mikrotomirlar va kapilyarlarda to‘laqonlik, dimlanish va trombotsitlarning agregatsiyasi aniqlandi. Reinfuziya qilingandan so’ng qon yo‘qotishning kech bosqichida turli a’zolarda o‘rgangan tadqiqotlarimiz natijalari shuni ko‘rsatdiki, mikroqon aylanish tizimi passiv tuzilma sifatida ish ko‘rsatadi. Reinfuziyadan keyin bosim va qon oqimi o‘zgarishiga moslashuv reaksiyalarini namoyish qilmaydi. Spazmolitiklar bilan premedikatsiya*

qilinishi ularning mikroqon aylanish va a’zolar strukturasiga ijobiy ta’sirini aniqladi.

Kalit so‘zlar: *tajriba, kalamush, qon yuqotish, umumiy narkoz, jigar, o‘pka, yurak, kapilyar, reinfuziya.*

Kurbanova L. M.
assistant professor
department of human anatomy
faculty of general medicine
Ismatova R. A.
student
Samarkand State Medical University

MORPHOLOGICAL CHARACTERISTICS OF VASODILATOR EFFECT IN ACUTE HEMORRHAGE IN RATS UNDER EXPERIMENTAL CONDITIONS

Abstract. *This article examines anatomical and histological changes in the liver, heart, and lungs of rats at various times after acute blood loss under general anesthesia in experimental conditions. In the initial stages after blood loss, shock was observed in all organs examined. Plethora, stasis, and platelet aggregation were observed in the microvessels and capillaries. Our studies of various organs*

after reinfusion at the late stage of blood loss showed that the microcirculatory bed behaves as a passive structure, loses its ability to autoregulate, and does not exhibit adaptive responses to changes in pressure and blood flow after reinfusion. Premedication with antispasmodics revealed a positive effect on microcirculation and organ structure.

***Key words**: experiment, rat, blood loss, general anesthesia, liver, lungs, heart, capillary, reinfusion.*

Kirish

O‘tkir qon yo‘qotishdan keyingi holatni dori darmonlar bilan davolash jarrohlik va reanimatologiyada hali ham dolzarb muammo bo‘lib qolmoqda [1,2]. Katta qon yo‘qotishlarda gemodinamik buzilishlarni bartaraf etishning muhim yo‘nalishlaridan biri vazodilatatorlarning tomirlarning adrenoreaktiv tizimlariga ta’siridir. Ularning ijobiy ta’sirining morfologik asoslari yetarli darajada ishlab chiqilmagan [3,4]. Shu bilan birga, qon reinfuziyasidan keyin hayotiy muhim organlardagi strukturaviy o‘zgarishlarni o‘rganish ham juda dolzarbdir. So‘nggi yillardagi tadqiqotlar shuni ko‘rsatdiki, uzoq davom etgan ishemiyadan keyin organda qon oqimini tiklash jiddiy strukturaviy shikastlanishlarga olib kelishi mumkin [5,6]. Shu sababli, ushbu ishning maqsadi postgemorragik davrda ayrim organlardagi strukturaviy o‘zgarishlarni o‘rganishdan iborat bo‘ldi: reinfuziyasiz, reinfuziyadan keyin hamda ba’zi vazodilatatorlar bilan premedikatsiya sharoitida o’rganish ilmiy jixatdan dolzarb xisoblanadi [7].

Tadqiqot maqsadi

Kalamo‘shlarda o‘tkir qon ketishda vazodilatatorlar ta’sirining morfologik xususiyatlarini eksperimental sharoitda o‘rganish.

Materiallar va tadqiqot usullari

Tajriba sharoitida umumiy narkoz ta’sirida 36 ta kalamushlarning o’pka, buyrak, yurak va jigarlari olindi. Olingan materallar 10 % li formalinda saqlandi. Umumiy gistologik tekshiruv usullaridan gemotoksilin va eosin usullari qo’llanildi. Organlar o‘tkir qon yo‘qotishdan 30 daqiqa o‘tgach va reinfuziyadan 10 daqiqa o‘tgach o‘rganildi. Tadqiqot preparatsiz hamda fenoksibenzamin, digeksilxloretilamin va diafillin kombinatsiyasi fonida premedikatsiya sharoitida o‘tkazildi. Arterial bosim 30 mm sim. ust. darajasida ushlab turildi.

Tadqiqot natijalari

O‘tkir qon yo‘qotish natijasida yuzaga kelgan 30 daqiqalik gipotenziyada o‘rganilgan organlarda shok holatlariga xos o‘zgarishlar kuzatildi: mikrosirkulyator tomirlarida ba’zi kapillyarlar bo‘shab qolgan, boshqalarida esa qon to‘planishi, staz va trombotsitlar agregatsiyasi; shuningdek, tomir devorlari va parenxima hujayralarida ishemik buzilishlar aniqlandi. Reinfuziyadan 10 daqiqa o‘tgach mikrosirkulyatsiya va parenxima hujayralaridagi o‘zgarishlar yanada kuchaydi. Ayniqsa, qon quyilishlari yurakning subendokardial zonasida va o‘pkada tez-tez uchradiki, buni ushbu organlarning gipoksiyaga yuqori sezuvchanligi va mahalliy qon ta’minoti xususiyatlari bilan izohlash mumkin. Jigarda reinfuziyadan keyingi mikrosirkulyator buzilishlar bo’laklar markazidan

periferiyaga qon to‘xtashi va sinusoidlarning haddan tashqari to‘lib ketishi shaklida namoyon bo‘ldi. Buyraklarda kortikal qavatning kamqonligi saqlanib qoldi. Turli organlardagi reinfuziya natijalari shuni ko‘rsatdiki, qon yo‘qotishning kech bosqichida mikrosirkulyator yotoq passiv tuzilma sifatida harakat qiladi, autoregulyatsiya qobiliyatini yo‘qotadi va reinfuziyadan keyin bosim hamda qon oqimi o‘zgarishiga moslashuv reaksiyalarini namoyon etmaydi. Spazmolitiklar bilan premedikatsiya mikrosirkulyatsiya va organ tuzilishiga ijobiy ta’sir ko‘rsatdi, ammo bu ta’sir turli organlarda turlicha edi. Fenoksibenzamin chap qorincha miokardida subendokardial qon quyilishlarning oldini oldi, miokard tomirlarida va buyrak medullyar qavatida qon quyulishini kamaytirdi. Gemorragik shokda subendokardial qon quyulishiga fenoksibenzaminning ijobiy ta’siri ham qayd etildi. Gepatotsitlar va kardiomiotsitlarda mitoxondriyalar gipertrofiyasi va giperplaziyasi esa yaxshilangan qon ta’minoti fonida energiya almashinuvining yaxshilanishi belgisi sifatida baholanishi mumkin.Diafillin bilan premedikatsiya barcha organlarda mayda tomirlarni kengaytirib, qon stazini kamaytirdi, lekin o‘pkada va chap qorincha subendokardial zonasida qon quyilish o‘choqlari paydo bo‘ldi.O‘rganilgan organlar tuzilishini saqlashda digeksilxloretilamin bilan diafillin kombinatsiyasida eng yaxshi natija kuzatildi. Bu omil va turli organlarda himoya ta’sirining turlicha bo‘lishi o‘tkir qon yo‘qotishdagi mikrosirkulyator buzilishlarning ko‘p komponentli va murakkab xarakterga ega ekanligini tasdiqlaydi.

Xulosa

Reinfuziyadan 10 daqiqa o‘tgach o‘tkir qon yo‘qotish natijasida organlardagi mikrosirkulyator va gipoksik o‘zgarishlar kuchayishi aniqlandi. Fenoksibenzamin, digeksilxloretilamin, digeksilxloretilamin va diafillin kombinatsiyasi organ tuzilishiga ijobiy ta’sir ko‘rsatadi, ammo bu ta’sir turli organlarda turlicha darajada namoyon bo‘ladi. Eng samarali himoya ta’siri digeksilxloretilamin bilan diafillin kombinatsiyasida kuzatildi. Faqat diafillin bilan premedikatsiyada subendokardial zonada keng ko‘lamli qon quyilishlar aniqlangan.

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Rajabov A. X.
katta o‘qituvchisi
“raqamli va fundamental fanlar kafedrasi”
Toshkent amaliy fanlar universiteti
orcid: 0009-0001-0617-4859

TALABALARNING IQTISODIY AXBOROT KOMPETENTLIGINI RIVOJLANTIRISHDA AXBOROT-TAHLILIY VOSITALARINING AHAMIYATI

Annotatsiya: *Mazkur ilmiy maqolada oliy ta’lim muassasalarida tahsil olayotgan talabalarning iqtisodiy axborot kompetentligini rivojlantirishda axborot-tahliliy vositalarining pedagogik, metodik va amaliy ahamiyatini yoritib berilgan. Raqamli iqtisodiyot sharoitida iqtisodiy ma’lumotlar hajmining keskin ortishi, ularni tahlil qilish va asosli qarorlar qabul qilish zarurati axborot-tahliliy vositalardan samarali foydalanishni taqozo etadi. Maqolada iqtisodiy axborot kompetentlik tushunchasining mazmuni, axborot-tahliliy vositalarning turlari, ularning ta’lim jarayoniga integratsiyasi, empirik misollar va o‘quv jarayonida qo‘llash mexanizmlari yoritilgan. Tadqiqot natijalariga ko‘ra, axborot-tahliliy vositalardan tizimli foydalanish, iqtisodiy axborotlarni tahlil qilish, tahlillar asosida xulosalar qilish iqtisodiy axborot kompotentligini yuqori darajaga ko’tarishda xizmat qiladi.*

Kalit so‘zlar: *iqtisodiy axborot, kompetentlik, axborot-tahliliy vositalar, raqamli iqtisodiyot, ta’lim texnologiyalari, tahliliy fikrlash, statistik axborot.*

Rajabov A. Kh.
senior lecturer
department of digital and fundamental sciences
Tashkent university of applied sciences
orcid: 0009-0001-0617-4859

THE IMPORTANCE OF INFORMATION AND ANALYTICAL TOOLS IN DEVELOPING STUDENTS’ ECONOMIC INFORMATION COMPETENCE

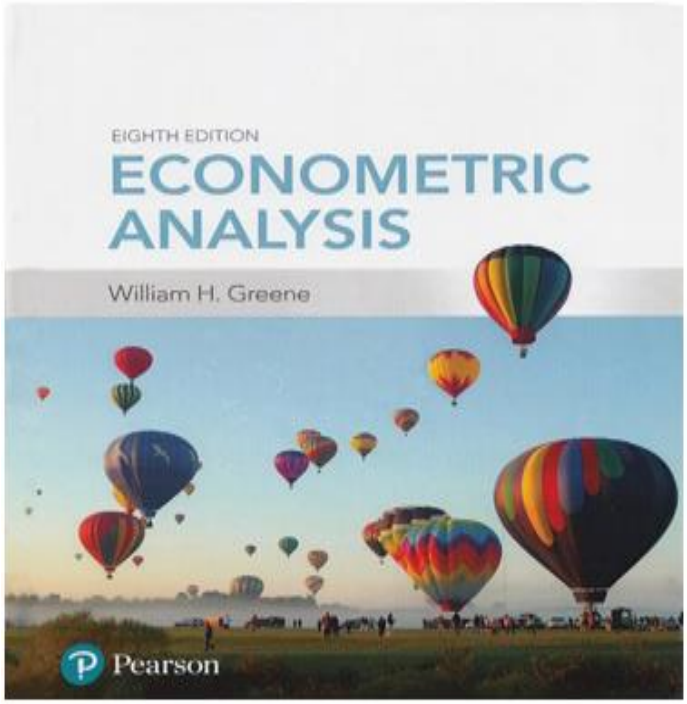
Abstract: *This scientific article highlights the pedagogical, methodological, and practical significance of information and analytical tools in developing the economic information competence of students studying at higher education institutions. In the context of the digital economy, the rapid growth of economic data volumes, along with the need for their analysis and evidence-based decision-making, necessitates the effective use of information and analytical tools. The article examines the essence of the concept of economic information competence, the types of information and analytical tools, their integration into the educational process, as well as empirical examples and mechanisms for their application in*

learning activities. The research findings indicate that the systematic use of information and analytical tools, analysis of economic information, and drawing conclusions based on analytical results contribute to enhancing students' economic information competence to a higher level.

Keywords: *economic information, competence, information and analytical tools, digital economy, educational technologies, analytical thinking, statistical information.*

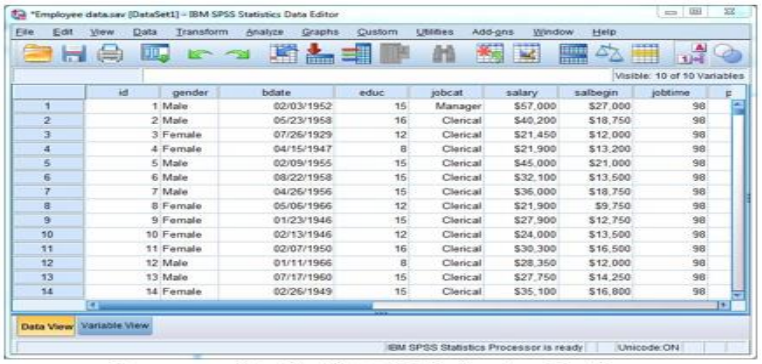
Kirish

Raqamli iqtisodiyot sharoitida iqtisodiy jarayonlar murakkablashib, iqtisodiy axborotlar hajmi va xilma-xilligi keskin ortib bormoqda. Bunday sharoitda kelajak mutaxassislarining nafaqat nazariy bilimlarga, balki iqtisodiy axborotni tahlil qilish, baholash va asosli qarorlar qabul qilish kompetentligiga ega bo‘lishi dolzarb ahamiyat kasb etadi. Talabalarning iqtisodiy kompetentligini shakllantirish va rivojlantirish jarayonida axborot-tahliliy vositalar muhim didaktik resurs sifatida namoyon bo‘lmoqda.



1-rasm. Ekonometrik tahlil dasturlari

Zamonaviy oliy ta’lim tizimida iqtisodiy fanlarni o‘qitish jarayonida elektron jadvallar, statistik dasturlar, vizualizatsiya platformalari va raqamli analitik muhitlardan foydalanish o‘quv jarayonining samaradorligini oshiradi. Shu bilan birga, ushbu vositalarning ta’limiy imkoniyatlari yetarlicha tizimlashtirilmaganligi, metodik yondashuvlarning yetishmasligi muammo sifatida namoyon bo‘lmoqda.



2-rasm. Statistik tahlil dasturlari

Ta’lim jarayonida axborot tahliliy vositalarning ayrimlaridangina foydalanish asosiy muammolardan biri hisoblanadi. Jumladan: Elektron jadvallar asosidagi tahliliy vositalar (Microsoft Excel, Google Sheets) dan foydalaniladi. Ammo, statistik va ekonometrik tahlil dasturlari (SPSS, Stata, EViews) (1,2-rasmlar), Dasturlash asosidagi tahliliy muhitlar (Python(pandas, numpy, matplotlib), R tili), Biznes-analitika va vizualizatsiya plarformalari (Power BI, Tableau) (3-rasm), Onlayn iqtisodiy ma’lumotlar bazalari va analitik platformalar (Jahon banki, IMF, OECD ma’lumotlar bazalari) kabi vositalardan foydalanilmaydi.



3-rasm. Vizualizatsiya platformalari

Mazkur tadqiqotning maqsadi – talabalarning iqtisodiy axborot kompetentligini oshirishda axborot-tahliliy vositalarining ahamiyatini ilmiy asosda ochib berish, mavjud muammolarni aniqlash va ularning yechimlarini taklif etishdan iborat.

Adabiyotlar tahlili

G. Siemensning “Learning Analytics: The Emergence of a Discipline” nomli maqolasi ta’lim jarayonida katta hajmdagi ma’lumotlarni yig‘ish, qayta ishlash, tahlil qilish va ularning asosida samarali qarorlar qabul qilish masalasiga bag‘ishlangan. Muallif learning analyticsni mustaqil ilmiy yo‘nalish sifatida shakllanayotgan soha deb asoslaydi va uni raqamli ta’lim muhitida ta’lim sifatini oshirishga xizmat qiluvchi muhim axborot-tahliliy mexanizm sifatida talqin qiladi.

Maqolada asosiy e’tibor ta’lim jarayonida hosil bo‘layotgan raqamli izlar (learning data)ni tahlil qilish orqali talabalarning o‘qish jarayonini chuqurroq tushunish, ularning o‘zlashtirish darajasini baholash hamda pedagogik qarorlarni ilmiy asosda qabul qilishga qaratilgan. Bu jihatlar bevosita iqtisodiy axborot

kompetentligining asosiy komponentlari - axborotni tahlil qilish, xulosa chiqarish va qaror qabul qilish ko‘nikmalariga mos keladi.

Ta’lim tizimida to‘planayotgan katta hajmdagi ma’lumotlar mavjud, biroq ushbu ma’lumotlardan samarali va tizimli foydalanish mexanizmlari yetarli darajada shakllanmaganligini ta’kidlaydi va shu muammoga yechim topishga harakat qiladi.

Muallif izlanishlar olib borar ekan iqtisodiy yo’nalishlar uchun dolzarb bo’lgan iqtisodiy ma’lumotlarga tayangan holda tahlil va qaror qabul qilish bu soha uchun dolzarbligini ta’kidlaydi. Agar talaba ta’lim jarayonidayoq axborotni tahlil qilishga o‘rganmasa, u kelajakdagi kasbiy faoliyatida iqtisodiy ma’lumotlar bilan samarali ishlay olmaydi.

Ta’lim jarayonlari haqida fikr bildirar ekan quyidagi muammolarni sanab o’tadi:

- ma’lumotlar faqat saqlanadi, lekin tahlil qilinmaydi;
- statistik va tahliliy vositalardan pedagogik qarorlar qabul qilishda yetarli foydalanilmaydi;
- o‘quv jarayonida ma’lumotlar asosida prognozlash va baholash mexanizmlari sust rivojlangan.

Siemens tahliliy o’rganishni quyidagicha ta’riflaydi: “O‘quvchilarning o‘rganish jarayonini tushunish va optimallashtirish maqsadida ma’lumotlarni o‘lchash, yig‘ish, tahlil qilish va taqdim etish jarayoni”.

Tahliliy o’rganish talabalarda statistik va raqamli ma’lumotlarni tahlil qilish, sabab-oqibat bog’liqliklarini aniqlash, pragnozlash va asosli qaror qabul qilish ko’nikmalarini shakllantirishga xizmat qilishini ta’kidlaydi.

Siemens tahliliy o’rganishni oddiy texnologiya emas, balki fanlararo soha sifatida ko’radi. Unda: statistika, ma’lumotlar tahlili, pedagogika, axborot texnologiyalari o’zaro uyg’unlashganligini ta’kidlaydi.

Tahliliy o’rganish yordamida;

- talabalarning o‘zlashtirish darajasini oldindan bashorat qilish;
- muammoli holatlarni erta aniqlash;
- individual ta’lim trayektoriyalarini shakllantirish mumkinligi asoslab beriladi.

G. Siemens (2013) maqolasi iqtisodiy axborot kompetentligini rivojlantirish uchun mustahkam nazariy asos yaratadi. Muallif tomonidan ilgari surilgan learning analytics konsepsiyasi talabalarda axborot bilan ishlash, tahlil qilish va qaror qabul qilish ko‘nikmalarini shakllantirishda samarali pedagogik va metodik vosita sifatida namoyon bo‘ladi.

Metodologiya

Tadqiqot jarayonida quyidagi ilmiy metodlardan foydalanildi:

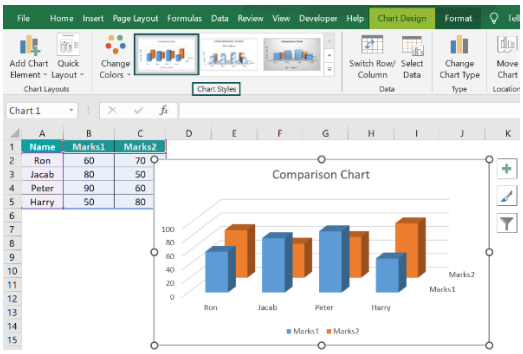
- tahlil va sintez – iqtisodiy kompetentlik va axborot-tahliliy vositalar tushunchalarini ilmiy manbalar asosida aniqlash. Bu metod orqali Excel dasturidagi statistik funksiyalar (AVERAGE, SUM, COUNT, MAX, MIN va boshqalar) iqtisodiy ma’lumotlarni qayta ishlash vositasi sifatida ilmiy manbalar

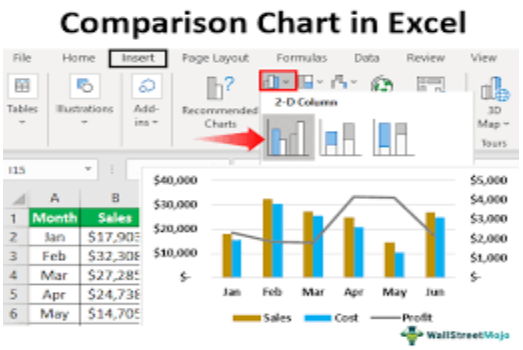
asosida o‘rganiladi va umumlashtiriladi. Talabalarga iqtisodiy ko’rsatkichlar (masalan, korxona daromadlari, xarajatlar, foyda) beriladi va ular: B ustunda joylashgan qiymatlarning umumiy daromadini aniqlaydi. Bunda =SUM(B2:B13) formuladan foydalanadi. =AVAREGE(B2:B13) formulasi orqali daromadni hisoblaydi, =MAX(B2:B13) formula yordamida eng yuqori ko’rsatkichni aniqlaydi, =MIN(B2:B13) funksiyasi yordamida eng past qiymat aniqlanadi

- qiyosiy tahlil – turli axborot-tahliliy vositalarning ta’lim jarayonidagi samaradorligini solishtirish. Qiyosiy tahlil yordamida Excel statistik funksiyalarining turli vaziyatlardagi samaradorligini solishtiriladi. 2 ta guruh natijalarini taqqoslanadi.

Guruh	O’rtacha ball
A	=AVERAGE(B2:B11)
B	=AVERAGE(C2:C11)

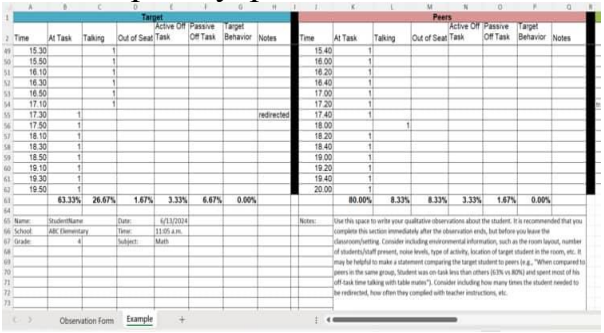
Qo’shimcha =IF(B15>C15, “A guruhi yuqori”, “B guruhi yuqori”) funksiyasidan foydalaniladi. Bundan tashqari natijalarni diogrammalar yordamida taqqqoslash ham mumkin.





- pedagogik kuzatuv – oliy ta’lim muassasalarida iqtisodiy fanlar bo‘yicha mashg‘ulotlarda axborot-tahliliy vositalardan foydalanish jarayonini o‘rganish. Pedagogik kuzatish orqali talabalarning Excelda statistik funksiyalardan foydalanish jarayonini dars mashg’ulotlari vaqtida kuzatish mumkin. Bunda quyidagi jarayonlarga e’tibor qaratiladi: talaba formulani mustaqil yozadimi; funksiyani to’g’ri tanlayaptimi; xatolarni tahlil qila olyaptimi.





Kuzatuv natijalari quyidagi jadvalga kiritiladi:

Ko’nikma	Bor	Qisman	Yo’q
AVERAGE ishlata oladi	+		
Diagramma tuzadi		+	

- empirik tahlil – amaliy misollar asosida talabalarning iqtisodiy kompetentligidagi o‘zgarishlarni baholash. Emperik tahlil yordamida Excelda statistik funksiyalar bilan ishlash oldidan va keyin talabalarning natijalari taqqoslanadi.

Talaba	Oldingi ball	Keyingi ball	Farq
A	65	80	=C2-B2

=AVERAGE(D2:D21) – o’rtacha o’sish

=COUNTIF(D2:D21, “>0”)- ijobiy o’sishlar soni

Metodologik asos sifatida kompetensiyaviy yondashuv, tizimli yondashuv va faoliyatga yo‘naltirilgan ta’lim tamoyillari qabul qilinadi.

Natijalar

Tadqiqot natijalari shuni ko‘rsatdiki, axborot-tahliliy vositalardan maqsadli va tizimli foydalanish talabalarning iqtisodiy kompetentligini quyidagi yo‘nalishlarda oshiradi:

1. **Iqtisodiy axborot bilan ishlash ko‘nikmalari** – talabalar real statistik ma’lumotlar asosida hisob-kitoblar olib borishni o‘rganadi.
2. **Tahliliy fikrlash** – diagrammalar, grafiklar va modellar yordamida iqtisodiy jarayonlarni tahlil qilish qobiliyati rivojlanadi.
3. **Qaror qabul qilish kompetentligI** – tahlil natijalariga asoslangan iqtisodiy xulosalar chiqarish malakasi shakllanadi.

Tahlil va sintez metodini Excelda statistik funksiyalarga tadbiq qilish natijasida quyidagi pedagogik natijalarga erishiladi:

- ✓ Iqtisodiy axborotni tahlil qilish;
- ✓ Statistik natijalarni sintezlab umumiy xulosa chiqarish ko’nikmasiga ega bo’ladi.

Bu metod telabalarda iqtisodiy kompotentlikning kognitiv (bilim) kompotentligini rivojlantiradi.

Qiyosiy tahlil metodini Excelda statistik funksiyalarga tadbiq qilish natijasida talabalarda quyidagi pedagogik natijalarga erishiladi:

- ✓ Iqtisodiy ma’lumotlarni solishtirish;
- ✓ Statistik natijalarni asoslab baholash;
- ✓ Turli vositalarning ta’lim samaradorligini tahlil qilish malakalarini shakllantiradi.

Bu metod talabalarda tahliliy va tanqidiy fikrlash kompetensiyalarini rivojlantiradi.

Pedagogik kuzatuv metodini Excelda statistik funksiyalarga tadbiq qilish natijasida quyidagi pedagogik natijalarga erishadi:

- ✓ amaliy faolligi;

- ✓ mustaqil ishlash darajasi;
- ✓ axborot bilan ishlash madaniyati baholanadi.

Bu metod talabalarda faoliyatli (amaliy) kompetentlikni rivojlantiradi.

Emperik tahlil metodini Excelda statistik funksiyalarga tadbiq qilish natijasida quyidagi pedagogik natijalarga erishadilar:

- ✓ iqtisodiy kompetentlikning oshganlik darajasi;
- ✓ Excel statistik funksiyalarining real ta'siri;
- ✓ metodikaning samaradorligi.

Bu metod natijaviy-baholash kompotensiyasini shakllantiradi.

Excel'da statistik funksiyalar bilan ishlash jarayoniga tahlil va sintez, qiyosiy tahlil, pedagogik kuzatuv hamda empirik tahlil metodlarining tatbiq etilishi talabalarning iqtisodiy axborotni qayta ishlash, tahlil qilish va asosli xulosalar chiqarish kompetentligini tizimli ravishda rivojlantirishga xizmat qiladi.

Muhokama

Olingan natijalar adabiyotlar tahlili bilan solishtirilganda, axborot-tahliliy vositalar ta'lim jarayonida faqat texnik vosita emas, balki didaktik resurs sifatida muhim ahamiyatga ega ekanligi tasdiqlandi. Biroq, ularni samarali qo'llash uchun o'qituvchilarning metodik tayyorgarligi va o'quv dasturlarining moslashuvchanligi muhim omil hisoblanadi.

Tadqiqot davomida aniqlangan asosiy muammo – axborot-tahliliy vositalardan foydalanishning tizimli metodikasining yetishmasligidir. Ushbu muammoni hal etish uchun quyidagi yechimlar taklif etiladi:

- o'quv dasturlariga amaliy tahliliy topshiriqlarni keng joriy etish;
- o'qituvchilar uchun malaka oshirish kurslarini tashkil etish;
- real iqtisodiy ma'lumotlar bazalaridan foydalanishni yo'lga qo'yish.

Xulosa

Xulosa qilib aytganda, axborot-tahliliy vositalar talabalarning iqtisodiy kompetentligini oshirishda muhim omil bo'lib, ularning kasbiy tayyorgarligini zamonaviy talablar darajasida ta'minlaydi. Ushbu vositalarni ta'lim jarayoniga tizimli integratsiya qilish orqali raqobatbardosh va tahliliy fikrlashga ega mutaxassislarni tayyorlash imkoniyati kengayadi.

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Rakhimov I. B.
department of natural sciences
Namangan State Pedagogical Institute
Mo'minov M.
department of natural sciences
Namangan State Pedagogical Institute

PEDAGOGICAL FOUNDATIONS OF TEACHING THE PRINCIPLES OF THE GREEN ECONOMY IN SCHOOL GEOGRAPHY EDUCATION

Annotation: *This article examines the pedagogical foundations of integrating green economic principles into school geography education. In the context of global environmental challenges, geography serves as a key discipline for developing students' ecological thinking, responsible consumption habits, and sustainable development competencies. The study analyzes relevant scientific literature, explores pedagogical approaches, and identifies effective methods for teaching green economics in secondary schools. The results demonstrate that interdisciplinary learning, experiential activities, project-based methods, and digital tools significantly enhance students' understanding of green economic principles. The article proposes practical strategies for geography teachers and highlights the need for curriculum renewal to ensure students' sustainable worldview formation.*

Keywords: *Green economy, geography education, sustainability, ecological literacy, pedagogical foundations, environmental education, sustainable development, interdisciplinary approach.*

Modern socio-economic development requires a shift toward environmentally responsible models of growth known as the green economy. The green economy emphasizes rational use of natural resources, low-carbon technologies, renewable energy, circular economy models, and sustainable consumption patterns. Preparing future generations to understand and implement these principles starts in school education, particularly in geography lessons, which provide both spatial and environmental perspectives.

School geography curriculum already includes topics such as natural resources, environmental protection, climate change, and sustainable development. Integrating green economic concepts into these topics is essential for equipping students with the competencies needed to become environmentally conscious citizens. The pedagogical foundations of teaching green economics include scientific literacy, critical thinking, values education, and problem-solving skills. This article discusses theoretical and practical approaches to implementing these foundations in the teaching process.

Teaching the principles of a green economy (circular economy, decarbonisation, resource efficiency, regenerative development, and social justice within planetary boundaries) in school geography is not simply about adding new

content. It requires a deliberate pedagogical redesign that develops students' geographical thinking, critical awareness, and capacity to act in complex socio-ecological systems. The following foundations provide a coherent, research-informed framework for teachers.

Constructivist and Socio-Constructivist Learning Theory

Students do not passively receive the idea of a green economy; they must build it themselves. According to Piaget and Vygotsky, meaningful learning occurs when new knowledge is connected to existing mental schemas through active experience and social interaction.

In practice:

- Begin with students' lived environments: "Where does the waste from our school canteen go?" or "Why did the price of electricity rise last winter?"

- Use the spiral curriculum (Bruner): revisit the same concepts (e.g., material flows) at increasing levels of complexity from primary to upper-secondary school.

- Organise collaborative inquiries where students co-construct understanding through discussion, modelling, and peer feedback (e.g., groups mapping the life-cycle of a smartphone from Congolese coltan mines to European recycling centres).

Systems Thinking as the Core Geographical Competence

A green economy cannot be understood through isolated facts; it demands recognition of interconnected Earth systems. Donella Meadows, the International Geographical Union (2016), and the Lucerna Declaration all emphasise systems thinking as indispensable for sustainability education.

Teachers should:

- Explicitly teach stocks, flows, delays, and feedback loops (e.g., the reinforcing loop of consumption → waste → resource depletion → higher prices → more consumption).

- Use rich pictures, causal loop diagrams, and computer-based system models (e.g., the free online "Loopy" tool or the Ellen MacArthur Foundation's interactive circular economy system diagrams).

- Link biophysical limits (Rockström's planetary boundaries) with economic processes so students see that infinite growth on a finite planet is a geographical impossibility.

Futures Education and Anticipatory Competence

The green economy is fundamentally about creating preferable futures rather than predicting inevitable ones. UNESCO's Futures Literacy framework and the concept of anticipatory competence (developed by Wiek, Bernstein, and others) are therefore central.

Effective methods include:

- Backcasting: start from a desired 2040 or 2050 vision (net-zero city, circular region, post-growth society) and work backwards to identify necessary actions today.

- Scenario exercises comparing business-as-usual, green growth, and degrowth/post-growth pathways.

- Three-horizons framework (Sharpe) to help students distinguish between the collapsing dominant system (linear economy), emerging innovations (repair cafés, renewable micro-grids), and visionary long-term possibilities (doughnut economics, commons-based economies).

Transformative and Transgressive Learning (ESD 2.0)

Traditional "education about sustainability" is insufficient. Stephen Sterling and Arjen Wals advocate a shift to "education as sustainability" – learning that changes the learner and, through the learner, the system itself.

This means:

- Making values and worldviews explicit. Teachers must create safe spaces to examine assumptions about economic growth, consumption, and human–nature relationships.

- Including normative competence: students learn to recognise unsustainability, interrogate justice implications (e.g., who pays the externalised costs of fast fashion?), and develop ethical positions.

- Encouraging "transgressive" actions – small disruptions of unsustainable norms (school strikes, redesigning the canteen menu, campaigning for plastic-free procurement).

Place-Based and Community-Connected Geography

Geography's unique contribution is its focus on place and spatial relationships. Green economy education becomes powerful when rooted in students' own localities before scaling up.

Examples:

- Material flow analysis of the school or neighbourhood (where does water, energy, food, waste come from and go to?).

- Partnerships with local circular enterprises (repair workshops, urban farms, energy cooperatives) for fieldwork and guest speakers.

- Service-learning projects: designing and implementing a school composting system, a second-hand uniform shop, or a biodiversity-enhancing school ground redesign.

Critical Political Ecology Perspective

A naïve presentation of the green economy risks "greenwashing." Students must be equipped to ask critical geographical questions:

- Who owns the new "green" infrastructure (wind farms, lithium mines)?

- Whose land is used for carbon offsets or biofuel plantations (green grabbing)?

- Who bears the risks and costs of the transition (just transition for coal-mining communities)?

Incorporating Southern and indigenous perspectives is essential to avoid a Eurocentric narrative. Case studies from the Global South (e.g., cobalt mining in the DRC, land conflicts over palm oil in Indonesia, or the Yasuní-ITT initiative in Ecuador) reveal the power geometries behind supposedly green solutions.

Inquiry-Based and Project-Based Pedagogies

Open, real-world problems are ideal for geography because they rarely have a single correct answer.

Strong project examples:

- Applying Kate Raworth's Doughnut Economics model to the students' own city or region.
- Conducting a full ecological and carbon footprint analysis of the school and presenting a staged transition plan to the senior leadership team.
- Simulating UN climate negotiations where countries present nationally determined contributions that include circular economy measures.

Interdisciplinary Integration with Geography as the Connecting Discipline

Green economy topics naturally span biology (biogeochemical cycles), chemistry (material properties and recycling), economics (externalities, subsidies), citizenship (policy and governance), and design/technology. Geography provides the spatial and holistic glue.

Practical approaches:

- Team-teaching units with science and economics colleagues.
- Using GIS and remote sensing to map resource flows, renewable energy potential, or urban heat islands as entry points to economic transformation discussions.

Developmental Progression Across School Years

Primary (ages 7–11): Phenomenon-based and storytelling approaches; focus on wonder, care, and simple actions (reduce, reuse, recycle in context).

Lower secondary (ages 12–15): Structured case studies, basic system mapping, introductory GIS, role-plays of stakeholder conflicts.

Upper secondary (ages 16–18): Deep critical analysis, student-designed research, engagement with academic and activist literature (degrowth, eco-feminism, doughnut economics, just transition).

By consciously grounding green economy education in these pedagogical foundations, geography teachers can move beyond superficial environmentalism and cultivate the geographical imagination, critical thinking, and agency that young people need to navigate and shape the socio-ecological transformations of the 21st century.

The findings indicate that teaching green economics in school geography education is both necessary and pedagogically beneficial. However, several challenges still exist:

Lack of teacher training.

Many geography teachers have limited knowledge of green economy concepts. Continuous professional development programs are needed.

Insufficient learning materials.

Textbooks often contain outdated information or insufficient content on sustainability and green economy.

Traditional teaching methods.

Teacher-centered approaches do not fully engage students in active problem solving or real-world environmental analysis.

Limited school resources such as digital tools, GIS systems, and laboratory materials hinder the practical implementation of green economy education.

Despite these challenges, integrating sustainability principles into geography lessons fosters students' environmental awareness, economic understanding, and social responsibility. The discussion highlights that pedagogical reforms must prioritize innovative methods and updated learning materials.

Conclusions

Teaching green economy principles in geography education plays a crucial role in shaping students' sustainable worldview. Interdisciplinary and learner-centered approaches significantly improve understanding of environmental and economic relationships. Modern pedagogical strategies—such as fieldwork, projects, digital mapping, and problem-based tasks—enhance students' motivation and learning outcomes. Curriculum modernization and teacher training are essential for effective green economy education.

Integrate green economy topics into all stages of geography curriculum with clear learning objectives.

Provide professional development for geography teachers on sustainability pedagogy and digital tools.

Develop new instructional resources, including textbooks, digital platforms, and interactive manuals.

Promote project-based learning, especially local environmental projects that engage students in practical sustainability activities.

Increase collaboration between schools, environmental organizations, and local communities.

Use GIS, remote sensing, and data analysis tools to help students visualize environmental processes and green economic models.

Encourage eco-friendly school environments (energy efficiency, waste sorting, green campus initiatives).

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Rakhmonov Yu. A.
assistant
Samarkand State Medical University
Samarkand, Republic of Uzbekistan

CHARACTERISTICS OF IRON DEFICIENCY ANEMIA IN CHILDREN

Abstract: *Iron deficiency anemia (IDA) in children is a leading cause of anemia in childhood and is one of the most pressing issues in modern pediatrics. The high prevalence of IDA is due to a combination of factors, including the anatomical and physiological characteristics of a growing organism, intensive tissue growth and differentiation processes, increased iron requirements at different ages, and inadequate dietary intake of this micronutrient. Iron deficiency in children leads not only to decreased hemoglobin levels but also to delayed physical and psychomotor development and increased susceptibility to infectious diseases.*

Keywords: *iron deficiency anemia, children, diagnosis, treatment, prevention.*

Introduction

Iron deficiency anemia (IDA) in children is the most common pathological condition resulting from an imbalance between the body's iron requirements and its actual stores. According to the World Health Organization, signs of latent or overt iron deficiency are observed in 30–60% of children under five years of age [1–5].

The disease develops significantly faster in children than in adults due to their rapid growth, immaturity of the hematopoietic system, and high metabolic demands [6–9].

These characteristics of the child's body determine the specific clinical course of the disease, the diversity of its clinical manifestations, and their impact on the child's physical development [1,5,13,14].

At the onset of the disease, the pathological process is latent and may remain unnoticed, as there are no pronounced clinical symptoms. Iron depletion manifests itself primarily through changes in behavior and general well-being: children become lethargic, tire quickly, have difficulty tolerating physical activity, and become more irritable and capricious. Infants experience feeding difficulties, sleep disturbances, and decreased weight gain.Gradually, the child's resistance to infectious agents decreases, which is explained by impaired enzymatic activity and a decrease in the functional capacity of the immune system [10-12].

Risk Factors for Iron Deficiency Anemia

The main factors contributing to the development of iron deficiency anemia (IDA) in children include:

- anemia in pregnant women;
- prematurity;
- poor nutrition;
- gastrointestinal diseases;
- helminthic infestations;
- blood loss of various origins.

Clinical Manifestations of Iron Deficiency Anemia in Children

The clinical picture of IDA in children can be characterized by a predominance of symptoms from various syndromes: asthenovegetative, epithelial, dyspeptic, cardiovascular, immunodeficiency, and hepatosplenic.

Asthenovegetative syndrome develops as a result of tissue hypoxia, including cerebral hypoxia. Children may experience muscle hypotonia, delayed physical and psychomotor development (in severe cases, intellectual disability), increased irritability, tearfulness, dizziness, fainting, episodes of orthostatic collapse, and signs of vegetative-vascular dystonia.

Epithelial syndrome manifests itself through changes in the skin and its appendages: dry skin, hyperkeratosis on the elbows and knees, cracks at the corners of the mouth (angular stomatitis), glossitis, cheilitis, dullness and hair loss, and brittle and striated nails.

Dyspeptic syndrome is characterized by decreased appetite, including anorexia, dysphagia, flatulence, constipation, or diarrhea. Taste perversion is often observed—a craving for inedible substances (chalk, earth, etc.)—and altered olfactory preferences (an attraction to the smells of gasoline, paint, and varnish). Gastrointestinal lesions exacerbate iron malabsorption, which contributes to the progression of anemia.

Cardiovascular changes are observed in severe forms of IDA and are manifested by tachycardia, shortness of breath, arterial hypotension, systolic murmurs, and signs of myocardial dystrophy.

Secondary immunodeficiency syndrome is characterized by prolonged low-grade fever, frequent acute respiratory and intestinal infections, and their protracted course.

Hepatosplenomegaly (hepatosplenomegaly) is typically found in children with severe iron deficiency anemia, often associated with rickets or other chronic diseases.

Diagnosis of Iron Deficiency Anemia in Children

The diagnosis of iron deficiency anemia (IDA) is based on a combined assessment of clinical manifestations and laboratory parameters, which help determine the presence, severity, and nature of iron metabolism disorders in the child's body.

The key laboratory criteria confirming the presence of IDA are:

- decreased hemoglobin levels - Hb <110 g/L;

• decreased color index (CI <0.86);
• decreased serum iron concentration - <14 μmol/L;
• increased total iron-binding capacity of serum (TIBC >63 μmol/L);
• decreased serum ferritin level — <12 μg/L [2–10].

The primary diagnostic method for IDA is a complete blood count, which includes assessment of the following parameters:

• red blood cell count;
• hemoglobin level;
• color index;
• mean corpuscular hemoglobin content (MCH);
• mean corpuscular hemoglobin concentration (MCHC);
• mean corpuscular volume (MCV);
• morphological features of red blood cells;
• reticulocyte count.

Total iron-binding capacity (TIBC) characterizes the amount of iron that can be bound by the transport protein transferrin. The normal range is 40.6–62.5 μmol/L.

Determining serum iron levels and performing a complete blood count are possible in an outpatient setting.

More in-depth tests—determination of ferritin, TIBC, transferrin saturation, and other biochemical parameters—are performed in a hospital setting [9–11].

Treatment of Iron Deficiency Anemia in Children

The main principles of treating iron deficiency anemia (IDA) in children are:

1. Eliminating the underlying causes of iron deficiency;
2. Adjusting diet and daily routine;
3. Prescribing iron supplements to replenish iron stores.

Diet Therapy and Breastfeeding

Exclusive breastfeeding is recommended until the child reaches six months of age as it provides the optimal source of bioavailable iron. Breastfed children with established iron deficiency should be given iron supplements starting at six months of age.

Formula-fed children should use iron-fortified formula until they begin eating solid foods (approximately 12 months).

Teaching parents the principles of a balanced diet for their children—one that includes sufficient iron-rich foods (meat, liver, fish, buckwheat, apples, and green vegetables)—is important.

Drug Therapy

The basis of treatment is the correction of iron deficiency with iron-containing supplements [3, 6].

The most commonly used are:

• divalent iron supplements: Aktiferrin, Sorbifer Durules, Tardiferon, Totema, Ferroplex, and Fenuls;

• trivalent iron supplements in the form of a hydroxide-polymaltose complex: Maltofer, Ferrum Lek.

For young children, iron supplements are primarily prescribed in liquid dosage forms (drops, syrups, suspensions).

It is recommended to take the supplements 1–2 hours before meals, with water or fruit juices (not milk, as calcium reduces iron absorption).

The use of injectable iron supplements is only justified in exceptional cases, such as posthemorrhagic anemia or impaired iron absorption in the intestine [4]. The course of the disease is largely determined by the timeliness of diagnosis and the comprehensiveness of the treatment. Adequate treatment includes eliminating the causes of the deficiency, normalizing nutrition, replenishing iron stores with oral medications, and ongoing monitoring.

Thus, iron deficiency anemia in children remains a pressing and social problem in pediatrics, characterized by a variety of clinical manifestations and a significant impact on the child's physical and psycho-emotional development. Early diagnosis and comprehensive treatment are key to preventing adverse consequences of the disease and ensuring the child's healthy development.

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Rakhmonov Yu. A.
assistant
Samarkand State Medical University
Samarkand, Republic of Uzbekistan

NEW APPROACHES TO ANTIBACTERIAL TREATMENT OF CHRONIC LUNG DISEASES

Annotation: *Chronic respiratory diseases, which began in childhood, are the cause of disability not only for children, but also for the adult population. Thus, according to the latest data, the incidence of obstructive pulmonary disease has increased by 3.2 times. Some mechanisms for the development of their progression in children have not been fully disclosed. In recent years, the number of antibiotic-resistant strains of microorganisms has increased, which contributes to the progression of lung tissue damage and worsens the prognosis of the disease. In solving the problem of the rationality of antibiotic therapy, an extremely important place is occupied by the issue of creating effective therapeutic concentrations of an antibiotic in a chronic focus of pulmonary inflammation. The effect of antimicrobial therapy is determined not only by the correct choice of the drug, but also by the method, its dose and frequency of administration. One of the effective methods that improve the results of treatment is physiotherapy procedures used in the complex treatment of CLD.*

Key words: *chronic lung diseases, patients, microbial flora, antibiotic therapy.*

For more than 100 years, the attention of pediatricians has been attracted by the problem of treating chronic nonspecific lung diseases and their complications in children [1,5,9,10,13,21]. In modern conditions, the role of rehabilitation is increasing, since the reform of the healthcare system implies a reduction in the length of the patient's stay in the hospital and a shift in the emphasis of medical care to the rehabilitation and outpatient stages [3,7,11,18]. Therefore, works devoted to the search for new treatment regimens for Chronic Lung Disease (CLD) in children are relevant for pulmonology.

Treatment of CLD is complex and includes antibiotic therapy, muco- and bronchodilators, vitamin therapy, kinesitherapy, physiotherapy, sports, and treatment of its complications. [4,6].

According to modern concepts, infection is the cause of exacerbation of CLD in 50-60% [2,14,20]. The problem of antibiotic therapy of chronic inflammatory lung diseases constantly attracts the attention of pediatricians. The detection of the causative agent of a bacterial infection in chronic inflammatory lung diseases is one of the main prerequisites for rational antibiotic therapy [6,8,10]. It should be noted that the spectrum of bacterial flora in chronic inflammatory lung diseases has changed significantly. Staphylococcus was

previously the most common causative agent of pneumonia, according to most authors, today it has lost its primary role [4,10,15].

In the last decade, the results of bacteriological studies carried out in chronic lung diseases in children have shown a variety of isolated flora. Most often, pneumococcus, influenza bacillus, staphylococcus, streptococcus are found in the respiratory tract, less often other types of pathogens [,4,16,17].

Studies of bronchial secretion samples, performed by a quantitative method using selective nutrient media for the isolation of pneumotropic pathogens, showed that the main etiological significant pathogen in chronic pyoinflammatory lung diseases in children is pneumococcus, isolated in monoculture and in association in 66% of patients, and coli influenza, which occupies the second place in the frequency of inoculation (45%) and occurs both in monoculture and in association with pneumococcus [19].

As observations show with a mild exacerbation of chronic bronchitis, the most common clinically significant microorganisms are non-typable and non-encapsulated forms of H. Influenzae, S. Pneumoniae, M. Catarrhalis [1,6]. With more severe exacerbations, often requiring hospitalization in intensive care units, the proportion of the above microorganisms decreases and the proportion of H. Influenzae producing β-lactamase, gram-negative bacteria, in particular various species of Enterobacteriacae, P. Aeruginosa, increases.

According to Ageikin V.A. [1] in the sputum of patients with chronic inflammatory lung diseases in children, two predominant pathogens are found: Haemophilus influenzae in 60-70% and pneumococcus in 35-40% of patients. In a small number of children (5-10%) Moraxella catarrhalis is sown, which is sown both in monoculture and in associations. The author also claims that Haemophilus influenzae is sensitive to protected penicillins (amoxicillin), as well as cephalosporins of 2-3 generations.

The authors point out that serological research methods were not inferior to microbiological seeding in terms of sensitivity and specificity, and their complex use is most effective for determining the etiological significance of Haemophilus influenzae in the development of exacerbation of chronic bronchitis. The combined use of microbiological and immunological methods makes it possible to detect not only microorganisms, but also the products of their destruction and the reaction of the immune system to the corresponding irritation. Summarizing the above literature data, it can be noted that bacteriological monitoring in chronic inflammatory lung diseases in children is one of the criteria for the severity of the pathological process and helps to choose a rational antibiotic therapy regimen.

Summarizing the above literature data, it can be noted that bacteriological monitoring in chronic inflammatory lung diseases in children is one of the criteria for the severity of the pathological process and helps to choose a rational antibiotic therapy regimen.

One of the reasons for the transition of acute pneumonia to chronic is a decrease in the sensitivity of pathogens to antibiotics. This is due to the widespread use of various antibiotics, in connection with which the selection of

resistant forms of microorganisms takes place [19].

Determining the sensitivity of the microbe to antibiotics is of particular importance in chronic inflammatory diseases of the lungs, in which, due to repeated and prolonged antibiotic treatment, the sensitivity of the microbial flora often changes. The data of the above literature once again confirm that antibiotic therapy is the main method of treatment and elimination of exacerbation of chronic inflammatory lung diseases.

The basis for prescribing antibiotic therapy for chronic inflammatory lung diseases is the diagnosis of the infectious nature of the exacerbation, which meets the criteria of Anthoniesen N.R. et al. [21] the presence of 3 main signs: an increase in sputum volume, an increase in its "purulence" and an increase in shortness of breath (I type of exacerbation). An indication for the appointment of AP may also be the presence of two of the above signs (type II exacerbation), but purulent sputum should be a mandatory sign. The observations made by Stockley R.A. et al. showed that in chronic nonspecific lung diseases there is a close correction between purulent sputum and the presence of microorganisms in it.

The effectiveness of antibiotic therapy in chronic inflammatory lung diseases remains an urgent problem. At the same time, it is known that the cure of a focal infection can be achieved only if the site of its direct action is adequately provided with an antibiotic. However, it is not easy to create the necessary therapeutic concentrations in the lung in chronic diseases, since drugs hardly penetrate into the foci of chronic infection. This is due to the development of pronounced fibro-sclerotic changes and impaired vascularization of the lung tissue, the presence of persistent bronchial dyscrinia and obstruction. Therefore, it is important to choose a method of therapy that maximizes the focus of inflammation in the lungs with antibacterial drugs.

Taking into account the prevailing pathogens and their drug sensitivity in chronic lung diseases in children, antibiotics of the penicillin and cephalosporin series, macrolides are used [2,6,11,12,18,21].

In the treatment of chronic inflammatory lung diseases in children and adolescents Volkov I.K., Katosova L.K. [13] give preference to parenteral administration of drugs and the appointment of the maximum allowable therapeutic doses. For this purpose, the authors used Rocephin in 67 children with COPD in children at a dose of 50-80 mg/kg once a day intravenously. The duration of the course ranged from 7 to 13 days. During treatment with Rocefin, complete eradication of M. catarrhalis, S. Pneumoniae and S. Aureus was noted. In 8.9% of patients, the seeding of H. infuenzfe remained and in 2.9% of patients - P. Aeruginosae. Side effects were detected in 3% of children who had dizziness on the background of jet administration of the drug, in 3% of children - intestinal dysfunction, in 10.5% of patients an increase in the amount of Candida fungal flora in sputum was noted.

Bronchoscopic and intratracheal methods of drug administration significantly increase the effectiveness of therapy, especially in the bronchiectasis form of chronic pneumonia and in severe purulent lesions of the draining

bronchus. In a very severe course of the disease, there is a positive experience with the introduction of antibiotics into the pulmonary artery system.

It has been established that the distribution of the antibiotic in the lungs depends on the nature of tracheobronchial secretion, on the partial binding of the drug to serum proteins and bronchial secretions, on the degree of endobronchitis activity and the individual characteristics of the child's body [11,21]. Inadequate concentration of antibiotics is one of the main components that adversely affect the results of the treatment of chronic lung diseases. [12,18,25].

In order to develop optimal antibiotic therapy regimens for chronic pneumonia in children during the period of maximum activity of the infectious-inflammatory process in the bronchi, intramuscular antibiotics were used for 10–12 days [2]. At the same time, the same drug in the average age daily dosage is administered endobrochially with an interval of 3 days. As the activity of endobronchitis subsided, the intramuscular administration of the antibiotic was canceled, and the drug was administered only endobronchially at the age-specific daily dosage after 5 days.

Traditional methods of antibiotic therapy do not always provide the desired results. This is due to the difficulty of eliminating the infection from the focus of chronic pulmonary inflammation, frequent relapses of bronchitis, a decrease in the activity of local airway protection factors and an increase in the number of antibiotic-resistant strains of microorganisms (6,12,18,26). The parenteral route of administration of antibiotics does not allow to obtain the desired result, since the antibiotics circulating in the blood do not penetrate in the required amount through the fibrous-modified lung tissue into the focus of infection. The introduction of large doses of antibiotics does not solve the problem of treating chronic lung diseases in children. This increases the possibility of toxic and allergic reactions [12,21,24].

In recent years, endobronchial administration, ultraviolet laser irradiation, ozone therapy in combination with antibiotics, and subanesthetic endobronchial ultrasonic injection-aerosol spraying of antibiotics have begun to be used in the treatment of chronic pneumonia [2,11,19].

However, the widespread use of antibiotics has contributed to significant changes in the nature of the microbial flora. There is an increase in antibiotic-resistant strains of microorganisms and an increase in pathogenic properties and potentially pathogenic microorganisms [6,11,12,22]. All this requires a periodic review of some principles of antibiotic therapy, among which the principle of the effect of antibiotics on bronchopathogens is of particular importance.

Thus, one of the reasons for the low efficiency of traditional methods of antibiotic therapy is the impossibility of creating the optimal concentration of antibiotics in the lymphatic system, which is the main route for the spread of infection [2,11,18,19,23]. An attempt to create high concentrations of antibiotics in the lymphatic system by traditional methods is accompanied by toxic and allergic reactions, leading to immunodeficiency [2,12,16]. Therefore, the effect of antimicrobial therapy is determined not only by the correct choice of the drug, but

also by the method, its dose and frequency of administration. One of the effective methods that improve the results of treatment is physiotherapy procedures used in the complex treatment of CLD. At present, the impact of ultrasonic (US) waves has become widely used. Ultrasound therapy has an anti-inflammatory effect, affects blood and lymph circulation, the state of nervous regulation, and proliferative-trophic processes in the body.

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Ravshanova G. X.
magistranti
psixologiya kafedrasi
Osiyo Xalqoro Universiteti

OG‘IR KASALLIKKA CHALINGAN YOKI BOLASINI YO‘QOTGAN OILALARNING HISSIY XULQ-ATVORI PSIXOLOGIK MEXANIZMLAR VA AMALIY YORDAM STRATEGIYALARI

Annotatsiya: *Mazkur ilmiy maqolada og‘ir (surunkali yoki hayot uchun xavfli) kasallik bilan yashayotgan hamda farzand yo‘qotish kabi og‘ir yo‘qotishni boshdan kechirgan oilalarning hissiy xulq-atvori, stress va travmaga javob reaksiyalari, oilaviy tizimdagi o‘zgarishlar tahlil qilinadi. Muammoga krizis psixologiyasi, oilaviy tizimlar nazariyasi va travma-yo‘naltirilgan yondashuv nuqtayi nazaridan yondashilib, depressiv holatlar, tashvish, aybdorlik, g‘azab, inkor va ijtimoiy chekinish kabi emotsional reaksiyalarni boshqarishga qaratilgan amaliy va psixologik tavsiyalar beriladi.*

Kalit so‘zlar: *og‘ir kasallik, farzand yo‘qotish, qayg‘u (grief), travma, oilaviy stress, emotsional regulyatsiya, psixologik birinchi yordam, oilaviy terapiya, ijtimoiy qo‘llab-quvvatlash.*

Ravshanova G. X.
master’s student
department of psychology
Asia International University

EMOTIONAL BEHAVIOR OF FAMILIES WITH SEVERE ILLNESS OR CHILD LOSS: PSYCHOLOGICAL MECHANISMS AND PRACTICAL SUPPORT STRATEGIES

Abstract: *This scientific article analyzes the emotional behavior of families living with severe (chronic or life-threatening) illnesses as well as those who have experienced profound loss such as the death of a child. The study examines stress- and trauma-related response reactions and changes within the family system. The problem is approached from the perspectives of crisis psychology, family systems theory, and trauma-informed practice, and practical as well as psychological recommendations are provided to manage emotional responses such as depression, anxiety, guilt, anger, denial, and social withdrawal.*

Keywords: *severe illness, child loss, grief, trauma, family stress, emotional regulation, psychological first aid, family therapy, social support.*

Inson hayotida ba’zi voqealar bo‘ladiki, ular nafaqat kundalik hayotni, balki butun dunyoqarashni tubdan o‘zgartirib yuboradi. Og‘ir kasallik yoki farzand yo‘qotish shunday sinovlardandir. Bu holatlar faqat bir insonning emas, balki

butun oilaning ruhiy muvozanatini izdan chiqaradi. Oila birdaniga avvalgidek yashay olmay qoladi: suhbatlar jimib boradi, kulgi kamayadi, har bir qaror og‘irlik bilan qabul qilinadi. Bunday vaziyatda insonning hissiy xulq-atvori keskin o‘zgaradi va ko‘pincha u o‘zini ham, atrofdagilarni ham tushunmay qoladi.

Og‘ir kasallikka duch kelgan oilalarda qo‘rquv eng birinchi paydo bo‘ladigan hissiyotdir. Bu qo‘rquv nafaqat kasallikning o‘zidan, balki noaniqlikdan, kelajakning mavhumligidan kelib chiqadi. “Nima bo‘ladi?”, “Qancha davom etadi?”, “Biz bunga dosh bera olamizmi?” degan savollar ongni band etadi. Vaqt o‘tgan sari qo‘rquv charchoqqa aylanadi. Ayniqsa bemorga qarayotgan yaqin insonlarda ruhiy va jismoniy holdan toyish, sabrsizlik, ba’zan esa ichki g‘azab paydo bo‘ladi. Bu g‘azab ko‘pincha bemorga emas, vaziyatning o‘ziga qaratilgan bo‘lsa-da, oila ichidagi munosabatlarga salbiy ta’sir ko‘rsatadi.

Farzand yo‘qotish esa bundan ham og‘irroq ruhiy zarba bo‘lib, u inson qalbida chuqur bo‘shliq qoldiradi. Ota-ona uchun bola hayot mazmuni, kelajak umidi edi. Uni yo‘qotish bilan hayot go‘yo rangsizlanib, ma’nosini yo‘qotgandek tuyuladi. Bunday paytda inson ko‘pincha o‘zini ayblay boshlaydi. “Agar shunday qilganimda…”, “Agar vaqtida sezganimda…” kabi fikrlar tinmay qayta-qayta xayoldan o‘tadi. Bu aybdorlik hissi insonni ich-ichidan yemiradi va qayg‘uni yanada og‘irlashtiradi.

Ko‘pchilik og‘ir qayg‘u paytida jamiyatdan chekinadi. Odamlar bilan gaplashgisi kelmaydi, tashqi dunyo begonalashib boradi. Ba’zida esa, aksincha, inson o‘zini majburan kuchli ko‘rsatishga urinadi, yig‘lamaslikka, his-tuyg‘ularini yashirishga harakat qiladi. Ammo hislarni bosib yurish ularni yo‘q qilmaydi, balki yanada chuqurroq joyga singdiradi. Vaqti kelib bu hislar tushkunlik, sog‘liq muammolari yoki oilaviy nizolar ko‘rinishida yuzaga chiqishi mumkin.

Shu sababli og‘ir kasallik yoki farzand yo‘qotgan oilalar uchun eng muhim narsa — his-tuyg‘ularni inkor etmaslikdir. Yig‘lash, iztirob chekkanini tan olish, “men hozir juda og‘ir ahvoldaman” deyish zaiflik emas. Aksincha, bu ruhiy sog‘lomlik sari tashlangan birinchi qadamdir. Oila a’zolari bir-birini tushunishga, ayblamasdan tinglashga harakat qilishi kerak. Ba’zan maslahat berishdan ko‘ra, yonida jim o‘tirib, tinglab berish ko‘proq yordam beradi.

Amaliy jihatdan esa bunday oilalarga kundalik hayotda kichik, ammo muhim yordamlar zarur. Ovqat tayyorlash, uy yumushlarida ko‘maklashish, bolalarga qarab turish kabi oddiy ishlar ruhiy yukni ancha yengillashtiradi. Chunki qayg‘u ichida bo‘lgan inson oddiy vazifalarni ham bajarishga qiynaladi. Yaqinlarning bunday amaliy yordami “sen yolg‘iz emassan” degan muhim signalni beradi.

Psixologik yordam ham katta ahamiyatga ega. Mutaxassis bilan suhbat insonning ichida yig‘ilib qolgan og‘ir hislarni tartibga solishga yordam beradi. Ayniqsa farzand yo‘qotgan ota-onalar uchun bu juda muhim. Chunki ularning qayg‘usi jamiyat tomonidan ko‘pincha yetarlicha tushunilmaydi va ular o‘z dardini yolg‘iz ko‘tarishga majbur bo‘lib qoladi. Psixologik yordam insonni qayg‘udan “qutqarish” uchun emas, balki qayg‘u bilan yashashni, hayotga asta-sekin qaytishni o‘rgatish uchun kerak.

Maqola tahliliy-umumlashtiruvchi usulda tayyorlandi. Krizis psixologiyasi, travma psixologiyasi, oilaviy tizimlar yondashuvi va qayg‘u bilan ishlash bo‘yicha ilmiy manbalar kontent-tahlil qilindi; amaliy psixologik maslahatlar tajribasida uchraydigan tipik holatlar ilmiy kategoriyalar asosida guruhlandi. Maqola amaliyotga yo‘naltirilgan bo‘lib, klinik tashxis qo‘yishdan ko‘ra, psixologik yordam ko‘rsatish mexanizmlarini tushuntirishga urg‘u beradi.

Natijalar shuni ko‘rsatadiki, og‘ir kasallik va farzand yo‘qotish oilada turli tipdagi stressni yuzaga keltiradi: birinchisida davomiy “parvarish stressi”, ikkinchisida esa “travmatik qayg‘u” ustun. Biroq ikkala holatda ham emotsional regulyatsiya buzilishi, o‘zaro muloqotning izdan chiqishi va ijtimoiy chekinish kabi umumiy xususiyatlar mavjud. Eng ko‘p uchraydigan muammolardan biri — yaqinlar “to‘g‘ri gap” topolmay, sukut saqlashi yoki aksincha, o‘ta nasihatgo‘ylikka o‘tib, qayg‘uni inkor etishi. Bu esa qayg‘u jarayonini cho‘zishi, murakkab qayg‘u yoki depressiv holatni kuchaytirishi mumkin.

Shu sababli, yordamning asosiy prinsipi — insonning his-tuyg‘usini tan olish, xavfsiz muloqot yaratish va resurslarni tiklashdan iborat. Psixologik yordam “bir marta suhbat” emas, balki bosqichma-bosqich qo‘llab-quvvatlash tizimi bo‘lishi kerak.

Xulosa qilib aytganda, og‘ir kasallik yoki farzand yo‘qotish oilaning hissiy hayotida chuqur iz qoldiradi. Bu jarayonda inson turli hissiy holatlardan o‘tadi: qo‘rquv, g‘azab, aybdorlik, tushkunlik va bo‘shliq hissi. Eng muhim narsa — bu holatlarni tabiiy deb qabul qilish va yolg‘iz qolmaslikdir. Oila ichidagi mehr, atrofdagilarning tushunishi va professional psixologik yordam og‘ir sinovdan o‘tayotgan oilaga hayot bilan bog‘lanib qolishga, asta-sekin bo‘lsa-da, yana oldinga qarab yurishga yordam beradi.

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Raxmatullayeva A. Sh.
talabasi
davolash fakulteti
Samarqand davlat tibbiyot universiteti
Ilmiy rahbar: Xidirov Z. E.
assistenti
odam anatomiyasi kafedrasi
Samarqand davlat tibbiyot universiteti
Samarkand, Uzbekistan

KO‘Z OLMASINING TUZILISHI VA YOSHGA QARAB O‘ZGARISHI. KO‘ZNING YORDAMCHI APPARATI. ULARNING YOSHGA QARAB O‘ZGARISHI

Annotatsiya: *Ushbu maqolada inson ko‘zi tuzilishi, uning yordamchi apparatlari va ularning yoshga bog‘liq o‘zgarishlari ilmiy jihatdan tahlil qilinadi. Ko‘z organi insonning asosiy sezgi organlaridan biri bo‘lib, vizual informatsiyani qabul qilish va markaziy asab tizimiga uzatish vazifasini bajaradi. Ko‘zning anatomik va fiziologik xususiyatlari, yoshga bog‘liq o‘zgarishlar, shuningdek, yordamchi apparatlarining — qovoqlar, ko‘z yosh bezlari, konjunktiva va ko‘z mushaklarining funksiyalari batafsil bayon etiladi.*

Kalit so’zlar: *Ko‘z olmasi, Ko‘z yordamchi apparatlari, Qovoqlar, Ko‘z yosh bezlari, Konjunktiva, Ko‘z mushaklari, Retina, Linza, Yoshga bog‘liq o‘zgarishlar, Presbiopiya Vizual funksiyalar*

Raxmatullayeva A. Sh.
student
faculty of medicine
Samarkand State Medical University
Scientific Supervisor: Xidirov Z. E.
assistant
department of human anatomy
Samarkand State Medical University
Samarkand, Uzbekistan

STRUCTURE OF THE EYEBALL AND AGE-RELATED CHANGES. ACCESSORY STRUCTURES OF THE EYE AND THEIR AGE-RELATED CHANGES

Abstract: *This article analyzes the structure of the human eye, its accessory structures, and their age-related changes. The eye is one of the main sensory organs of humans, responsible for receiving visual information and transmitting it to the central nervous system. The article provides a detailed overview of the anatomical and physiological features of the eye, age-related changes, and the*

functions of accessory structures, including the eyelids, lacrimal glands, conjunctiva, and ocular muscles.

Keywords: *eyeball, accessory structures of the eye, eyelids, lacrimal glands, conjunctiva, ocular muscles, retina, lens, age-related changes, presbyopia, visual functions*

Kirish

Inson tug'ulib, voyaga yetib, umr kechirishi davomida turli kasalliklarga chalinadi. Har bir a'zoning o'ziga xos funksiyasi bor va har bir a'zo insonga ko'mak beradi. Inson ko'zi ko'rar ekan, u barcha ishini bajara oladi.

Ko‘z organi insonning eng muhim sezgi organlaridan biri bo‘lib, atrof-muhitdan vizual ma'lumotlarni qabul qiladi va ularni miya orqali qayta ishlashga imkon beradi. Ko‘zning anatomiyasi va fiziologiyasi murakkab bo‘lib, uning samarali ishlashi ko‘plab yordamchi strukturalar orqali ta'minlanadi. Ko‘z organi va uning yordamchi apparatlari yoshga bog‘liq o‘zgarishlarga uchraydi, bu esa vizual qobiliyatning pasayishi yoki ayrim kasalliklarning rivojlanishiga olib kelishi mumkin.

Ko‘z olmasi insonning sezgi organlari ichida eng murakkab tuzilmalardan biri bo‘lib, vizual informatsiyani qabul qilish va markaziy asab tizimiga uzatish funksiyasini bajaradi. Ko‘zning anatomik va fiziologik xususiyatlari yoshga bog‘liq ravishda o‘zgaradi, bu esa nafaqat vizual qobiliyat, balki ko‘zning morfologik holatiga ham ta'sir ko‘rsatadi. Shu nuqtai nazardan, ko‘zning asosiy tarkibiy qismlari va ularning yordamchi apparatlari (qovoqlar, kon'yunktiva, ko‘z yosh bezlari va optik tuzilmalar) ning yoshga qarab morfologik va funksional transformatsiyalari ilmiy jihatdan muhim mavzudir.

Maqolaning maqsadi – ko‘z olmasi va uning yordamchi apparatlarining strukturaviy xususiyatlarini yoshga bog‘liq ravishda tahlil qilish hamda bu o‘zgarishlarning klinik ahamiyatini ochib berish.

1. Ko‘z olmasining anatomiyasi

Ko‘z olmasi (bulbus oculi) uch qavatdan tashkil topgan:

Tashqi qavat – sklera va kornea

Sklera (oq qavat) ko‘zning mexanik qo‘llab-quvvatlovchi qismi bo‘lib, uning zichligi va elastikligi yoshga bog‘liq ravishda o‘zgaradi. Bolalikda sklera nisbatan yumshoq va elastik, keksa yoshda esa kollagen tolalarining qattiqlashishi sababli qattiqlashadi va rangsizlanadi.

Kornea shaffof va optik qavat bo‘lib, uning qalinligi va optik indekslari yoshga bog‘liq o‘zgaradi. Masalan, bolalikda kornea nisbatan qalin va yumshoq, kattalarda esa biroz yupqalashadi va shaffoflik darajasi pasayishi mumkin.

O‘rta qavat – xoroid, iris, ciliary tanasi

Xoroid qon tomirlar tarmog‘i orqali ko‘z oziqlanishini ta'minlaydi. Yoshga bog‘liq transformatsiyalarda xoroid qalinligi kamayadi, bu esa retina metabolizmini sekinlashtiradi.

Iris rang pigmentlariga ega bo‘lib, qovoqning yorug‘likka moslashuvini boshqaradi. Yosh bilan irisdagi pigment miqdori o‘zgarishi mumkin, ba’zi hollarda irisdagi melanotsitlarning soni kamayadi.

Ciliary tanasi linzaning fokuslash mexanizmini nazorat qiladi. Presbiopiya — bu yoshga bog‘liq linza elastikligining kamayishi natijasida yuzaga keladi.

Ichki qavat – retina

Retina vizual ma’lumotlarni qabul qiluvchi fotoreseptorlar (konuslar va stavlar)dan tashkil topgan. Yosh bilan stavlar soni kamayadi, bu esa tunda ko‘rish qobiliyatini susaytiradi. Konuslar esa rang sezuvchanligini ta’minlaydi, ular ham qariy yoshda funktsional faollikni yo‘qotadi.

2. Ko‘zning yordamchi apparatlari

Ko‘zning asosiy yordamchi apparatlari quyidagilarni o‘z ichiga oladi:

Qovoqlar (palpebrae) – ko‘z olmasini mexanik himoya qiladi, ko‘z yuzasini namlaydi va mikroblardan himoya qiladi. Yoshga bog‘liq o‘zgarishlarda qovoq elastikligi kamayadi, chalishish va ptos (qovoq tushishi) kuzatiladi.

Kon’yunktiva – ko‘zning shilliq qavati bo‘lib, infektsiyalarga qarshi himoya qiladi. Yosh bilan kon’yunktivalarning silliqligi pasayadi, damarlar ko‘proq ko‘rinadi.

Ko‘z yosh bezlari (glandula lacrimalis) – ko‘z yuzasini namlaydi va infektsiyalardan himoya qiladi. Keksa yoshda ko‘z yosh ishlab chiqarilishi kamayadi (kseroftalmiya), bu esa ko‘rish va ko‘z sog‘lig‘iga salbiy ta’sir ko‘rsatadi.

Ekstraokulyar muskullar – ko‘z harakatini ta’minlaydi. Yoshga bog‘liq atrof muskullar kuchi kamayishi, ko‘zning koordinatsiya va fokuslash qobiliyatiga ta’sir qilishi mumkin.

3. Yoshga bog‘liq o‘zgarishlar

Ko‘z olmasi va uning yordamchi apparatlarida yosh bilan bog‘liq quyidagi o‘zgarishlar kuzatiladi:

Bolalik va o‘smirlik: ko‘z olmasi tez o‘sadi, qovoqlar va muskullar elastik, ko‘z yosh ishlab chiqarish faol.

Voyaga yetish davri: ko‘z linzasi elastikligini yo‘qotishi boshlaydi, fokuslash qobiliyati (akkomodatsiya) sekinlashadi.

Keksa yosh: sklera va linza qattiqlashadi, retina stavlari kamayadi, ko‘z muskullarining koordinatsiyasi susayadi, ko‘z yosh ishlab chiqarilishi kamayadi, kon’yunktiva silliqligi pasayadi.

Bu o‘zgarishlar klinik jihatdan presbiopiya, katarakta, quruq ko‘z sindromi va boshqa oftalmologik kasalliklarning rivojlanishiga sabab bo‘lishi mumkin.

Ko‘z olmasi tuzilishi

Ko‘z olmasi sferik shaklga ega bo‘lib, taxminan 24 mm diametrga ega. U uch qavatdan iborat:

Sclera va kornea (tashqi qavat)

Sclera: Ko‘zning oq qismi bo‘lib, mexanik himoya vazifasini bajaradi.

Kornea: Shaffof qavat bo‘lib, yorug‘likni ko‘zga o‘tkazadi va optik fokusni ta’minlaydi.

Choroid, iris va ciliary tanasi (o‘rta qavat)

Choroid: Ko‘zga qon ta’minotini beradi, yorug‘likni so‘ndiradi.

Iris: Pupilani o‘zgartirib, kirayotgan yorug‘lik miqdorini boshqaradi.

Ciliary tanasi: Linzaning shaklini o‘zgartirish orqali fokuslashni amalga oshiradi.

Retina (ichki qavat) Retina fotoreseptorlar — konuslar va tayoqchalar orqali yorug‘likni impulslarga aylantiradi va optik nerv orqali miyaga uzatadi.

Ko‘z yordamchi apparatlari

Ko‘zning samarali ishlashi faqat olma tuzilishi bilan cheklanmaydi, balki quyidagi yordamchi apparatlar orqali ta’minlanadi:

Qovoqlar – ko‘z yuzasini himoya qiladi, namlikni ta’minlaydi, yorug‘likning kiritilishini nazorat qiladi.

Ko‘z yosh bezlari – ko‘z yuzasini namlik bilan ta’minlaydi, mikroblarga qarshi himoya vazifasini bajaradi.

Konjunktiva – qizarish va infektsiyalardan himoya qiladi, qovoqlar ichki yuzasini qoplaydi.

Ko‘z mushaklari – 6 ta skelet mushaklari ko‘z harakatlarini amalga oshiradi, bino va vizual koordinatsiyani ta’minlaydi.

Yoshga bog‘liq o‘zgarishlar

Ko‘z va uning yordamchi apparatlari insonning turli yosh bosqichlarida turlicha o‘zgaradi:

Bola va bolalik davri

Ko‘z olmasi sferik shaklga ega, fokuslash qobiliyati cheklangan.

Linza elastik, shuning uchun yaqin va uzoq masofani ko‘rishda katta moslashuv imkoniyati mavjud.

Ko‘z mushaklari nisbatan zaif rivojlangan.

O‘sish va voyaga yetish davri

Ko‘zning diametri asta-sekin oshadi.

Linza elastikligi pasayadi, yoshga bog‘liq fokuslash qobiliyati biroz kamayadi.

Ko‘z yosh ishlab chiqarish qobiliyati barqaror bo‘ladi.

Keksalik

Linza elastikligi keskin pasayadi, presbiopiya rivojlanadi.

Sclera va kornea biroz qattiqlashadi, yorug‘likni o‘tkazish kamayadi.

Ko‘z yosh ishlab chiqarish kamayadi, qurib qolish va irritatsiya xavfi ortadi.

Ko‘z mushaklarining koordinatsiyasi pasayadi, strabizm va ko‘z charchoqligi kuzatilishi mumkin.

Bola tug‘ilganda hah juda to‘liq yetilmagan, endi ochiladigan guldek nozik bo‘ladi. Bu hoi tabiiy albatta, chunki insonning haqiqiy hayoti u yorug4 dunyoga kelgandan so‘ng boshlanadi. Bunga misol tariqasida shuni aytish mumkin-ki, 40 haftalik (9 oylik) homiladagi normal bola ko‘zning to‘r pardasidagina hamma 10 morfologik qavatlari mukammal tashkil topgan bo‘ladi. Lekin mazkur chaqaloq ko‘zini 2-3 oylik bola ko‘zi to‘r pardasining morfologik tuzilishiga solishtirib ko'rilganda, bundagi to‘r pardaning hamma qavatlari juda aniq, yanada ravshan va

yaqqol ko‘rinadi. Bu esa 2-3 oylik bolaning ko‘zi hayot vaqtida - tashqi muhit sharoitida ko‘ziga tushgan yorugnurlar ta’sirida, ko‘zidagi nerv tolalari va hujayralarning quyoshdan nur olib jilolanganidan darak beradi. Demak, inson ko‘zi yorug‘lik nuri bilan adekvatdir. Ko‘zning ko‘rish faoliyati bolaning turli yoshida turlicha bo‘ladi. Chunki, ko‘rish analizatorining distal qismi - ko‘z soqqasi juda erta, homila davridayoq va bola tug‘ilishi oldidan takomillashib, ko‘rish vazifasini bajaraveradi. Ammo analizatoming markaziy qismi - bosh miya po‘stloq osti va po'stloq qismining faoliyati juda kech rivojlanadi. Ya’ni, bolada odamlami tanish, ularni eslab qolish, buyumlarni farqlash, ranglarni ajratish qobiliyati faqat bolaning 2-3 yoshidan keyin asta-sekin davom etib, u 7-8 yoshga to‘lganda ko‘rish faoliyati to‘liq bo‘ladi. Agar 3-4 yoshli bolaga barmoqlarimizni ko‘rsatsak u hammasini sanab berolmaydi. 5-6yoshli bola ham jadvaldagi belgilami eslay olmaydi. Bu holat patalogiya emas, balki bola yoshiga xos xususiyatdir. 7-8 yoshli bola o ‘sha belgilarni to‘la o ‘qib berishi mumkin. Shu kabi ko‘zning ranglarni ajrata olish qobiliyati ham boyagi yoshdagi sog‘lom bolalarda asta-sekin rivojlangan boladi. 0 ‘smirlar va yoshlarda miyaning hamma analizatorlari singari ko‘z ham a’lo darajada ko‘rib, o‘z vazifasini normal darajada bajaradi. Tashqi muhitda yashash odam organizmining har bir a’zosiga o‘z tegishli ta’sirinj ko‘rsatadi. Buijdan ma’lum bo‘ladi-ki, yangi tug‘ilgan bola organizmi - yuzi, ko‘zi, qulog‘i va boshqa a’zolari tashqi muhitdagi turli nurlar, havoning issiq-sovuqligi ta’siri ostida etiladi. U oydan-oyga, yildan-yilga mavjud muhitga moslashib, rivojlanadi, o‘sadi va ulg‘ayadi. 0 ‘z me’yorida o ‘sib kelayotgan chaqaloqningqovoq terisi, qovoqlari, kipriklari va ko‘zlari ham nafis hamda bejirim bo‘ladi. Kipriklar ko‘payadi, qoshlar qorayadi, qovoqlar ham o‘sib, kengayib ko‘zlarga chiroy beradi. Yillar osha organizmda va ko‘rish a’zolarida muhit hamda ba’zan balog‘atga yetish ta’sirida turli o‘zgarish1ar yuzaga keladi. Eng awalo, yuz va qovoqlar terisida, ko‘zning shilliq pardasida yengilgina qizarish paydo bo‘lishi mumkin. Ba’zida terida turli donachalar, husnbuzarlar paydo bo‘lishi kabi o‘zgarish1ar yuz beradi. Ma’lum bir yoshda (balog‘at yoshidagi yigit va qizlarda) bo‘yga o‘sish (akseliratsiya) sodir bo‘ladi-ki, buning ta’sirida ba’zi o‘smirlardako‘z soqqasi o‘qining ham uzayishi, uning nur singdirish faoliyatining kuchayishi, miopiya paydo bo‘lishiga sabab bo‘ladi. Bu ko‘z gavharining qalinlashuvi va shaklining o‘zgaruvchanligidan vujudga keladi. Yosh bola ko‘zining gavhari esa normada juda yumshoq, dumaloq va juda ham tiniq bo‘ladi. Odatda 18-20 yoshlarda gavharda yadro (o‘zak) paydo boladi va bu yadro qalinlasha borib, inson 40 yoshlarga borganda o‘z yumshoqligini butunlay yo‘qotadi va uning qisqarib-kengayish harakati ham susayib, kozning yaqindan ko'rish qobiliyati asta-sekin kuchsizlanadi. Odam yozish, chizish va tikish kabi ishlami bajarishda qiynala boshlaydi. Shuninguchun unda yaqindan ko‘rish uchun ko‘zoynak taqishga ehtiyoj paydo boMadi. Ko‘zning va gavhar vazifasining bu dinamik o‘zgarishi presbiopiya deyiladi. Bu inson hayotidagi fiziologik jarayondir. Bu jarayon ko‘zning uzoqni yaxshi - normal ko‘rishiga salbiy ta’sir qilmaydi. Soglom ko‘zlarning uzoqni ko'rish faoliyati 40 yoshdan keyin ham a’lo darajada saqlanib qolaveradi.

Xulosa

Ko‘z olmasi va uning yordamchi apparatlari insonning vizual funksiyasi uchun muhim bo‘lib, ularning strukturaviy va funksional xususiyatlari yoshga bog‘liq ravishda o‘zgaradi. Bolalikda ko‘z tizimi elastik va faol, katta yoshda esa morfologik o‘zgarishlar va funktsional pasayishlar kuzatiladi. Shu sababli ko‘z sog‘lig‘ini saqlash, profilaktika va yoshga moslashgan terapiya strategiyalari tibbiyot amaliyoti uchun katta ahamiyatga ega.

Ko‘z anatomiyasi va yoshga bog‘liq o‘zgarishlarni chuqur o‘rganish oftalmologik kasalliklarni erta aniqlash va samarali davolash imkonini beradi.

Ko‘z olmasi va uning yordamchi apparatlari insonning vizual qobiliyatini ta’minlovchi murakkab tizimdir. Ushbu tizimning tuzilishi va funksiyalari yoshga bog‘liq ravishda o‘zgaradi. Yoshga bog‘liq o‘zgarishlarni hisobga olgan holda ko‘z salomatligini saqlash va davolash choralari samarali bo‘ladi. Shu sababli, ko‘z kasalliklarini profilaktika qilish, vizual faoliyatni qo‘llab-quvvatlash va yoshga mos optik vositalardan foydalanish muhim ahamiyatga ega.

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Raxmatullayeva A. Sh.
talabasi
davolash fakulteti
Samarqand davlat tibbiyot universiteti
Ilmiy rahbar: Xidirov Z. E.
assistenti
odam anatomiyasi kafedrasi
Samarqand davlat tibbiyot universiteti
Samarkand, Uzbekistan

ORQA MIYA VA ORQA MIYA PARDALARI, UNING YOSHGA DOIR XUSUSIYATLARI

Annotatsiya*: Ushbu maqolada orqa miyaning anatomik-tuzilish xususiyatlari, uning pardalari (meninges spinales) hamda turli yosh davrlarida uchraydigan morfofunksional o‘zgarishlar yoritilgan. Orqa miyaning embrional, bolalik, o‘smirlik va qarilik davrlaridagi rivojlanish xususiyatlari ilmiy manbalar asosida tahlil qilingan. Olingan ma’lumotlar klinik nevrologiya, pediatriya va anatomiya fanlari uchun muhim ahamiyatga ega. Ushbu anatomik ma’lumotlar bolalar organizmining fiziologik xususiyatlarini, shuningdek, bolalarda uchraydigan patologik jarayonlarni tushunish uchun zarurdir. Anatomiyani bilish shifokor-pediatr uchun nihoyatda muhim ahamiyatga ega, chunki u kasallikning dastlabki belgilarini aniqlashga, bolaning normal rivojlanishidan chetga chiqishlarni aniqlashga, yoshga oid xususiyatlarni hisobga olgan holda davolash rejasini ishlab chiqishga hamda o‘tkazilayotgan tibbiy tadbirlarning samaradorligini to‘g‘ri baholashga yordam beradi.*

Kalit so‘zlar: *orqa miya, qattiq parda, o‘rgimchaksimon parda, yumshoq parda, yoshga doir xususiyatlar, markaziy asab tizimi.*

Raxmatullayeva A. Sh.
student
faculty of medicine
Samarkand State Medical University
Scientific advisor: Khidirov Z. E.
assistant
department of human anatomy
Samarkand State Medical University
Samarkand, Uzbekistan

SPINAL CORD AND ITS MENINGES, AGE-RELATED FEATURES

Abstract: *This article highlights the anatomical and structural features of the spinal cord, its meninges (meninges spinales), and the morphofunctional changes that occur at different age stages. The developmental features of the*

spinal cord during the embryonic, childhood, adolescence, and elderly periods are analyzed based on scientific sources. The obtained data are of significant importance for clinical neurology, pediatrics, and anatomy. This anatomical information is essential for understanding both the physiological characteristics of the child's body and the pathological processes in children. Knowledge of anatomy is extremely important for pediatricians, as it helps to recognize early signs of disease, detect deviations from normal child development, develop treatment plans considering age-related characteristics, and accurately assess the effectiveness of medical interventions.

Keywords: *spinal cord, dura mater, arachnoid mater, pia mater, age-related features, central nervous system.*

Kirish

Orqa miya markaziy asab tizimining muhim bo‘limlaridan biri bo‘lib, reflektor va o‘tkazuvchi funksiyalarni bajaradi. U organizmning tashqi muhit bilan o‘zaro aloqasini ta’minlashda, harakat va sezgi faoliyatining muvofiqlashuvida muhim rol o‘ynaydi. Orqa miyaning tuzilishi va uni o‘rab turgan pardalarning yoshga qarab o‘zgarishi tibbiyot amaliyotida, ayniqsa, bolalar va keksalar patologiyalarini tushunishda muhim ahamiyat kasb etadi.

Markaziy va periferik asab tizimining shakllanishidagi morfologik qonuniyatlar fiziologik qonuniyatlar bilan chambarchas bog‘liqdir. Inson asab tizimining morfofiziologik rivojlanishi prenatal hayot davridan boshlanib, postnatal davrda tobora takomillashib va murakkablashib boradi. Rivojlanishning har bir yangi, yuqoriroq bosqichida sifat jihatidan yangi, o‘ziga xos tuzilma va funksional xususiyatlar paydo bo‘ladi.

Yosh davrlari: Insonning individual rivojlanishida quyidagi davrlar ajratiladi:

-embrional davr — embrion rivojlanishining dastlabki 2–3 oyini o‘z ichiga oladi;

-homilaviy (fetal) davr — 3-oydan boshlab homilaning bachadondagi hayoti oxirigacha davom etadi;

-postnatal davr — tug‘ilgandan keyin insonning butun hayotini qamrab oladi.

Orqa miya

• Bachadon ichidagi rivojlanish davrining birinchi yarmida orqa miya uzunligi bo‘yicha butun umurtqa kanalini egallaydi.

• Keyinchalik uning o‘sishi umurtqa pog‘onasining o‘sishidan ortda qoladi.

• Yangi tug‘ilgan chaqaloqda orqa miyaning pastki uchi 3-bel umurtqasi darajasida joylashadi.

• Bolalik yoshida ham orqa miyaning o‘sishi umurtqa pog‘onasining o‘sishidan ortda qolishda davom etadi.

• Kattalarda orqa miya 1-bel umurtqasi darajasida, ayrim hollarda esa 2-bel yoki 12-ko‘krak umurtqalari darajasida tugaydi.

Orqa miya uzunligini tana uzunligi bilan solishtirish quyidagi ko‘rsatkichlar orqali aniqlanadi: yangi tug‘ilganlarda orqa miya uzunligi tana uzunligining 30 % ini, 1 yoshli bolada taxminan 27 % ni, 3–5 yoshli bolalarda 21 % ni, 7 yoshdan boshlab 22 % ni, kattalarda esa 26 % ni tashkil etadi (A. K. Koveshnikova, 1958).

• Ushbu foiz ko‘rsatkichlarni taqqoslash shuni ko‘rsatadiki, tana o‘sishi bilan orqa miya uzunligining tana uzunligiga nisbati dastlab kamayadi, keyinchalik esa kattalarda yana biroz ortadi. Bu nisbatlar bolaning organizmi shakllanish jarayonida o‘zgarib boradi.

• Yangi tug‘ilgan chaqaloqda orqa miya uzunligi o‘rtacha 14,1 sm bo‘lib, butun postnatal davr mobaynida 3–4 barobar ortadi.

• Orqa miya uzunligi bilan tana uzunligi o‘rtasida yaqin bog‘liqlik mavjud: bu ikki ko‘rsatkich to‘g‘ri proporsional ravishda ortib boradi.

• Boshqa bo‘limlarga nisbatan ko‘krak qismi ko‘proq o‘sadi, bel sohasi esa eng sekin o‘sadi.

Yangi tug‘ilgan chaqaloqda orqa miyaning o‘rtacha vazni 3,2 g ni tashkil etadi, ya’ni tana vaznining 0,1 % iga teng (kattalarda — tana vaznining 0,04 % i) va bosh miya vaznining 1 % ini tashkil qiladi (kattalarda — 2 %). Tug‘ilgandan keyin 6–10 oy ichida uning vazni ikki baravar oshadi, 3 yoshga kelib 3 baravar ortadi, shundan so‘ng vaznning ortishi sekinroq kechadi.

• Bo‘yin va bel qismidagi kengayishlar (qalinlashishlar) 3 yoshdan keyin shakllana boshlaydi. Orqa miya yuzasida kattalarnikiga nisbatan ko‘proq egatchalar bo‘lishi mumkin. Doimiy egatchalar mavjud bo‘lib, ular yosh o‘tishi bilan chuqurlashadi, vaqtinchalik egatchalar esa keyinchalik yo‘qoladi.

• Yangi tug‘ilganlarda orqa miyaning oq moddasi yuzasi kulrang modda yuzasiga nisbatan ikki baravar katta bo‘ladi. Kulrang va oq moddaning o‘sishi notekis kechadi: kulrang modda hajmi 5 baravar, oq modda esa 14 baravar ortadi.

• Orqa miyaning markaziy kanali kattalarnikiga nisbatan nisbatan kengroq bo‘ladi.

• Sezuvchi yo‘llar va oldingi piramidal yo‘l yaxshi miyelinlangan bo‘ladi. Qolgan yo‘llar 4–6 oylikdan boshlab miyelinlanishni boshlaydi va bu jarayon bolalarda 3 yoshdan 7 yoshgacha bo‘lgan davrda yakunlanadi.

Rivojlanish jarayonida bosh miya va orqa miya vazni o‘rtasidagi nisbatlar o‘zgaradi. Yangi tug‘ilganlarda orqa miya bosh miya vaznining 1 % ini tashkil etsa, 1 yoshli bolada — 1,2 %, 2 yoshli bolada — 1,3 %, kattalarda esa — 2 % ni tashkil etadi.

Tana vazniga nisbatan orqa miya ulushi yangi tug‘ilganlarda 0,09 % dan kattalarda 0,04 % gacha kamayadi.

Postnatal ontogenez davrida orqa miyaning jadal o‘sishi orqa miya reflekslarining shakllanishi, o‘tkazuvchi yo‘llarning hamda analizatorlar po‘stlog‘iy markazlarining rivojlanishi bilan uzviy bog‘liqdir. Ontogenezda ham, filogenezda bo‘lgani kabi, avval orqa miyaning qadimgi yo‘llari shakllanadi, keyinroq esa yangi yo‘llar va ularga mos keluvchi hujayraviy tuzilmalar rivojlanadi.

Rivojlanish jarayonida orqa miyaning konfiguratsiyasi o‘zgaradi, yuqori va pastki qo‘l-oyoqlar kurtaklarining o‘sishi bilan bog‘liq holda bo‘yin va bel qismidagi kengayishlar paydo bo‘ladi. Aynan shu kengayishlar sohasida orqa miya eng katta massaga ega bo‘ladi. Bo‘yin qismidagi kengayish bel qismiga nisbatan tezroq rivojlanadi, bu esa yuqori qo‘l-oyoqning ertaroq rivojlanishi bilan izohlanadi.

Bolalikning dastlabki yillarida bo‘yin va bel qismidagi kengayishlarning shakllanish jarayoni eng jadal kechadi.

• N. P. Gundobin ma’lumotlariga ko‘ra, orqa miya qalinligi sekin o‘sadi. 12 yoshga kelib uning qalinligi ikki baravar ortadi va keyinchalik deyarli o‘zgarmay qoladi.

• F. I. Valker (1938) ma’lumotlariga ko‘ra, orqa miyaning bel va dumg‘aza bo‘limlari ko‘krak bo‘limiga nisbatan sekinroq o‘sadi.

• Yangi tug‘ilgan chaqaloqda orqa miya uzunligi o‘rtacha 14–16 sm ni, kattalarda esa 42–45 sm ni tashkil etadi.

Rivojlanish jarayonida orqa miyaning konfiguratsiyasi o‘zgaradi, yuqori va pastki qo‘l-oyoqlar kurtaklarining o‘sishi bilan bog‘liq holda bo‘yin va bel qismidagi kengayishlar paydo bo‘ladi. Aynan shu kengayishlar sohasida orqa miya eng katta massaga ega bo‘ladi. Bo‘yin qismidagi kengayish bel qismiga nisbatan tezroq rivojlanadi, bu holat yuqori qo‘l-oyoqning ertaroq rivojlanishi bilan izohlanadi. Yangi tug‘ilganlarda orqa miya uzunligi taxminan 16 sm bo‘lsa, kattalarda 42–45 sm ni tashkil etadi.

Bo‘yin va bel qismidagi kengayishlar hayotning 3-yilidan keyin aniq shakllana boshlaydi. Orqa miya yuzasida kattalarnikiga nisbatan ko‘proq egatchalar mavjud bo‘lishi mumkin. Doimiy egatchalar yosh o‘tishi bilan chuqurlashadi, vaqtinchalik egatchalar esa keyinchalik yo‘qoladi.

Yangi tug‘ilganlarda orqa miyaning oq moddasi yuzasi kulrang modda yuzasiga nisbatan ikki baravar katta bo‘ladi. Kulrang va oq moddaning o‘sishi notekis kechadi: kulrang modda hajmi 5 baravar, oq modda esa 14 baravar ortadi.

Orqa miyaning markaziy kanali kattalarnikiga nisbatan nisbatan kengroq bo‘ladi. Sezuvchi yo‘llar va oldingi piramidal yo‘l yaxshi miyelinlangan bo‘ladi. Qolgan o‘tkazuvchi yo‘llar 4–6 oylikdan boshlab miyelinlanishni boshlaydi va bu jarayon bolalarda 3 yoshdan 7 yoshgacha bo‘lgan davrda yakunlanadi.

Prenatal hamda postnatal ontogenez davrida orqa miyaning orqa shoxlari hujayralari oldingi shoxlar hujayralariga nisbatan shaklan xilma-xil va hajm jihatidan kichikroq bo‘ladi. A. I. Molochek (1936) ma’lumotlariga ko‘ra, oldingi shoxlarning harakatlantiruvchi hujayralarida fibrillyar tuzilma boshqa orqa miya hujayralariga qaraganda kechroq, ya’ni embrional davrning V oyida aniqlanadi, holbuki boshqa hujayralarda u III oydayoq paydo bo‘ladi.

Embrional davr oxiriga kelib, orqa miyaning asab hujayralari shakli, hajmi, yadroning joylashuvi va undagi Nissl tanachalari tarkibi bo‘yicha allaqachon rivojlangan holatda bo‘ladi. Glial to‘qima ham to‘liq rivojlangan bo‘ladi.

Adabiyot ma’lumotlariga ko‘ra, yangi tug‘ilgan chaqaloqlarda orqa miyaning hujayra tuzilishi maktabgacha yoshdagi bolalarnikidan deyarli farq

qilmaydi. Kattaroq yoshdagi bolalarda hujayralar kattalashadi va ularda argento-fil donachalar paydo bo‘ladi. Dastlab keng bo‘lgan asab nayining lumen postnatal rivojlanish jarayonida maktab yoshidagi bolalar va kattalarda tor markaziy kanalga aylanadi. Shu bilan birga, postnatal ontogenezning dastlabki bosqichlarida orqa miyaning makro- va mikroskopik tuzilishi kattalarda mavjud tuzilish bilan deyarli bir xil bo‘ladi.

Orqa miya, uning hujayra va tolali tuzilishi boshqa asab tizimi bo‘limlaridan avvalroq rivojlanadi, bu esa orqa miya refleks mexanizmlarining erta shakllanishi bilan to‘liq mos keladi.

Orqa miya umurtqa pog‘onasi kanalida joylashgan bo‘lib, yuqori tomondan uzunchoq miya bilan tutashadi, pastki qismi esa konussimon shaklda tugaydi. Orqa miyaning markaziy qismida kulrang modda, periferik qismida esa oq modda joylashgan.

Kulrang modda oldingi, orqa va yon shoxlardan iborat bo‘lib, nerv hujayralari tanalarini o‘z ichiga oladi. Oqart modda esa asosan nerv tolalaridan tashkil topgan bo‘lib, yuqoriga va pastga yo‘nalgan o‘tkazuvchi yo‘llarni hosil qiladi.

Orqa miya uch qavat parda bilan o‘ralgan:

Qattiq parda (dura mater spinalis) – tashqi, zich va mustahkam parda bo‘lib, orqa miyani mexanik ta’sirlardan himoya qiladi.

O‘rgimchaksimon parda (arachnoidea spinalis) – yupqa va shaffof parda bo‘lib, qattiq va yumshoq pardalar orasida joylashgan.

Yumshoq parda (pia mater spinalis) – orqa miyaning yuzasiga bevosita yopishib yotadi va qon tomirlarga boy bo‘ladi.

Bu pardalar orqa miya uchun himoya, oziqlantirish va suyuqlik almashinuvi funksiyalarini bajaradi.

Orqa miyaning yoshga doir xususiyatlari

Embrional va yangi tug‘ilgan davr

Embrional rivojlanish jarayonida orqa miya umurtqa pog‘onasi bilan deyarli bir xil uzunlikda bo‘ladi. Yangi tug‘ilgan chaqaloqlarda orqa miya pastki qismi III bel umurtqasi darajasida tugaydi.

Bolalik va o‘smirlik davri

Bola o‘sishi bilan umurtqa pog‘onasi orqa miyaga nisbatan tezroq rivojlanadi. Natijada orqa miyaning pastki qismi yuqoriroqqa ko‘tarilib, kattalarda I–II bel umurtqalari darajasida tugaydi. Bu davrda nerv tolalarining mielinlanishi kuchayadi va reflektor faoliyat takomillashadi.

Kattalar va qarilik davri

Qarilik davrida orqa miyada degenerativ o‘zgarishlar kuzatiladi. Nerv hujayralari sonining kamayishi, qon ta’minotining pasayishi va pardalarning elastikligi kamayishi funksional buzilishlarga olib kelishi mumkin.

Xulosa

Orqa miya va uning pardalari organizmning muhim hayotiy funksiyalarini ta’minlovchi murakkab tizim hisoblanadi. Yoshga doir anatomik va fiziologik o‘zgarishlarni bilish klinik amaliyotda tashxis qo‘yish va davolash choralarini

to‘g‘ri rejalashtirishda muhim ahamiyatga ega. Ushbu bilimlar ayniqsa pediatriya, nevrologiya va gerontologiya sohalarida dolzarbdir.

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Rozikova L. T., PhD
associate professor
Samarkand State Medical University

THE EFFECTIVENESS OF PEDAGOGICAL APPROACHES IN DEVELOPING PROFESSIONAL COMPETENCIES IN MEDICAL STUDENTS

Abstract: *This article examines the effectiveness of modern pedagogical approaches in developing professional competencies among medical students. The study focuses on competency-based education, problem-based learning, simulation-based training, and interdisciplinary teaching methods as key tools for enhancing clinical thinking, practical skills, communication abilities, and ethical decision-making. Through the analysis of current pedagogical practices and educational outcomes, the research highlights how student-centered and practice-oriented approaches contribute to the formation of essential professional competencies required in medical education. The findings demonstrate that the integration of innovative teaching strategies with traditional medical instruction significantly improves students' readiness for clinical practice, promotes lifelong learning skills, and ensures higher quality healthcare training.*

Keywords: *pedagogical approaches; medical education; professional competencies; competency-based education; problem-based learning; clinical skills; medical students*

Introduction

In the evolving landscape of medical education, innovative pedagogical approaches have emerged as essential components in shaping competent healthcare professionals. These methods, which include the integration of technology and experiential learning, are vital in fostering critical skills such as communication and empathy. For instance, researchers have found that Artificial Intelligence (AI) tools can enhance students critical evaluation skills, enabling them to engage deeper with course material and understand patient interactions more effectively (Oates A et al., 2025) . Moreover, the introduction of augmented reality (AR) in educational settings has demonstrated significant improvements in learning outcomes, suggesting that immersive technologies offer powerful avenues for developing professional competencies (Li G et al., 2025) . Consequently, this synthesis of traditional and modern teaching strategies not only aims to improve knowledge retention but also prepares students for real-world scenarios, underscoring the need for a comprehensive approach to effective medical education that aligns with contemporary healthcare demands.

OVERVIEW OF THE IMPORTANCE OF PROFESSIONAL COMPETENCIES IN MEDICAL EDUCATION

The development of professional competencies in medical education is crucial for producing healthcare professionals equipped to navigate complex

clinical environments. A focus on skills such as patient communication and empathy not only enhances the quality of patient care but also fosters collaborative relationships within multidisciplinary teams. Effective pedagogical approaches, such as the integration of flipped classroom methodologies and reflective practices, have proven to significantly enhance these competencies. For instance, pedagogies that emphasize active student engagement lead to marked improvements in reflective practice and clinical skills ((Wang D, 2025)). Furthermore, competency-based education models, which prioritize interdisciplinary collaboration and problem-solving, have shown substantial increases in trainee performance and satisfaction ((Liu M et al., 2025)). However, the advent of generative AI tools presents both opportunities and challenges; while they can enhance learning, they may inadvertently diminish critical cognitive skills if overused ((Qian Y, 2025)). Thus, a balanced integration of innovative teaching methods is vital for cultivating essential professional competencies in medical students.

PURPOSE AND SCOPE OF THE ESSAY

Effective pedagogical approaches are essential in maximizing the development of professional competencies in medical students, particularly when it comes to crucial skills such as communication, empathy, and patient interaction. These competencies not only enhance clinical performance but also foster a compassionate healthcare environment. For instance, traditional methods, such as role-playing and direct patient engagement, have been employed to facilitate the nuanced practice of communication skills. However, the incorporation of modern technologies, like virtual simulations, has shown promising results in providing students with immersive learning experiences that reinforce empathy and effective communication strategies. As articulated in the existing literature, these methodologies must be critically assessed for their effectiveness in transforming theoretical knowledge into practical skills that meet the evolving demands of healthcare settings (Arr LAáez-Aybar, 2025) . Consequently, this essay seeks to explore the breadth of pedagogical approaches that can successfully cultivate these professional competencies, ensuring that future healthcare professionals are well-equipped for real-world challenges (Papaneophytou C et al., 2025) . Additionally, the integration of artificial intelligence tools can further enhance learning experiences by fostering critical thinking and improving student agency (Ayyoub AA et al., 2025) (Rupnik D et al., 2025) .

TRADITIONAL PEDAGOGICAL APPROACHES

In the context of medical education, effective communication skills are paramount for cultivating empathy and fostering productive patient interactions. Traditional pedagogical approaches, characterized by didactic lectures and rote memorization, often fall short in enhancing these essential competencies. Instructional methods that prioritize active engagement and reflective practice, such as role-playing and simulated patient interactions, are recognized for promoting deeper understanding and retention of communication principles among medical students. Research indicates that while traditional methods may

present foundational knowledge, they lack the interactive and experiential elements necessary for developing empathetic engagement in healthcare settings (Qian Y, 2025) . This shift is echoed in the growing interest in integrating technology, where generative AI has been proposed as a support tool for communication training, though it raises concerns regarding overreliance on technology at the expense of human interaction (Ayyoub AA et al., 2025) (Krause S et al., 2025) . Thus, diversifying pedagogical frameworks is crucial for achieving optimal educational outcomes and producing competent, empathetic healthcare professionals (Papakostas C, 2025) .

LECTURE-BASED LEARNING AND ITS IMPACT ON KNOWLEDGE RETENTION

The effectiveness of pedagogical approaches in medical education is largely contingent upon the methods employed in skill development. For instance, in teaching communication skills essential for patient interaction, traditional lecture-based learning may fall short compared to more interactive methods. Research indicates that students engaged in self-directed learning (SDL) demonstrate superior retention of clinical anatomy compared to those relying solely on didactic lectures, suggesting that engagement and active participation are crucial for effective learning (Arora S et al., 2025) . Additionally, frameworks integrating gamification reveal significant improvements in student engagement, motivation, and knowledge retention, highlighting the shortcomings of lecture-based formats (Pena AD, 2025) . Furthermore, problem-based learning (PBL) and case-based learning (CBL) foster deeper competencies by immersing students in real-world scenarios, thereby preparing them as adaptable practitioners (Zhu Y et al., 2025) . This underscores the necessity of evolving pedagogical strategies to enhance not just knowledge retention but also practical skills, ultimately supporting better patient outcomes (Ba H et al., 2025).

Conclusion

The integration of contemporary educational practices in medical training can substantially enhance the development of essential competencies, particularly in communication skills and the cultivation of empathy toward patients. Emphasizing experiential learning through simulated patient interactions can foster critical thinking and interpersonal skills necessary for effective medical practice. The incorporation of generative AI tools, as noted in recent studies, may further bolster this pedagogical approach by providing medical students with immediate feedback and diverse scenarios, thereby enriching their learning experience (Qian Y, 2025) . Additionally, fostering a community of practice where students can engage in peer learning supports the development of AI literacy, as well as encourages collaboration and innovation (Ayyoub AA et al., 2025) . However, it is crucial to establish clear guidelines for the ethical use of these technologies in education to avoid potential pitfalls, such as overreliance on artificial intelligence (Krause S et al., 2025) (Papakostas C, 2025) . Adopting these recommendations will better prepare future physicians for the complexities of patient interactions.

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Rozikova L. T., PhD
associate professor
Samarkand State Medical University

THE ROLE OF MODERN PEDAGOGICAL TECHNOLOGIES IN THE FORMATION OF CLINICAL THINKING IN HIGHER MEDICAL EDUCATION INSTITUTIONS (BASED ON SIMULATION TRAINING, PROBLEM-BASED LEARNING AND INTERACTIVE METHODS)

Abstract: *This article explores the role of modern pedagogical technologies in the formation and development of clinical thinking among students in higher medical education institutions. Particular attention is given to simulation-based training, problem-based learning, and interactive teaching methods as effective tools for integrating theoretical knowledge with practical clinical experience. The study analyzes how these pedagogical technologies enhance diagnostic reasoning, clinical decision-making, teamwork, and communication skills. The findings indicate that the systematic implementation of innovative, student-centered, and practice-oriented educational technologies significantly contributes to the development of clinical thinking, improves students' readiness for real clinical situations, and increases the overall quality of medical education.*

Keywords: *modern pedagogical technologies; clinical thinking; medical education; simulation-based training; problem-based learning; interactive methods; clinical decision-making; medical students.*

INTRODUCTION

The landscape of higher medical education is increasingly shaped by the integration of modern pedagogical technologies, which play a pivotal role in cultivating clinical thinking among students. By adopting methodologies such as simulation training, problem-based learning (PBL), and interactive approaches, educational institutions can enhance the learning experience and prepare future healthcare professionals for complex clinical scenarios. Simulation training, in particular, allows students to engage in realistic patient interactions, thereby bridging the gap between theoretical knowledge and practical application. This is emphasized in recent findings which highlight that effective implementation of PBL frameworks leads to the development of adaptive, patient-centered practitioners equipped to face evolving healthcare challenges (Zhu Y et al., 2025) . Furthermore, advancements in Generative Artificial Intelligence (GAI) present unprecedented opportunities to enrich educational resources and improve accessibility across various medical specialties (Zhang Y et al., 2025) . Thus, the adoption of these innovative pedagogical strategies is essential for fostering critical clinical thinking skills and ensuring comprehensive medical training.

DEFINITION OF CLINICAL THINKING IN MEDICAL EDUCATION

Clinical thinking in medical education encompasses a systematic approach to problem-solving and decision-making that integrates knowledge, clinical skills, and patient-centered care. It is not merely about the recollection of facts but involves applying theoretical concepts to real-world scenarios, enabling medical professionals to navigate complex patient presentations effectively. As modern educational methodologies, such as simulation training and problem-based learning, proliferate, they foster the development of clinical thinking, promoting active learning and critical analysis (Callera RR, 2025) . These pedagogical advancements address traditional constraints of medical pedagogy, such as limited resource access and fragmented knowledge application, by providing immersive, technology-enhanced experiences that encourage flexible learning and self-directed mastery (Sikarwar P et al., 2025) . Furthermore, innovations like QR codes facilitate on-demand access to instructional resources, bridging theory and practice, thereby reinforcing students clinical competencies (Wu L et al., 2025) . Ultimately, integrating these modern methods is essential for cultivating the clinical thinking required for high-quality patient care.

OVERVIEW OF MODERN PEDAGOGICAL TECHNOLOGIES IN HIGHER EDUCATION

The integration of modern pedagogical technologies in higher education is reshaping instructional methodologies, particularly in the context of medical education. Technologies such as simulation training and problem-based learning are increasingly employed to cultivate clinical thinking and enhance student engagement. For instance, simulation training provides a safe environment for students to practice clinical skills and decision-making processes, thereby bridging the gap between theoretical knowledge and practical application. Furthermore, the implementation of artificial intelligence (AI) tools enhances personalized learning experiences, allowing for tailored feedback and targeted support during the educational journey (Andrew E Williams, 2025) . However, the rapid adoption of AI and data-driven methodologies also necessitates a thoughtful approach to ethics and governance in education to mitigate potential biases and integrity issues related to automated systems (Stahl BC, 2025) . In sum, these technological advancements are pivotal in modernizing curricula, reinforcing ethical practices, and ensuring that future healthcare professionals are equipped with essential clinical competencies (C Li, 2025) .

SIMULATION TRAINING

Simulation training has emerged as a vital pedagogical technology in shaping clinical thinking among medical students, effectively bridging theoretical knowledge with practical application. By engaging in realistic clinical scenarios, students enhance their diagnostic reasoning and ethical sensitivity, which are crucial for navigating the complexities of modern healthcare. This method not only improves procedural skills but also fosters communication and collaborative competencies—key attributes in effective patient care. The integration of various

teaching strategies, such as case-based learning (CBL) and problem-based learning (PBL), complements simulation training by encouraging adaptability in clinical practice, thereby preparing graduates for the intricacies of real-world situations (Wei H et al., 2025) . Furthermore, innovative approaches like virtual simulation grounded in experiential learning models enhance motivation and practical competencies, demonstrating that simulation training is not merely supplementary but essential for a comprehensive medical education (Zhu Y et al., 2025) . Ultimately, the interplay of these methods transforms how future healthcare practitioners develop critical clinical thinking skills (Yevtushenko Y, 2025) .

BENEFITS OF SIMULATION TRAINING IN DEVELOPING CLINICAL SKILLS

The implementation of simulation training in medical education serves as a catalyst for developing essential clinical skills, fostering both technical proficiency and critical thinking among students. Unlike traditional methods, simulation offers a risk-free environment where learners can experiment with complex clinical scenarios without jeopardizing patient safety. This approach not only enhances procedural skills but also cultivates a deeper understanding of ethical considerations in practice, as outlined in recent literature emphasizing the integration of epistemological and ethical components into training frameworks (Uch EBôa Cavalcanti, 2025) . Furthermore, simulation training encourages adaptive thinking and problem-solving capabilities, aligning well with contemporary pedagogical strategies such as problem-based learning (PBL), which has been shown to effectively prepare residents for the complexities of real-life medical practice (Zhu Y et al., 2025) . Overall, the interactive nature of simulation allows for personalized feedback, essential for building confidence and competence, which is vital for patient-centered care (Mourabit IE et al., 2025) (Masdah S et al., 2025) .

IMPACT OF REALISTIC SCENARIOS ON CRITICAL THINKING AND DECISION-MAKING

The incorporation of realistic scenarios in training environments significantly enhances critical thinking and decision-making among medical students. Immersive pedagogical technologies, such as simulation training and problem-based learning, provide a contextual framework within which learners can engage in complex clinical situations that mirror real-life challenges. Engaging with these scenarios promotes cognitive engagement, allowing students to apply theoretical knowledge to practical situations, thereby sharpening their analytical skills. For instance, as highlighted in recent studies, experiential learning models grounded in realism not only increase technical competence but also improve professional judgment and readiness for clinical practice, addressing the persistent misalignment between traditional curricula and the demands of contemporary healthcare settings (Bertone B et al., 2025) . Furthermore, mobile learning and gamification in educational games foster motivation and user-centered engagement, making the learning process more interactive and impactful

(Jos Jé Cardoso de Sales et al., 2025) . These methods ultimately reshape the educational landscape by preparing students for the nuanced realities of medical practice (Kailani A et al., 2025) (Andrew E Williams, 2025) .

PROBLEM-BASED LEARNING (PBL)

The implementation of Problem-Based Learning (PBL) in higher medical education serves as a pivotal strategy in fostering clinical thinking among students. By engaging learners in complex, nuanced clinical scenarios, PBL cultivates essential skills such as critical thinking, collaboration, and self-directed learning. The necessity of well-structured cases is emphasized, as they provide a framework allowing students to explore real-world problems while fostering adaptability in their practice, aligning with the insights from (Zhu Y et al., 2025) . Additionally, the integration of modern technologies, like chatbots and mobile applications, facilitates personalized learning experiences that PBL inherently demands, addressing barriers such as low engagement and insufficient individualized support, as discussed in (Mourabit IE et al., 2025) . Moreover, experiential learning, enhanced by simulation training, allows students to apply theoretical knowledge in practice, thus reinforcing their clinical competencies and preparing them for the complexities of patient care in situations highlighted by (Masdah S et al., 2025) . Ultimately, these educational methodologies, when combined effectively, lead to significant improvements in the quality of healthcare education and practice.

CONCLUSION

The conclusion of this analysis underscores the transformative impact of modern pedagogical technologies on the development of clinical thinking within higher medical education. By utilizing simulation training, problem-based learning, and interactive methods, educators can create dynamic learning environments that foster critical thinking and practical skills essential for future medical professionals. For instance, the integration of artificial intelligence facilitates personalized learning experiences, while chatbots offer immediate support and adaptive feedback, enhancing student engagement and comprehension (Andrew E Williams, 2025) . Furthermore, findings emphasize the importance of continuous professional development for educators to effectively leverage these technologies (Callera RR, 2025) . However, challenges such as digital literacy among diverse student populations need to be addressed through tailored educational interventions (Masdah S et al., 2025) . As higher medical education evolves to incorporate these modern methodologies, it promises a more robust framework that not only equips students with knowledge but also hones their clinical reasoning abilities, ultimately benefiting patient care outcomes (Mourabit IE et al., 2025).

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Ro‘ziyev I. X.
Sh. Rashidov nomidagi Samarkand Davlat Universiti Biokimyo instituti
O‘rmonova N. M.
Sh. Rashidov nomidagi Samarkand Davlat Universiti Biokimyo instituti
Samiyev R. A.
Sh. Rashidov nomidagi Samarkand Davlat Universiti Urgut filiali
Turobova N. F.
Sh. Rashidov nomidagi Samarkand Davlat Universiti Urgut filiali

KIMYO O‘QITISH JARAYONIDA KIMYOVIY TAJRIBALARNING O‘RNI

Annotatsiya. *Ushbu maqolada umumiy o‘rta ta’lim maktablarida organik kimyo fanini o‘qitish jarayonida kimyoviy tajribalardan foydalanishning ahamiyati va samaradorligini o‘rganadi. Maqolada tajribalardan foydalanish talabalar tomonidan organik kimyoning asosiy tamoyillarini chuqurroq tushunishga qanday hissa qo‘shishi haqida ma’lumot berilgan. Adabiyot manbalari va tadqiqotlar tahlili o‘tkazilib, o‘quvchilarning organik kimyo fanini o‘rganishga qiziqishi va ishtiyoqini oshirishda kimyoviy tajribalardan foydalanish samaradorligi aniqlangan.*

Kalit so‘zlar: *zamonaviy texnologiya, o‘qitish metodologiya, spirt, fenol, struktur formula, kimyoviy xossa, o‘rinbosar ta’siri, kimyoviy tajriba, probirka, shisha tayoqcha.*

Ro‘ziyev I. X.
Biochemistry Institute, Samarkand State University named after Sh. Rashidov
O‘rmonova N. M.
Biochemistry Institute, Samarkand State University named after Sh. Rashidov
Samiyev R. A.
Urgut Branch Samarkand State University named after Sh. Rashidov
Turobova N. F.
Urgut Branch Samarkand State University named after Sh. Rashidov

THE ROLE OF CHEMICAL EXPERIMENTS IN THE CHEMISTRY TEACHING PROCESS

Abstract: *This article examines the importance and effectiveness of using chemical experiments in the teaching process of organic chemistry in secondary schools. The article provides information on how the use of experiments contributes to students' deeper understanding of the basic principles of organic chemistry. Based on the analysis of literature sources and research, the effectiveness of using chemical experiments in increasing students' interest and motivation to study organic chemistry was determined.*

Keywords: *modern technology, teaching methodology, alcohol, phenol, structural formula, chemical property, substitution effect, chemical experiment, test tube, glass rod.*

Kirish

Bugungi modernizatsiya qilinayotgan ta'lim tizimida tabiiy fanlarni, xususan, kimyoni o‘qitish sifatini oshirish ayniqsa muhimdir. Kimyo eksperimental fan sifatida o‘quvchilarning ilmiy dunyoqarashini, mantiqiy fikrlashini va amaliy ko‘nikmalarini rivojlantirishning muhim vositasi bo‘lgan kimyoviy tajribalar bilan uzviy bog‘liqdir. Shuning uchun kimyo ta'limida kimyoviy tajribalarning rolini o‘rganish dolzarb ilmiy va metodologik masala hisoblanadi.

Kimyoviy tajribalar nazariy materialni chuqurroq tushunishga yordam beradi, mavhum tushunchalar va qonuniyatlarni aniqlashtiradi va o‘quvchilarning fanga bo‘lgan kognitiv qiziqishini oshiradi. Kompetensiyaga asoslangan va amaliyotga yo‘naltirilgan o‘qishga o‘tish bilan talabalarning tadqiqot ko‘nikmalarini, mustaqilligini va ijodiy fikrlashini rivojlantirishga qaratilgan namoyish, laboratoriya va amaliy tajribalardan faol foydalanish zarurati ortib bormoqda.

Bundan tashqari, innovatsion pedagogik va raqamli texnologiyalarni joriy etish kimyoviy tajribalarni tashkil etishning an'anaviy yondashuvlarini, jumladan, virtual laboratoriyalar, multimedia vositalari va xavfsiz mikrotexnikalardan foydalanishni qayta ko‘rib chiqishni talab qiladi. Bu, ayniqsa, cheklangan moddiy-texnik resurslar va ortib borayotgan xavfsizlik talablari sharoitida muhimdir.

Adabiyotlar tahlili

Hozirgi vaqtda maktab ta’limining asosiy vazifalaridan biri ta’lim jarayoniga kompetensiyaviy yondashuvni joriy etish hisoblanadi. Kimyo o‘qitishda bu yondashuvdan foydalanish o‘qituvchidan metodik vositalarni muntazam yangilab turishni, ta`lim maqsadlariga erishishning yangi usullarini izlashni talab qiladi. Bu muammoning yechimlaridan biri muammoli ta’lim tushunchasidir. An'anaviy usullardan farqli o‘laroq, bu kontseptsiya ta'lim nazariyasi va amaliyotiga o‘quvchilarning nafaqat bilim qiziqishlari va tafakkurini rag‘batlantirish, balki ijodiy qobiliyatlarini rivojlantirishga qaratilgan tizimni kiritadi. Mamlakatimizda kimyo va biologiya fanlarini rivojlantirish, ushbu yo‘nalishlarda ta’lim sifati va ilm-fan natijadorligini oshirish “Ilm, ma’rifat va raqamli iqtisodiyot yili” Davlat dasturining ustuvor vazifalari qatorida belgilangan.

Shu bilan birga, umumta’lim maktablaridagi kimyo va biologiya fanlarini o‘qitish sifati bugungi davr talablariga javob bermasligini, o‘qitish metodologiyasi va laboratoriyalar ma’nan eskirganligini, o‘qituvchilarning mehnatini munosib rag‘batlantirish mexanizmlari joriy qilinmaganligini alohida qayd etish zarur.

Kimyo fan va ta’lim olamida muhim o‘rin tutadi va uni o‘rganish nafaqat nazariy bilimlarni, balki amaliy ko‘nikmalarni ham talab qiladi. Kimyo o‘qitishning samarali usullaridan biri o‘quv jarayonida kimyoviy tajribalardan foydalanishdir [1].

Ayni kunlarda talim jarayonida zamonaviy texnologiyalar-interfaol uslublardan foydalanib, ta’limning samaradorligini ko‘tarishga bo‘lgan e’tibor kundan kunga yuksalib bormoqda. Shu paytga qadar an’anaviy ta’limda o‘quvchilarni faqat tayyor bilimlarni egallashga o‘rgatib kelingan edi. Bunday an’anaviy usul o‘quvchilarda mustaqil fikrlash, ijodiy izlanish, tashabbuskorlikni so‘ndirar edi [2, 4].

Shunday qilib, ushbu maqolaning dolzarbligi kimyo ta'limida kimyoviy tajribalarning rolini ilmiy asoslash va metodologik tahlil qilish, shuningdek, ulardan ta'lim sifatini oshirish va kimyoni o‘rganish uchun barqaror motivatsiyani shakllantirish uchun samarali foydalanish usullarini aniqlash zaruratidan kelib chiqadi.

Tadqiqotimizning ***maqsadi*** o‘rta maktabda kimyo fanini kasbiy o‘qitishda kimyoviy tajribani tanlash va qo‘llash edi.

Tadqiqotimiz natijasida:

1. Umumta’lim maktabida ixtisoslashtirilgan ta’limning mazmun-mohiyati va uning tashkil etilishi ochib berilgan.

2. Fan o‘qituvchisining kimyo fanini profilli o‘qitish dasturi bo‘yicha taklif qilingan “Spirtlar va fenollar” mavzusidagi kimyoviy tajriba tahlil qilindi va kamchiliklari aniqlandi.

3. Maktab kimyoviy eksperimenti uchun tajribalarni tanlash tamoyillari aniqlandi va “Spirtlar va fenollar” mavzusida tajribalar tanlandi.

4. “Spirtlar va fenollar” mavzusiga oid dars konspektlari kimyoviy tajriba yordamida ishlab chiqilgan va biz ilgari surgan gipoteza tasdiqlandi, agar kimyo o‘qitish jarayonida “Spirtlar va fenollar” mavzusini o‘rganishda kimyoviy tajriba o‘tkaziladi. tizimli ravishda foydalanilsa, bu o‘quvchilarning yutuqlarini oshirishga yordam beradi. Misol tariqasida quida “Spirtlar” mavzusining dars ishlamasi keltirilgan.

Mavzu: “Spirtlar”. Bir atomli to‘yingan spirtlarning olinishi va kimyoviy xossalari.

Darsning maqsadi: bir atomli to‘yingan spirtlarning kimyoviy xossalarini o‘rganish. *Vazifalar:*

1) Ta’limiy: bir atomli spirtlarning kimyoviy xossalarini o‘rganish: yonish, ishqoriy va ishqoriy tuproq metallari, galogenidlar bilan o‘zaro ta'siri, molekulalararo va molekulyar suvsizlanish. Rivojlantiruvchi: talabalarning moddaning tuzilishiga qarab uning xususiyatlarini oldindan aytib berish qobiliyatini oshirish, kimyoviy tajribadan foydalanishda kuzatish, tahlil qilish va

xulosa chiqarish qobiliyatini rivojlantirish. 2) Tarbiyaviy: talabalarning dialektik-materialistik dunyoqarashini shakllantirish.

Dars turi: birlashtirilgan.

Usullari: og‘zaki (hikoya), vizual-samarali - kimyoviy tajriba.

Uskunalar va reaktivlar: tubi dumaloq kolba, vertikal shisha nayli tiqin, spirtli lampa, gugurt, 3 dona probirka, shisha tayoqcha, filtr qog‘oz; spirtli ichimliklar: etil, metil va butil, natriy metal bo‘lakchasi, pivo.

Darsning tuzilishi: I. Kirish qismi (12 min)

1. Darsni tashkil etish (1÷2 min)

2. Oldin olingan bilimlarni ochish (7÷8 min)

3. O‘quvchilarni yangi materialni idrok etishga tayyorlash (1) -2 min)

II. Asosiy qism (21÷23 daqiqa)

III. Yakuniy qism (9÷10 min.) 1. O‘rganilgan material bo‘yicha tushunchalarini ochish (5-6 min) 2. Xulosa (2 min) 3. Uyga vazifa (1-2 min)

Darsning borishi: I. Kirish qismi Xayrli kun, bolalar. Oxirgi darsda “Spirtlar ularning tarkibi, tasnifi, nomenklaturasi va izomeriyasi, tuzilishi, fizik xossalari, olinishi va ishlatilishi” mavzusini o‘tdik. Frontal suhbat. 1. Qanday moddalar spirtlar deb ataladi? (molekulalarida uglevodorod radikaliga bog‘langan bir yoki bir nechta gidroksil guruhi (-OH guruhlari) mavjud bo‘lgan organik moddalar).

2. Spirtlar gidroksil guruhlari soniga qarab qanday tasniflanadi? (monatomik, ko‘p atomli: ikki atomli, uch atomli va ko‘p atomli).

3. Bir atomli spirtlar radikaliga qarab qanday tasniflanadi? (Spirtli ichimliklar marginal, to‘yinmagan, aromatiklarga bo‘linadi).

4. Qanday moddalar cheklovchi bir atomli spirtlar deyiladi? (Molekulalarida bitta vodorod atomi gidroksil guruhi bilan almashtirilgan to‘yingan uglevodorodlarning hosilalari).

5. Ushbu spirtlarning formulalarini ayting: metanol (CH_3OH), etanol (C_2H_5OH), propanol (C_3H_7OH), butanol (C_4H_9OH), pentanol ($C_5H_{11}OH$).

6. Atomlarning qanday guruhlari funksional deyiladi? (Funktsional guruhlar - ma'lum bir sinf moddalarining xarakterli kimyoviy xususiyatlarini aniqlaydigan atomlar guruhlari).

7. Spirtli ichimliklar qaysi funksional guruhga xosdir? (gidroksil guruhi).

8. Spirtlarning fizik xossalari qanday? (Tarkibida birdan o‘n birgacha uglerod atomi bo‘lgan to‘yingan monohidrik spirtlar qatorining quyi va o‘rta a’zolari suyuqlikdir. Yuqori spirtlar ($C_{12}H_{25}OH$ dan boshlanadi) xona haroratida qattiq moddalardir.

Topshiriq: Moddalarning nomlarini yozing:

A) CH_3 - CH_2 – CH(OH) - CH_3 (butanol-2);

B) CH_3 – CHOH - CH = CH_2 (buten-1-ol-3);

C) CH_3 – $CH(CH_3)$- CH(OH) - CH_2 - CH_3 (2-metilpentanol-3)

II. Asosiy qism. Biz yangi materialni o‘rganishga murojaat qilamiz. Dars mavzusini daftarga yozamiz: “Spirtlar. Bir atomli to‘yingan spirtlarning olinishi va kimyoviy xossalari.

Bizning darsimizning maqsadi monohidrik spirtlarning kimyoviy xossalarini o‘rganishdir. Quyidagi reja asosida ishlaymiz: (doskaga yoziladi):

1. Spirtlarning yonishi
2. Ishqoriy va ishqoriy tuproq metallari bilan o‘zaro ta’siri
3. Galogen vodorod bilan o‘zaro ta’siri
4. Spirtlarning molekulalararo va molekulyar suvsizlanishi.

Organik moddalarning xossalari ularning tarkibi va tuzilishi bilan belgilanadi. Spirtli ichimliklar umumiy qoidani tasdiqlaydi. Ularning molekulalari uglevodorod va gidroksil radikallarini o‘z ichiga oladi, shuning uchun spirtlarning kimyoviy xossalari bu guruhlarning o‘zaro ta'siri va bir-biriga ta'siri bilan belgilanadi. Ushbu birikmalar sinfiga xos xususiyatlar gidroksil guruhining mavjudligi bilan bog‘liq.

1. Spirtli ichimliklarning yonishi. Video tajribasini namoyish qilish - spirtli ichimliklarni yoqish $2CH_3OH + 3O_2 \rightarrow 2CO_2 + 4H_2O$

2. Spirtlarning gidroksidi va gidroksidi tuproq metallari bilan o‘zaro ta'siri.

O‘qituvchining ko‘rsatmasi - bir atomli spirtlarning natriy bilan o‘zaro ta’siri.

Kerakli asbob va reaktivlar: 3 ta probirka, shisha tayoqcha, spirtli lampa, filtr qog‘ozi; spirtlar: etil, metil va butil, metall natriy.

Tajriba ishning borishi: 3 ta probirkaga 1-2 ml metil, etil va butil quyiladi va ularning har biriga filtr qog‘oz bilan quritilgan metall natriydan kichik bo‘lak tushiriladi. Yonish mumkin bo‘lgan gazning evolyutsiyasini kuzating. Reaksiya metil spirti solingan probirkada eng intensiv, butil spirti solingan probirkada esa sekinroq boradi. Etil spirti solingan probirkada reaksiya tugagach, natriy etoksidi ajratamiz. Buning uchun biz shisha tayoqchani probirkaga tushiramiz va uni o‘choq olovi ustida ushlab turamiz. Ortiqcha spirt bug‘lanadi. Stik ustida natriy etoksidning oq qoplamasi qoladi [3]. Spirt molekulalari va suv molekulalarining gidroksil guruhining vodorodi gidroksidi va gidroksidi tuproq metallari bilan kamayishi mumkin (ular bilan almashtiriladi) alkogolga qaraganda ancha faolroq ketadi, katta issiqlik chiqishi bilan birga keladi va portlashga olib kelishi mumkin. Bu farq gidroksil guruhiga eng yaqin radikalning elektron berish xususiyatlari bilan izohlanadi. Elektron donor (I-tur o‘rinbosarlari) xususiyatlariga ega bo‘lgan radikal kislorod atomidagi elektron zichligini biroz oshiradi, uni o‘z hisobidan ,,to‘yintiradi’’ va shu bilan -O-H bog‘ ining qutbliligini va ,,kislotalik”ni kamaytiradi. suv molekulalari bilan solishtirganda spirt molekulalarida gidroksil guruhining vodorod atomining tabiati. Virtual tajriba o‘tkazish - etil spirtining natriy bilan o‘zaro ta’siri

3. Spirtlarning galogen vodorod bilan o‘zaro ta'siri. Virtual eksperiment o‘tkazish - etil spirtining vodorod bromidi bilan o‘zaro ta'siri. Gidroksil guruhini galogenga almashtirish alkanlar galogen hosilalarining hosil bo‘lishiga olib keladi. Masalan: $C_3H_7OH + HBr \rightarrow C_3H_7Br + H_2O$

4. Spirtlarning molekulalararo degidratatsiyasi suvni ajratib oluvchi moddalar ishtirokida qizdirilganda suv molekulasining ikki spirt molekulasidan ajralishi: $2R\text{-}OH \xrightarrow{H^+} R\text{-}O\text{-}R + H_2O$.

Spirtlarning molekulalararo suvsizlanishi natijasida efirlar hosil bo‘ladi. Shunday qilib, etil spirti sulfat kislota bilan 100 dan 140 °S gacha qizdirilganda dietil (oltingugurt) efir hosil bo‘ladi:

Umumiy holda $ROH + R'OH \xrightarrow{t<140°,\ H^+} ROR' + H_2O$

$$CH_3\text{-}CH_2\text{-}OH \xrightarrow{t<140°,\ H^+} CH_3\text{-}CH_2\text{-}O\text{-}CH_2\text{-}CH_3$$

5. Molekulyar spirtlarning suvsizlanishi spirtlarni suvsizlantiruvchi moddalar ishtirokida molekulalararo suvsizlanish haroratidan yuqori haroratgacha qizdirganda sodir bo‘ladi. Natijada alkenlar hosil bo‘ladi. Bu reaktsiya qo‘shni uglerod atomlarida vodorod atomi va gidroksil guruhi mavjudligi bilan bog‘liq. Etanolni konsentrlangan sulfat kislota ishtirokida 140 °S dan yuqori qizdirish orqali eten (etilen) olish reaktsiyasini misol qilib keltirish mumkin:

$$CH_3\text{-}CH_2\text{-}OH \xrightarrow{t>140°,\ H^+} CH_2=CH_2 + H_2O$$

Etanol alkogolli ichimliklar tayyorlash uchun ishlatiladi. U pivo va sharobda uchraydi.

Tajriba ishining borishi: dumaloq tubli kolbaga 50-100 ml pivo quying, uni vertikal shisha nay bilan tiqin bilan yoping. Kolbani qaynaguncha qizdiring va bir muncha vaqt o‘tgach, nayning yuqori uchidagi spirt bug‘larini yoqing. Pivoni karbonat angidridni olib tashlash uchun avval yaxshilab chayqatish kerak, aks holda qizdirilganda kuchli ko‘pik paydo bo‘ladi.

III. Yakuniy qism

Xulosa. Bugun darsda biz ,,Spirtlar’’ mavzusini o‘rganishni boshladik. Spirtli ichimliklarning kimyoviy xossalari. Spirtlarning yonishi, ularning ishqoriy va ishqoriy tuproq metallari, galogenid vodorodlari bilan o‘zaro ta’siri, shuningdek, spirtlarning molekulalararo va ichki molekulyar degidratataiyalanishi bilan batafsil tanishdik.

Uyga vazifa:

1) Daftarga mavzu materialini konspektlashtirish;

2) 3.2-§ ÷ 3.7-§ 110-137-betlarni o‘rganish.

Xulosalar

1. Kimyoviy tajribalar kimyoni o‘rganish jarayonida muhim va ajralmas o‘rin tutadi, chunki ular nazariy bilimlarni ko‘rgazmali shaklda yoritib, talabalarning mavzuni yanada chuqur va ongli ravishda egallashiga xizmat qiladi.

2. Namoyishiy, laboratoriya va amaliy tajribalardan foydalanish talabalarining fan bo‘yicha bilishga bo‘lgan qiziqishini kuchaytiradi, o‘quv jarayonidagi faolligini oshiradi hamda kimyoni o‘rganishga barqaror motivatsiyani shakllantiradi.

3. Kimyoviy tajribalar orqali talabalarda amaliy malaka va ko‘nikmalar, tadqiqotchilik tafakkuri, tajriba natijalarini tahlil qilish, asoslangan xulosalar chiqarish va bilimlarni kundalik hayotda qo‘llash qobiliyatlari rivojlanadi.

4. Kimyoviy tajribalarni samarali tashkil etish o‘qitishning metodik va didaktik tamoyillariga amal qilishni, shuningdek, texnika xavfsizligi qoidalariga qat’iy rioya etishni talab etadi, bu esa talabalarda eksperimental faoliyatga nisbatan mas’uliyatli yondashuvni shakllantiradi.

5. Virtual laboratoriyalar, multimedia vositalari hamda mikrometodlarni o‘z ichiga olgan zamonaviy pedagogik va raqamli texnologiyalarni joriy etish kimyoviy tajribalarni o‘tkazish imkoniyatlarini kengaytirib, ularning ta’lim jarayonidagi samaradorligini yanada oshiradi.6. Shunday qilib, kimyo ta'limida kimyoviy tajribalardan maqsadli va metodologik jihatdan oqilona foydalanish ta'lim sifatini oshirish, ilmiy dunyoqarashni shakllantirish va o‘quvchilarning asosiy kompetensiyalarini rivojlantirishda muhim omil hisoblanadi.

Umuman olganda, umumiy o‘rta ta’lim maktablarida organik kimyo fanini o‘qitishda kimyoviy tajribalardan foydalanish o‘quvchilar uchun juda ko‘p qulayliklarga ega bo‘lsa-da, puxta rejalashtirish, tayyorgarlik ko‘rish va xavfsizlik choralarini ko‘rishni talab qiladi. U o‘quvchilarni o‘rganishda qo‘llab-quvvatlashi, fan va organik kimyoga qiziqishini rivojlantirishi va amaliy tajriba orqali murakkab tushunchalarni yaxshiroq tushunishga yordam berishi mumkin.

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Sadikova S. Z.
EFL teacher
University of Business and Science

TRANSLATION THEORIES: EVOLUTION, PARADIGMS, AND CONTEMPORARY DEVELOPMENTS

Abstract: *This article provides a comprehensive overview of the historical and theoretical evolution of translation studies, from ancient dichotomies of literal versus sense-based approaches to contemporary multimodal and technological paradigms. It examines key shifts, including the linguistic turn of the mid-20th century, the cultural turn of the 1970s, functionalist theories, and critical perspectives from postcolonialism and feminism. The discussion highlights translation's role in cultural mediation, power dynamics, and global communication, while addressing emerging challenges posed by digital tools and ecological frameworks. Emphasizing the field's interdisciplinary nature, the article argues for translation as a dynamic process essential to cultural preservation and innovation in a globalized world.*

Keywords: *Translation theories, equivalence, cultural turn, polysystem theory, skopos theory, postcolonial translation, feminist translation, multimodal translation, machine translation, eco-translatology*

Translation theories constitute an integral component of human culture and linguistics, evolving over millennia as a bridge between languages, societies, and knowledge systems. From antiquity, translation has been pivotal in disseminating ideas across civilizations. In ancient Rome, figures like Cicero and Horace distinguished between literal translation (metaphrase) and sense-based rendition (paraphrase), establishing foundational dichotomies that influenced subsequent practices. Cicero advocated for a translator's role akin to an orator, emphasizing eloquence over word-for-word fidelity, while Horace warned against slavish adherence to the source text. This binary—literal versus free translation—persisted through the ages, shaping debates on fidelity and creativity.

During the Middle Ages, translation primarily served religious and scholarly purposes, particularly in the transmission of sacred texts. Saint Jerome's Vulgate Bible translation in the late 4th century exemplified a "sense-for-sense" approach, prioritizing the conveyance of meaning over literalism to ensure accessibility for Latin readers. However, this era also witnessed tensions, as seen in the Arabic-to-Latin translations of Greek philosophical works by scholars like Avicenna and Averroes in the Islamic Golden Age, which facilitated the Renaissance in Europe. These efforts underscored translation's role in knowledge transfer, often mediated by intermediary languages, highlighting issues of cultural adaptation and potential loss in transmission.

The Renaissance and Enlightenment periods further refined translation theories, with thinkers like John Dryden in 17th-century England categorizing

translations into metaphrase, paraphrase, and imitation. Dryden's framework emphasized the translator's artistic liberty, aligning with emerging notions of authorship and originality. In the 19th century, Romanticism influenced translation through figures like Friedrich Schleiermacher, who proposed two paths: domesticating the text to the target culture or foreignizing it to preserve the source's alterity. This foreignization-domestication debate, later popularized by Lawrence Venuti in the 1990s, critiques the invisibility of translators and the ethnocentric tendencies in Western translation practices.

The 20th century marked the institutionalization of translation studies as an independent discipline, catalyzed by linguistic paradigms in the 1950s and 1960s. Jean-Paul Vinay and Jean Darbelnet's contrastive analysis model identified seven procedures borrowing, calque, literal translation, transposition, modulation, equivalence, and adaptation providing a systematic toolkit for translators. J.C. Catford's linguistic theory framed translation as a substitution of textual material in one language for equivalent material in another, rooted in structural linguistics. Eugene Nida's concepts of "formal equivalence" (focusing on source form and structure) and "dynamic equivalence" (prioritizing receptor response) revolutionized Bible translation, emphasizing functional communication over rigid adherence. Nida's work integrated insights from anthropology and semiotics, arguing that equivalence is not absolute but contextual, dependent on cultural and situational factors. The 1970s ushered in the "cultural turn" in translation studies, shifting focus from linguistic equivalence to socio-cultural dynamics. Susan Bassnett and André Lefevere's manipulation school posited translation as a form of rewriting influenced by patronage, ideology, and poetics. They argued that translations are shaped by target-system norms, often serving to reinforce or challenge power structures. Itamar Even-Zohar's polysystem theory conceptualized literature as a dynamic system where translated works occupy central or peripheral positions, affecting innovation or conservatism in the target culture. For instance, in peripheral polysystems, translations might introduce foreign models to enrich domestic literature, as seen in the importation of Western novels into 19th-century Japan. Gideon Toury's descriptive translation studies (DTS) advocated an empirical, non-prescriptive approach, identifying norms—preliminary (selection of texts), initial (orientation toward source or target), and operational (translation decisions)—through analysis of actual translations. This methodology moved away from evaluative judgments, fostering a target-oriented perspective that examines translations as facts within their socio-historical contexts.

Functionalist approaches gained prominence in the 1980s, with Hans Vermeer's skopos theory positing that the purpose (skopos) of the translation determines its strategies, subordinating source-text fidelity to target-audience needs. This teleological view, expanded by Katharina Reiss's text-type classification (informative, expressive, operative) and Christiane Nord's loyalty principle (balancing skopos with ethical responsibilities), empowered translators as experts in cross-cultural communication. Functionalism proved particularly

useful in technical and legal translation, where adequacy trumps equivalence. Postcolonial and feminist theories introduced critical lenses in the late 20th century, deconstructing translation's complicity in power imbalances. Postcolonial scholars like Gayatri Chakravorty Spivak questioned "Can the Subaltern Speak?" in translation contexts, viewing translators as agents of hybridity or resistance against colonial legacies. Homi Bhabha's concept of the "third space" frames translation as a site of cultural negotiation, where meanings are renegotiated amid ambivalence. In feminist translation studies, Sherry Simon and Luise von Flotow highlighted gender biases in language and advocated interventionist strategies, such as supplementing texts to amplify women's voices or using gender-inclusive language. These paradigms portray translation not merely as transfer but as a political act, challenging patriarchal and imperial narratives.

In the 21st century, particularly from 2020 to 2025, translation theories have embraced multimodal and technological dimensions amid globalization and digitalization. Multimodal translation encompasses audiovisual media, subtitling, and localization, where semiotic modes (visual, auditory) interact with verbal elements, as explored in Jorge Díaz Cintas's work on subtitling norms. Machine translation post-editing (MTPE) and neural machine translation (NMT) systems, like Google Translate's advancements, have prompted debates on human-machine collaboration, with scholars like Lynne Bowker examining quality assessment in hybrid workflows.

Cognitive and ecological approaches further deepen the field. Cognitive translatology, drawing from neuroscience, investigates mental processes via eye-tracking and think-aloud protocols, revealing how translators manage bilingual activation and decision-making. Eco-translatology, pioneered by Chinese scholars like Hu Gengshen, conceptualizes translation as an adaptive ecosystem, emphasizing harmony between translator, text, and environment, countering Eurocentrism by integrating Eastern philosophies. Translation theories continue to evolve as a multifaceted domain, intertwining language, culture, power, and technology. In an era of artificial intelligence and multimodal texts, they underscore translation's role in fostering global dialogue, preserving cultural diversity, and promoting equity. Future trajectories may involve ethical AI integration and decolonial frameworks, yet the human translator's subjectivity and cultural sensitivity remain indispensable, ensuring that translation transcends mere mechanics to embody empathetic intercultural exchange.

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Salomov O.
“bank ishi” yo‘nalishi talabasi
Andijon davlat texnika instituti
Ilmiy rahbar: Rustamova F. A.
assistenti
“iqtisodiyot” kafedrasi
Andijon davlat texnika instituti

QISHLOQ JOYLARDA KICHIK BIZNESNI RIVOJLANTIRISHNING ASOSIY MUAMMOLARI VA IMKONIYATLARI

Annotatsiya. *Ushbu maqola qishloq joylarda kichik biznes tadbirkorligini rivojlantirishning asosiy muammolari va imkoniyatlarini tahlil qiladi. Maqolada qishloq hududlaridagi tadbirkorlik faoliyatini cheklovchi omillar moliyaviy resurslarning yetishmasligi, infratuzilma va transport imkoniyatlarining cheklanganligi, bozor va marketing mexanizmlarining rivojlanmaganligi, shuningdek, bilim va malaka yetishmovchiligi yoritiladi. Shu bilan birga, maqolada qishloq tadbirkorligida mavjud imkoniyatlar, jumladan, mahalliy xom-ashyo resurslaridan samarali foydalanish, qishloq xo‘jaligi mahsulotlarini qayta ishlash va eksport salohiyatini oshirish, innovatsion texnologiyalar va davlat qo‘llab-quvvatlash dasturlari orqali biznesni rivojlantirish imkoniyatlari ko‘rib chiqiladi.*

Kalit so‘zlar: *qishloq hududlari, mikro va kichik biznes, moliyaviy resurslar, innovatsion imkoniyatlar, ish bilan bandlik, iqtisodiy salohiyat.*

Salomov O.
student, “banking”
Andijan State Technical Institute
Scientific supervisor: Rustamova F. A.
assistant
department of “economics”
Andijan State Technical Institute

MAIN PROBLEMS AND OPPORTUNITIES OF SMALL BUSINESS DEVELOPMENT IN RURAL AREAS

Abstract. *This article analyzes the main problems and opportunities of developing small business entrepreneurship in rural areas. The article highlights the factors limiting entrepreneurial activity in rural areas: lack of financial resources, limited infrastructure and transport capabilities, underdevelopment of market and marketing mechanisms, as well as lack of knowledge and skills. At the same time, the article considers the opportunities available in rural entrepreneurship, including the effective use of local raw materials, increasing the*

processing and export potential of agricultural products, and the development of business through innovative technologies and state support programs.

Keywords: *rural areas, micro and small businesses, financial resources, innovation opportunities, employment, economic potential.*

Kirish

Qishloq hududlarda kichik biznes tadbirkorligi qishloq joylarda yashovchi aholining o‘z mablag‘lari yoki davlat tomonidan qo‘llab-quvvatlash dasturlari orqali kichik hajmdagi ishlab chiqarish, savdo, xizmat ko‘rsatish va qishloq xo‘jaligi mahsulotlarini qayta ishlash faoliyatini amalga oshirishdir. Kichik biznes qishloq iqtisodiyotining asosiy drayveri hisoblanadi, chunki u ish bilan bandlikni oshiradi, mahalliy resurslardan samarali foydalanishni rag‘batlantiradi va mahalliy bozorda mahsulot va xizmatlar tanlovini kengaytiradi. Qishloq tadbirkorligi qishloq xo‘jaligi, oziq-ovqat mahsulotlarini qayta ishlash, hunarmandchilik, kichik xizmat ko‘rsatish va savdo sohalarida rivojlanadi. Shu bilan birga, u qishloq hududlarning iqtisodiy salohiyatini oshirish, aholining daromad manbalarini diversifikatsiya qilish va mahalliy iqtisodiy barqarorlikni ta’minlashda muhim rol o‘ynaydi.

Qishloq hududlarda tadbirkorlikni rivojlantirishda davlat tomonidan bir qator chora-tadbirlar amalga oshirilmoqda. Jumladan, O‘zbekiston Respublikasi Prezidentining PF-50-son Farmoni 2025-yil 19-martda kichik va o‘rta biznesning iqtisodiyotdagi o‘rnini oshirish, biznes muhitini yaxshilash va yangi tashabbuslarni qo‘llab-quvvatlash bo‘yicha tizimli chora-tadbirlarni belgilaydi [1]. Ushbu farmon kichik biznesning yalpi ichki mahsulotdagi ulushini oshirish, eksport salohiyatini kengaytirish, ish bilan bandlikni mustahkamlash va startap loyihalarni rag‘batlantirishni ko‘zda tutadi. Shuningdek, 2023-yil 14-sentabrdagi PQ-306-son qarori “Kichik biznesni rivojlantirishni moliyaviy va institutsional qo'llab-quvvatlash chora-tadbirlari to'g'risida” 2023-yilda qishloq tadbirkorlarini moliyaviy va institutsional qo‘llab-quvvatlashga qaratilgan bo‘lib, qaror asosida individual tadbirkorlar, dehqon xo‘jaliklari, hunarmandlar va kichik biznes sub’yektlari uchun moliyaviy yordam va konsalting xizmatlari tashkil etiladi [2]. Bu dastur qishloq hududlarida tadbirkorlar uchun kredit, grant va maslahat yo‘nalishida yordam beradi.

O‘zbekiston Respublikasi Prezidentining 2024-yil 30-avgustdagi PQ - 132 qarori mikrokreditlarni kengaytirish va moliyaviy resurslarni soddalashtirilgan tarzda taqdim etishni nazarda tutadi [3]. Qaror qishloq hududlarda kichik biznes sub’yektlariga sarmoya jalb etishni osonlashtiradi, bu ayniqsa ishlab chiqarish yoki xizmat ko‘rsatish yo‘nalishida faoliyat yuritayotgan tadbirkorlar uchun muhimdir. Shu bilan birga, Prezident rezolyutsiyasi 2023-yilda aholining keng qatlamlarini, shu jumladan qishloq hududlar aholisi va tadbirkorlarini kichik biznesga jalb qilish choralarini belgilaydi. Rezolyutsiyada moliyaviy va maslahat qo‘llab-quvvatlash tizimini takomillashtirish, malaka oshirish va bozor imkoniyatlarini kengaytirish choralari ko‘rsatib o‘tilgan. Bundan tashqari, 2017-yil 19-iyuldagi PF-5087 farmoni “Biznesning qonuniy manfaatlari davlat

tomonidan muhofaza qilinishi…” kichik biznes va xususiy tadbirkorlikni ishonchli himoya qilish va rivojlantirish bo‘yicha huquqiy asosni mustahkamlashga xizmat qiladi [4]. Ushbu hujjatlar birgalikda qishloq hududlarda tadbirkorlar uchun moliyaviy resurslarga kirish imkoniyatini kengaytiradi, bozor va konsalting xizmatlarini takomillashtiradi, huquqiy kafolatlarni mustahkamlaydi va infratuzilma va logistika imkoniyatlarini yaxshilashga yordam beradi. Shu bilan birga, ular qishloq hududlarda ish bilan bandlikni oshirish va mahalliy iqtisodiy barqarorlikni ta’minlashga xizmat qiladi. Umuman olganda, qishloq hududlarda kichik biznes tadbirkorligi nafaqat iqtisodiy rivojlanish, balki ijtimoiy barqarorlikni ta’minlash, aholining daromad darajasini oshirish va mahalliy resurslardan samarali foydalanishni rag‘batlantirishda muhim rol o‘ynaydi. Davlat tomonidan qabul qilingan qonun va qarorlar tadbirkorlikni rivojlantirish va qishloq hududlarda ish bilan bandlikni oshirish uchun mustahkam huquqiy va moliyaviy asos yaratadi.

Qishloq hududlarda tadbirkorlik faoliyatining eng katta cheklovchi omillaridan biri - moliyaviy resurslarning yetishmasligidir. Ko‘plab qishloq tadbirkorlari o‘z faoliyatini boshlash yoki kengaytirish uchun zarur bo‘lgan sarmoya va kreditlarni jalb eta olmaydi [5]. Moliyaviy resurslarning cheklanishi bir nechta omillarga bog‘liq: birinchidan, banklar va moliyaviy institutlar qishloq hududlardagi kichik biznesga qarz berishda ehtiyotkor bo‘ladi, chunki ular kredit xavfini yuqori deb hisoblaydi. Ikkinchidan, ko‘plab tadbirkorlar o‘z biznes rejasini aniq va raqamli tarzda ishlab chiqmaganligi sababli, moliyaviy institutlar ularni moliyalashtirishni istamaydi.

Moliyaviy resurslarning yetishmasligi bir nechta jihatdan biznesning rivojlanishiga salbiy ta’sir ko‘rsatadi. Avvalo, biznesni boshlash yoki kengaytirish uchun zarur bo‘lgan uskuna, xom-ashyo va infratuzilma xarajatlari amalga oshirilmaydi. Bu esa ishlab chiqarish hajmini cheklaydi va mahsulot sifati yoki raqobatbardoshligini pasaytiradi. Ikkinchidan, yetarli mablag‘ bo‘lmagani sababli tadbirkorlar marketing va reklama faoliyatiga yetarli mablag‘ ajrata olmaydi, natijada mahsulot bozorga yetib bormaydi yoki talabni qondira olmaydi. Shuningdek, moliyaviy resurslar cheklanganligi qishloq tadbirkorlarini faqat kichik hajmdagi faoliyat bilan cheklashga majbur qiladi, bu esa iqtisodiy rentabellik va barqaror o‘sish imkoniyatlarini kamaytiradi. Jahon Banki va boshqa xalqaro tashkilotlar tadqiqotlariga ko‘ra, qishloq hududlarda tadbirkorlik faoliyatini rivojlantirish uchun kredit bozorini rivojlantirish va subsidiyalar yoki grantlar tizimini yo‘lga qo‘yish muhim ahamiyatga ega. Shu bilan birga, mikrofinanslash institutlari va mikrokredit tizimlari qishloq tadbirkorlariga moliyaviy imkoniyatlarni kengaytirish uchun samarali vosita sifatida ishlatilmoqda. Umuman olganda, moliyaviy resurslarning yetishmasligi qishloq hududlarda tadbirkorlikning eng dolzarb muammosi bo‘lib, uning yechimi davlat dasturlari, moliyaviy institutlar va xalqaro hamkorlik orqali amalga oshirilishi mumkin. Shu orqali qishloq hududlarda ish bilan bandlik va iqtisodiy faollik darajasi oshadi.

Qishloq joylarda tadbirkorlikni rivojlantirishdagi ikkinchi katta muammo - infratuzilma va logistika tizimining yetarli darajada rivojlanmaganligidir. Bu omil qishloq hududlarda biznesning xarajatlarini oshiradi, mahsulotni bozorga yetkazishni qiyinlashtiradi va raqobatbardoshlikni pasaytiradi [6]. Masalan, yo‘l va transport infratuzilmasining yetarli darajada rivojlanmaganligi mahsulotning bozorga yetib borish muddatini uzaytiradi va xarajatlarni oshiradi. Bu ayniqsa qishloq xo‘jaligi mahsulotlari va tez buziladigan tovarlar uchun jiddiy muammo hisoblanadi. Shuningdek, energiya ta’minoti va suv resurslarining yetishmasligi ham tadbirkorlik faoliyatiga to‘sqinlik qiladi. Ko‘plab qishloq tadbirkorlari elektr energiyasi yetishmasligi yoki barqaror bo‘lmasligi sababli ishlab chiqarish jarayonlarini to‘liq amalga oshirolmaydi. Shu bilan birga, suv resurslari yetishmovchiligi qishloq xo‘jaligi va oziq-ovqat mahsulotlarini qayta ishlashda muhim rol o‘ynaydi.

Logistika tizimining rivojlanmaganligi esa mahsulotni bozorga yetkazishda qo‘shimcha xarajatlar va kechikishlarga olib keladi. Masalan, transport vositalarining yetishmasligi yoki narxining yuqoriligi, shuningdek, saqlash va sovutish uskunalarining yetarli emasligi mahsulot sifatiga salbiy ta’sir qiladi. Natijada, tadbirkorlar bozor talablari va narxlaridagi o‘zgarishlarga tezkor javob bera olmaydi. Izlanishlar shuni ko‘rsatadiki, qishloq hududlarda tadbirkorlikni rivojlantirish uchun yo‘l, transport, energetika va suv ta’minoti infratuzilmasini rivojlantirish muhim ahamiyatga ega. Shu bilan birga, davlat tomonidan logistika markazlari, sovutish omborlari va transport vositalarini qo‘llab-quvvatlash tadbirkorlik faoliyatini samarali amalga oshirishga yordam beradi.

Qishloq tadbirkorligidagi yana bir katta muammo - bozor mexanizmlari va marketing tizimining rivojlanmaganligidir. Ko‘plab qishloq bizneslari o‘z mahsulotini sotish uchun samarali bozor tizimini tashkil qila olmaydi. Mahalliy bozorlardagi talab va taklif haqidagi ma’lumotlarning yetishmasligi, narxni aniqlashdagi noaniqliklar va raqobatchilar faoliyatini tahlil qilishning yetishmasligi tadbirkorlikni cheklaydi [7]. Marketing faoliyatining pastligi mahsulotning bozorda tanilmasligiga va sotuv hajmining cheklanishiga olib keladi. Shu bilan birga, qishloq hududlarda reklama va targ‘ibot vositalari yetarli emasligi sababli iste’molchilar mahsulotlar haqida yetarli ma’lumotga ega bo‘lmaydi. Bu ayniqsa yangi bizneslar va innovatsion mahsulotlar uchun dolzarb muammo hisoblanadi. Bozor mexanizmlari rivojlanmaganligi, shuningdek, qishloq tadbirkorlarini o‘z mahsulotlarini eksport qilish imkoniyatidan cheklaydi. Ko‘plab kichik tadbirkorlar bozorda yetarlicha raqobatbardosh mahsulot ishlab chiqara olmasligi yoki sifat standartlariga javob bera olmasligi sababli mahsulotlarini keng bozorga yetkazolmaydi. Izlanishlar shuni ko‘rsatadiki, qishloq hududlarda bozor mexanizmlarini rivojlantirish va marketing tizimini mustahkamlash tadbirkorlikni samarali qilishda muhim ahamiyatga ega. Masalan, savdo kooperativlari tashkil qilish, elektron savdo platformalarini joriy etish va brend yaratish orqali tadbirkorlar o‘z mahsulotlarini samarali sotishi mumkin. Shu bilan birga, davlat va nodavlat tashkilotlar tomonidan bozorni tahlil qilish, ma’lumot va treninglar berish tadbirkorlik faoliyatini qo‘llab-quvvatlaydi.

Qishloq tadbirkorligidagi yana bir jiddiy cheklov - tadbirkorlarning bilim va malaka darajasining pastligi. Ko‘plab qishloq hududlardagi tadbirkorlar biznesni boshqarish, moliya hisob-kitobi, marketing va strategik rejalashtirish bo‘yicha yetarli bilimga ega emas. Bu esa tadbirkorlikni samarali rivojlantirishga to‘sqinlik qiladi. Malaka va bilimning pastligi mahsulot sifatiga, xarajatlarni boshqarishga va raqobatbardosh strategiyalarni ishlab chiqishga salbiy ta’sir qiladi [8]. Shu sababli, qishloq tadbirkorlarining o‘qitilishi, trening va seminarlar orqali ko‘nikmalarini oshirish iqtisodiy faollikni kuchaytiradi. Xalqaro tajribalar shuni ko‘rsatadiki, qishloq hududlarda tadbirkorlik bo‘yicha masofaviy kurslar, mentorlik dasturlari va amaliy seminarlar biznesning barqaror rivojlanishida muhim vosita hisoblanadi. Hozirgi kundagi ma’lumotlar shuni ko‘rsatadiki, malaka oshirilmagan tadbirkorlar moliyaviy resurslarni samarali ishlata olmaydi, bozor talablari va raqobatni to‘g‘ri tahlil qila olmaydi. Shu sababli davlat, nodavlat tashkilotlar va xalqaro hamkorlik dasturlari qishloq hududlarda tadbirkorlarni o‘qitish va malakali kadrlarni tayyorlash bo‘yicha faol ishlashi kerak. Bu esa nafaqat tadbirkorlikni, balki mahalliy iqtisodiy faollik va bandlikni oshirishga yordam beradi.

Xulosa

Xulosa qilib aytganda, qishloq hududlarda kichik biznes tadbirkorligini rivojlantirish davlatning iqtisodiy va ijtimoiy siyosatida muhim o‘rin tutadi. Tadbirkorlik faolligi qishloq iqtisodiyotini barqarorlashtiradi, ish bilan bandlikni oshiradi va aholining daromad manbalarini diversifikatsiya qiladi. Davlat tomonidan qabul qilingan qonun va qarorlar, xususan moliyaviy yordam, mikrokreditlar, startaplarni qo‘llab-quvvatlash, infratuzilma va logistika imkoniyatlarini yaxshilash, shuningdek, marketing va malaka oshirish bo‘yicha chora-tadbirlar tadbirkorlik salohiyatini sezilarli darajada oshirishga xizmat qiladi. Shu yo‘l bilan qishloq hududlarda kichik biznesning barqaror rivojlanishi, mahalliy iqtisodiy salohiyatning kuchayishi va ijtimoiy barqarorlikning ta’minlanishi mumkin. Umuman olganda, ushbu chora-tadbirlar qishloq hududlarda tadbirkorlikni rivojlantirishning samarali mexanizmlarini yaratadi va aholining farovonligini oshirishga xizmat qiladi.

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Seitmuratova V. J.
katta o‘qituvchisi
“maktabgacha ta’lim metodikasi” kafedrasi
Toshkent amaliy fanlar universiteti
Halimova G. X.
talabasi

ZAMONAVIY YONDASHUVLAR ASOSIDA BO’LAJAK TARBIYACHILARNING KASBIY KOMPETENTLIGINI OSHIRISH TAMOYILLARI

Annotatsiya: *Mazkur maqolada zamonaviy yondashuv asosida bo‘lajak tarbiyachilarning kasbiy kompetentligini oshirishning nazariy va amaliy jihatlari yoritilgan. Tadqiqotda zamonaviy pedagogik ta’lim jarayonida integratsiyaning o‘rni va ahamiyati tahlil qilinib, fanlararo bog‘liqlik asosida ta’limni tashkil etish bo‘lajak tarbiyachilarning kasbiy tayyorgarligini oshirishda muhim omil ekanligi asoslab berilgan. Shuningdek, kasbiy kompetentlikning tarkibiy qismlari – bilim, ko‘nikma, malaka va shaxsiy sifatlarni shakllantirishda integrativ yondashuv, amaliy mashg‘ulotlar hamda innovatsion pedagogik texnologiyalardan foydalanish yo‘llari ko‘rsatib o‘tilgan. Tadqiqot natijalari bo‘lajak tarbiyachilarning kasbiy faoliyatga tayyorgarligini takomillashtirish va maktabgacha ta’lim tizimi uchun raqobatbardosh mutaxassislar tayyorlashga xizmat qiladi.*

Kalit so‘zlar: *zamonaviy yondashuv, kasbiy kompetentlik, bo‘lajak tarbiyachi, pedagogik ta’lim, innovatsion texnologiyalar.*

Seitmuratova V. J.
senior lecturer
department of preschool education methodology
Tashkent University of Applied Sciences
Halimova G. Kh.
student

PRINCIPLES OF ENHANCING THE PROFESSIONAL COMPETENCE OF FUTURE EDUCATORS BASED ON MODERN APPROACHES

Abstract: *This article presents the theoretical and practical aspects of improving the professional competence of future educators based on a modern approach. The study analyzes the role and importance of integration in the contemporary pedagogical education process and substantiates that organizing education on the basis of interdisciplinary connections is an important factor in enhancing the professional training of future educators. In addition, the ways of developing the structural components of professional competence—knowledge,*

skills, abilities, and personal qualities—through an integrative approach, practical training, and the use of innovative pedagogical technologies are highlighted. The research results contribute to improving the readiness of future educators for professional activity and to training competitive specialists for the preschool education system.

Keywords: *modern approach, professional competence, future educator, pedagogical education, innovative technologies.*

Kirish

Mamlakatimizda maktabgacha ta’lim sohasini rivojlantirish, uni xalqaro mezonlar asosida yangilash va modernizatsiya qilish bugungi kunda davlat siyosatining muhim ustuvor yo‘nalishlaridan biri sanaladi. O‘zbekiston Respublikasining “Maktabgacha ta’lim va tarbiya to‘g‘risida”gi Qonunida belgilanganidek, tarbiyachilarning kasbiy malakasini oshirish, pedagogik mahoratlarini yanada takomillashtirish hamda ta’lim-tarbiya jarayonini zamonaviy va samarali metodlar asosida tashkil etish dolzarb vazifalar qatoriga kiradi [1].

Bo‘lajak tarbiyachilarning kasbiy kompetentligini shakllantirish va rivojlantirish pedagogik ta’lim jarayonining ustuvor yo‘nalishlaridan biri hisoblanadi. Ayniqsa, zamonaviy yondashuvlar, innovatsion pedagogik texnologiyalar hamda fanlararo integratsiya asosida tashkil etilgan ta’lim jarayoni tarbiyachilarning kasbiy tayyorgarligini sifat jihatidan yangi bosqichga olib chiqadi. Zamonaviy yondashuv ta’lim jarayonining uzviyligini ta’minlab, bolalar shaxsining har tomonlama kamol topishiga xizmat qiladi hamda ularning bilish faoliyatini tabiiy va mantiqiy ketma-ketlikda rivojlantirishga ko‘maklashadi. Maktabgacha ta’lim jarayoniga innovatsion g‘oyalarini tatbiq etish tarbiyachilarning kasbiy tayyorgarligini yanada mustahkamlaydi, pedagogik fikrlash doirasini kengaytiradi va o‘quv-tarbiyaviy ishlarni zamonaviy metodik yondashuvlar asosida samarali tashkil etishga undaydi. Shu bilan birga, zamonaviy yondashubni integrativ yondashuv asosida olib borilganda maktabgacha ta’lim tashkilotlarida bolalar bilan ishlash jarayonida fanlararo aloqadorlikni ta’minlab, ta’lim-tarbiya faoliyatini real hayotiy vaziyatlar bilan uyg‘un holda tashkil etishga xizmat qiladi. Buning natijasida bolalarda mustaqil tafakkur yuritish, ijodiy fikrlash va muloqot ko‘nikmalari yanada rivojlanadi, tarbiyachilar uchun esa o‘z kasbiy faoliyatini innovatsion yondashuvlar asosida takomillashtirish imkoniyatlari kengayadi.

Mazkur maqolaning maqsadi — zamonaviy yondashuvlar asosida bo‘lajak tarbiyachilarning kasbiy kompetentligini oshirish tamoyillarini nazariy va amaliy jihatdan tahlil qilishdan iborat.

Mavzuga oid adabiyotlar sharhi

Ta’lim tizimida muhim yo‘nalishlardan yana biri — xalqaro ta’lim standartlarini o‘rganish va o‘qitish metodlarini global tajribalar bilan uyg‘unlashtirishdir. Zamonaviy yondashuvlar deganda, eng avvalo, raqamli texnologiyalar nazarda tutiladi. Bo‘lajak tarbiyachilarning kasbiy kompetentligini shakllantirishda raqamli texnologiyalardan foydalanish ta’lim jarayonini yanada

samarali va interfaol qiladi hamda tarbiyachilarning media kompetentligini rivojlantirishga xizmat qiladi.

Kompetensiya – bu kutilgan natijaga olib keluvchi faoliyat belgisidir. U bilim

mahsuli bo‘lib, mutaxassis tomonidan uni amaliyotda qo‘llay olish qobiliyatidir. Kompetensiyaning bilimdan farqi shundaki, vazifani amaliy bajarmasdan turib, uni

aniqlab ham, baholab ham bo‘lmaydi. Malaka kompetentlikning muhim mezoni bo‘lib, u turli holatlarda, shu qatori muammoli vaziyatlarda ham bir necha bor qo‘llash natijasida namoyon bo‘ladi [2].

Tarbiyachilarning kreativligi ularning bolaga bo‘lgan yondashuvi va ta’lim jarayonini qanday o‘tishiga bog‘liq bo‘ladi. Tarbiyachi o‘z ustidan uzluksiz va to‘xtovsiz ishlashlari kerak bo‘ladi. Bu qobilyatni yangiliklarga intilish, zamon talablari va texnologiyalar bilan birga qadam tashlash, muntazam ravishda harakatlar orqali shakillantiriladi. Tarbiyachi qanchalik kreativ bo‘lib har bir darsga individual yondashsa dars bolalar uchun shunchalik qiziq va zavqli o‘tadi [3].

R.G'ofurovaning fikricha pedagogik kompetentlikni nafaqat bilim, balki amaliy ko‘nikmalarni ham o‘z ichiga olgan integratsion jarayon sifatida tasvirlaydi [4]. U o‘z tadqiqotida, tarbiyachilarning bilimlarini real hayotdagi muammolarni hal qilishda qo‘llay olish qobiliyatini rivojlantirishning ahamiyatini alohida qayd etadi.

N.Saidova ilmiy ishlarida kompetensiya yondashuvini bo‘lajak tarbiyachilarning kasbiy kompetentligini shakllantirishda asosiy prinsip sifatida ko‘rsatadi [5]. Uning fikricha, kompetensiya yondashuvi pedagogning nafaqat akademik bilimlarini, balki pedagogik jarayonni samarali boshqarish va o‘quvchilarga ta'lim berishda muammolarni hal qilish qobiliyatlarini ham o‘z ichiga oladi. Shuningdek, Saidova o‘quv jarayonini faqat nazariy bilimlar bilan emas, balki amaliy mashg‘ulotlar bilan ham boyitish zarurligini ta'kidlaydi.

F. Maxmudova pedagogik kompetentlikni rivojlantirishda shaxsiy rivojlanish va o‘z-o‘zini baholashning o‘rni haqida yozgan[6]. U, shuningdek, tarbiyachilarning o‘z kasbiy faoliyatini tahlil qilish va baholashga qaratilgan metodlarni taklif etadi. Maxmudova o‘z-o‘zini baholash jarayonida tarbiyachilarning o‘z bilim va ko‘nikmalarini tahlil qilish, ularni muntazam ravishda yangilab borish va kasbiy faoliyatdagi kamchiliklarni bartaraf etishga imkoniyat yaratishni zarur deb biladi.

Tadqiqot metodologiyasi

Bo‘lajak tarbiyachilarning kasbiy kompetentligini zamonaviy yondashuvlar asosida oshirish masalasini o‘rganishda, pedagogik va ilmiy izlanishning o‘zaro uyg‘unlashgan bir qator metodlaridan foydalanildi. Tadqiqot metodlari muammoning nazariy asoslarini aniqlash, amaliy tajribani tahlil qilish hamda olingan natijalarning ishonchliligini ta’minlashga xizmat qildi.

Birinchidan, ilmiy-pedagogik adabiyotlarni tahlil qilish va umumlashtirish metodi orqali kasbiy kompetentlik, zamonaviy yondashuvlar, integrativ ta’lim va

innovatsion pedagogik texnologiyalar masalasiga oid mahalliy va xorijiy ilmiy manbalar o‘rganildi.

Ikkinchidan, ta’lim jarayonini kuzatish metodi bo‘lajak tarbiyachilar bilan olib borilgan mashg‘ulotlar jarayonida qo‘llanildi. Kuzatuvlar davomida talabalarning o‘quv faolligi, kasbiy bilim va ko‘nikmalarni egallash darajasi, innovatsion texnologiyalarga bo‘lgan munosabati hamda amaliy faoliyatdagi ishtiroki tahlil qilindi.

Uchinchidan, taqqoslash va tizimlashtirish metodlari yordamida an’anaviy va zamonaviy yondashuvlar asosida tashkil etilgan ta’lim natijalari o‘zaro solishtirildi. Olingan ma’lumotlar asosida bo‘lajak tarbiyachilarning kasbiy kompetentligini rivojlantirishga ta’sir etuvchi omillar tizimlashtirildi hamda muhim pedagogik tamoyillar ajratib ko‘rsatildi.

To‘rtinchidan, pedagogik tajriba-sinov ishlari tadqiqotning asosiy amaliy bosqichi sifatida amalga oshirildi. Tajriba-sinov jarayonida zamonaviy yondashuvlar, integrativ ta’lim modeli va innovatsion pedagogik texnologiyalar asosida ishlab chiqilgan mashg‘ulotlar tizimi sinovdan o‘tkazildi. Tajriba natijalari bo‘lajak tarbiyachilarning kasbiy bilim, ko‘nikma va malakalaridagi o‘zgarishlarni aniqlashga imkon berdi.

Natijalar

Tadqiqot natijalari shuni ko‘rsatdiki, bo‘lajak tarbiyachilarning kasbiy kompetentligini oshirishda quyidagi asosiy tamoyillar muhim ahamiyat kasb etadi: Integrativ yondashuv tamoyili — fanlararo bog‘liqlik asosida tashkil etilgan ta’lim bo‘lajak tarbiyachilarda kasbiy bilimlarni yaxlit tizim sifatida shakllantiradi;

Amaliy yo‘naltirilganlik tamoyili — nazariy bilimlarni amaliy mashg‘ulotlar orqali mustahkamlash kasbiy ko‘nikma va malakalarni rivojlantiradi;

Innovatsion texnologiyalardan foydalanish tamoyili — interfaol metodlar, raqamli vositalar va pedagogik texnologiyalar ta’lim samaradorligini oshiradi;

Shaxsga yo‘naltirilgan yondashuv tamoyili — bo‘lajak tarbiyachilarning individual qobiliyatlari va ehtiyojlarini hisobga olish kasbiy o‘sishga xizmat qiladi.

Tajriba-sinov ishlari natijasida ushbu tamoyillar asosida tashkil etilgan ta’lim jarayoni bo‘lajak tarbiyachilarning kasbiy tayyorgarlik darajasini sezilarli darajada oshirganligi aniqlandi.

Muhokama

Olingan natijalar shuni tasdiqlaydiki, an’anaviy o‘qitish usullarigina bo‘lajak tarbiyachilarning kasbiy kompetentligini to‘liq shakllantirish uchun yetarli emas. Zamonaviy yondashuvlar asosida tashkil etilgan ta’lim jarayoni tarbiyachilarning kasbiy bilim, ko‘nikma, malaka va shaxsiy sifatlarini kompleks rivojlantirish imkonini beradi. Integratsiyalashgan, innovatsion va amaliy yo‘naltirilgan ta’lim modeli maktabgacha ta’lim tizimi uchun yuqori salohiyatli mutaxassislar tayyorlashda muhim ahamiyat kasb etadi.

Xulosa

Xulosa qilib aytganda, zamonaviy yondashuvlar asosida bo‘lajak tarbiyachilarning kasbiy kompetentligini oshirish ta’lim jarayonini yangicha tashkil etishni talab etadi. Integrativ yondashuv, innovatsion pedagogik texnologiyalar va amaliy mashg‘ulotlarga asoslangan ta’lim bo‘lajak tarbiyachilarni kasbiy faoliyatga puxta tayyorlashga xizmat qiladi. Mazkur tadqiqot natijalari pedagogik ta’lim amaliyotida samarali foydalanish uchun tavsiya etiladi.

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Sharipov Sh. A.
assistenti
“informatsion texnologiyalar, biofizika va tibbiy fizika” kafedrasi
Samarqand davlat tibbiyot universiteti

IONLARI ALMASHTIRILGAN SILIKAT SHISHA XUSUSIYATLARINI TEKSHIRISH

Annotatsiya: *Integral optikaning rivojlanishi ayniqsa amorf materiallardan shishalarning to’lqin o’tkazgich xarakterga ega ekanligining ochilishi elektronika sohasining rivojlanishiga va EHM texnikasida eng tez hisoblash mashinalari yaratilishiga olib keldi. Shishasimon materiallarning optik xususiyatlarini yaxshilash bilan undan kelgusida elektron qurilmalarda va quyosh energetikasida foydalanish mumkin.*

Kalit so‘zlar: *Ion almashinuv, termodiffuziya, yutilish spektri, γ-nurlanish, silikat shisha, gradient profil, to’rtburchak profil*

Sharipov Sh. A.
assistant
department of "information technologies, biophysics and medical physics"
Samarkand State Medical University

INVESTIGATION OF PROPERTIES OF ION-EXCHANGED SILICATES GLASS

Abstract: *The development of integrated optics, especially the discovery of the wave-conducting nature of glass from amorphous materials, led to the development of electronics and the creation of the fastest computers in computer technology. By improving the optical properties of glass materials, it can be used in future electronic devices and solar energy.*

Keywords: *Ion exchange, thermodiffusion, absorption spectrum, γ-radiation, silicate glass, gradient profile, rectangular profile*

Kirish

Optik aloqaning rivojlanishi va optik kompyuterning yaratilishi ko'p jihatdan optoelektronikada ishlatiladigan to'lqin uzatuvchi tuzilmalarning sifati, ularning xususiyatlari, ishlab chiqarish texnologiyasining narxi va boshqalar bilan belgilanadi. Shu munosabat bilan, to'lqin o’tkazgich tuzilmalarini yaratish usuli katta ahamiyatga ega, chunki u to'lqin o'tkazgichlarning sifatini, ilovalarini, narxini va boshqalarni belgilaydi. To'lqin o'tkazgichlarni yaratish uchun turli xil texnologiyalar qo'llaniladi.

Integratsiyalashgan optikada planar to'lqin o'tkazgichlarining sindirish ko'rsatkichi (SK) profilini shakllantirishning ikkita printsipi mavjud:

1) Boshqa taglik materialning yuzasida optik plyonkalarni hosil qilish;

2) Kimyoviy yoki fizik ta'sirlar natijasida taglikning sirtga yaqin qatlamlarida SK ning oshishi.

Birinchi holda, SK ning o'zgarishi keskin (to'rtburchak profili), ikkinchi holda, plyonkaning SK silliq o'zgaradi (gradient profili).

Asosiy qism

Gradient to'lqin o'tkazgich qatlamlarini yaratishda ion almashinadigan diffuziya usuli katta qiziqish uyg'otadi. Usulning mohiyati shisha tarkibidagi gidroksid metall ionlarining kimyoviy potentsiallardagi farq tufayli tuz eritmalaridan boshqa metall ionlari bilan almashinishidadir. Qoida sifatida, eritmadan shishaga diffuziyalangan ionlar shishadan eritmaga diffuziyalangan ionlarga qaraganda yuqori o'ziga xos yorug'lik nurining sinishiga ega, masalan, Ag^+, Li^+, K^+, Tl^+, Rb^+, $Cs^+ \leftrightarrow Na^+$. Bunday almashtirish natijasida shishaning sirt qatlamida SK oshadi, bu esa to'lqin o'tkazgichning shakllanishiga olib keladi. Odatda, ion almashinuv shishaning erish temperaturasi T_g dan past haroratlarda amalga oshiriladi.

Bu ishda ion almashtirilgan silikat shishaga γ-nurlanishning ta'siri tajriba yo'li bilan o'rganildi. Shishaga issiqlik bilan ishlov berish KNO_3 va $NaNO_3$ tuzi eritmasida amalga oshirildi.

Ushbu usul bilan olingan to'lqin o'tkazgichlar boshqa usullar bilan qilingan to'lqin o'tkazgichlarga nisbatan minimal yo'qotishlarga ega (0,2 - 0,5 dB / sm).

K^+ ioni spektrning ko'rinadigan va yaqin infraqizil sohasida yutmaydigan modifikatordir. K^+ dan foydalanish rekord darajada past yo'qotishlar (~ 0,2 dB/sm) bilan yaxshi optik sifatdagi to'lqin o'tkazgichlarini olish imkonini beradi. Bundan tashqari, kaliy nitrat eritmalarida qayta ishlangan shisha namunalari mexanik mustahkamlikni oshiradi, bu hozirgi vaqtda shisha mustahkamlash amaliyotida keng qo'llaniladi. Shuni ham ta'kidlash kerakki, KNO_3 eritmasida past haroratli ion almashinuvi shisha namunalari sirtining termik barqarorligi, ishqalanishga chidamliligi, kimyoviy barqarorligi, mikroqattiqligi va optik mustahkamligining oshishiga olib keladi.

Ion almashinadigan diffuziya odatda shishalarda to'lqin o'tkazgichlarni yaratish uchun ishlatiladi.

Diffuziya jarayoni turli haroratlarda bir necha soat davomida amalga oshirildi. KNO_3 va $NaNO_3$ ning erigan tuzi va 4 ta namuna maxsus idishga solininib, pechga kiritiladi, bitta namuna bir soatdan keyin olinadi. Olingan namuna maxsus idishdagi distillangan suvga botiriladi va qaynoq suvda 30 daqiqa davomida sirti tozalanadi. Ikkinchi namuna ham 2 soat davomida belgilangan haroratda maxsus pechda saqlanadi va 30 daqiqa davomida qaynoq suvda sirti tozalanadi. Uchinchi namuna 3 soat davomida belgilangan haroratda saqlanadi va 30 daqiqa davomida qaynoq suvda sirti tozalanadi. Maxsus pechning harorati 500 °C gacha ko'tarilganda ham diffuziya yuqoridagi tartibda amalga oshiriladi.

Diffuziya jarayonlari to'liq bajarilgandan so'ng, namunalardagi yutilish spektrini aniqlash uchun Perkin Elmer Lambda 35 markali maxsus qurilmadan foydalanildi.10^5 R nurlantirildi va yutilish spektri o'lchandi. Keyin bu namuna 10^6

R dozada nurlantirildi va yutilish spektri o'lchandi. Keyin xuddi shu namuna 10^7 R dozada nurlantirildi va yutilish spektri yana o'lchandi.

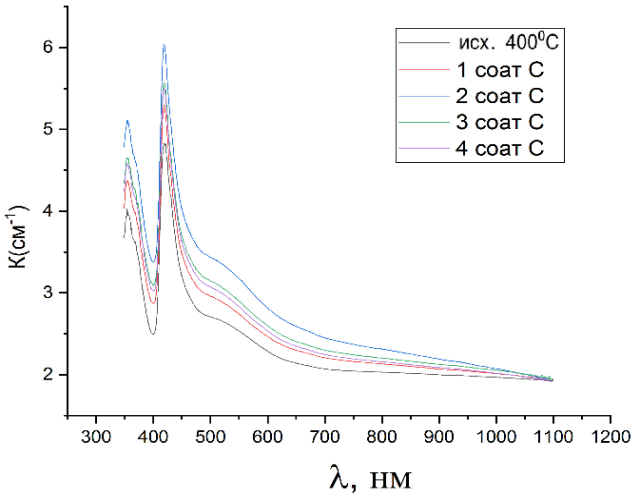
Turli haroratlarda ionlari almashingan namunalarning yutilish spektrini o'lchash yuqoridagi tartibda amalga oshirildi.

Shishalarni KNO_3 va $NaNO_3$ ishqoriy nitratlari eritmalarida ishlov berish Mn^{2+} ionlarining qisman oksidlanishiga olib keladi va ishqor ionlari almashtirilganda markazlarning simmetriyasi kamayadi. Ion almashinuvi vaqti ortishi bilan shishaning rangi ham o'zgaradi va quyuq jigarrang bo'ladi (3.1-rasm).

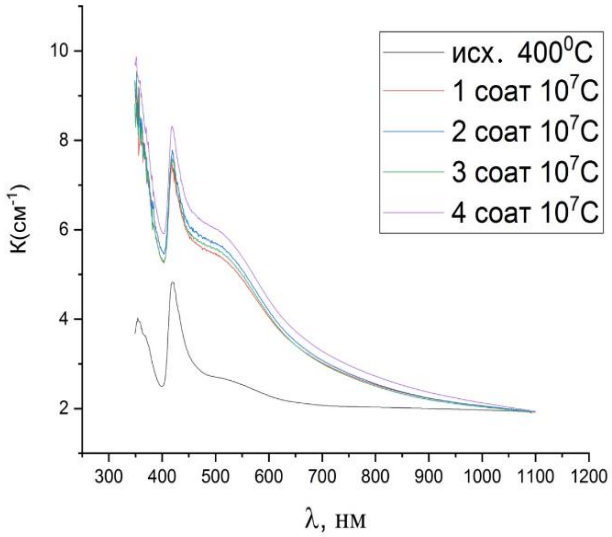
Namunalar 400^0C da ion almashtirish jarayoni o‘tkazildi. Spektrda 380 va 450 nm dagi yorug‘lik yutilish spektri ko‘ringan. Spektrdan ko‘rinadiki, ion almashish vaqti oshishi bilan 350 va 420 nm dagi signallar intensivligi oshib borgan. 530 nm da ham ozgina o‘zgarish bo‘lyapti. U ham ion almashish vaqti oshishi bilan oshyapti. Ion almashish vaqti oshishi marganets ham valentliugini 2 dan 6 gacha o’zgartiradi.

Namunalar γ-nurlanish ta’sirida nurlantirilgandan so’ng olingan yutilish spektrida quyidagi ikkita yutilish polosasi, ya’ni 420 va 530 nm maksimumlarga ega bo’lgan yutilish polosasi kuzatildi. Bu polasalar marganets ionlari bilan bog’liqdir. Dastlabki namunada 350 nm to’lqin uzunligida ham yutilish polosasi kuzatildi. Ion almashtirilgan namunalarda esa chetlanish yuz beryapti va polasa kuzatilmaydi (3.2-rasm).

Doza oshishi bilan bu polosalarning intensivligi oshar kam bo’lsa ham o’zgarar ekan.



3.1-rasm. Nurlanishdan oldingi yutilish spektrlari ($NaNO_3$ tuzi eritmasida ishlov berilgan).



3.2-rasm. Nurlanishdan keyingi yutilish spektrlari ($NaNO_3$ tuzi eritmasida ishlov berilgan).

Xulosa

Shunday qilib, shishani ishqoriy nitrat eritmalarida qayta ishlash Mn^{2+} ionlarining qisman oksidlanishiga olib keladi va shisha rangi o'zgaradi, bundan tashqari, marganets valentligini 2 dan 6 gacha o'zgartiradi.

Boshqa tomondan, shishani bir xil turdagi diffuzant bilan eritmada qayta ishlov berishda markazlarning simmetriyasi ortadi. Bundan tashqari, ion almashishgan namunalarga havoda haroratili ishlov berilganda marganets ionlarining holatiga sezilarli ta'sir ko'rsatadi

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Shermanova F. D., p.f.f.d
dotsent
Toshkent amaliy fanlar universitet

OLIY TA'LIM MUASSASALARIDA TALABALARNING RAQAMLI SAVODXONLIKNI RIVOJLANTIRISH TEXNOLOGIYALARI VA ULARNING IMKONIYATLARI

Annotatsiya. *Ushbu maqolada oliy ta'lim muassasalarida talabalarning raqamli savodxonligini rivojlantirishga yo'naltirilgan zamonaviy texnologiyalar va ularning didaktik imkoniyatlari tahlil qilinadi. Raqamli savodxonlikni shakllantirish jarayonida raqamli ta'lim platformalari, bulutli texnologiyalar, sun'iy intellekt vositalari, multimedia resurslari hamda interfaol o'qitish usullarining o'rni yoritib beriladi. Tadqiqotda texnologik yondashuvlar talabalarning axborot bilan ishlash madaniyati, tanqidiy fikrlashi, raqamli muhitda mustaqil va mas'uliyatli faoliyat olib borish kompetensiyalarini rivojlantirishga xizmat qilishi asoslab beriladi. Maqola natijalari oliy ta'lim tizimida raqamli savodxonlikni samarali rivojlantirishga doir metodik tavsiyalar ishlab chiqishda amaliy ahamiyat kasb etadi.*

Kalit so'zlar*. raqamli savodxonlik, oliy ta'lim, raqamli ta'lim texnologiyalari, raqamli kompetentlik, ta'lim platformalari, axborot madaniyati.*

Shermanova F. D., Ph.D.
associate professor
Tashkent University of Applied Sciences

TECHNOLOGIES FOR DEVELOPING STUDENTS' DIGITAL LITERACY IN HIGHER EDUCATION INSTITUTIONS AND THEIR OPPORTUNITIES

Annotation. *This article examines modern technologies for developing students' digital literacy in higher education institutions and analyzes their didactic potential. Particular attention is paid to the role of digital learning platforms, cloud technologies, artificial intelligence tools, multimedia resources, and interactive teaching methods in fostering digital literacy. The study substantiates that the integration of these technologies contributes to the development of information culture, critical thinking, and students' ability to engage independently and responsibly in digital educational environments. The findings of the article have practical significance for designing methodological recommendations aimed at improving digital literacy development in higher education.*

Keywords. *digital literacy, higher education, digital educational technologies, digital competence, educational platforms, information culture.*

Bugungi shiddatli raqamli transformatsiya davri oliy ta’lim muassasalaridan paradigma o‘zgarishini talab qilmoqda. Endilikda ta’limning asosiy vazifalaridan biri talabalarni texnologik jihatdan malakali, axborotga tanqidiy yondashuvchi, media savodxon, samarali kommunikator va raqamli xavfsizlik madaniyatiga ega shaxs sifatida shakllantirishdan iboratdir. O‘zbekistonda uzluksiz ta’lim tizimini modernizatsiyalash, uni Yevropa va xalqaro ta’lim makoni bilan integratsiyalash jarayonlari izchil davom etmoqda. Xususan, Boloniya deklaratsiyasi tamoyillarini joriy etish, kredit-modul tizimiga o‘tish hamda talabalar mustaqil ta’lim ulushini oshirish oliy ta’limda raqamli savodxonlikni rivojlantirishga bo‘lgan ehtiyojni yanada kuchaytirdi. “2030 yilgacha O‘zbekiston ta’limini modernizatsiyalash konsepsiyasi”da ham raqamli transformatsiya, zamonaviy axborot-kommunikatsiya texnologiyalarini ta’lim jarayoniga integratsiya qilish ustuvor vazifalar sifatida belgilangan.

Bugungi kunda jamiyatning innovatsion rivojlanish modeliga o‘tishi, fan, texnika va texnologiyalar sohasida raqamli transformatsiyaning jadallashuvi oliy ta’lim tizimida raqamli savodxonlikni rivojlantirishni strategik ahamiyatga ega masalaga aylantirmoqda. Axborot-telekommunikatsiya texnologiyalari va elektronika yo‘nalishlarining ustuvorligi talabalarning raqamli kompetensiyalarini, jumladan axborot xavfsizligi, raqamli etika, media va axborot savodxonligi ko‘nikmalarini tizimli shakllantirishni taqozo etadi.

Shu sababli, mazkur kompetensiyalarni rivojlantirishga qaratilgan texnologiyalarni shunchaki didaktik vosita emas, balki ta’limiy jarayonning ajralmas, fundamental va integral tarkibiy qismi sifatida tushunish va tizimli, maqsadga yo‘naltirilgan tarzda qo‘llash zarurati yuzaga chiqmoqda. Talabalarning raqamli savodxonligini rivojlantirish texnologiyalari deganda, zamonaviy ta’lim jarayonida ularning informatsion, kommunikatsion va raqamli ko‘nikmalarini shakllantirishga yordam beradigan vositalar, dasturlar va metodik yondashuvlar nazarda tutiladi. Raqamli savodxonlikni rivojlantirishga qaratilgan texnologiyalar samarali qo‘llanilishi uchun ularni quyidagi asosiy to‘rt guruhga ajratish mumkin:

1. Axborot-kommunikatsiya texnologiyalari (AKT) asosidagi o‘qitish;
2. Hamkorlikda o‘qitish texnologiyalari;
3. Tanqidiy fikrlashni rivojlantirish texnologiyalari;
4. Xavfsizlik va axloqiy me’yorlarni o‘rgatish texnologiyalari.

Har bir turdagi texnologiyaning pedagogik salohiyatini to‘liq ro‘yobga chiqarish, ularning imkoniyatlarini maksimal darajada ishga solish va o‘quv jarayoniga samarali integratsiya qilish maxsus metodik yondashuvni, pedagogik-psixologik tayyorgarlikni hamda ta’lim infratuzilmasining moslashuvchanligini talab etadi.

Axborot-kommunikatsiya texnologiyalari (AKT) – bu axborotni yaratish, saqlash, uzatish, qayta ishlash va taqdim etish jarayonlarini avtomatlashtirish va optimallashtirishga xizmat qiluvchi texnologiyalar majmui sifatida ilmiy nuqtai nazardan ta’riflanadi.

Ilmiy manbalarda AKT quyidagicha tushuntiriladi: UNESCO (2013)**:** AKT – bu *ta’lim, fan, iqtisodiyot va boshqa sohalarda axborot almashish va boshqarish*

jarayonlarini qo‘llab-quvvatlaydigan texnologiyalar; [1]R. Picciano va K. Seaman (2017) AKT – o‘quv jarayonini interaktiv, masofaviy va shaxsiylashtirilgan qilish imkonini beruvchi vositalar va metodlarni o‘z ichiga oladi. [2]

Oliy ta’lim muassasalarida talabalarning raqamli savodxonligini rivojlantirishda samarali qo‘llaniladigan axborot-kommunikatsiya texnologiyalari (AKT) asosidagi o‘qitish texnologiyalari raqamli savodxonlikning asosini tashkil qiladi. Bu texnologiyalarga:

✓ Masofaviy ta’lim platformalari (LMS – Learning Management System)

Masofaviy ta’lim platformalari oliy ta’lim muassasalarida talabalarning raqamli savodxonligini rivojlantirishda asosiy vositalardan biridir. Bu platformalar o‘quv jarayonini markazlashtirish, resurslarni taqdim etish va topshiriqlarni nazorat qilish imkonini beradi. Masalan, Moodle, Google Classroom, Zoom va Microsoft Teams kabi tizimlar talabalarga platformada ishlash, o‘quv materiallarini yuklab olish yoki yuklash, onlayn topshiriqlarni bajarish, guruhlarda hamkorlik qilish va raqamli o‘quv muhitida o‘zini boshqarish ko‘nikmalarini shakllantiradi. Shu bilan birga, LMS platformalari orqali talabalar ta’lim jarayonini o‘z sur’atida boshqarish, vaqtni rejalashtirish va mustaqil ishlash ko‘nikmalarini ham rivojlantiradi.

Tadqiqotlar, xususan, Alrasheedi, Capretz va Raza (2015) tomonidan olib borilgan izlanishlar shuni ko‘rsatadiki, “Moodle va Google Classroom kabi raqamli o‘quv platformalari nafaqat o‘quv materiallarini yetkazish imkonini beradi, balki talabalarga mustaqil o‘qish, o‘zini baholash va hamkorlikda ishlash imkoniyatlarini ham yaratadi.”[3]

Ta’lim kontentini boshqarish tizimlarini o‘rganish CMSga nisbatan kengroq funksionallikka ega bo‘lib, o‘quv kontentini yaratish, saqlash, qayta ishlatish va tarqatish jarayonlarini to‘liq boshqaradi. Ular kurslarni individual ehtiyojlarga moslashtirish imkonini beradi. Ta’limni qo‘llab-quvvatlovchi tizimlar talabalarga o‘quv jarayonida yordam beruvchi, ularning savollariga javob beruvchi yoki o‘quv materiallariga kirishni osonlashtiruvchi qo‘shimcha vositalar (masalan, chatbotlar, onlayn yordam xizmatlari).

Слабодчиков В.И. fikricha ta’limiy platformalar (Learning Platforms - LP). Yuqoridagi tizimlarni o‘zida mujassam etgan yoki ularni birlashtirgan keng qamrovli ekotizimlar bo‘lib, uzluksiz va kompleks ta’lim muhitini yaratadi.[4]

LMSlar akademik yoki kasbiy ta’lim jarayonlarini boshqarish, kurs tashkil qilish, ro‘yxatdan o‘tkazish, talabalar progressini kuzatish va baholashni avtomatlashtirish imkonini beradi.[5]

✓ **Multimedia texnologiyalari** —Multimedia va vizualizatsiya talabalarga raqamli kontent yaratish va murakkab g‘oyalarni bu bir vaqtning o‘zida rasm, videotasvir, animatsiya, ovozli axborot va matn bilan ishlashni ta’minlaydigan interfaol axborot texnologiyalaridir.

S.G. Grigorev va V.V. Grinshkun ta’lim jarayonida multimedia texnologiyalaridan foydalanish o‘qitish samaradorligini sezilarli darajada

oshirishini ta’kidlab, multimediani turli axborot turlarini integratsiyalash asosida o‘quv materialini vizual, audial va interaktiv shaklda taqdim etish imkonini beruvchi zamonaviy ta’lim vositasi sifatida ta’riflaydilar.[6]

O‘qitish va o‘rganish jarayonida multimedia tizimlarining qo‘llanilishi sifatli ta’limga erishish va talabalar natijalarini yaxshilash uchun samarali strategiya sifatida ko‘plab tadqiqotlarda tasdiqlangan. Interfaol kontent yaratish va multimedia texnologiyalari aynan shu maqsadga xizmat qiladi. Bu vositalar nafaqat o‘qituvchiga materiallarni dinamik tarzda taqdim etish imkonini beradi, balki talabalarning o‘zlari ham raqamli kontent yaratish, vizual va audio axborotni qayta ishlash ko‘nikmalarini rivojlantirishlari uchun keng sharoit yaratadi. [7] Ushbu turdagi texnologiyalar quyidagi imkoniyatlarni taqdim etadi:

Vizual va audio-vizual materiallar yaratish - PowerPoint, Google Slides, Prezi kabi prezentatsiya dasturlari orqali visual axborotni birgalikda ishlatish bilimlarni tizimli ideallashtirish va uzoq muddatli saqlashga xizmat qiladi.[8] Shuningdek, grafik dizayn vositalari (Canva, Photoshop, Figma) yordamida talabalarning axborotni estetik va strukturaviy jihatdan yaratishi vizual savodxonlik, kontent yaratish va ifodalash kompetensiyalarini mustahkamlaydi.[9] Bu ularda axborotni strukturaviy va estetik jihatdan to‘g‘ri taqdim etish ko‘nikmalarini shakllantiradi.

Bulutli texnologiyalar (Cloud Technologies)**.** Bulutli texnologiyalar oliy ta’lim muassasalarida talabalar va o‘qituvchilar o‘rtasida ma’lumot almashish, hujjatlarni boshqarish va real vaqt rejimida hamkorlik qilish imkoniyatini taqdim etadi. Masalan, Google Drive, Dropbox, OneDrive kabi xizmatlar orqali talabalar hujjatlarni saqlash, ularni birgalikda tahrirlash va tahlil qilish imkoniyatiga ega bo‘ladi. Bu texnologiyalar talabalarda raqamli hujjatlarni boshqarish, onlayn hamkorlik ko‘nikmalarini rivojlantirish va ma’lumotlarga xavfsiz kirish tamoyillarini o‘rgatadi. Shu bilan birga, bulutli texnologiyalar o‘quv jarayonini markazlashtirish va talabalarni masofadan ishlashga moslashishga o‘rgatishda samarali vosita sifatida ishlatiladi.

Xulosa qilib aytganda, oliy ta’lim muassasalarida talabalar raqamli savodxonligini rivojlantirish texnologiyalari ko‘p qirrali va tizimli pedagogik yondashuvni talab etadi. Tadqiqot doirasida ajratilgan axborot-kommunikatsiya texnologiyalari asosidagi o‘qitish, hamkorlikda o‘qitish, loyiha texnologiyalari, tanqidiy fikrlashni rivojlantirish hamda xavfsizlik va axloqiy me’yorlarni o‘rgatish texnologiyalari bir-birini to‘ldiruvchi va uzviy bog‘liq pedagogik mexanizmlar sifatida namoyon bo‘ldi. Ushbu texnologiyalarni integratsiyalashgan holda qo‘llash talabalarning raqamli muhitda axborot bilan ishlash, muloqot qilish, muammolarni hal etish va mas’uliyatli qaror qabul qilish kompetensiyalarini kompleks shakllantirish imkonini beradi.

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Sulaymonova M. M.
magistranti
turizm va mehmondo‘stlik yo‘nalishi
Buxoro davlat Universiteti

BUXORO VOHASIDA TURISTIK XIZMATLAR BOZORINI RIVOJLANTIRISH OMILLARI VA ULARNING TASHKILIY-IQTISODIY SAMARADORLIGI

Annotatsiya. *Bugungi globallashuv sharoitida turizm sohasi jahon iqtisodiyotining eng jadal rivojlanayotgan tarmoqlaridan biri hisoblanadi. Turizm nafaqat iqtisodiy foyda keltiradi, balki madaniy merosni asrash, hududlar infratuzilmasini rivojlantirish va aholi bandligini ta’minlashda muhim omil bo‘lib xizmat qiladi. O‘zbekistonning qadimiy tarixiy hududlaridan biri bo‘lgan Buxoro vohasi o‘zining boy madaniy-tarixiy merosi, qulay geografik joylashuvi va noyob an’analari bilan turistik xizmatlar bozorini rivojlantirish uchun katta salohiyatga ega.*

Kalit so‘zlar. *Turizm, geografik, UNESCO, Qizilqum cho‘li, Quljuqtov tizmasi, Ekoturist.*

Suleimanova M. M.
master's student
faculty of tourism and hotel business
Bukhara State University

FACTORS OF TOURISM SERVICES MARKET DEVELOPMENT IN THE BUKHARA OASIS AND THEIR ORGANIZATIONAL AND ECONOMIC EFFICIENCY

Abstract. *In today's globalized world, the tourism industry is one of the fastest-growing sectors of the global economy. Tourism not only generates economic benefits but also plays a vital role in preserving cultural heritage, developing regional infrastructure, and providing employment. The Bukhara oasis, one of the most ancient historical regions of Uzbekistan, has enormous potential for developing the tourism market thanks to its rich cultural and historical heritage, favorable geographic location, and unique traditions.*

Keywords. *Tourism, geography, UNESCO, Kyzylkum Desert, Kulyuktov Range, ecotourism.*

Buxoro vohasi Markaziy Osiyodagi eng qadimiy madaniyat o‘choqlaridan biri bo‘lib, Buyuk Ipak yo‘li chorrahasida joylashgan. Hududda 300 dan ortiq tarixiy-me’moriy yodgorliklar mavjud bo‘lib, ularning aksariyati UNESCO Jahon madaniy merosi ro‘yxatiga kiritilgan. Ark qal’asi, Po‘i-Kalon majmuasi, Lyabi-Hovuz, Mir Arab madrasasi kabi obidalar xalqaro va mahalliy sayyohlar uchun

katta qiziqish uyg‘otadi. Shuningdek, Buxoro vohasida milliy hunarmandchilik, an’anaviy oshxona, diniy ziyorat maskanlari va milliy urf-odatlar turizmni rivojlantirishda muhim omil hisoblanadi. Ushbu resurslardan samarali foydalanish turistik xizmatlar bozorining kengayishiga olib keladi. Turistik xizmatlar bozorini rivojlantirish omillari:

Tarixiy-madaniy omillar - Buxoro vohasining asosiy ustunligi — uning boy tarixiy-madaniy merosidir. Qadimiy obidalar, masjid va madrasalar, maqbaralar turizmning madaniy, ziyorat va ilmiy yo‘nalishlarini rivojlantirish imkonini beradi. Tarixiy obyektlarni restavratsiya qilish, ularni zamonaviy talablarga mos tarzda saqlash va targ‘ib etish turistik xizmatlar bozorining kengayishiga xizmat qiladi.

Davlat siyosati va huquqiy omillar - So‘nggi yillarda O‘zbekistonda turizm sohasini rivojlantirish davlat siyosatining ustuvor yo‘nalishlaridan biriga aylandi. Vizani soddalashtirish, turistik zonalar tashkil etish, tadbirkorlarga imtiyozlar berilishi Buxoro vohasida turistik xizmatlar bozorining faollashuviga ijobiy ta’sir ko‘rsatmoqda. Davlat tomonidan qabul qilinayotgan dasturlar va qarorlar turizm infratuzilmasini rivojlantirish uchun muhim huquqiy asos bo‘lib xizmat qiladi.

Infratuzilma omillari - Turistik xizmatlar bozorining rivoji bevosita infratuzilma holatiga bog‘liq. Buxoro shahrida mehmonxonalar, oilaviy mehmon uylari, transport xizmatlari, restoran va kafe tarmoqlarining kengayib borayotgani turizmni rivojlantirishga xizmat qilmoqda. Aeroport va temiryo‘l infratuzilmasining takomillashuvi, ichki transport qulayliklari sayyohlar oqimini oshirishda muhim omil hisoblanadi.

Iqtisodiy omillar - Turizm sohasi hudud iqtisodiyotiga katta daromad keltiradi. Buxoro vohasida turistik xizmatlar bozorining rivojlanishi kichik biznes va xususiy tadbirkorlikning faollashuviga, yangi ish o‘rinlarining yaratilishiga sabab bo‘lmoqda. Milliy hunarmandchilik mahsulotlari, suvenirlar, xizmat ko‘rsatish sohasi iqtisodiy jihatdan barqarorlikni ta’minlaydi.

Kadrlar va xizmat sifati omillari - Turistik xizmatlar bozorida raqobatbardoshlikni ta’minlash uchun malakali kadrlar muhim ahamiyatga ega. Gid-tarjimonlar, mehmonxona xodimlari, turoperatorlar va xizmat ko‘rsatuvchi mutaxassislarning kasbiy mahoratini oshirish xizmat sifati yaxshilanishiga olib keladi. Ta’lim muassasalarida turizm yo‘nalishida mutaxassislar tayyorlash ushbu bozorning barqaror rivojlanishini ta’minlaydi.

Axborot va reklama omillari - Zamonaviy axborot texnologiyalari turizm bozorida muhim rol o‘ynaydi. Internet saytlar, ijtimoiy tarmoqlar, onlayn bron qilish tizimlari orqali Buxoro vohasining turistik imkoniyatlarini keng targ‘ib etish mumkin. Samarali reklama va marketing strategiyalari xorijiy va mahalliy sayyohlar sonining oshishiga xizmat qiladi.

O‘zbekistonning cho‘l zonasi, aniqrog`i Buxoro viloyatida ekologik turizm bozorini rivojlantirishning istiqbolli hududlaridan biri bo‘lib, Buxoro shahridan 140-160 km uzoqlikda, bepoyon Qizilqum cho‘li bag`rida joylashgan Quljuqtov tizmasidir. Quljuqtov tizmasi yuqoridan qaraganda yerga cho‘kib yotgan ikki

o‘rkachli tuyani eslatadi va past tog`lar toifasiga kiradi. Uning eng baland nuqtalari –g`arbiy qismida 785, sharqiy chekkasida (Bosh Gujumdi) 773 metr mutlaq balandlikka ega. Tog`ning markaziy qismining kengligi 25-35 km gacha cho‘zilgan. Maydoni ming kvadrat km atrofida. Tizma geologik jihatdan juda murakkab tektonik, minerologik tuzilishga ega. Tog` jinslarida devon va toshko‘mir davrining qumtosh, slanets, ohaktosh hamda biotitli granitlar yetakchilik qiladi. Tog` etaklarida esa mezozoy davrining turli rangli gilli yotqiziqlari o‘ziga xos manzaraga ega. Tizma yonbag`irlari esa har 2-3 km masofada bir-biriga parallel bo‘lgan 100 ga yaqin yirik soy vodiylari bilan qirqilgan va turli shakldagi relyef ajoyibotlarni hosil qilgan. Bundan tashqari Churuq, Jing`ildi, Uchquduq, Oyoqog`itma kabi aholi manzilgohlari (aullar) hamda 20 dan ortiq chorva quduqlari, qo‘shlar va ular bilan bog`liq infratuzilmalar yaratilgan. Ayni davrda tizma hududida tuyalar va o‘n ming boshdan ortiq echki, qorako‘l qo‘ylari boqilmoqda. Churuq qishlog`i yaqinida, Oyoqog`itma qudug`i etagida O‘zbekiston FA Botanika institutining “Qizilqum cho‘l stantsiyasi” 1959 yildan buyon faoliyat ko‘rsatib kelmoqda. Mazkur ilmiy markaz huzurida 5 gektar maydonda cho‘l va madaniy o‘simliklardan iborat bog` tashkil qilingan. Ekoturistlarni Churuq qishlog`iga kirish oldida yonma-yon qad ko‘tarib turgan erozion supasimon baland (25-30 metr) tepalar hamda soy vodiysini o‘rab turgan “o‘rkachsimon” sarg`ish gilli qirlar e`tiborsiz qoldirmaydi. Churuq qishlog`ida 30 ga yaqin xo‘jalik joylashgan bo‘lib, 200 ga yaqin aholi istiqomat qiladi. Qishloq tuman markazidan 70 km shimolda joylashgan. Uning tub aholisi qozoqlardir. Yana bir rekreatsion maskanlardan biri Buxoro viloyati Oyoqog`itma qishlog`i yaqinidagi “Og‘utma” ko‘lidir. Og‘utma ko‘li 1985-1986-yillarda Shimoliy Shofirkon zovuri orqali keladigan oqava suvlar hamda bahor va qish fasllaridagi yog`ingarchiliklar hisobidan hosil bo‘lgan. Hozirda Og‘utma ko‘li atrofida kichik dam olish uylari, plyaj zonalari tashkil qilingan bo‘lib, u yerga asosan tub aholi va viloyatning qolgan tumanlaridan odamlar boradi. Lekin bu juda past ko‘rsatkich bo‘lib, ko‘ldagi infratuzilmani xalqaro standartlarga javob beradigan darajaga olib chiqib, turistik kompleks yaratish kerak. Shu o‘rinda shuni aytib o‘tish joizki, O‘zbekiston Respublikasi Prezidentining 2017 yil 19-maydagi “2017-2019-yillarda Buxoro viloyati va Buxoro shahrining turistik salohiyatini jadal rivojlantirish chora-tadbirlari to‘g‘risida”gi PQ-2980-sonli qarorlari e’lon qilindi. Mazkur qarorga ko‘ra 2018 yilning noyabr oyiga qadar Og‘utma ko‘li atrofida infratuzilmani rivojlantirib, u yerda sog‘lomlashtirish turizmi, ov turizmni va sport turizmini rivojlantirish ko‘zda tutilgan.

Xulosa qilib aytganda, Buxoro vohasida turistik xizmatlar bozorini rivojlantirish ko‘plab omillar majmuasiga bog‘liq. Boy tarixiy-madaniy meros, davlat qo‘llab-quvvatlovi, rivojlanayotgan infratuzilma, iqtisodiy imkoniyatlar, malakali kadrlar va zamonaviy axborot texnologiyalaridan samarali foydalanish ushbu hududda turizmning barqaror rivojlanishini ta’minlaydi. Ushbu omillarni uyg‘unlashtirish orqali Buxoro vohasi nafaqat O‘zbekiston, balki Markaziy Osiyodagi yetakchi turistik markazlardan biriga aylanishi mumkin.

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Sultonov Sh. A.
dotsenti
Shahrisabz davlat pedagogika instituti
Raximova D. Z.
talabasi
Shahrisabz davlat pedagogika instituti
Abdiyeva G. Sh.
talabasi
Shahrisabz davlat pedagogika instituti
O‘zbekiston, Shahrisabz shahri

KITOB TUMANI GEOGRAFIK JOYLASHUVI VA RELYEF XUSUSIYATLARI

Annotatsiya. *Ushbu maqolada Kitob tumani geografik joylashuvi va relyef xususiyatlari, geologik jarayonlar ta’sirida relyef xossalarini o‘zgarishi, tabiiy jarayonlar kechishi haqida ma’lumotlar bayon etilgan.*

Kalit so‘zlar: *geologiya, tog‘, relyef, yonbag‘ir, qo‘rg‘oshin, rux, gil, qum, shag‘al, daryo, vodiy, gilli jins, marmar, granit, kon.*

Sultanov Sh.A.
associate professor
Shakhrisabz State Pedagogical Institute
Raximova D. Z.
student
Shakhrisabz State Pedagogical Institute
Abdiyeva G. Sh.
student
Shakhrisabz State Pedagogical Institute
Uzbekistan, Shakhrisabz city

GEOGRAPHICAL LOCATION AND TOPOGRAPHICAL CHARACTERISTICS OF KITOB DISTRICT

Abstract. *Abstract. This article provides information on the geographical location and relief characteristics of the Kitab district, changes in relief properties influenced by geological processes, and the occurrence of natural processes in the area.*

Keywords: *geology, mountain, relief, slope, lead, zinc, clay, sand, gravel, river, valley, clay rock, marble, granite, deposit.*

Kirish

Kitob tumani O‘zbekiston Respublikasining Qashqadaryo viloyatidagi tuman bo‘lib viloyatning shimoliy-sharqiy qismida joylashgan. 1926-yil sentabrda

tashkil etilgan. 1962-yil 24-dekabrda Shahrisabz tumani bilan birlashtirilgan. 1968-yil 25-dekabrda qayta tuzildi va hozirda viloyatning Chiroqchi, Shahrisabz tumanlari, Samarqand viloyati va Tojikiston Respublikasi bilan chegaradosh. Umumiy maydoni - 1,75 ming km². Aholisi – 287,7 ming kishi (2025-yil holatiga ko‘ra). Kitob tumanida 1 shahar (Kitob), 13 ta shaharcha -Alaqo‘yliq, Bektemir, Beshterak, Rus qishloq, Baxt darvozasi, Obikanda, Panji, Sariosiyo, Sevaz, Xoji, Varganza, Yakkatut, Yangiobod), 60 dan ortiq (rasmiy ma’lumotlarda) mahalla va 26 ta mahalla punktlari bor (2025-yil holatiga ko‘ra). Markazi – Kitob shahri. Tuman hududidan Katta O‘zbekiston trakti o‘tgan. Taxtaqoracha dovoni (balandligi 1788 m) esa respublika janubini qo‘shni hududlar bilan bog‘laydi.

Asosiy qism

Qashqadaryo viloyatida ko‘plab tumanlar mavjud bo‘lib,ularning har biri o‘zgacha ko‘rinishi, geologik tuzilishi va relyefidagi farqlar bilan ajralib turadi. Hudud o‘zining relyef tuzilishi, tabiati, go‘zalligi bilan alohida ta’rifga loyiqdar, ko‘p qismi tog‘li va tog‘ oldi hududlaridan iborat.

Hudud nomi fors-tojikcha kift yelka, ob – suv so‘zlaridan kelib chiqqan deb ta’riflanadi. Kitob tumani o‘rta asrlarda G‘arb bilan Sharq mamlakatlarini bir-biriga bog‘lagan yirik karvon yo‘li yoqasida, Samarqand va Shahrisabz (eski Kesh) ga yaqin joylashganligi uchun yirik shaharga aylangan.

Tuman relyefi tog‘li va tog‘ oldi tipida bo‘lib, asosan Zarafshon tizmasining janubiy-g‘arbiy tarmoqlari va yon bag‘irlarida joylashgan.

Tumanni mutloq balandliklari. Ko‘pincha 1300 - 2700 metr oralig‘ida. Tuman shimoli-sharqiy va sharqiy qismlarida balandligi 2500 - 2700 metrgacha yetadigan cho‘qqilar mavjud. Masalan, Kitob geologiya milliy bog‘i hududidagi eng baland nuqta - Bursixirmon tog‘i (2061 metr).

Nisbiy balandlik farqlari: 500 - 1500 metrgacha (ya’ni, bir joydan ikkinchisiga balandlik o‘zgarishi juda keskin). Bu relyefni chuqur soylar, jarliklar va tik yon bag‘irlar bilan ajratib turadi.

Relyef xususiyatlari. Yuqori qismlarda - keskin bo‘lingan, qoyali (qattiq tog‘ jinslari, tik devorlar, jarliklar). O‘rta va pastki qismlarda - o‘rta tog‘li, biroz yumshoqroq, ammo baribir tik yon bag‘irli struktura hukmronlik qiladi.

Tog‘ oldi zonalari (Kitob shahri atrofida, Shahrisabz-Kitob vodiysi tomon) - nisbatan tekisroq, tepaliklar, kichik tepaliklar va kengroq vodiylar bilan (balandligi 600–1200 metr atrofida) bog‘lanib ketgan.

Asosiy tog‘ tizmalari va joylashuvi:

Zarafshon tizmasining janubiy tarmoqlari (jumladan, Qoratog‘, Qoraxon tog‘lari).

So‘qar tog‘lari (Kitob shahridan taxminan 30–35 kilometr sharqda, shimoldan Qoraxon tog‘lari bilan o‘ralgan).

Tuman shimoliy chegarasida baland Hisor va Zarafshon tog‘lari (4000 metrgacha cho‘qqilar) joylashgan bo‘lib, ular sovuq havo oqimlarini to‘sib, tuman iqlimini nisbatan mo‘tadil qiladi.

Muhim hududlar misolida:

Kitob davlat geologiya qo‘riqxonasi (hozirgi Kitob geologiya milliy tabiat bog‘i) relyefi - o‘rta tog‘li, keskin kesilgan, yuqori qismida qoyali, pastki qismida biroz tekisroq. Mutlaq balandlik 1300–2650 m. Qo‘riqxonadan oqib o‘tadigan soylar (Obisafit, Xo‘jaqo‘rg‘on, Zinzilbon, Novobak, Qushnov, Qizilolma va boshqalar) chuqur va go‘zal daralar hosil qilgan. Bu yerda paleozoy davriga oid noyob geologik kesmalar (470–330 mln yil oldingi cho‘kindi jinslar) ochiq holda ko‘rinadi.

Taxtaqoracha dovoni - tuman hududidan o‘tgan, balandligi 1788 m, respublika janubini shimol bilan bog‘lovchi muhim yo‘l.

Shahrisabz-Kitob botig‘i tomon (janub va g‘arb) relyef keskin pasayib, tekisroq vodiylarga o‘tadi.

Baland tog‘lar tuman hududini sovuq havo oqimidan to‘sib turgani uchun tuman iqlimi viloyatda eng mo‘tadil. O‘rtacha harorat yanvar da 0,8°, iyulniki 28°. Yiliga o‘rtacha 545 mm yog‘in tushadi. Yog‘inning 85% bahor va qish fasllariga to‘g‘ri keladi. Tuman hududidan Qashqadaryoning irmoqlari - Kichikjar, Oqsuv, Jinnidaryo, Oqdaryo oqib o‘tadi.

Tuprog‘i Shahrisabz-Kitob botig‘ida tipik bo‘z, daryo bo‘yida allyuvial bo‘z, tog‘larda qo‘ng‘ir tuproq. Efemer o‘simliklar hamma joyda uchraydi. Suv bo‘ylarida qamish, yulg‘un o‘sadi. Tog‘ yon bag‘irlarida archa, bodom, do‘lana, olma, tol, yong‘oq, pista, zarang daraxtlari va xilma-xil butalar o‘rmon hosil qilgan. Tog‘ yon bag‘irlari chorva mollari uchun yozgi yaylov. Tulki, bo‘ri, chiyabo‘ri, bo‘rsiq, ayiq, qobon, tog‘ echkisi, arhar; sudraluvchilar; kaklik, chil, bulbul va boshqa yashaydi.

Yuqorida ta’kidlaganimizdak, tog‘lar bilan bir qatorda, tuman hududida ko‘plab tepaliklar ham mavjud. Bu tepaliklar tog‘larning yemirilishi natijasida hosil bo‘lgan. Tumanning daryo vodiylarida va tog‘ etaklarida tekisliklar uchraydi. Bu tekisliklar asosan allyuvial yotqiziqlardan tashkil topgan. Tumanning hududidan bir nechta daryolar oqib o‘tadi. Bu daryolar o‘z o‘zanlari bo‘ylab chuqur vodiylar hosil qilgan. Bu daryolar Zarafshon tizmasidan boshlanadi va Qashqadaryo havzasiga quyiladi.

1. Oqsuv daryosi. Kitob tumanidagi eng katta daryo hisoblanadi. U Zarafshon tizmasidan boshlanadi va tumanning markaziy qismidan oqib o‘tadi. Oqsuv daryosi Qashqadaryo daryosining asosiy irmog‘i hisoblanadi.

2. Jinnidaryo. Oqsuv daryosining irmog‘i hisoblanadi. U ham Zarafshon tizmasidan boshlanadi va tumanning shimoliy qismidan oqib o‘tadi.

3. Shirin daryo. Oqsuv daryosining irmog‘i hisoblanadi. U tumanning janubiy qismidan oqib o‘tadi. Tog‘li hududlarda so‘qmoqlar va daralar ko‘p uchraydi. Bu relyef shakllari suv eroziyasi natijasida hosil bo‘lgan.

Kitob tumanining relyefi hududning iqtisodiy rivojlanishiga katta ta’sir ko‘rsatadi. Tog‘lar yaylovlar uchun qulay sharoit yaratadi, daryo vodiylari esa qishloq xo‘jaligi uchun suv bilan ta’minlaydi. Relyef turizm va rekreatsiya uchun ham imkoniyatlar yaratadi.

Kitob tumanining relyefini o‘rganish uchun turli xil usullardan foydalaniladi, jumladan, aerokosmik suratga olish, geodezik o‘lchashlar, geologik tadqiqotlar va geologik tahlil.

Jumladan tuman hududidagi Kitob geologiya milliy tabiat bog‘i O‘zbekistonning geologik va tabiiy merosining bebaho qismidir. Bu yerda paleozoy davrining uzluksiz stratigrafik kesmalari saqlangan bo‘lib, ular Yer tarixini va hayot evolyutsiyasini o‘rganishda muhim ilmiy resurs vazifasini o‘taydi. Qo‘riqxona nafaqat ilmiy markaz, balki sayyohlar uchun ham noyob tabiat yodgorligidir.

Kitob tumani tog‘li hudud bo‘lganligi sababli, bu yerda turli xil tog‘ konlari mavjud. Bu konlar tumanning geologik tuzilishi va tarixiy rivojlanishi bilan bog‘liq.

Hududda tarqalgan asosiy foydali qazilma konlarini quyidagicha tasniflash mumkin.

1. Ohaktosh konlari: Kitob tumanida ohaktosh konlari keng tarqalgan. Ohaktosh qurilishda, sement ishlab chiqarishda va boshqa sohalarda ishlatiladi.

2. Qum-shag‘al aralashmasi konlari: Daryo vodiylarida qum-shag‘al aralashmasi konlari mavjud. Bu materiallar yo‘l qurilishida, beton ishlab chiqarishda va boshqa qurilish ishlarida ishlatiladi.

3. Gil (gilli jinslar) konlari: Tumanda gil konlari ham mavjud bo‘lib, ular g‘isht, keramika va boshqa qurilish materiallari ishlab chiqarishda ishlatiladi.

4. Qo‘rg‘oshin va rux konlari: Kitob tumanida qo‘rg‘oshin va rux konlari topilgan. Bu metallar turli sanoat sohalarida, jumladan, akkumulyatorlar ishlab chiqarishda, metall qoplamalarida va boshqa maqsadlarda ishlatiladi.

5. Marmar konlari: Tumanda marmar konlari ham mavjud bo‘lib, ular qurilishda va bezak materiallari sifatida ishlatiladi.

6. Granit konlari: Granit konlari ham uchraydi, ular qurilishda, yodgorliklar yasashda va boshqa maqsadlarda ishlatiladi.

Kitob tumanidagi konlarning aksariyati o‘rganilgan va zaxiralari aniqlangan. Ba’zi konlar hozirda ishlatilmoqda, boshqalari esa kelajakda ishga tushirilishi mumkin. Tuman hududida yangi konlarni qidirish va razvedka qilish ishlari davom ettirilmoqda.

Kitob tumanidagi tog‘ konlari tumanning iqtisodiy rivojlanishida muhim rol o‘ynaydi. Mahalliy qurilish materiallari sanoatini ta’minlash, yangi ish o‘rinlarini yaratish va tuman budjetiga daromad keltirish imkoniyatlari mavjud.

Tog‘ konlarini qazib olish atrof-muhitga salbiy ta’sir ko‘rsatishi mumkin. Shuning uchun konlarni qazib olishda ekologik xavfsizlik choralarini ko‘rish, jumladan, tuproqni qayta tiklash, suv havzalarini muhofaza qilish va chiqindilarni to‘g‘ri utilizatsiya qilish hozirgi davrni asosiy omilidir.

Xulosa

Umuman, Kitob tumani relyefi keskin vertikal zonallikka ega hududir, pastki qismdagi vodiylardan yuqoriga chiqqan sari tog‘ jinslari mustahkamligi ortib boradi. Bu xususiyat tufayli tuman tabiiy go‘zalligi yuqori, ekoturizm uchun juda qulay (tog‘ yurishlari, geologik ekskursiyalar, manzarali joylar).

Kitob tumani Qashqadaryo viloyatining istiqbolli hududlaridan biri hisoblanadi. Uning tabiiy resurslari, qulay geografik joylashuvi va mehnatkash aholisi tumanning iqtisodiy va ijtimoiy rivojlanishi uchun imkoniyatlar yaratadi.

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Umaraliyev O. R.
katta o‘qituvchi
Guliston davlat universiteti

QISHLOQ XO‘JALIGIDA KOOPERATSIYA MUNOSABATLARINI RIVOJLANTIRISH

Annotatsiya. *Ushbu maqolada qishloq xo‘jalik kooperatsiyasining qishloq hududlaridagi ijtimoiy-iqtisodiy rivojlanishga ta’siri keng ko‘lamda tahlil etiladi. Avvalo, kooperatsiya tushunchasi, uning tamoyillari va turlari, kooperativni tashkil etish tartibi o‘rganilgan.*

Kalit so‘zlar: *qishloq xo‘jaligi kooperativi, kooperativ a’zosi, kooperativ ustavi, to‘lanadigan pay.*

Umaraliyev O. R.
senior teacher
Gulistan State University

DEVELOPMENT OF COOPERATIVE RELATIONS IN AGRICULTURE

Annotation. *This article extensively analyzes the impact of agricultural cooperation on socio-economic development in rural areas. First of all, the concept of cooperation, its principles and types, the procedure for organizing a cooperative are studied.*

Keywords: *agricultural cooperative, cooperative member, cooperative charter, payable share.*

Kirish

Qishloq xo‘jaligining asosiy masalasi bu – qishloq xo‘jaligida ishlab chiqarishning barqarorligini ta‘minlash va iqtisodiy samaradorligini oshirib borish asosida mamlakat aholisining oziq-ovqatga, sanoatning esa xom-ashyoga bo‘lgan ehtiyojini qondirishdir. Ayniqsa, qishloq joylarda yashovchi aholining ijtimoiy-iqtisodiy rivojlanishida qishloq xo‘jaligi bilan chambarchas bog‘liq bo‘lgan kooperativlarning o‘rni beqiyosdir.

Global miqyosda kechayotgan iqlim o‘zgarishlari, suv resurslarining tanqisligi va yer maydonlarining unumdorligi pasayib borayotgan bir davrda, agrar sohada ishlab chiqarish samaradorligini oshirish masalasi har qachongidan ham dolzarb bo‘lib qolmoqda. O‘zbekiston Respublikasining “Qishloq xo‘jaligini rivojlantirishning 2020–2030 yillarga mo‘ljallangan strategiyasi”da ham sohani modernizatsiya qilish, kooperatsiya munosabatlarini rivojlantirish, mehnat unumdorligini tubdan oshirish hamda innovatsion, resurs tejovchi texnologiyalarni keng joriy etish iqtisodiy islohotlarning eng ustuvor yo‘nalishlaridan biri sifatida belgilangan.

Kooperativ asosida faoliyat yurituvchi qishloq xo‘jaligi subyektlari alohida ishlab chiqaruvchilarga nisbatan barqaror iqtisodiy natijalarga erishmoqda. Kooperatsiya resurslardan unumli foydalanish, xarajatlarni kamaytirish, bozor infratuzilmasiga kirishni yengillashtirish, savdo-sotiqdagi vositachilardan xalos bo‘lish imkonini beradi. Kooperatsiyalar aholining bandligini oshirib, ijtimoiy tenglikni ta’minlashga xizmat qilmoqda. Kooperativlar o‘z mablag‘lari evaziga yo‘l, sug‘orish tizimi, saqlash omborlari kabi infratuzilmalarni rivojlantirishga hissa qo‘shmoqda. Bu esa qishloq joylardagi umumiy yashash sifatini yaxshilagan.

Natija va xulosalar

Qishloq xo‘jalik kooperatsiyasi qishloq rivojida strategik vosita hisoblanadi. Agar bu tizim to‘g‘ri yo‘lga qo‘yilsa, u nafaqat iqtisodiy barqarorlikni, balki ijtimoiy adolat va ekologik muvozanatni ham ta’minlashi mumkin.

Qishloq xo‘jalik kooperatsiyasi – bu fermerlar, dehqonlar, chorvadorlar va boshqa ishlab chiqaruvchilarning o‘zaro manfaatdorlik asosida tuzgan birlashmalaridir. Ular ishlab chiqarish, mahsulotni saqlash, qayta ishlash va realizatsiya qilishda kooperativ asosida faoliyat yuritib, iqtisodiy samaradorlikka erishadilar.

Zamonaviy texnologiyalar va innovatsiyalarni joriy qilish kooperatsiya samaradorligini sezilarli darajada oshiradi. Ayni paytda, raqamli texnologiyalardan foydalanish (masalan, onlayn savdo platformalari, agro-ilovalar) kooperativ a’zolariga yangi imkoniyatlar yaratmoqda. Qishloq xo‘jalik kooperatsiyasi qishloqlarning kompleks rivojlanishida muhim rol o‘ynaydi. U orqali iqtisodiy mustaqillik, ijtimoiy barqarorlik va infratuzilma taraqqiyoti ta’minlanadi.

Kooperatsiyaning muvaffaqiyatli faoliyati uchun esa quyidagilar muhim hisoblanadi: qishloq aholisi o‘rtasida kooperatsiya madaniyatini shakllantirish; davlat tomonidan huquqiy, moliyaviy va texnik qo‘llab-quvvatlashni kuchaytirish; kooperativ boshqaruvini ochiq va shaffof tizimga o‘tkazish; raqamli texnologiyalarni joriy qilish orqali bozor integratsiyasini kuchaytirish; xalqaro tajribalarni o‘rganish va moslashtirish.

Ushbu yo‘nalishdagi tizimli ishlar O‘zbekistonning qishloq joylarida yashovchi aholi turmush darajasini oshirishga xizmat qiladi hamda qishloq xo‘jaligining barqaror taraqqiyotini ta’minlaydi.

Mamlakatimizda aholi o‘sish sur’atlarining yuqoriligini inobatga olgan holda yangi ish o‘rinlarini yaratish zarurati kooperatsiya faoliyatini rivojlantirishni hamda uni har tomonlama qo‘llab-quvvatlashni taqozo etadi.

Qishloq xo‘jaligida kooperatsiya faoliyatining asosiy tamoyillari quyidagilar:

1. kooperativ a’zoligiga kirish va undan chiqishning ixtiyoriyligi;
2. kooperativ faoliyatidagi o‘zini o‘zi boshqarish va mustaqillik;
3. kooperativ ustavida nazarda tutilgan tartibda uning ishi ustidan kooperativ a’zolarining nazorat qilishi;
4. unung faoliyatida kooperativ a’zolarining iqtisodiy jihatdan ishtirok etishi;

5. kooperativ a’zolari o‘rtasida daromadni (foydani) ularning paylariga muvofiq mutanosib ravishda taqsimlash;

6. kooperativlar o‘rtasidagi hamkorlikni rivojlantirish, kooperativni ijtimoiy jihatdan rivojlantirish.

Qishloq xo‘jaligi kooperativni tashkil etish tartibi quyidagicha amalga oshiriladi. Kooperativ huquqiy shaxs sifatida tashkil etiladi. Buning uchun davlat xizmatlari markaziga qonunda belgilangan tartibda ariza bilan muroajat qilinadi. Mazkur arizaga kooperativning tasdiqlangan ustavi, kooperativ boshqaruvini, kooperativ boshqaruvi raisini va kooperativning kuzatuv kengashini saylash to‘g‘risidagi hujjatlar, shuningdek kooperativ muassislari ta’sis yig‘ilishining bayonnomasi ilova qilinadi.

Qishloq xo‘jaligi kooperativi kamida etti nafar jismoniy shaxsdan iborat bo‘lganda tashkil etilishi mumkin. Shu jumladan huquqiy shaxslardan tashkil topishi ham mumkin. Qo‘shma kooperativ tashkil etilganda kamida uchta kooperativdan iborat tarkibda shakllantiriladi.

Kooperativ tashkil etish istagini bildirgan jismoniy va yuridik shaxslar ta’sis qo‘mitasini tuzadi.

Ta’sis qo‘mitasining vazifalari jumlasiga quyidagilar kiradi: kooperativ ustavining loyihasini tayyorlash; tashkil etiladigan kooperativ muassislarining ta’sis yig‘ilishini tayyorlash va o‘tkazish.

Kooperativ muassislarining ta’sis yig‘ilishi quyidagi vazifalarni bajaradi:

- kooperativni tashkil etish to‘g‘risida qaror qabul qiladi;
- kooperativ ustavini tasdiqlaydi;
- kooperativ ustavi tasdiqlangan hujjatga o‘z ismi, familiyasi va manzillarini ko‘rsatgan holda, yuridik shaxslarga nisbatan esa o‘z vakillarining vakolatlarini tasdiqlaydigan hujjatni ko‘rsatgan holda imzo qo‘ygan ta’sis yig‘ilishi ishtirokchilarini kooperativ a’zoligiga qabul qilish to‘g‘risida qaror qabul qiladi;
- kooperativning boshqaruv organlarini, shu jumladan kooperativ boshqaruvini, kooperativ boshqaruvi raisini va kooperativning kuzatuv kengashi a’zolarini saylaydi.

Ustav-kooperativning ta’sis hujjati hisoblanadi. O‘zbekiston respublikasining “Qishloq xo‘jaligi kooperativi to‘g‘risidagi qonunnig 9 moddasida hujjatda bo‘lishi kerak bo‘lgan ma’lumotlar keltirilgan:

• Tashkilot nomi.
• Faoliyatning predmeti, muddatlari va maqsadlari.
• Ulushli badallar miqdori.
• Bo‘linmas badallarni shakllantirish shartlari.
• Subsidiar javobgarlik shartlari.
• Boshqaruv organining tarkibi.
• Ishtirokchilarning huquq va majburiyatlari.
• Tugatish shartlari. Ustavga o‘zgartirishlar kiritilishi mumkin. Biroq, bu umumiy yig‘ilishning tegishli qarorini talab qiladi.

Qishloq xo‘jaligi kooperativlarning bozor iqtisodiyotidagi afzalliklari quyidagilardan iborat:

- sa’y-harakatlarni birlashtirish, ulardan oqilona foydalanish uchun mehnat, moddiy va moliyaviy resurslarni jamlash imkoniyati;
- bozorga yaxshiroq moslashish va o‘zgaruvchan talabga moslashuvchan javob berishga imkon beradi;
- xaridorga mahsulotning kafolatlangan hajmlarini taqdim etish orqali maksimal narxni olish;
- hamkorlik sizga daromad va aniq amalga oshirish muddatlarini rejalashtirish imkonini beradi;
- bu qishloq mehnatkashlari uchun iqtisodiy va ijtimoiy kafolatlardir. Tadbirkorlikning kooperativ shakllari ko‘plab mamlakatlarda keng qo‘llanila boshlandi va ko‘p yillik hamkorlik natijasida o‘zining samaradorligini isbotladi

Qishloq xo‘jaligi kooperativlarning faoliyat turlari quyidagicha shakllanadi:

- qishloq xo‘jaligi mahsulotlarini etishtirish, qishloq xo‘jaligi mahsulotlarini qayta ishlash;
- ishtirokchilar nafaqat tovarlarni sotishda, balki qadoqlash va saqlashda ham ishtirok etadilar;
- ishtirokchilar har qanday xizmatlarni taqdim etadilar: qayta ishlash, ta’mirlash ishlari, yuridik maslahat;
- kooperativlar xarid qilish maqsadida tuziladi; ozuqa va o‘g‘itlarni birgalikda sotib olish pulni tejashga yordam beradi.

Shunday qilib, qishloq xo‘jaligi kooperativi - xodimlarning turmush darajasini oshirishni ta’minlaydi, ijtimoiy muammolarni hal etishga hissa qo‘shadi, ishtirokchilarning mulkiy manfaatlarini himoya qilishni ta’minlaydi , qo‘shilgan qiymat zanjirini yaratishga xizmat qiladi, qishloq joylarda eng muhim vazifalardan biri bo‘lgan bandlikni ta’minlaydi. Uning sanoat bilan integratsiyasi mamlakat eksport salohiyatini oshiradi,qishloq xo‘jaligi mahsulotlariga bo‘lgan ichki va tashqi ehtiyojlar bozorini qoplashda muhim o‘rin tutadi.

Foydalanilgan adabiyotlar ro‘yxati

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Urmanova G. U.
associate professor
Tashkent State Medical University
Abdusattorov S. Sh.
associate professor
Institute "ISFT"
Karshiev D. A.
associate professor
Tashkent State Medical University

THE ROLE OF ARTIFICIAL INTELLIGENCE IN IMPROVING WORK EFFICIENCY

Abstract. *This article will highlight the characteristics of artificial intelligence that influence global development. In developing countries, the appropriate use of artificial intelligence has become a pressing issue, as there are also cases where this tool can be used to spread false information. For example, discrimination, harassment, and other incidents can occur online. This article presents methods, findings, and recommendations for harnessing the benefits of artificial intelligence for appropriate purposes and minimizing its harmful impact.*

Keywords: *innovation, organization, industry, enterprise, society, technology.*

Currently, some industries, businesses, organizations, and institutions struggle to understand the difference between innovation, new ideas, and artificial intelligence. As these technologies become widely applied across various fields, they will transform human life and society.

As we know, innovation is a tool that performs unique functions for peaceful life, well-being, and human development. In other words, it is a successful product or technology necessary for improving the efficiency and quality of work to create a healthy environment.

Many online sources also refer to artificial intelligence as artificial cognition, artificial intelligence, and intelligent machines.

The methods for this study were based on the following approaches: an analysis of artificial intelligence capabilities presented in scientific literature and online sources; and a comparison of the advantages and disadvantages of artificial intelligence in organizations based on this analysis.

The primary goals of implementing artificial intelligence or artificial cognition are: peaceful, calm, and prosperous lives; improving the quality of a healthy environment for human life; promoting economic development; upholding the law; ensuring security, creating modern workplaces within organizations, etc.

Artificial intelligence (AI) serves as a social tool capable of conveying the content of large volumes of information in concise and understandable forms, as

well as ensuring social integration and fulfilling competitive objectives within organizations.

These intelligent machines are viewed as a process or management method designed to produce high-quality products that provide significant value to organizations. They improve operational efficiency and produce quality products that meet requirements and needs. This creates new value, resulting in higher profitability. However, it's important to remember that these beneficial methods also come with their own risks.

Artificial intelligence is currently the subject of heated debate around the world. It has become clear that AI has the potential to take over virtually every field. This, of course, reduces human dominance and raises concerns among experts, since artificial intelligence is capable of performing all the tasks that humans can perform, and in sufficient quantities.

These research methods were implemented based on the following approaches: analysis of the capabilities of artificial intelligence presented in scientific literature and online sources; comparative study of the advantages and disadvantages of artificial intelligence in organizations based on the analysis; A comprehensive, systematic approach to assessing its impact, a comprehensive analysis of all the features of this system; a logical comparison of its capabilities with the organization's activities in a natural state, supporting numerical indicators of the SI's effectiveness.

Based on the research conducted, it can be concluded that artificial intelligence will affect virtually all professions. Consequently, some jobs will disappear. Others will adapt to the new conditions. As a result, new professions related to intelligent tools will emerge.

According to statistics, this unique tool is expected to create approximately 133 million jobs by 2027. It's worth noting that a number of processes cannot be performed without human intervention. Because many processes are difficult for artificial intelligence to perform. For example, replacing repetitive and simple processes, as well as entering and processing new data, requires human skills.

Artificial intelligence is currently capable of performing virtually all tasks the human mind can, including decision making. It excels in areas such as the ease of implementing complex processes, rapid problem solving, visual perception, and translation. Computer programs developed specifically for language translation are of enormous importance. Such intelligent programs facilitate rapid development in many different fields.

Based on the above, it can be said that artificial intelligence is a unique tool that can perform all the tasks that a human can perform, such as understanding language, storing, processing, recording, reconstructing images, analyzing and solving complex problems in a short time. Such intelligent tools are capable of creating systems that can perceive their environment, process data, and perform actions, making them extremely important and useful in everything from virtual assistants to self-driving cars.

Based on the above, it can be said that it is crucial to have complete information about the positive and negative consequences of using these intelligent machines. It is necessary to develop rules governing the use of artificial intelligence in organizations. Measures should be developed to correctly implement the future development of programs created using artificial intelligence. To preserve employees' jobs, their numerical skills must be developed. To this end, that is, to improve workers' digital skills, it is necessary to develop measures and training methods. This will help prevent conflicts between employers and employees, prevent social inequality, and reduce processes that affect a healthy work environment.

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Varsha G. N.
assistant
department of pathological anatomy
Samarkand State Medical University

UNRAVELING THE MECHANISMS OF CELL DEATH IN LIVER INFLAMMATION

Abstract: *Liver inflammation can play either protective or harmful roles depending on its intensity and duration. Mild, self-limiting inflammatory responses have been shown to support hepatocyte survival, facilitate tissue repair, and restore liver homeostasis. In contrast, excessive or persistent inflammation can trigger widespread hepatocyte death, aggravating various liver disorders, including ischemia-reperfusion injury, metabolic diseases such as obesity, diabetes, and non-alcoholic fatty liver disease, alcoholic hepatitis, xenobiotic-induced toxicity, and infections. These conditions may lead to irreversible liver damage, fibrosis, or even cancer. Both liver-resident cells (e.g., Kupffer cells, hepatic stellate cells, sinusoidal endothelial cells) and infiltrating immune cells (e.g., monocytes, macrophages, dendritic cells, natural killer cells) release pro-inflammatory mediators, including cytokines, chemokines, lipid signaling molecules, and reactive oxygen species, promoting hepatocyte apoptosis or necrosis.*

Resume: *Inflammation in the liver exhibits a dual role: it can be protective when controlled, promoting tissue repair and homeostasis, but harmful when excessive, leading to massive hepatocyte loss and worsening liver diseases. Both resident and recruited immune cells contribute to hepatocyte death through the release of inflammatory mediators, which include cytokines, chemokines, reactive oxygen species, and lipid messengers. Hepatocyte death further stimulates innate immune responses via DAMPs, establishing a vicious cycle of inflammation and tissue damage. Understanding the cellular and molecular mechanisms that drive this process is crucial for developing therapies to mitigate liver injury and prevent progression to fibrosis and cancer.*

Keywords: *Hepatic inflammation, hepatocyte death, apoptosis, necrosis, immune-mediated liver injury, damage-associated molecular patterns (DAMPs), kupffer cells, liver fibrosis, inflammatory signaling pathways.*

Introduction

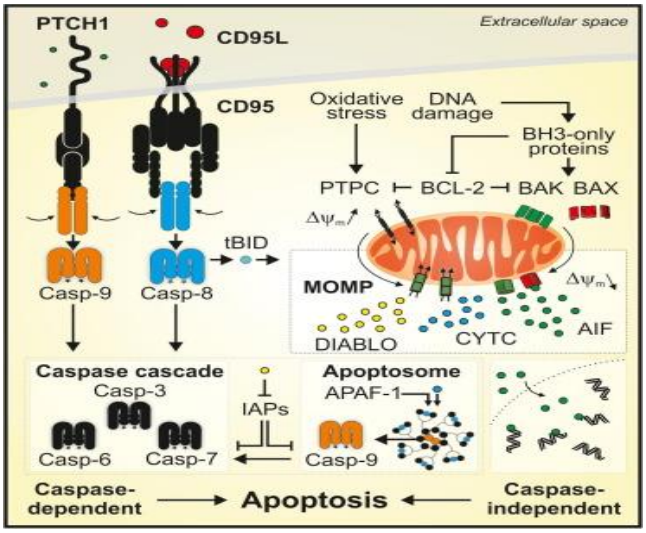
Liver inflammation exhibits a dual nature, being either protective or harmful depending on its intensity and duration. Mild, self-limiting inflammatory responses support hepatocyte survival, promote tissue repair, and help restore liver homeostasis. Conversely, excessive or chronic inflammation can trigger widespread hepatocyte death, aggravating a variety of hepatic conditions, including ischemia-reperfusion (IR) injury, metabolic disorders such as obesity,

diabetes, non-alcoholic fatty liver disease (NAFLD) and non-alcoholic steatohepatitis (NASH), alcoholic hepatitis, xenobiotic toxicity, and infections. These processes are often associated with irreversible liver damage, fibrosis, and even carcinogenesis.

Both liver-resident cells, such as Kupffer cells, hepatic stellate cells, and sinusoidal endothelial cells, and immune cells recruited to the liver under stress—including monocytes, macrophages, dendritic cells, and natural killer cells—release a variety of pro-inflammatory mediators. These include cytokines, chemokines, lipid signaling molecules, and reactive oxygen species, which can directly induce hepatocyte apoptosis or necrosis. Dying hepatocytes release damage-associated molecular patterns (DAMPs) that activate innate immune responses, creating a self-amplifying cycle of inflammation and cell death [6].

Hepatocytes are capable of robust replication, which enables regeneration of lost parenchyma—a property that underpins the clinical success of split-liver transplantation, where a single donor organ can sustain two recipients [4]. However, chronic inflammation coupled with continuous regenerative stimuli increases the risk of hepatocellular carcinoma [5]. Dysregulated inflammatory responses have been linked to nearly all forms of hepatotoxic stress, including IR injury, excessive alcohol consumption, exposure to xenobiotics or heavy metals such as Cu^{2+} and Hg^{2+}, infections, and systemic metabolic disorders such as NAFLD, NASH, obesity, diabetes, and metabolic syndrome [6].

Mitochondrial dysfunction is a common feature across most hepatic disorders and can either directly drive massive hepatocyte death or sensitize cells to otherwise mild stressors, such as hypoxia or nutrient deprivation [7,8]. Structural and functional mitochondrial abnormalities have been observed in IR injury, NASH, sepsis, and Wilson's disease [8–10].



Both extrinsic and intrinsic apoptosis, as well as regulated necrosis, contribute to hepatocyte death in response to various hepatotoxic insults, including viral and bacterial infections [2], metabolic disorders [3], alcohol

overconsumption [4], and xenobiotic toxicity [5] (Fig. 1 and Supplementary Discussion).

Key members of the tumor necrosis factor (TNF) superfamily—including TNFα, CD95L (FASL), and TNF-related apoptosis-inducing ligand (TRAIL, TNFSF10)—are among the most well-characterized triggers of hepatocyte death. TNFα is produced in large amounts by hematopoietic cells exposed to live bacteria or lipopolysaccharide (LPS) in vivo, contributing to fatal shock syndromes that prominently involve the liver [6]. Notably, both the severe hepatotoxicity and systemic lethality of TNFα are markedly reduced in Ripk3$^{-/-}$ mice, indicating a significant role for regulated necrosis, challenging the notion that this model is purely apoptotic.10

Materials and Methods

This review is based on a comprehensive analysis of the current literature addressing liver inflammation, hepatocyte death, and the underlying cellular and molecular mechanisms. Peer-reviewed articles were identified through systematic searches of major scientific databases, including PubMed, Scopus, and Web of Science. Searches were conducted using combinations of relevant keywords such as liver inflammation, hepatocyte death, apoptosis, regulated necrosis, mitochondrial dysfunction, TNF signaling, ischemia-reperfusion injury, NAFLD, NASH, and hepatic carcinogenesis.

Original research articles, reviews, and meta-analyses published in English were considered, with particular emphasis on studies providing mechanistic insights into inflammatory signaling pathways and cell death regulation in the liver. Preference was given to well-established experimental models, translational studies, and clinically relevant findings. Reference lists of selected articles were also manually screened to identify additional relevant publications. The collected literature was critically evaluated and synthesized to provide an integrated overview of current knowledge and emerging concepts in the field.

Discussion

Chronic liver inflammation represents a critical driver of hepatocyte loss and disease progression across a wide spectrum of hepatic disorders. While transient and controlled inflammatory responses are essential for tissue repair and maintenance of liver homeostasis, sustained or dysregulated inflammation promotes excessive hepatocyte death, ultimately compromising liver function. The data reviewed herein highlight the complex interplay between immune-mediated signaling, mitochondrial dysfunction, and cell death pathways in shaping liver pathology.

A central theme emerging from recent studies is the pivotal role of mitochondria as integrators of metabolic stress, inflammatory cues, and death signals. Mitochondrial dysfunction not only directly contributes to hepatocyte apoptosis and regulated necrosis but also sensitizes liver cells to secondary stressors such as hypoxia, nutrient deprivation, and toxic insults. These effects are particularly relevant in metabolic liver diseases, where altered lipid and glucose metabolism impose chronic stress on hepatocellular mitochondria.

Inflammatory mediators produced by liver-resident immune cells and recruited circulating leukocytes—including cytokines, chemokines, lipid messengers, and reactive oxygen species—serve as major initiators of hepatocyte death. Among these, TNF superfamily members play a prominent role by activating both apoptotic and necroptotic signaling cascades. Importantly, growing evidence indicates that regulated necrosis significantly contributes to liver injury in conditions previously thought to be dominated by apoptosis alone, reshaping our understanding of inflammatory hepatotoxicity.

The reciprocal relationship between hepatocyte death and inflammation further amplifies tissue damage. Dying hepatocytes release damage-associated molecular patterns (DAMPs) that activate innate immune receptors, perpetuating inflammatory signaling and establishing a self-reinforcing cycle of cell death and immune activation. Over time, this vicious loop not only drives parenchymal loss but also promotes fibrogenesis and increases the risk of hepatocellular carcinoma, particularly in the context of chronic liver disease.

From a therapeutic perspective, these insights underscore the potential value of strategies aimed at simultaneously limiting inflammation and preserving hepatocyte viability. Targeting key inflammatory mediators, modulating mitochondrial function, or selectively inhibiting specific cell death pathways may offer effective means to halt disease progression. Given the redundancy and complexity of inflammatory and death signaling networks, combination therapies that integrate hepatoprotective and anti-inflammatory approaches are likely to be most effective.

In conclusion

The prevalence of liver diseases continues to rise in developed countries, driven by lifestyle factors such as high-calorie diets, poor nutritional balance, sedentary behavior, and excessive use of hepatotoxic medications, alongside increased life expectancy. Considering the central involvement of hepatocyte death and inflammation in the development of most liver disorders, a promising therapeutic approach may be the application of hepatoprotective and anti-inflammatory strategies, either individually or in combination.

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Varsha G. N.
assistant
department of pathological anatomy
Samarkand State Medical University

REDUCED NAÏVE MAIT CELLS AND INCOMPLETE IMMUNE RECONSTITUTION IN TREATED HIV-1 PATIENTS

Abstract: *Incomplete immune reconstitution affects 10%–40% of HIV patients receiving antiretroviral therapy (ART), yet the underlying immunological features of these immunological non-responders (INRs) remain poorly defined. Using single-cell RNA sequencing and paired T-cell receptor profiling of peripheral blood mononuclear cells, we compared immune landscapes among INRs, immunological responders (IRs), and healthy controls. INRs exhibited a marked reduction in mucosal-associated invariant T (MAIT) cells, particularly the naïve MAIT subset, a finding validated in simian immunodeficiency virus–infected rhesus macaques. MAIT cells in INRs were predominantly $CD8^+$ and displayed reduced expression of cytotoxic genes alongside enhanced TGF-β signaling–related pathways. These results associate naïve MAIT cell deficiency with impaired immune recovery in ART-treated HIV patients, identifying a potential cellular target for improving immune reconstitution.*

Resume: *Investigated the immunological mechanisms underlying incomplete immune reconstitution in antiretroviral therapy–treated HIV-1 patients. Using single-cell RNA sequencing and T-cell receptor repertoire analysis of peripheral blood mononuclear cells, distinct immune profiles were identified between immunological non-responders, immunological responders, and healthy controls. The study revealed a significant reduction in naïve mucosal-associated invariant T (MAIT) cells in non-responders, a finding validated in a simian immunodeficiency virus rhesus macaque model. Transcriptomic analysis demonstrated impaired cytotoxic function and enhanced TGF-β signaling in MAIT cells from non-responders, highlighting naïve MAIT cells as a potential target for improving immune reconstitution.*

Keywords:*Human immunodeficiency virus (HIV)****,*** *immune reconstitution****,*** *immunological response****,*** *T-cell receptor repertoire****,*** *single-cell RNA sequencing*

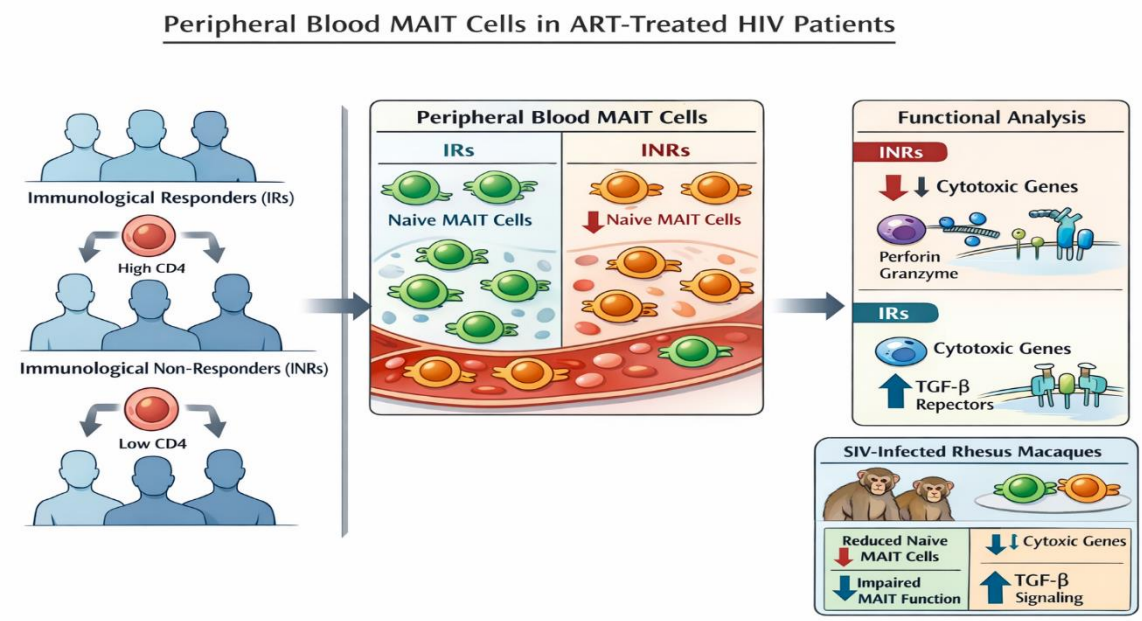
Introduction

Sustained antiretroviral therapy (ART) is the cornerstone of human immunodeficiency virus (HIV) management and can effectively suppress viral replication while restoring $CD4^+$ T-cell counts to levels comparable to those observed in healthy individuals (Yang et al., 2021; Menendez-Arias and Delgado, 2022; Mao et al., 2024). However, considerable heterogeneity exists in immunological outcomes among ART-treated patients. While some individuals achieve robust $CD4^+$ T-cell recovery alongside virological suppression and are

classified as immunological responders (IRs), others fail to reconstitute $CD4^+$ T-cell counts despite effective viral control; these patients are referred to as immunological non-responders (INRs) (Zhang et al., 2024; Mou et al., 2025).

Persistent $CD4^+$ T-cell depletion in INRs is frequently accompanied by compromised immune function, predisposing these individuals to opportunistic infections and increasing the risk of progression to acquired immune deficiency syndrome (AIDS) (Liu et al., 2025). The mechanisms underlying incomplete immune reconstitution are multifactorial and remain incompletely understood. Contributing factors include impaired bone marrow hematopoiesis, reduced thymic output, residual viral replication, chronic immune activation, and dysregulated cytokine production (Yang et al., 2020).

Previous studies have demonstrated a positive correlation between peripheral $CD4^+$ T-cell counts and the proliferative capacity of bone marrow hematopoietic progenitor cells (HPCs) and hematopoietic stem cells (HSCs). Notably, INRs exhibit significantly reduced colony-forming potential of HPCs and HSCs compared with IRs, indicating defective hematopoietic function in these individuals (Guo et al., 2016). In addition, diminished thymic output results in a reduced pool of naïve $CD4^+$ T cells, which has been implicated as a key contributor to impaired immune reconstitution during HIV infection (Carvalho-Silva et al., 2020). Moreover, inhibitory receptor–driven $CD4^+$ T-cell exhaustion has been linked to suboptimal immune recovery in ART-treated patients (Noyan et al., 2018; Vos et al., 2024). Beyond adaptive immunity, persistent activation of innate immune cells—including natural killer cells, monocytes, and macrophages—may further influence immune reconstitution during ART (Mensching and Hoelzemer, 2022).Figure-1.



Despite extensive research, the precise mechanisms governing immune pathway modulation and the balance of T-cell subsets during discordant immunological responses to ART remain incompletely understood (Yang et al.,

2020). Mucosal-associated invariant T (MAIT) cells represent an evolutionarily conserved population of unconventional T lymphocytes characterized by the expression of a semi-invariant αβ T-cell receptor (TCR). These cells function at the interface of innate and adaptive immunity and rapidly secrete diverse cytokines and cytotoxic effector molecules following activation through both TCR-dependent and TCR-independent pathways (Su et al., 2022).

Multiple studies have demonstrated a marked decline in MAIT cell frequency during both acute and chronic HIV infection. Although MAIT cells are not preferentially targeted by HIV, their depletion is thought to result from tissue redistribution, sustained activation, functional exhaustion, and subsequent long-term attrition (Han et al., 2022; Xia et al., 2022). During early HIV-1 infection, MAIT cells undergo transient activation and expansion in peripheral blood and mucosal tissues concurrent with peak viremia, likely driven by increased microbial translocation. This phase is followed by partial viral control as viremia stabilizes at a setpoint, and subsequently by a progressive loss of MAIT cell function during chronic infection (Lal et al., 2020).

Materials and Methods

Peripheral blood samples were obtained from ART-treated HIV-1–infected individuals classified as immunological non-responders (INRs) or immunological responders (IRs) based on $CD4^+$ T-cell recovery, as well as from age- and sex-matched healthy controls (HCs). All HIV-1–infected participants maintained sustained viral suppression under ART. Peripheral blood mononuclear cells (PBMCs) were isolated using density-gradient centrifugation.PBMCs were processed for single-cell RNA sequencing (scRNA-seq) and paired single-cell T-cell receptor (TCR) repertoire sequencing using a droplet-based platform following the manufacturer's protocols. Libraries were sequenced on a high-throughput sequencing system. Raw sequencing data were processed using standard pipelines for quality control, normalization, dimensionality reduction, and cell clustering. TCR clonotypes were assigned and analyzed in parallel with transcriptomic data.

Discussion

In this study, we characterized immune cell heterogeneity associated with incomplete immune reconstitution in ART-treated HIV-1 patients using single-cell multi-omics approaches. Our data reveal a pronounced reduction in MAIT cells in INRs, with a particularly marked loss of the naïve MAIT cell subset. This alteration was consistently observed in both human cohorts and an SIV-infected rhesus macaque model, suggesting a conserved immunological phenomenon.

MAIT cells are critical mediators at the interface of innate and adaptive immunity and play an important role in antimicrobial defense and immune regulation. Although MAIT cells are not directly infected by HIV, chronic immune activation, microbial translocation, and sustained antigenic stimulation during HIV infection are thought to drive their activation, exhaustion, and eventual depletion. Our findings extend previous observations by demonstrating that impaired

immune reconstitution is specifically associated with a deficiency in naïve MAIT cells, rather than a uniform loss of all MAIT subsets.

Together, these results support a model in which disrupted MAIT cell homeostasis—particularly at the naïve stage—contributes to impaired immune reconstitution in a subset of ART-treated patients. Targeting pathways that preserve or restore MAIT cell function may therefore represent a novel therapeutic strategy for improving immune recovery in INRs.

Conclusion

This study provides a comprehensive single-cell characterization of immune dysregulation in ART-treated HIV-1 patients with incomplete immune reconstitution. We identify a significant reduction in naïve MAIT cells as a distinguishing feature of immunological non-responders and demonstrate associated functional alterations at the transcriptional level. These findings highlight naïve MAIT cells as a potential cellular determinant of immune recovery and suggest new avenues for therapeutic intervention aimed at enhancing immune reconstitution in HIV-1–infected individuals.

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Xaydarova D.
o'qituvchisi
buxgalteriya xisobi va moliya kafedrasi
raqamli iqtisodiyot va innovatsiyalar fakulteti
Guliston davlat universiteti
ORCID:0009-0005-2739-3435

IMPLEMENTATION OF THE PILOT PROJECT OF THE MEDICAL INSURANCE MECHANISM IN THE SYRDARYA REGION

Abstract. *The article highlights the essence of medical insurance, analyzes the directions of implementation of state medical insurance, and which regions will be covered in which years. The expenditure of funds allocated for state health insurance and the number of patients were studied. At the same time, the results and effectiveness of the introduction of state health insurance were studied, conclusions and proposals were made.*

Keywords: *medical insurance, compulsory insurance, voluntary insurance, insurance system, mechanism, primary medical care, medical examination, volume of medical services, clinical protocol.*

Entrance

Foreign experience shows that medical insurance has various characteristics. Including: reflects the social significance of medical insurance for the population; its role in obtaining medical care by the population; its role in financing the healthcare sector from additional sources.

"The further improvement and development of reforms in the healthcare sector, the regulation of relations in the field of health insurance, the establishment of the legal basis for voluntary and compulsory health insurance, the provision of high-quality medical services under the insurance policy are important steps aimed at improving public health. The mechanism of financing the healthcare system through medical insurance The development of health insurance in the Republic of Uzbekistan serves as an important basis for strengthening the financial control of insurance companies over medical institutions, increasing the effectiveness of healthcare management, which effectively guarantees the patient's freedom to choose insurance and medical institutions.[49]. .

Description of the methodology used in the study

In the research process, methods of logical thinking, forecasting, synthesis, mathematical, systematic approach, structural and comparative analysis, economic comparison, scientific generalization, and statistical calculation were used.

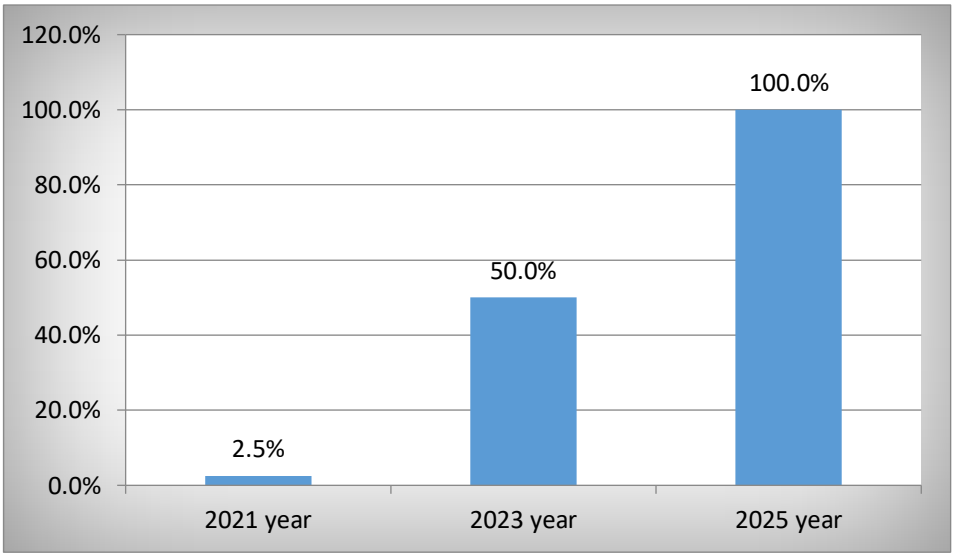
[49] Buriyeva N.Kh. Application of Healthcare Financing Models in World Practice. \\ Economics and Finance. 2019. №4 –Б.57.

Analysis and results

The management mechanism of the healthcare sector in modern conditions is based on the following organizational and practical principles: a mixed healthcare system (public, private, insurance) operates; responsibility and responsibility for public health are increased; financial freedom of healthcare system organizations requires the formation of their activities in various forms of ownership (public, collective, private); the cost of medical services is determined based on supply and demand in the medical services market; it is carried out at the expense of revenues from self-financing of healthcare system organizations.

The following table shows the expected results from the introduction of compulsory health insurance in the draft Strategy for Financing Healthcare in the Republic of Uzbekistan for 2021-2025.

As can be seen from the data in Figure 1, mandatory health insurance will cover 100 percent by 2025, and mandatory health insurance will reach all regions of our country.



1- Figure. Compulsory medical insurance of the population by year coverage dynamics [50]

Taking into account the specifics of medical services, the following payment methods are being introduced:

✓ primary health care - a method of payment based on a single per capita standard with categorized correction coefficients, taking into account the characteristics of the regions, the type of institution, population density, and other factors, taking into account the results of the quality of medical services provided;

✓ specialized secondary outpatient care - a method of payment for specialized outpatient services;

✓ inpatient care a method of payment for "every treated case" by clinical and cost groups in treatment and prevention institutions.

[50] Тадқиқотчи томонидан мавзуга оид адабиётлар асосида тузилган.

The table below shows the positive results expected from medical insurance of funds allocated per bed-day for the purchase of food and medicine for inpatient medical institutions.

2-figure.
Sale of food and medicines to inpatient medical institutions
Funds allocated for accommodation expenses per day
in sums

№	Inpatient medical institutions	2023 year		2024 year	
		food	medication	food	medication
1.	District (city) central hospitals	15 936	18 368	17 530	20 205
2.	District (city) emergency medical care Sections	26 773	34 232	29 450	37 655
3.	District (city) emergency medical care Sections	26 773	60 853	29 450	66 938
4.	Anti-tuberculosis institutions	31 873	24 239	35 060	26 761
5.	Oncological institutions	31 873	58 429	35 060	64 272
6.	Narcological institutions	26 773	24 852	29 450	27 338
7.	Endocrinological institutions	28 048	29 093	30 853	32 003
8.	Cardiology institutions	13 769	35 585	15 146	39 143
9.	Infectious disease hospitals	26 773	22 884	29 450	25 172
10.	Children's hospitals	28 048	31 057	30 853	34 162
11.	For children with tuberculosis sanatoriums	31 873	9 427	35 060	10 794
12.	AIDS centers for combating	26 773	16 657	29 450	18 323

"In medical insurance, the insured, in exchange for the insurance premium agreed upon with the insurance organization, transfers the risk of incurring expenses for the use of medical services, the amount agreed upon in the insurance contract concluded between the insurer and the insurance organization, to the insurance organization on the terms. When incurring expenses is mandatory due to the deterioration of the insured's health, the insurance organization reimburses these expenses within the funds specified in the insurance contract. Since medical insurance is socially oriented, additional requirements for financial stability and solvency are imposed on the insurance organization carrying out this type of insurance.

“The responsibility for providing medical services requires the imposition of financial responsibility on the medical worker and the healthcare institution, as a result of which the quality of medical services increases. Therefore, a system of compulsory insurance of the responsibility of medical workers to clients has been introduced”[51].

[51] Bazarov Z. Theoretical and practical issues of medical insurance. // BUSINESS EXPERT. - Tashkent.2019.- № 9.

“Compulsory liability insurance can be regulated by the following cases: inclusion in the documentation for a medical worker entering a medical institution; assigning control over the process of compulsory liability insurance to the employer, establishing compensation by the employer for damage caused to the user of medical services”[52].

In the formation of medical insurance in the healthcare system, the task is to provide financial support for convenient and high-quality medical services for citizens of the country. A mandatory health insurance system will be gradually introduced in Uzbekistan starting in 2021. The first stage was held in Syrdarya region in 2021, the second stage will be implemented in Karakalpakstan, Tashkent, Samarkand, Navoi, Surkhandarya, and Fergana regions from 2023, and the third stage will be implemented throughout the country from 2025. Measures were implemented within the framework of a pilot project to introduce a state medical insurance mechanism in the Syrdarya region.

The Concept for the pilot implementation of state health insurance in the Syrdarya region was developed within the framework of the implementation of the State Program for the implementation of the Action Strategy on five priority areas of development of the Republic of Uzbekistan in 2017-2021 in the "Year of Science, Enlightenment and the Digital Economy." The Concept defines the main directions for the pilot implementation and testing of the state health insurance system in the provision and financing of state-guaranteed medical care. It is planned to conduct an approbation of the state medical insurance system in the Syrdarya region from July 1, 2021 to the end of 2022, and to gradually introduce its positive results in other regions of the republic starting from 2023.

The population of the Syrdarya region has reached 846.3 thousand people, and their average life expectancy is 71.9 years (the average for the republic is 75.1 years). Over the past ten years, the birth rate in the region averaged 24.8 per thousand people, and the mortality rate was 4.6 per thousand. The overall morbidity rate in the region is up to 3.1 thousand per 100,000 population, depending on the type of disease. "In 2021, there are 137 healthcare institutions in the region, including 99 outpatient clinics, 26 inpatient treatment and prevention institutions, and 12 administrative medical institutions. These medical institutions employ 1.4 thousand doctors and 12.5 thousand nurses. The number of doctors is 17.6 people per 10,000 population (the national average is 23.0 people), and the number of paramedical personnel is 150.6 people (the national average is 103.6 people). In 2019, 358.9 billion soums were allocated from the state budget to finance the regional healthcare system. Within the framework of these funds, 7,589.1 thousand examinations were carried out in outpatient settings in medical institutions, and 162.4 thousand patients received inpatient medical care.[53]

[52] Rakhmonov D.A. Methodological Foundations for Improving the Financing of the Social Sphere in Uzbekistan. Monograph. T.: Science and Technology. 2017. –C.201.

[53] Decree of the President of the Republic of Uzbekistan dated November 12, 2020 No. UP-4890 "On measures to introduce a new model of healthcare organization and mechanisms of state medical insurance in the Syrdarya region."

Before the introduction of medical insurance, we want to emphasize that the healthcare financing system will have a negative impact on increasing the socio-economic efficiency of funds allocated to the sector, including:

the share of inefficient expenditures in the healthcare system reaches 40 percent;

the level of direct payments by the population for medical services remains at the level of 40-45%;

more than 60 percent of the total funds allocated to the healthcare sector from the state budget are spent on inpatient treatment and prevention care;

the main part of the funds allocated to primary health care institutions is spent on wages, and only 10 percent is directed to the provision of medical care;

the lack of equal conditions and a competitive environment for state and private medical organizations in the field of providing medical care to the population hinders the improvement of the quality of medical services;

the financial independence of medical institutions has not been fully ensured, as a result of which the possibilities of introducing modern management methods and paying decent wages to employees in these institutions are limited;

the average coefficient of substitution of existing doctors in medical institutions exceeds 2.0 (the national average is 1.4), and more than 700 doctor positions remain vacant.

As a result of the implementation of the Concept for the pilot implementation of the state health insurance system in the Syrdarya region and within the framework of the pilot project, an opportunity will be created to: gradually reduce the share of inefficient expenditures in the healthcare system; ensure openness and transparency in the medical services market and reduce the level of direct payments of the population for medical care; increase the share of primary health care within the funds allocated to the healthcare system; increase the financial independence of medical institutions and expand the mechanisms for material incentives for medical workers; increase the level of provision of quality medical services to representatives of socially vulnerable categories of the population; develop a competitive environment in the medical services market with the involvement of private medical organizations in the provision of state-guaranteed medical care to the population.

Conclusion

As a result of carrying out scientific research devoted to improving the mechanisms of budget and medical insurance in financing the healthcare system in the Republic of Uzbekistan, several scientific conclusions and practical proposals were formulated.

1. The State Insurance Fund is a state-owned non-profit organization, whose property is assigned to medical institutions on the basis of operational management, carrying out state policy in the field of compulsory health insurance and paying expenses for medical services provided to the insured client for medical services established on the basis of the compulsory health insurance

program, with the accumulation of mandatory health insurance contributions and their territorial associations.

2. The draft Health Code of the Republic of Uzbekistan provides for the procedure for state regulation of the healthcare system, effective management of the sphere, the mechanism of state medical insurance, control and supervision in medical institutions, and interdepartmental interaction in the field of healthcare. This Code sets out the mechanisms for financing the healthcare system in the republic, and also provides a procedure for organizing sanitary and epidemiological surveillance in the country.

3. Public-private partnership in the healthcare system is a combination of attracting private capital to the public sector and improving the quality of social services. The introduction of such a practice in the healthcare system will lead to a new stage in the development of the healthcare system in our country.

4. It is advisable to form a list of the guaranteed volume of medical care covered by the state budget and mandatory placement of relevant extracts from the list on the official website of all state medical institutions of the republic by December 31 of each year in accordance with the specialization of the activities of these institutions.

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Xojibekova M. A.
assistenti
o'zbek tili pedagogika va jismoniy madaniyat kafedrasi
Andijon qisjloq xo'jaligi va agrotexnologiyalari instituti
Mirzayev S. B.
talabasi
Andijon qisjloq xo'jaligi va agrotexnologiyalari instituti

RUS TILI DARSLARIDA MATNLAR USTIDA ISHLASH METODIKASINI TAKOMILLASHTIRISH

Annotatsiya: *Ushbu maqolada hozirgi kunda eng dolzarb masalalardan biri bo‘lgan, o‘quvchilarningrus tili darslarida matn bilan ishlash hamda u orqali bilim, tafakkurlarini oshirishi hamda o‘quvchilar bilan matn ustida ishlash bilan birgalikda ularning nuqtqiy kompetensiyalarini oshirishga alohida e’tibor qaratilgan. O‘quvchilarda matnlarni tahlil qilish, ularni tasvirlab berish jarayonida nutqiy tafakkurni oshishi, matn turlarini mustaqil ajratishi haqida so‘z borgan.*

Kalit so‘zlar: *matn, salohiyat, ifodali o‘qish, tahlil qilish, rasmli matn, ekspressiv nutq*

Khojibekova M. A.
assistant
department of uzbek language, pedagogy and physical culture
Andijan Institute of Agriculture and Agrotechnologies
Mirzayev S. B.
student
Andijan Institute of Agriculture and Agrotechnologies

IMPROVING THE METHODOLOGY OF WORKING WITH TEXTS IN RUSSIAN LANGUAGE LESSONS

Abstract: *This article discusses one of the most relevant issues in modern education — working with texts in Russian language lessons. Special attention is paid to enhancing students’ knowledge and thinking through text-based activities, as well as to developing their communicative competencies. The article addresses the development of speech thinking in the process of text analysis and description, and students’ ability to independently distinguish different types of texts.*

Keywords: *text, potential, expressive reading, analysis, illustrated text, expressive speech.*

Hozirgi kunda maktablarda rus tilini o‘qitishda sezilarli darajada o‘zgarishlar amalga oshirilmoqda. “Ta'lim to‘g‘risida” gi yangi qonun O‘zbekiston davlat ta'lim standartining asosiy yo‘nalishini belgilaydi – bu ta'lim sifatini

oshirishdir. Bu muammoning yechimi ta’lim mazmunini modernizatsiya qilish, o‘quv jarayonini tashkil etish usullari va texnologiyalarini optimallashtirish va, albatta, qayta ko‘rib chiqish kabi vazifalardan iboratdir. Vazifalarning asosini shakllantirish bilan bog‘liq kompetentsiyaga asoslangan kommunikativ kompetentsiya asos bo‘la oladi.

Zamonaviy hayot o‘quvchidan rus tilni yaxshi bilishni, turli vaziyatlarda, o‘zini erkin his qilib turli odamlar bilan muloqot qila olishini talab qiladi. Shuning uchun, izchil taqdim etish qobiliyatini rivojlantirish og‘zaki va yozma shakldarus tilida fikr yuritish, yozilgan narsalarni tahlil qilish va takomillashtirish, fikrni malakali ifodalash qobiliyati muhokama qilinayotgan masala bo‘yicha – o‘quvchilar rus tilidagi nutqi va fikrlash faolligini rivojlantirishning eng muhim yo‘nalishlaridandir.

Rus tili darslarida matn bilan ishlash o‘quvchilarning ijodiy salohiyatini rivojlantirish, ularning rus tilida so‘z boyligini kengaytirish, nutq sifatini oshirish imkonini beradi. Rus tili darslarida matn yaratish, nutq muhitini rivojlantirish uchun asosdir. O‘quvchilarni rus tilining go‘zalligi bilan tanishtirish, so‘zga ehtiyotkorona va o‘ychan munosabatda bo‘lishni tarbiyalash kabi maktab ta’limining muhim muammolardandir. Darslarda matn bilan doimiy ishlash menimcha, rus adabiyoti asarlari asosida olib borilishi kerak. Bundan tashqari eng samaralilari matn bilan ishlashni tashkil etishning quyidagi shakl va usullari: murakkab va lingvistik-stilistik tahlillar, matn, insho yozish, matnni tahrirlash, har xil turdagi diktantlar, rasmli matnlari bilan ishlash, turli o‘yin vaziyatlari.

O‘zbek maktablarning rus tili darslarida o‘quvchilar bilan matnlar ustida ishlashda dastavval hajm jihatidan kichik va mazmunan o‘quvchilat tushunib tahlil qilishi uchun osonroq matnlargdan foydalangan maqsadga muvofiqdir. O‘quvchining til bilish darajasi o‘sishi va o‘zlashtirish qobilyatiga osishishiga keginchalik murakkab matn tahliliga o‘tish samarali natija beradi.

Maqsadli matnlar shaxsning ma'naviy-axloqiy rivojlanishi, xotira madaniyati, o‘tmish, hozirgi va kelajakka munosabat, milliy an'analar, ekologik muammolar haqida ibrat bo‘lishi darkor. Bu esa har qanday nutq turidagi matnni tahlil qilishning taxminiy rejasi:

1. Matnni ifodali o‘qish.
2. Lug‘at bilan ishlash.
3. Matn mavzusi.
4. Matnning g‘oyasi.
5. Matn turi.
6. Matn uslubi.
7. Ekspressiv nutq vositalari va ularning roli.

Rasmli matnlari bilan ishlash, ikki matnni solishtirish, o‘quvchilar matnni idrok etish va tushunchasi orqali o‘z ifodasini, kompozitsiyasini yaratishga boradi, bu esa o‘quvchilar e’tibori va tafakkurini rivojlantirishda muhim ahamiyatga ega.

O‘zbek maktablarining 5 chi sinf rus tili darsligi 13-14 darslar “ Имя прилагательное (Sifan so‘z turkumi)” mavzusini o‘rganishda “Русская изба” nomli matn berilgan. Matn o‘quvchilarga birinchi topshiriq sifatida quyidagicha

vazifa berilgan “ matnni o ‘qing va rus millatiga tegishli uylar va uy odatlari haqida tarnishing”

O‘quvchilar avval berilgan matnni bir necha marotaba o’qib chiqishadilar va ustozlari yordanida matn ichida ularga notanish bo‘lgan so‘zlarning tarjimasini tahlil qilishadilar va mantnga oid berilgan savollarga og’zaki javob berishadilar. Bu matn mano va hajm jihatidan yengil hisoblanadi. Matn bilan tanishish jarayoniga o‘quvchi nafaqat rus tilini balkim, rus millatining qadriyatlari, o‘ziga hos jihatlari bilan ham tanish boradi bu esa tilni yana ham yaxshi o‘zlashtirishiga yordam beradi.

Darslikning “Семья Традиции” 16-mavzusida rus va o‘zbek millatining oilalari haqida mant berilgan. Matnni o‘qib bolalar o‘zbek va rus oilalalarining qadriyatlari an’analari va faqat usha millatgagina hos bo‘lgan urf–odatlari haqida tanishadilar.

O‘quvchilar matn bilan tashib chiqishadi va matn ostidagi savollarga javob berishadi. Matnga oid rasmlarda foydalanib o‘zlari mustaqil rus tilida mant tuzishadi.

Bunday matnlar o‘quvchilarda rus tiliga bo‘lgan muhabbatni oshiradi, rus tilida fikirlash qobilyatini shakillantiradi, nafaqat tilni o‘rganish balkim, shu til egalarining urf odatlarini, an’analarini qadriyatlari bilan ham tanishib tassavvur hosil qilib borishga yordam beradi.

O‘zbek maktablarida rus tili darslari o‘tilishi ham bejis emas chunki oliy ta’limda o‘quxchilar davlat imtixonlarini o‘zbek va rus tillarida topshirishadilar, shuning uchun butun maktab kursi davomida matn bilan ishlashdan keng foydalanish va o‘quv, ilmiy-ommabop jurnallarni o‘qish ko‘nikmalarini rivojlantirish tavsiya etiladi. Matnlar, shu asosda kitob bilan ishlashda umumiy ta'lim ko‘nikmalarini shakllantiradi, matnni tahlil qilishni o‘rgatadi, tilning estetik funksiyasiga e'tibor beradi; turli uslub va janrdagi matnlarni yozma ravishda takrorlash, izohlash va yaratishga o‘rgatadi.

Shuning uchun (ayniqsa, o‘rta maktabda) matnni ko‘p usulda tahlil qilish juda muhimdir:

- ✓ kompozitsion va mazmuni (mavzuni, matnning asosiy g‘oyasini aniqlash, kichik mavzularni ajratib ko‘rsatish va boshqalar);
- ✓ stilistik (matnning ma'lum bir nutq uslubiga tegishliligini asoslash, uslubga xos
- ✓ bo‘lgan til vositalari va stilistik vositalarini ajratib ko‘rsatish);
- ✓ tipologik (matndagi yetakchi nutq turini ajratib ko‘rsatish, matndagi turli tipik
- ✓ bo‘laklarning kombinatsiyasini ko‘rsatish);
- ✓ alohida matn elementlarini lingvistik tahlil qilish (fonetik, orfoepik, so‘z
- ✓ shakllantiruvchi, belgilangan so‘zlarning leksik, morfologik tahlili, ibora va gaplarni sintaktik tahlil qilish);
- ✓ alohida so‘zlarning imlosini va gaplarning tinish belgilarini tahlil qilish (imlo va tinish belgilari).

Matnlar uchun topshiriqlar rus tili kursining barcha mavzularini, barcha imlo va punktogrammalarni qamrab oladi. O‘rta maktabda ushbu matnlar bilan ishlash ayniqsa samarali bo‘lib, rus tilini chuqur takrorlash, matnni har tomonlama tahlil qilish. Imlo va punktogrammalarga ega bo‘lgan bu matnlar nafaqat yuqori sinf o‘quvchilari, balki individual ish, guruh, sinf bilan ishlashga imkon beradi.

Matn yaratish matn ustida ishlash jarayoni bilan uyg‘unlikda olib borilishi zarur. Har bir yaratilgan matnning takomiliga yetishi matn ustida olib boriladigan grammatik va tahririy ishlarga bog‘liq bo‘lib, bu leksik (so‘z tanlash, so‘zlarning o‘zaro aloqador uyadoshlari, sinonimlari va uslubiy bo‘yoqdor variantlarini topish, turg‘un so‘z birikmalari va iboralardan o‘rinli foydalanish), grammatik (so‘z va gaplarni, matn qismlarini bog‘lovchi vositalarni to‘g‘ri qo‘llash, sintaktik sinonimik vositalardan o‘rinli foydalanish), matnda qo‘llangan tinish belgilarini to‘g‘ri qo‘llash matnning mazmuniy va grammatik mukammaligini ta’minlaydi.

Xulosa

Matnni nisbatan to‘liq lingvistik tahlili ko‘p vaqt talab etadi va faqat maxsus darslarda ham foydalanish mumkin. Oddiy rus tili darslarida, fonetika, lug‘at, morfologiya, sintaksisni o‘rganishda, takroriy darslarda, o‘rganilgan materialni umumlashtirish va tizimlashtirishda o‘qituvchilar ko‘pincha matnni qisman til tahlilidan foydalanadilar, bu ishni imlo me'yorlarini o‘zlashtirish va olib borish bilan bog‘lash mumkin.

Matn bilan keng qamrovli ish darsda yangi materiallarni o‘rganish va takrorlashning munosabatlarini ta'minlash, subyekt ichidagi va fanlararo aloqalarni amalga oshirish uchun sharoit yaratish imkonini beradi.

Matn yaratishga yo‘naltiruvchi lingvopsixologik o‘quv topshiriqlari tizimini rus tili ta’limiga keng joriy etish o‘quvchining so‘z boyligini oshirish, egallagan bilimlarini qiyoslash, analiz va sintez qilish asosida mustaqil ijodiy fikrlash, o‘z fikrini ifodalash jarayonida so‘zlarni tanlab ishlatish kabi ehtiyojlarni yuzaga keltirishga yordam beradi. Shunga yo‘naltirilgan ko‘nikma va malakalarni uzluksiz shakllantirib va rivojlantirib borish esa o‘quvchi nutqiy mahoratining oshib borishiga va ijodiy tafakkur ko‘lamining kengayishiga, asta-sekin matn yaratish ko‘nikmalarining avtomatlashuviga xizmat qiladi.

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Yo'ldoshova N. I.
talabasi
yurisprudensiya yo'nalishi
ijtimoiy fanlar fakulteti
Mirzo Ulug'bek nomidagi O'zbekiston Milliy Universiteti

BOLA HUQUQLARINING XALQARO MIQYOSDA HIMOYA QILINISHI

Annotatsiya: *Ushbu maqolada bola huquqlarining xalqaro miqyosda himoya qilinishi bilan bog‘liq normativ-huquqiy asoslar, monitoring mexanizmlari va ularning amaliy samaradorligi tahlil qilinadi. Xalqaro hamjamiyat tomonidan yaratilgan huquqiy tizimlar, xususan Birlashgan Millatlar TashkXMTti tomonidan qabul qilingan 1989-yildagi Bola huquqlari to‘g‘risidagi Konvensiya va uning fakultativ protokollari, XMTning bolalar mehnatiga qarshi konvensiyalari, UNICEF va boshqa xalqaro institutlarning faoliyati faktlar asosida sharhlanadi. Tadqiqot natijalari dunyo miqyosida bolalar huquqlarini buzilish holatlarining yuqoriligini, jumladan, majburiy mehnat, zo‘ravonlik, qurolli nizolarga jalb etish, bolalar savdosi va ta’limdan chetda qolish kabi muammolarning hanuz dolzarb ekanini ko‘rsatadi.*

Kalit so‘zlar: *bola huquqlari, xalqaro huquq, monitoring mexanizmlari, majburiy mehnat, zo‘ravonlik, bola savdosi, ta’limdan chetda qolish, UNICEF, CRC, XMT*

Yoldoshova N. I.
student
department of jurisprudence
faculty of social sciences
National University of Uzbekistan named after Mirzo Ulugbek

PROTECTION OF CHILDREN’S RIGHTS AT THE INTERNATIONAL LEVEL

Annotation: *This article examines the normative and legal foundations of the protection of children’s rights at the international level, monitoring mechanisms, and their practical effectiveness. It reviews the international legal systems established by the global community, including the 1989 United Nations Convention on the Rights of the Child and its optional protocols, XMT conventions against child labor, as well as the activities of UNICEF and other international institutions based on factual data. The study’s findings indicate a high level of violations of children’s rights worldwide, including forced labor, violence, recruitment into armed conflicts, child trafficking, and lack of access to education, demonstrating the continued relevance of this issue.*

Keywords: *children's rights, international law, monitoring mechanisms, forced labor, violence, child trafficking, lack of access to education, UNICEF, Bola huquqlari to'g'risidagi Konvensiya - CRC, XMT*

Kirish

Bola huquqlari zamonaviy xalqaro huquqning eng muhim yo'nalishlaridan biri hisoblanadi va uni ta'minlash inson huquqlari tizimining ajralmas qismi sifatida qaraladi. XX asrning ikkinchi yarmidan boshlab bolalarning ijtimoiy, iqtisodiy va siyosiy himoyasiga oid masalalar xalqaro hamjamiyat e'tiborini tobora ko'proq jalb qila boshladi. 1989-yilda qabul qilingan Bola huquqlari to'g'risidagi Konvensiya (CRC) bolaga mustaqil huquq subyekti sifatida yondashuvni joriy etdi va uning 196 ta davlat tomonidan ratifikatsiya qilinishi uni inson huquqlari sohasidagi eng universal shartnoma sifatida e'tirof etishga asos beradi[1]. Shu bilan birga, xalqaro huquqiy hujjatlar mavjud bo'lishiga qaramay, dunyo miqyosida bolalar huquqlarining buzilishi keng ko'lamli muammo bo'lib qolmoqda.

UNICEFning 2023-yilgi hisobotiga ko'ra, har yili dunyo bo'yicha taxminan bir milliard bola jismoniy, ruhiy yoki jinsiy zo'ravonlikdan aziyat chekadi, bu esa Bola huquqlari to'g'risidagi Konvensiyaning 19-moddasida nazarda tutilgan "zo'ravonlikdan himoya qilinish huquqi"ning buzilishi sifatida baholanadi[2]. Xalqaro Mehnat Tashkiloti (XMT) ma'lumotlariga ko'ra, hozirda 160 million bola mehnatga jalb etilgan, ularning qariyb yarmi og'ir va xavfli mehnat turlarida ishlaydi. Bu holat Bola huquqlari to'g'risidagi Konvensiyaning 32-moddasida belgilangan "ekspluatatsiya va bolalar mehnatidan himoyalanish huquqi"ga zid[3]. UNESCO ta'lim monitoringi bo'yicha 244 million bola maktab ta'limidan chetda qolayotgani qayd etilgan, bu esa Bola huquqlari to'g'risidagi Konvensiyaning 28-moddasidagi "ta'lim olish huquqi"ning buzilishi hisoblanadi[4]. UNODC ma'lumotlariga ko'ra, odam savdosi qurbonlarining uchdan bir qismini voyaga yetmaganlar tashkil etadi, bu esa Bola huquqlari to'g'risidagi Konvensiyaning 35-moddasidagi "bolalarni o'g'irlash va sotishdan himoya qilish huquqi"ga zid[5]. Shu bilan birga, qurolli nizolar davom etayotgan davlatlarda bolalarning hayoti eng xavf ostida qolmoqda, bu esa Bola huquqlari to'g'risidagi Konvensiyaning 6-moddasidagi "hayotga bo'lgan huquq"ning buzilishi hisoblanadi[6].

Uslublar

Ushbu tadqiqot normativ-huquqiy tahlil, statistik tahlil, qiyosiy va sotsiologik metodlarga tayangan holda olib borildi. Normativ-huquqiy tahlil metodi orqali Bola huquqlari to'g'risidagi Konvensiya, uning fakultativ protokollari, XMTning 138- va 182-son konvensiyalari, BMT Inson huquqlari Kengashining rezolyutsiyalari va boshqa xalqaro hujjatlar chuqur o'rganildi. Statistik tahlil yordamida UNICEF, UNODC, UNESCO va XMTning so'nggi global ma'lumotlari tahlil qilinib, bola huquqlarining buzilishiga doir asosiy ko'rsatkichlar aniqlashtirildi. Qiyosiy metod orqali turli mintaqalarda amaliy mexanizmlar solishtirilib, ularning samaradorligi baholandi[7].

Natijalar

Tadqiqot natijalari bola huquqlarining xalqaro miqyosda himoya qilinishi keng va ko‘p qatlamli tizimga ega ekanini ko‘rsatdi. Bola huquqlari to‘g‘risidagi Konvensiya bolalarning hayot, rivojlanish, ta’lim, fikr bildirish, ijtimoiy himoya, ekspluatatsiyadan va zo‘ravonlikdan himoyalanish huquqlarini kafolatlaydi. Fakultativ protokollar esa bolalarni qurolli nizolarga jalb qilishni qat’iyan taqiqlaydi, bolalar savdosi va pornografiyasiga qarshi kurashishning xalqaro standartlarini belgilaydi va bolalarga xalqaro sud organlariga murojaat qilish imkonini yaratadi.

Monitoring tizimi ham muhim rol o‘ynaydi: Bola huquqlari to‘g‘risidagi Konvensiya Qo‘mitasi davlatlarning har besh yilda taqdim etadigan hisobotlarini tahlil qilib, bola huquqlarining amaldagi holatini baholash imkonini beradi. UNICEF 190 dan ortiq davlatda bolalar salomatligi, ta’limi, himoyasi va rivojlanishi bo‘yicha amaliy dasturlarni amalga oshirmoqda. XMT bolalar mehnatini bartaraf etishga qaratilgan global tashabbuslarni samarali yuritib, dunyo bo‘yicha eng og‘ir shakldagi bolalar mehnatini kamaytirishga erishgan. UNODC ma’lumotlariga ko‘ra, odam savdosi qurbonlarining uchdan bir qismini voyaga yetmaganlar tashkil etadi[8].

Muhokama

Tahlillar shuni ko‘rsatdiki, xalqaro miqyosda bola huquqlarini himoya qiluvchi tizim ancha rivojlangan bo‘lsa-da, uning amaliy samaradorligi yetarli darajada emas. Bola huquqlari to‘g‘risidagi Konvensiya davlatlarga kuchli majburiyat yuklasa-da, ayrim hukumatlarda iqtisodiy qiyinchiliklar, ijtimoiy tengsizlik, qurolli mojaro va korrupsiya tufayli majburiyatlar to‘liq bajarilmayapti. Ayrim hududlarda bolalar mehnati an’anaviy madaniy amaliyotlar bilan uzviy bog‘liq bo‘lib, qonuniy taqiqlarga qaramay yashirin shaklda davom etadi. Zo‘ravonlik va ekspluatatsiya holatlarining yuqoriligi milliy himoya tizimlarining zaifligini ko‘rsatadi. Xalqaro mexanizmlar tavsiyaviy xarakterga ega bo‘lgani sababli, ularni bajarish darajasi ba’zan past bo‘ladi.

Xulosa va takliflar

Mazkur tadqiqot shuni ko‘rsatdiki, bola huquqlarining xalqaro himoyasi keng qamrovli huquqiy-institutsional tizimga ega bo‘lsa-da, global muammolar – majburiy mehnat, zo‘ravonlik, bolalar savdosi, ta’limdan chetda qolish, qashshoqlik va qurolli mojarolar – hal etilmaguncha, bolalar huquqlarini to‘liq ta’minlandi deb aytib bo‘lmaydi. Shu bois xalqaro hamkorlikni kengaytirish, Bola huquqlari to‘g‘risidagi Konvensiya ning asosiy moddalarini milliy qonunchilikka to‘liq integratsiya qilish, monitoring tizimlarini mustahkamlash, bolalar farovonligiga yo‘naltirilgan resurslarni oshirish va milliy darajada qat’iy siyosiy iroda shakllantirish dolzarb vazifa hisoblanadi. Bolalar mehnatini bartaraf etish, zo‘ravonlikning oldini olish, ta’limdan chetda qolgan bolalarga imkon yaratish, odam savdosiga qarshi xalqaro hamkorlikni kuchaytirish va bolalar Ombudsmani institutining mustaqilligini oshirish tavsiya etiladi.

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Yuldoshev Sh. X.
o'qituvchisi
NamDTU
Nomozov I. I.

IONLASHTIRUVCHI NURLANISH MANBALARI BILAN BOG'LIQ FAVQULODDA VAZIYATLARDA TO'G'RI HARAKATLANISH QILISH BO'YICHA DUAL O'QITISH TIZIMI

Annatatsiya: *Radiatsiyaviy holatlar va ularning xavfsizligi bo'yicha O'zbekiston Respublikasining 2000 yil 31 avgustda «Radiatsiyaviy xavfsizlik to'g'risida»gi qonuni qabul qilingan. Ushbu qonunning maqsadi insonlar hayoti, sog'ligi va mol-mulki, shuningdek, atrof-muhitni ionlashtiruvchi nurlanish, radioaktiv ifloslanishlarning zararli ta'sirlaridan muhofaza qilishni ta'minlash bilan bog'liq masalalarni tartibga solishdan iborat.*

Kalit so'zlar: *Radiatsiya,ionlashtirish,portlash,nur, nurlanish*

Yuldoshev Sh. Kh.
teacher
NamDTU
Nomozov I. I.

A DUAL SYSTEM OF TRAINING ON CORRECT ACTIONS IN EMERGENCY SITUATIONS INVOLVING SOURCES OF IONIZING RADIATION

Abstract: *On radiation situations and their safety, the Law of the Republic of Uzbekistan "On Radiation Safety" was adopted on August 31, 2000. The purpose of this law is to regulate issues related to ensuring the protection of human life, health and property, as well as the environment from the harmful effects of ionizing radiation and radioactive pollution.*

Keywords: *Radiation, ionization, explosion, light, radiation*

Qonunda radiatsiyaviy xavfsizlikka doir yangi tahrirdagi tushunchalar ham kiritilgan, jumladan:

Ionlashtiruvchi nurlanish - radoaktiv parchalanishda, yadroviy yemirilishlarda, moddadagi zaryadlangan zarrachalar harakatlanishini sekinlashuvida hosil bo'ladigan hamda muhit bilan o'zaro ta'sir etish chog'ida har xiI qutbli ionlarni hosil qiladigan nurlanish;

Ionlashtiruvchi nurlanish manbai – o'zidan ionlashtiruvchi nurlanish chiqaruvchi qurilma yoki radioaktiv modda;

Kuzatuv hududi – radiatsiyaviy monitoring o'tkaziladlgan sanitariya-muhofaza hududidan tashqaridagi hudud;

Radiatsiyaviy avariya – uskuna nosozligi, xodimlarning xatti-harakatlari tabiiy va texnologik xususiyatli favqulodda vaziyat tufayli kelib chiqqan, fuqarolarning belgilangan me'yordan ko'proq nurlanish olishga yoki atrof muhitning radioaktiv ifloslanishiga olib keluvchi yohud olib kelgan ionlashtiruvchi nurlanish manbai ustidan boshqaruvning izdan chiqishi;

Radiatsiyaviy xavfsizlik – fuqarolar va atrof-muhitning ionlashtiruvchi nurlanishning zararli ta'siridan muhofazalanganlik holati;

Yadroviy xavfsizlik – yadroviy materialdan xavfsiz foydalanishni ta'minlovchi chora-tadbirlar majmui.

Yer usti va yer osti yadro portlashlari natijasida radioaktiv moddalar havo va tuproq mahsulotlari bilan aralashadi, so'ng havo oqimi bo'ylab harakatlanib, sekin-asta yerga tushadi. Bunda ko'zga ko'rinmaydigan radioaktiv zararlanish izi hosil bo'ladi, bu iz qanchalik ko'p bo'lsa, insonlarning yashashlari va ishlashlari uchun shuncha uzoq xavf tug'diradi. Xuddi shunday holat yadro zaryadi bilan ishlaydigan tarmoqlarda (AES, gamma nuridan foydalaniladigan ilmiy labarotoriyalarda) avariya natijasida ham kuzatilishi mumkin. Jumladan, 1986-yildagi Chemobil AES idagi avariya oqibatida 4-energoblokdan chiqqan radioaktiv moddalar 30 km li masofaga tarqaIib, u yerdagi jamiki obyektlarni (atrof-muhitni, insonlarning yashash-ishlash joylarini, kiyim-kechaklari, moddiy resurslari, suvni va boshqalarni) shikastlagan.

Dushman tomonidan kimyoviy va biologik qurollar qo'llanilganda yoki KTZM bilan ishlaydigan tarmoqlardagi avariyalarda ham katta hududlar zaharlanadi. Agar shu joylarda zararsizlantirish choralari ko'rilmasa, bunday hududlarda bemalol yashash yoki ishlash imkoniyati bo'lmaydi. Radiatsiyaviy, kimyoviy va bakteriologik holatlarni baholash fuqaro muhofazasi boshlig'ining, shtab va obyekt mutaxassislarining majburiy ishidir. Radiatsiyaviy holat deganda, joylarning radioaktiv zararlanish darajasi va o'lchami tushunilib, bu aholining yashashiga hamda iqtisodiyot tarmoqlari obyektlari ishlashlariga ta'sir etadi. Joylarning radioaktiv zararlanish o'lchovi va darajasi ma'lum hududdagi yadro portlashlarining soniga, quvvatiga, turlariga hamda portlash vaqtidagi shamolning tezligiga bog'liqdir.

Portlash quvvati oshishi bilan zararlanish maydonlari ham ko'paysa, u holda radioaktiv bulut izlarida radiatsiya darajasi ham ortib boradi. Uncha katta bo'lmagan hududda bir necha yadro quroli portlasa, radioaktivlik darajasi yanada oshadi. Vaqt o'tishi bilan radiatsiya darajasi kamayib boradi. Shuning uchun portlashdan keyin qancha ko'p vaqt o'tsa, radiatsiya darajasi shuncha kam bo'ladi.

Radioaktiv bulut izining katta-kichikligiga o'rtacha shamolning tezligi sezilarli ta'sir ko'rsatadi. O'rtacha shamolning tezligi oshishi bilan yadro qurolining portlashidan zararlangan maydonlarning hajmi ham oshadi. Radiatsiya darajasi 0,5 R/s ga teng bo'lgan joylami radioaktiv moddalar bilan zararlangan hudud deb hisoblanadi. Yadro aslahasi portlatilgan joy bilan biror obyekt orasidagi masofa, o'sha joyning radiatsiya holatini aniqlashda muhim rol o'ynaydi. Obyektlarning va unga yaqin bo'lgan joylarning radiatsiyaviy holati, fuqaro muhofazasining razvedka guruhi va DP-5A (B yoki V) turidagi rentgenometr

jihozlari yordamida radiatsiyaviy hamda kimyoviy kuzatish postlari orqali aniqlanadi.

Radiatsiyaviy holatni baholash deganda – joylarni radioaktiv zararlanganlik tavsifnomasi va ularning fuqarolarga, texnika, qurilish va imoratlarga hamda hayvon va o‘simliklarga ta’siri tushuniladi.

Tavsifnomaga quyidagilar kiradi:

-obyekt hududidagi ionlashtiruvchi nurlanishni xavflilik darajasi;

-radioaktiv modda bilan zararlangan hudud o‘lchami;

-fuqarolar va hayvonlarning nurlanish darajasi;

-texnika, tuproq, o‘simlik, oziq-ovqat, suv, bino va inshootlarning radioaktiv zararlanganlik darajasi;

-fuqarolarga va hayvonlarga ionlashtiruvchi nurlanishning xavflilik darajasi;

-radiatsiya xavfining iqtisodiyot tarmog‘iga qanchalik zarar yetkazganlik darajasi.

Radiatsiya holatining natijalariga qarab zararlangan joylarda aholiga davolash va profilaktik choralarini qo‘llash zarurligi aniqlanadi. Razvedkaning bergan ma’lumotIari asosida radiatsiyaviy holatni aniqlash va baholash mumkin, bunday ma’lumotlarni tuman, shahar viloyat va Respublika fuqaro muhofazasining rahbarlari, ularning shtablari qabul qiladilar. Radiatsiyaviy holatni baholash bilan bog‘liq bo‘lgan hisoblarni bajarishda turli formulalar, jadvallar, radiatsiyaviy o‘lehov lineykasi va boshqa hisoblash jihozlaridan foydalaniladi.





Tovush to‘lqini har bir kilometr masofani 3 soniyada bosib o‘tadi. Aytaylik, kuzatuv joyiga tovush to‘lqini 60 soniyada yetib kelgan bo‘lsa, portiash kuzatuv joyidan 60/3=20 km uzoqlikda sodir bo‘lgan bo‘ladi.

Portlash turini olovli girdob (shar) nurlanishi so‘ngandan keyin ko‘rib aniqlash mumkin. Agar changli ustun, bulut bilan ulangan bo‘lsa (qo‘ziqorin tuzilishidagi ko‘rinishda) u holda portIash yer ustida sodir bo‘lgan bo‘ladi. Agar portlash havoda sodir etilgan bo‘lsa, u hoida changli ustun, bulut bilan ulanmagan bo‘ladl, lekin changli ustun ko‘tarilish jarayonida bulutgacha yetib oladi va keyin ulanadi (N ≤ 20 $\sqrt[3]{q}$, metrda), yoki ulanmaydi (agar N ≥20 $\sqrt[3]{q}$ metrda).

Eng qiyin masala portlash quvvatini aniqlash hisoblanadi. Ammo uni taxminan qiymatini bilish mumkin. Buning uchun portlash sodir etilgandan (8-9

daqiqadan) keyin chang ustunini yerdan maksimal balandligi «h» va bulutni ko‘rinib turgan gorizontal diametri «d» aniqlanib, so‘ngra ularning nisbatiga ko‘ra, aslahaning taxminiy quvvati topiladi. Masalan, h/dx=5 bo‘lsa, bu trotil ekvivalenti 5000 tonnali, agar h/dx=l bo‘lsa trotil ekvivalenti 1 ming tonnali aslahaga to‘g‘ri keladi.

Yadroviy aslahalar yer ustida portiatilganda hosil bo‘ladigan bulut shamol ta’sirida uzoq joylargacha tarqalib, yerga tushadi va o‘sha joylar taxminan 4 ta zararlangan hududga bo‘linadi. Zararlangan joylarning (A,B,V,G hududlari) radioaktiv holatini baholash quyidagi tartibda aniqlanadi (6.1-jadval):

• radioaktiv shikastlangan joyiarning ko‘lamini aniqlanadi;

• radioaktiv shikastlangan hududlarni xaritaga tushiriladi;

• boshlang‘ich shikastlanish vaqti aniqlanadi.

l-misol. Obyektda yadroviy portiashdan 2 soat keyin nurlanish dozasi o‘ichandi - R2=100 rad/soat. Yadroviy portlashdan bir soat keyin nurlanish dozasi qancha bo‘iganini (R1) toping.

Yechish: 12.1- jadvaldan foydalanib, 2 soatga to‘g‘ri keladigan, Ro/R ni qiymatini topamiz va u 2:30 minutga to‘g‘ri keladi.

Ya'ni: Po =P_0 / P=2:30, bundan Po = P* 2:30 = 100 *2:30 = 230 R/soat

lavob: aslaha portlagandan 1 soatdan keyingi nurlanish dozasi 230 R/soat

2-misol. Yadroviy aslaha portiaganda ionlatiruvchi nurianish 40 rad/soat bo‘lib, 2 soatdan keyin o‘lchanganda 20 rad/soatni tashkil qildi. Shu hududda harakatlanuvchi fuqaro muhofazasi tizimlarining ishlash uchun ruxsat etilgan vaqtni toping.

Yechlsh: D_{bosh}*K_{sys} /D_{oxir} formuladan foydalanamiz.

Masala shartidagi qiymatlarni formulaga qo‘ysak: D_{bosh}*K_{sus} /D_{oxir} =40*1/20=2

bu yerda, D_{oxir} - shikastlangan hududdagi oxirgi o‘lchangan radiatsiya darajasi

D_{bosh} - boshlang‘ich radiatsiya darajasi, rad.

K_{sus}. - radiatsiyani susaytirish koeffitsienti.

Aslaha portlatilgandan keyin turli vaqtlarda ionlashtiruvchi nurlanishni aniqlashga qo‘llaniladigan koeffitsient.

1.1.1-jadval

Portlashdan keyingi o‘tgan vaqt, soat	R_0/R	Portlashdan keyingi o‘tgan vaqt,soat	R_0/R
0,5	0,43	7	10,33
1	1,0	10	15,85
1,5	1,63	12	19,72
2	2,30	20	36,41
2,5	3,00	24	45,3
3	3,74	30	59,23
4	5,28	48	104,1
4,5	6,08	72	169,3
5	6,90	240	805,2
6	8,59	336	1169

12.2-jadvaldan foydalanib, topligan qiymatga to‘g‘ri keladigan vaqt aniqlanadi. Ya’ni 4 soat 6 daqiqa davomida fuqarolar muhofazasining xizmatchilari 20 rad/soatli shikastlangan hududda ishlarini olib borishlari mumkin.

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Zubaydullayeva M. A.
assistenti
bolalar stomatologiyasi kafedrasi
Samarqand davlat tibbiyot universiteti

METABOLIK SINDROMLI BEMORLARDA STOMATOLOGIK KASALLIKLARNING OLDINI OLISH

Annotatsiya: *Metabolik sindrom (MS) — zamonaviy tibbiyotda dolzarb muammolardan biri bo‘lib, u insulinrezistentlik, semirish, arterial gipertenziya va lipid almashinuvining buzilishi bilan tavsiflanadi. Ushbu holat og‘iz bo‘shlig‘i to‘qimalarida yallig‘lanish jarayonlarining kuchayishi, parodont kasalliklari va kariyes rivojlanish xavfining ortishiga olib keladi. Maqolada metabolik sindromli bemorlarda stomatologik kasalliklarning rivojlanish xususiyatlari, profilaktika usullari va kompleks tibbiy yondashuvning samaradorligi tahlil qilingan.*

Kalit so‘zlar: *metabolik sindrom, stomatologik kasalliklar, profilaktika, parodontit, kariyes, og‘iz bo‘shlig‘i gigiyenasi.*

Zubaydullaeva M. A.
associate professor
department of pediatric dentistry
Samarkand State Medical University

PREVENTION OF DENTAL DISEASES IN PATIENTS WITH METABOLIC SYNDROME

Abstract: *Metabolic syndrome (MS) is a pressing issue in modern medicine, characterized by insulin resistance, obesity, hypertension, and lipid metabolism disorders. This condition leads to increased inflammation in the oral tissues, increasing the risk of periodontitis and dental caries. This article analyzes the development of dental diseases in patients with metabolic syndrome, prevention methods, and the effectiveness of a comprehensive medical approach.*

Keywords*: metabolic syndrome, dental diseases, prevention, periodontitis, dental caries, oral hygiene*

Dolzarbligi

So‘nggi o‘n yilliklarda metabolik sindrom aholi salomatligiga jiddiy tahdid solayotgan global muammolardan biriga aylandi. Tadqiqotlar natijalariga ko‘ra, katta yoshli aholining 25–30 % ida metabolik sindrom komponentlari uchraydi. Metabolik sindrom fonida mikrotsirkulyatsiyaning buzilishi, to‘qimalarda oksidlovchi stressning ortishi va immunitetning pasayishi kuzatiladi. Bu holatlar og‘iz bo‘shlig‘ida yallig‘lanish kasalliklarining rivojlanishi uchun qulay sharoit yaratadi.

Stomatologik kasalliklar, ayniqsa parodontit va kariyes, metabolik sindromli bemorlarda og‘ir kechishi, tez rivojlanishi va davolashga chidamli bo‘lishi bilan ajralib turadi. Shu sababli, ushbu bemorlar guruhida profilaktikaga yo‘naltirilgan kompleks tadbirlarni ishlab chiqish va joriy etish dolzarb hisoblanadi.

Tadqiqot maqsadi

Metabolik sindromli bemorlarda stomatologik kasalliklarning rivojlanish xususiyatlarini o‘rganish hamda samarali profilaktik chora-tadbirlarni ishlab chiqish va ularning klinik ahamiyatini baholashdan iborat.

Materiallar va tadqiqot usullari

Tadqiqot klinik-kuzatuv va tahliliy usullar asosida o‘tkazildi. Tadqiqotda 35–65 yosh oralig‘idagi 120 nafar bemor ishtirok etdi. Ular ikki guruhga bo‘lindi:

Asosiy guruh – 70 nafar metabolik sindrom tashxisi qo‘yilgan bemorlar;

Nazorat guruhi – 50 nafar somatik jihatdan sog‘lom shaxslar.

Metabolik sindrom tashxisi Jahon sog‘liqni saqlash tashkiloti mezonlari asosida qo‘yildi.

Qo‘llanilgan usullar:

klinik stomatologik ko‘rik;

DMF indeksi (kariyes intensivligi);

CPI indeksi (parodont holatini baholash);

og‘iz bo‘shlig‘i gigiyenasini baholash (OHI-S);

so‘lak sekretsiyasi va uning pH ko‘rsatkichlarini aniqlash;

statistik tahlil (variatsion usullar).

Bemorlarga individual profilaktik dastur ishlab chiqildi: professional tozalash, antiseptik vositalar, ftor saqlovchi preparatlar, to‘g‘ri ovqatlanish bo‘yicha tavsiyalar hamda endokrinolog bilan hamkorlik.

Tadqiqot natijalari

Tadqiqot natijalariga ko‘ra, metabolik sindromli bemorlarda parodont kasalliklari tarqalishi nazorat guruhiga nisbatan 1,8 barobar yuqori ekani aniqlandi. DMF indeksi asosiy guruhda o‘rtacha 6,4 ± 0,3 ni tashkil etdi, nazorat guruhida esa 4,1 ± 0,2 bo‘ldi.

Og‘iz bo‘shlig‘i gigiyenasi ko‘rsatkichlari past bo‘lib, so‘lak ajralishi kamaygani va og‘iz qurug‘ligiga moyillik yuqori ekani qayd etildi. Profilaktik tadbirlar qo‘llanilgandan so‘ng 6 oy mobaynida yallig‘lanish belgilari kamaydi, gigiyena ko‘rsatkichlari yaxshilandi va kariyes rivojlanishi sekinlashdi.

Dolzarblik

Zamonaviy tibbiyotda metabolik sindrom (MS) aholi salomatligiga jiddiy xavf soluvchi kompleks kasalliklar majmuasi sifatida e’tirof etilmoqda. Uning tarkibiga abdominal semirish, insulinrezistentlik, giperglikemiya, arterial gipertenziya hamda lipid almashinuvining buzilishi kabi patofiziologik holatlar kiradi. So‘nggi yillarda metabolik sindromning tarqalish ko‘lami sezilarli darajada ortmoqda, ayniqsa mehnatga layoqatli aholi orasida ushbu sindromning uchrashi tibbiy-ijtimoiy ahamiyatini yanada oshirmoqda.

Metabolik sindrom fonida organizmda xronik past darajali yallig‘lanish jarayoni rivojlanadi. Bu holat qon tomirlar devorlarida mikrotsirkulyatsiyaning

buzilishi, to‘qimalarda kislorod yetishmovchiligi va immun himoya mexanizmlarining pasayishiga olib keladi. Mazkur patogenetik o‘zgarishlar og‘iz bo‘shlig‘i to‘qimalari, xususan, parodont va shilliq qavat holatiga salbiy ta’sir ko‘rsatadi. Natijada stomatologik kasalliklar rivojlanishi uchun qulay sharoit shakllanadi.

Stomatologik amaliyotda metabolik sindromli bemorlarda parodont kasalliklari, kariyes, gingivit, stomatit hamda og‘iz bo‘shlig‘i qurug‘ligi kabi holatlar keng tarqalganligi kuzatilmoqda. Ushbu bemorlarda yallig‘lanish jarayonlari og‘ir kechishi, davolashga chidamli bo‘lishi va tez-tez retsidiv berishi bilan ajralib turadi. Bu esa stomatologik yordam samaradorligini pasaytiradi hamda bemorlarning hayot sifatini yomonlashtiradi.

Shu bilan birga, metabolik sindromli bemorlarda so‘lak ajralishi kamayishi, uning biokimyoviy tarkibi o‘zgarishi va bufer xususiyatlarining susayishi aniqlangan. Bunday holatlar og‘iz bo‘shlig‘ida mikrobiotsenoz muvozanatining buzilishiga, patogen mikroorganizmlar faolligining oshishiga olib keladi. Bu esa kariyes va parodont kasalliklarining rivojlanishini yanada tezlashtiradi.

Metabolik sindromning stomatologik kasalliklar bilan o‘zaro bog‘liqligi ikki tomonlama xarakterga ega. Bir tomondan, metabolik buzilishlar og‘iz bo‘shlig‘i kasalliklarini keltirib chiqarsa, ikkinchi tomondan, xronik stomatologik yallig‘lanish o‘choqlari umumiy yallig‘lanish darajasini oshirib, metabolik sindromning og‘irlashishiga xizmat qiladi. Bu holat stomatologiya va umumiy tibbiyot o‘rtasida integratsiyalashgan yondashuv zarurligini ko‘rsatadi.

Hozirgi kunda stomatologik amaliyotda asosan kasalliklarni davolashga yo‘naltirilgan choralar ustunlik qiladi. Biroq metabolik sindromli bemorlarda profilaktika masalalari yetarlicha ishlab chiqilmagan, individual profilaktik dasturlar amaliyotga to‘liq joriy etilmagan. Shu sababli, ushbu toifadagi bemorlar uchun maxsus profilaktik yondashuvlarni ishlab chiqish va ilmiy asoslash dolzarb vazifalardan biri hisoblanadi.

Yuqoridagilarni hisobga olgan holda, metabolik sindromli bemorlarda stomatologik kasalliklarning oldini olishga qaratilgan kompleks tadqiqotlar o‘tkazish, profilaktik tadbirlarni takomillashtirish va ularni amaliyotga tatbiq etish zamonaviy stomatologiya va umumiy tibbiyot uchun katta ilmiy va amaliy ahamiyatga ega.

Muhokama

Ushbu tadqiqot natijalari metabolik sindrom va stomatologik kasalliklar o‘rtasida mustahkam patogenetik bog‘liqlik mavjudligini yana bir bor tasdiqladi. Olingan ma’lumotlar asosida metabolik sindromli bemorlarda og‘iz bo‘shlig‘i to‘qimalarida yallig‘lanish jarayonlari nafaqat tezroq rivojlanishi, balki ularning klinik kechishi og‘ir va davolashga chidamli bo‘lishi aniqlandi. Bu holat umumiy somatik o‘zgarishlar va mahalliy stomatologik omillarning o‘zaro ta’siri bilan izohlanadi.

Metabolik sindromning asosiy patogenetik bo‘g‘inlaridan biri hisoblangan insulinrezistentlik organizmda xronik past darajali inflammator jarayonni qo‘zg‘atadi. Bu jarayon parodont to‘qimalarida sitokinlar (interleykin-1β, TNF-α)

miqdorining ortishiga, osteoklastik faollikning kuchayishiga va suyak rezorbsiyasining tezlashishiga olib keladi. Bizning tadqiqot natijalarimiz ham metabolik sindromli bemorlarda parodontit tarqalish darajasi yuqoriligini ko‘rsatdi, bu esa xorijiy mualliflar ma’lumotlari bilan uyg‘un keladi.

So‘lak bezlari faoliyatining pasayishi metabolik sindromli bemorlarda muhim klinik ahamiyatga ega. So‘lak ajralishi kamayganda uning himoya funksiyalari susayadi, mexanik tozalash imkoniyatlari cheklanadi va og‘iz bo‘shlig‘ida patogen mikrofloraning faollashuvi yuz beradi. Ushbu holat kariyes jarayonining tezlashishi va shilliq qavat yallig‘lanishlarining rivojlanishiga zamin yaratadi. Tadqiqot davomida asosiy guruh bemorlarida og‘iz qurug‘ligi shikoyatlari ko‘proq qayd etildi, bu esa so‘lak ajralishi ko‘rsatkichlari bilan to‘liq bog‘liq ekani aniqlandi.

Olingan natijalar stomatologik kasalliklar va metabolik sindrom o‘rtasida ikki tomonlama aloqadorlik mavjudligini ko‘rsatadi. Xronik parodontal yallig‘lanish o‘choqlari umumiy yallig‘lanish darajasini oshirib, insulinga sezgirlikni yanada pasaytiradi. Bu holat metabolik sindromning og‘irlashuviga sabab bo‘ladi va “yopiq aylana” shakllanadi. Shu nuqtayi nazardan qaraganda, stomatologik profilaktika faqat mahalliy ahamiyatga ega bo‘lib qolmasdan, balki umumiy somatik holatni yaxshilashda ham muhim o‘rin tutadi.

Profilaktik tadbirlarning samaradorligi bizning tadqiqotimizda aniq ifodalandi. Individual og‘iz bo‘shlig‘i gigiyenasiga o‘rgatish, muntazam professional tozalash, antiseptik va remineralizatsiya qiluvchi vositalarni qo‘llash yallig‘lanish belgilarining kamayishiga olib keldi. Shu bilan birga, endokrinolog bilan hamkorlikda metabolik buzilishlarni korreksiya qilish stomatologik davolash natijalarini barqarorlashtirishda muhim omil ekani kuzatildi.

Adabiyotlar tahlili shuni ko‘rsatadiki, so‘nggi yillarda stomatologik amaliyotda somatik kasalliklarni hisobga olgan holda profilaktik yondashuvlarni ishlab chiqishga qiziqish ortib bormoqda. Biroq amaliyotda metabolik sindromli bemorlar uchun maxsus ishlab chiqilgan stomatologik profilaktika algoritmlari yetarli darajada qo‘llanilmayapti. Bu esa ushbu yo‘nalishda yanada chuqur ilmiy izlanishlar olib borish zarurligini ko‘rsatadi.

Shuningdek, ushbu tadqiqot natijalari stomatologik xizmat ko‘rsatishda individual yondashuv ahamiyatini yanada oshiradi. Metabolik sindromli bemorlarda standart profilaktik choralar yetarli bo‘lmasligi mumkin, shu sababli ularning umumiy somatik holati, yoshi, kasallik davomiyligi va hamroh patologiyalari hisobga olinishi lozim. Bu esa stomatolog va boshqa mutaxassislar o‘rtasidagi multidisiplinar hamkorlikni talab qiladi.

Umuman olganda, muhokama qilingan natijalar metabolik sindromli bemorlarda stomatologik kasalliklarning oldini olish bo‘yicha ishlab chiqilgan profilaktik yondashuvlarning ilmiy asoslanganligini tasdiqlaydi va ularni amaliyotga joriy etish maqsadga muvofiq ekanini ko‘rsatadi.

Xulosa

O‘tkazilgan tadqiqot natijalari metabolik sindrom og‘iz bo‘shlig‘i salomatligiga bevosita va bilvosita ta’sir ko‘rsatuvchi muhim patogenetik omil

ekanini ilmiy jihatdan asoslab berdi. Metabolik sindromli bemorlarda stomatologik kasalliklarning yuqori tarqalishi, ularning og‘ir klinik kechishi hamda davolashga chidamliligi umumiy metabolik buzilishlar, xronik inflammator jarayon va mikrotsirkulyatsiya o‘zgarishlari bilan uzviy bog‘liq ekani aniqlandi.

Tadqiqot natijalari parodont kasalliklari va kariyes metabolik sindrom fonida faqat mahalliy muammo sifatida emas, balki umumiy somatik holatni og‘irlashtiruvchi omil sifatida qaralishi lozimligini ko‘rsatdi. Xronik stomatologik yallig‘lanish o‘choqlari insulinrezistentlikni kuchaytirib, metabolik sindromning rivojlanishini tezlashtirishi mumkin. Bu esa stomatologiya va umumiy tibbiyot o‘rtasida uzviy hamkorlikni talab etadi.

Ishlab chiqilgan kompleks profilaktik tadbirlar — muntazam stomatologik nazorat, professional gigiyena, individual og‘iz bo‘shlig‘i parvarishi, remineralizatsiya va antiseptik vositalar qo‘llanilishi hamda endokrinologik korreksiya — stomatologik kasalliklar chastotasini kamaytirishda yuqori samara berishi isbotlandi. Ushbu yondashuv bemorlarda yallig‘lanish belgilarining pasayishi, og‘iz bo‘shlig‘i gigiyenasi ko‘rsatkichlarining yaxshilanishi va kariyes rivojlanish sur’atining sekinlashishiga olib keldi.

Olingan natijalar metabolik sindromli bemorlar uchun standart stomatologik yordam yetarli emasligini, balki individual va multidisiplinar yondashuv zarurligini ko‘rsatadi. Stomatologik profilaktik tadbirlarni umumiy somatik davolash bilan uyg‘unlashtirish bemorlarning hayot sifatini yaxshilash, asoratlar xavfini kamaytirish va uzoq muddatli klinik natijalarni barqarorlashtirish imkonini beradi.

Shu tariqa, metabolik sindromli bemorlarda stomatologik kasalliklarning oldini olishga qaratilgan kompleks profilaktika nafaqat stomatologik amaliyot uchun, balki umumiy tibbiyot tizimi uchun ham muhim ahamiyatga ega bo‘lib, ushbu yo‘nalishdagi ilmiy izlanishlarni yanada chuqurlashtirish va amaliyotga keng joriy etish maqsadga muvofiq hisoblanadi.

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Абдуллаева С. Б.
ассистенти
Самарқанд давлат тиббиёт университети
Улашбоева Б. А.
талабаси
Самарқанд давлат тиббиёт университети

ТИББИЙ ЖАРАЁНЛАРНИ АВТОМАТЛАШТИРИШНИНГ ЯНГИ ЕЧИМЛАРИ

Аннотация: *Замонавий технологиялар, шу жумладан сунъий интеллект, машинани ўрганиш, робототехника ва электрон соғлиқни сақлаш тизимлари тиббий амалиётларни соддалаштириш ва хато эҳтимолини камайтиришда муҳим аҳамиятга эга эканлиги сир эмас. Ушбу мақолада тиббий жараёнларни автоматлаштиришнинг замонавий ечимлари ва уларнинг соҳа самарадорлигига таъсири таҳлил қилинади. Шунингдек, автоматлаштиришнинг афзалликлари ва амалиётда учраши мумкин бўлган қийинчиликлар ҳам таҳлил қилинади. Мақола тиббий муассасаларда технологик интеграцияни ривожлантириш ва хизмат сифатини ошириш учун амалий тавсиялар тақдим этади.*

Калит сўзлар: *тиббий автоматлаштириш, сунъий интеллект, электрон соғлиқни сақлаш, диагностика, робототехника.*

Abdullaeva S. B.
assistant
Samarkand State Medical University
Ulashboeva B. A.
student
Samarkand State Medical University

NEW SOLUTIONS FOR AUTOMATION OF MEDICAL PROCESSES

Abstract: *It is no secret that modern technologies, including artificial intelligence, machine learning, robotics, and electronic healthcare systems, play an important role in simplifying medical practice and reducing the likelihood of errors. This article analyzes modern solutions for automating medical processes and their impact on the efficiency of the industry. The advantages of automation and the difficulties that may arise in practice are also analyzed. The article provides practical recommendations for the development of technological integration in medical institutions and improving the quality of care.*

Keywords: *medical automation, artificial intelligence, electronic healthcare, diagnostics, robotics.*

Кириш

Бугунги кунда тиббий соҳада технологиялар тез суръат билан ривожланмоқда. Бу ривожланишнинг асосий йўналишларидан бири – тиббий жараёнларни автоматлаштиришдир. Янги ечимлар орқали беморларга юқори сифатли хизмат кўрсатиш, даволаш жараёнларини тезлаштириш ва тиббий ходимлар ишини енгиллаштириш мумкин.

Аввалambор, электрон саломатлик карталари (Electronic Health Records) эътиборга лойиқ. Бу тизимлар беморлар ҳақидаги маълумотларни электрон шаклда сақлайди ва уларни ҳар қандай вақтда тез ва қулай қайта ишлаш имконини беради. Бу эса диагностика ва даволаш жараёнларини сезиларли даражада самарали қилади.

Иккинчидан, сунъий интеллект ва машина ўрганиши тиббий маълумотларни таҳлил қилишда қўлланилади. Бу технологиялар врачларга тез ва аниқ диагностика қўйиш, индивидуал даволаш режасини тузиш ва ҳатто прогноз беришда ёрдам беради.

Шунингдек, роботлаштирилган операциялар ва лаборатория автоматизацияси ҳам аҳамиятлидир. Роботлар жарроҳликда аниқликни оширади, лаборатория автоматизацияси эса қон текширувлари ва бошқа таҳлилларни тез ва самарали амалга ошириш имконини беради.

Бундан ташқари, телемедицина ва мобил технологиялар орқали беморлар узоқ масофада ҳам консультация олишлари ва даволаниш жараёнини кузатишлари мумкин. Бу айниқса чекка ҳудудларда аҳоли учун жуда қулай.

Шунингдек, автоматлаштирилган даволашни назорат қилиш тизимлари ҳам фойдаланилмоқда. Улар дориларни бериш, беморларни кузатиш ва даволаниш натижаларини таҳлил қилишни автоматлаштириш орқали тиббий хизматнинг самарадорлигини оширади.

Хулоса қилиб айтганда, тиббий жараёнларни автоматлаштириш соҳада сифат ва самарадорликни оширади. Янги технологиялар билан интеграциялаштирилган тизимлар нафақат беморлар учун, балки тиббий ходимлар учун ҳам катта ёрдам ҳисобланади.

Тиббий жараёнларни автоматлаштириш – бу келажак тиббиётининг асосий йўналишларидан бири. Ушбу технологиялардан тўлиқ фойдаланиш орқали соғлиқни сақлаш тизимини янада самарали қилиш мумкин.

Адабиётлар таҳлили ва методологияси

Ҳозирги кунда тиббий соҳада технологияларни қўллаш орқали жараёнларни автоматлаштириш глобал тенденцияга айланди. Янги ечимлар нафақат беморларга хизмат сифати ва хавфсизлигини оширади, балки тиббий ходимлар ишини енгиллаштиради.

Тиббий жараёнларни автоматлаштириш бўйича тадқиқотлар асосан қуйидаги методологиялардан фойдаланади:

1. **Системали адабиёт таҳлили (Systematic Literature Review):** Тиббиётда EHR, AI ва робототехника қўлланилиши бўйича илмий мақолалар ва тажрибалар таҳлил қилинади. Масалан, Miller ва Smith (2020)нинг

тадқиқотларида электрон саломатлик карталари (EHR)нинг диагностика ва даволаш самарадорлигига таъсири кўрсатилган.

2. **Солиқли тадқиқотлар ва кейс-стади (Case Study):** Янги технологиялар амалда қандай самара бериши кузатилади. Роботлаштирилган операциялар бўйича Amal et al. (2021) маълумотлари операциянинг аниқлигини сезиларли даражада оширганлигини кўрсатади.

3. **Машина ўрганиши ва маълумот таҳлили (Machine Learning & Data Analytics):** AI моделлари орқали беморлар маълумотлари таҳлил қилинади ва индивидуал даволаш режаси тузилади. Johnson ва ҳамкасблари (2019) сунъий интеллектнинг беморларнинг оғир касалликлари прогнозини аниқлашда 90% самарадорликка эришганлигини таъкидлаган. Бу борада етук олимларнинг фикрлари келтирилган:

- Topol (2019) таъкидлайдики, сунъий интеллект ва автоматизация тиббиётда инқилобий ўзгаришларни амалга оширади ва врачлар учун ҳар куни қийин бўлган вазифаларни енгиллаштиради.
- Berner (2021) эса электрон саломатлик карталарининг асосий афзаллигини маълумотларни тез ва хавфсиз қайта ишлай олишида кўради.
- Yang ва ҳамкасблари (2020) лаборатория автоматизацияси ва роботлаштирилган диагностика жараёнлари аниқликни ва хавфсизликни сезиларли даражада оширишини қайд қилган.

Муҳокама

Ҳозирги кунда тиббий соҳада технологияларни қўллаш орқали жараёнларни автоматлаштириш муҳим тенденцияга айланмоқда. Автоматизация нафақат тиббий ходимлар учун ишни енгиллаштиради, балки беморларга сифатли ва хавфсиз хизмат кўрсатиш имконини ҳам беради. Янги ечимлар асосан электрон саломатлик карталари, сунъий интеллект, робототехника ва телемедицина соҳаларида кенг қўлланилмоқда. Электрон саломатлик карталари (EHR) беморлар ҳақидаги маълумотларни электрон шаклда сақлаш ва қайта ишлаш орқали диагностика ва даволаш жараёнини тезлаштиради, шу билан врачларга ҳар бир беморнинг ҳолатига тезкор ва аниқ ёндошиш имконини беради. Сунъий интеллект ва машина ўрганиши технологиялари тиббий маълумотларни таҳлил қилишда қўлланилади, бу эса диагноз қўйишни аниқлаштиради ва индивидуал даволаш режасини тузишда ёрдам беради. Роботлаштирилган операциялар ва лаборатория автоматизацияси жараёнларнинг аниқлиги ва самарадорлигини оширади, инсоний хатоларни камайтиради ва тиббий ходимлар учун оғир ишларини енгиллаштиради. Телемедицина ва мобил технологиялар орқали беморлар узоқ масофада ҳам консультация олиши ва даволаниш жараёнини кузатиши мумкин, бу айниқса чекка ҳудудларда аҳоли учун жуда қулай. Шу билан бирга, автоматлаштирилган даволашни назорат қилиш тизимлари дориларни бериш, беморларни кузатиш ва даволаш натижаларини таҳлил қилиш орқали тиббий хизматнинг самарадорлигини оширади. Барча ушбу технологиялар тиббий хизматни сифатли, хавфсиз ва самарали қилишга хизмат қилади, аммо уларни жорий этишда техник, молиявий ва этик жиҳатлар ҳам ҳисобга

олиниши лозим. Тиббий жараёнларни автоматлаштириш соҳа ривожига катта ҳисса қўшиб, келажакда соғлиқни сақлаш тизимини янада самарали ва инновацион қилиш имконини беради.

Натижа

Тиббий жараёнларни автоматлаштиришнинг янги ечимлари таҳлили шуни кўрсатадики, электрон саломатлик карталари, сунъий интеллект, робототехника ва телемедицина каби технологиялар нафақат тиббий хизматни самарали қилади, балки беморларга сифатли ва хавфсиз даволаниш имконини ҳам беради. Автоматизация жараёнларни тезлаштириш, хатоларни камайтириш ва маълумотларни аниқ таҳлил қилишда муҳим аҳамиятга эга эканлигини кўрсатади. Шу билан бирга, бу ечимлар тиббий ходимлар учун оғир ва такрорий вазифаларни енгиллаштириб, уларнинг диққатини муҳим клиник қарорларга қаратилган ҳолда ишлашини таъминлайди. Ўтказилган тадқиқотлар ва амалий тажрибалар шуни кўрсатадики, автоматлаштирилган тизимлар нафақат диагностика ва даволаш самарадорлигини оширади, балки соғлиқни сақлаш тизимида инновацион ёндашувлар учун асос яратади. Бироқ, технологияларни жорий этишда техник қўллаб-қувватлаш, молиявий харажатлар ва этик меъёрлар каби жиҳатлар ҳам эътиборда бўлиши керак. Умуман олганда, тиббий жараёнларни автоматлаштириш соҳа ривожига сезиларли таъсир кўрсатади ва келгуси даврда соғлиқни сақлаш тизимини янада самарали, хавфсиз ва замонавий қилишда асосий йўналишлардан бири бўлиб хизмат қилади.

Хулоса

Тиббий жараёнларни автоматлаштириш янги технологияларнинг қўлланилиши орқали соғлиқни сақлаш тизимини самарали ва инновацион қилади. Электрон саломатлик карталари маълумотларни тез ва хавфсиз қайта ишлаш имконини беради, сунъий интеллект эса индивидуал даволаш ва диагностика жараёнларини такомиллаштиради. Робототехника ва лаборатория автоматизацияси операция ва текширувларнинг аниқлигини оширса, телемедицина беморларга масофадан ҳам сифатли хизматдан фойдаланиш имконини тақдим этади. Шу билан бирга, автоматизация тиббий ходимлар учун такрорий вазифаларни енгиллаштириб, уларни стратегик ва клиник қарорлар қабул қилишга йўналтиради. Технологияларни жорий этишда молиявий харажатлар, техник қўллаб-қувватлаш ва этик меъёрлар алоҳида эътиборни талаб қилади. Умуман олганда, янги ечимлар соғлиқни сақлашда сифат, самарадорлик ва хавфсизликни оширишда асосий восита бўлиб хизмат қилади ва келажакда соҳа ривожига катта ҳисса қўшади.

Тиббий жараёнларни автоматлаштиришнинг янги ечимлари ва уларнинг келгусидаги фойдали томонлари

1. Сунъий интеллект ва машинани ўрганиш усуллари клиник маълумотларни тез ва аниқ таҳлил қилиш имконини беради, шу билан касалларнинг сифатли диагностика олишини таъминлайди.

2. Роботлаштирилган жараёнлар шифокорларнинг одатий ва такрорланувчи вазифаларини автоматлаштириб, уларнинг эътиборини мураккаб ва стратегик вазифаларга қаратиш имкониятини яратади.

3. Персонализирланган даволаш моделлари беморларга индивидуал терапевтик режалар таклиф қилиши орқали муолажа самарадорлигини оширади.

4. IoT ва киберфизик тизимлар тиббий ускуналарни реал вақтда кузатиш ва профилактик хизмат кўрсатишни соддалаштиради.

5. Маълумотлар омборлари ва блокчейн технологиялари тиббий маълумотларни хавфсиз ва шаффоф сақлашни таъминлайди, бу эса беморлар ва соҳа мутахассислари учун ишончлиликни оширади.

6. Автоматлаштирилган жараёнлар клиник тадқиқотларда инсон хатосини камайтиради ва натижаларни стандартлаштиришга ёрдам беради.

7. Самарадорликнинг ошиши тиббий ресурсларни тежаш, сармояларни мақсадли тақсимлаш ва соҳага инновацияларни тез жорий қилиш имконини беради.

8. Прогнозлаштирувчи моделлар касалликларни олдиндан аниқлаш ва тарқалишини назорат қилиш орқали жамоат саломатлигини яхшилайди.

9. Янги ечимлар тиббий мутахассисларнинг билим ва кўникмаларини рақамли воситалар орқали бойитишга ва касбий ривожланишини таъминлашга ёрдам беради.

Хулоса қилиб айтганда, тиббий жараёнларни автоматлаштириш – бу соғлиқни сақлаш тизимини самарали ва инновацион қилиш йўли ҳисобланади. Янги технологиялар, jumladan EHR, AI, робототехника ва телемедицина интеграцияси беморлар ва тиббий ходимлар учун катта имкониятлар очади. Тадқиқотлар ва олимлар фикрлари шуни кўрсатадики, автоматизация нафақат самарадорликни оширади, балки тиббиётда сифат ва хавфсизликни ҳам таъминлайди. Тиббий жараёнларни автоматлаштиришнинг янги ечимлари келгусида клиник самарадорликни ошириш, беморларга сифатли хизмат кўрсатиш ва соҳа инновациялари орқали умумий саломатликни яхшилашда муҳим аҳамиятга эга бўлади.

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Аманбаева З. А.
доцент
кафедра географии и основ экономических знаний
Национальный педагогический университет Узбекистана
Каракулов Н. М.
старший преподаватель
кафедра географии и основ экономических знаний
Национальный педагогический университет Узбекистана
Сафаралиева К., *магистр*
кафедра географии и основ экономических знаний
Национальный педагогический университет Узбекистана

АНАЛИЗ ТУРИСТИЧЕСКИХ ВОЗМОЖНОСТЕЙ ГОРОДА ТАШКЕНТА

Аннотация: *В данной статье проведён анализ туристического потенциала города Ташкента, его инфраструктурных возможностей и направлений развития туризма. Рассмотрены исторические и культурные достопримечательности столицы, современные гостиничные комплексы, транспортная система, гастрономические и торгово-развлекательные объекты, влияющие на рост туристического потока. Особое внимание уделено преимуществам и проблемам внутреннего и въездного туризма, а также перспективам дальнейшего развития туристической сферы. Результаты исследования могут быть использованы для совершенствования туристической инфраструктуры и повышения привлекательности Ташкента на международном уровне. Выполняются ряд методов и сравнения для развития туризма. В статье рассматриваются основные направления и особенности развития туризма в Узбекистане. Республика обладает широкими возможностями для продвижения внутреннего и международного туризма, что подтверждается богатым культурным и историческим наследием, разнообразными природно-климатическими условиями, самобытной национальной кухней и гостеприимством узбекского народа, которое традиционно привлекает туристов со всего мира. Основной целью данного исследования является анализ современного состояния и перспектив дальнейшего развития туристической сферы, а также определение роли туризма в социально-экономическом росте страны.*

Ключевые слова: *туризм, Ташкент, туристическая инфраструктура, развитие, потенциал, турпоток, Узбекистан*

Amanbayeva Z. A.
associate professor
department of geography and fundamentals of economic knowledge
National pedagogical university of Uzbekistan
Karakulov N. M.
senior lecturer
department of geography and fundamentals of economic knowledge
National pedagogical university of Uzbekistan
Safaraliyeva K.
master's student
department of geography and fundamentals of economic knowledge
National pedagogical university of Uzbekistan

ANALYSIS OF THE TOURISM POTENTIAL OF THE CITY OF TASHKENT

Abstract: *This article analyzes the tourism potential of Tashkent, its infrastructure capabilities, and tourism development trends. It examines the capital's historical and cultural attractions, modern hotel complexes, transportation system, and gastronomic, shopping, and entertainment venues, all of which contribute to the growth of tourist flow. Particular attention is paid to the advantages and challenges of domestic and inbound tourism, as well as prospects for further development of the tourism sector. The research results can be used to improve tourism infrastructure and enhance Tashkent's international appeal. A number of methods and comparisons are used for tourism development. The article examines the main trends and characteristics of tourism development in Uzbekistan. The country has ample opportunities for promoting domestic and international tourism, as evidenced by its rich cultural and historical heritage, diverse natural and climatic conditions, distinctive national cuisine, and the hospitality of the Uzbek people, which traditionally attracts tourists from all over the world. The main objective of this study is to analyze the current state and prospects for further development of the tourism sector, as well as to determine the role of tourism in the country's socioeconomic growth.*

Keywords: *tourism, Tashkent, tourism infrastructure, development, potential, tourist flow, Uzbekistan*

Введение

В последние годы туризм в Узбекистане стал одной из приоритетных отраслей экономики. Город Ташкент, как крупнейший политический, экономический и культурный центр страны, играет ведущую роль в формировании туристического имиджа государства. Актуальность исследования обусловлена необходимостью анализа туристического потенциала столицы в условиях постпандемийного восстановления и активного внедрения инноваций в сферу услуг. Ранее проводившиеся

исследования рассматривали Ташкент преимущественно как административный центр, однако современная ситуация требует переоценки его возможностей как международного туристического направления.

Методы

Исследование базируется на анализе статистических данных Комитета по туризму Узбекистана, официальных отчётов о туристическом потоке за 2018–2025 гг., а также данных сайтов kun.uz, daryo.uz и kursiv.media. Применялись методы сравнительного анализа, систематизации и экспертной оценки. Также учитывались данные наблюдения и контент-анализ информационных источников о развитии инфраструктуры, гостиничных услуг и культурных объектов.

В последние годы в Узбекистане наряду с традиционными формами туризма активно развиваются и укрепляются новые направления, среди которых экотуризм, агротуризм, геотуризм, медицинский и гастрономический туризм. В стране ведётся всесторонняя работа по обновлению туристической сферы, совершенствованию законодательной базы и созданию необходимых условий для её устойчивого роста. Особое внимание уделяется повышению уровня обслуживания и приведению качества туристических услуг в соответствие с мировыми требованиями. Государственная политика в области туризма ориентирована на раскрытие регионального потенциала, развитие современной инфраструктуры и расширение занятости населения, что делает туризм одной из ключевых сфер социально-экономического развития Узбекистана. На сегодняшний день туризм считается одной из наиболее значимых и быстро развивающихся отраслей мировой экономики. В связи с этим Узбекистан уделяет особое внимание обновлению и совершенствованию туристической сферы, укреплению её правовой основы и обеспечению устойчивого роста отрасли. Большое значение придаётся приведению качества туристических услуг в соответствие с международными стандартами. За годы независимости в стране были реализованы масштабные программы, направленные на развитие туризма, сохранение историко-культурного наследия, возрождение национальных традиций и обычаев, а также благоустройство и модернизацию туристических объектов и достопримечательностей.

Ташкент - крупнейший политический, экономический и культурный центр Узбекистана, обладающий значительным туристическим потенциалом. Город сочетает в себе богатое историческое наследие и современные достижения урбанистики, что делает его привлекательным направлением для путешественников как изнутри страны, так и из-за рубежа. Благодаря удачному географическому положению и развитой транспортной системе Ташкент выступает главным транзитным узлом для туристов, прибывающих в Узбекистан. К основным туристическим достопримечательностям столицы относятся ансамбль Хаст-Имам с усыпальницей Кафаль Шоши, рынок Чорсу, площадь Амира Темура, площадь Независимости, а также многочисленные

музеи, театры, галереи и парки отдыха. Наряду с этим активно развиваются современные туристические зоны - парк “Tashkent City”, пешеходные улицы, торгово-развлекательные центры и канатная дорога, создающие условия для комфортного пребывания гостей города. Большое внимание уделяется развитию гостиничного бизнеса, ресторанной индустрии и сервисных услуг. В Ташкенте функционируют десятки отелей международного уровня, хостелов и гостевых домов, соответствующих мировым стандартам. Развивается система онлайн-бронирования, экскурсионное сопровождение и мобильные приложения для туристов. Кроме того, в последние годы ведётся активная работа по благоустройству городской среды, повышению уровня безопасности и экологичности, созданию новых туристических маршрутов и пешеходных зон. Всё это способствует росту туристического потока и укреплению имиджа Ташкента как современного и гостеприимного мегаполиса Центральной Азии. Среднегодовой темп роста иностранных посетителей в 2016 году за последние пять лет составил 8%. В 2017 году этот показатель на 32,7% больше, чем в 2016 году. За одиннадцать месяцев 2018 года количество иностранных туристов превысило показатели за аналогичный период 2017 года почти в 2 раза.

В 2018 году туризм в городе Ташкенте начал активно развиваться в рамках государственной программы по поддержке туристической отрасли, принятой в Узбекистане. Этот год стал одним из ключевых этапов в модернизации инфраструктуры и улучшении качества обслуживания в сфере туризма. В Ташкенте наблюдался рост количества иностранных туристов, чему способствовали либерализация визового режима, введение электронных виз и упрощение порядка регистрации для иностранных граждан. Большое внимание уделялось развитию гостиничного сектора: в столице открывались новые современные отели, хостелы и частные гостевые дома, ориентированные на различные категории путешественников. Активно реконструировались исторические и культурные объекты - ансамбль Хаст-Имам, площадь Амира Темура, старинные мечети и медресе, что способствовало повышению привлекательности города для туристов. Кроме того, в 2018 году были реализованы проекты по благоустройству общественных пространств и улучшению транспортной инфраструктуры. Особое значение имело развитие международного аэропорта «Ташкент», модернизация метрополитена и организация новых экскурсионных маршрутов. В результате проведённых мероприятий Ташкент укрепил позиции одного из ведущих туристических центров Центральной Азии. Увеличение туристического потока, рост инвестиций в туристическую сферу и расширение спектра предлагаемых услуг стали важными показателями положительной динамики развития туризма в столице в 2018 году.

В 2019 году развитие туристической отрасли в Ташкенте продолжилось ускоренными темпами. Благодаря активной государственной политике в сфере туризма и реализации комплекса мер по продвижению национального туристического бренда, столица стала одним из самых

посещаемых городов региона. В этот период наблюдался рост числа иностранных гостей, в том числе из России, Южной Кореи, Китая и стран Европы. Существенное влияние оказало внедрение безвизового режима для граждан ряда государств и развитие цифровых сервисов в сфере туризма - онлайн-бронирования, электронных гидов и информационных порталов о достопримечательностях города. Важным направлением стало совершенствование туристической инфраструктуры: проводилась реконструкция парков, улиц и исторических районов, открывались новые гостиницы, рестораны и туристические агентства. Повышался уровень подготовки персонала в сфере обслуживания, создавались новые туристические маршруты по культурным и историческим местам Ташкента.
Однако в 2020 году развитие туризма столкнулось с серьёзными трудностями, вызванными пандемией COVID-19. В этот период были ограничены международные перелёты, временно приостановлена деятельность гостиниц, ресторанов и туристических агентств. Поток иностранных туристов значительно снизился. Тем не менее, благодаря поддержке государства и развитию внутреннего туризма, Ташкент сумел частично компенсировать спад за счёт привлечения местных путешественников. Акцент был сделан на безопасные формы отдыха, цифровизацию туристических услуг и онлайн-продвижение достопримечательностей столицы. Несмотря на глобальные вызовы, Ташкент в 2019-2020 годах сохранил статус важного центра культурного и познавательного туризма Узбекистана. Опыт этого периода стал основой для дальнейшего восстановления и устойчивого развития отрасли в последующие годы. Период 2021-2023 годов стал этапом постепенного восстановления туристической отрасли Ташкента после последствий пандемии COVID-19. Государство предприняло комплекс мер, направленных на оживление внутреннего и въездного туризма, а также на адаптацию инфраструктуры к новым санитарным и цифровым стандартам. Одним из ключевых направлений стало развитие внутреннего туризма, популяризация культурно-познавательных маршрутов и создание благоприятных условий для безопасного отдыха граждан. В 2021 году в Ташкенте началось поэтапное восстановление работы гостиниц, ресторанов, туристических агентств и экскурсионных бюро. Были внедрены современные системы онлайн-бронирования, цифровые туристические карты и сервисы дистанционного обслуживания. Наряду с этим, особое внимание уделялось повышению квалификации работников туристической сферы и продвижению туристического имиджа столицы через социальные сети и международные платформы.

В 2022 году наблюдался заметный рост количества туристов по сравнению с предыдущим годом. В этот период реализовывались проекты по благоустройству общественных пространств, строительству новых отелей и модернизации транспортной системы. Активно развивались такие направления, как экотуризм, гастрономический и событийный туризм. В

столице проводились международные выставки, фестивали и культурные мероприятия, что способствовало повышению интереса к городу.

В 2023 году Ташкент окончательно укрепил позиции ведущего туристического центра Узбекистана. Продолжилось развитие туристических зон - “Tashkent City”, парка “Янгиҳаёт”, набережной канала Анхор, а также старого города с его историко-культурными памятниками. Расширение гостиничной сети и совершенствование туристической инфраструктуры позволили повысить качество обслуживания и увеличить туристический поток. В целом, в 2021–2023 годах Ташкент продемонстрировал устойчивую тенденцию роста туристической активности, а также подтвердил свой статус динамично развивающегося мегаполиса, способного сочетать культурное наследие и современный уровень комфорта. В 2024 году туристическая отрасль Узбекистана оказалась на этапе устойчивого роста: число въездных иностранных туристов достигло примерно 8,2 млн человек, что выше показателя 2023 года. В столице Ташкенте, как крупнейшем городе страны, этот рост подразумевает усиление значимости города как туристического центра: увеличивается спрос на гостиничные услуги, экскурсионные маршруты, транспортную и сервисную инфраструктуру.

В 2025 году рост продолжается быстрыми темпами: за первые пять месяцев зарегистрирован рост иностранных туристов более чем на 48 % по сравнению с аналогичным периодом предыдущего года. Также за период январь-сентябрь 2025 года число иностранных посетителей достигло порядка 8,6 млн человек, что свидетельствует о динамичном восстановлении и расширении турпотока. Среди основных направлений, влияющих на развитие туризма в Ташкенте в этот период, можно отметить следующие: усиление деятельности по упрощению визового режима и привлечению гостей из приграничных стран и регионов; расширение транспортных связей и модернизация инфраструктуры (аэропорт, городская мобильность, маршруты);развитие внутренних форм туризма (поскольку международный турпоток постепенно восстанавливается) и активизация событийного, гастрономического, культурно-познавательного туризма; повышение требований к качеству туристических услуг и адаптация города к стандартам международного туризма (гостиницы, сервис, цифровые платформы бронирования).Тем не менее, перед Ташкентом сохраняются задачи, связанные с инфраструктурной нагрузкой: необходимость увеличения гостиничного фонда, улучшения транспортных маршрутов, обеспечения достаточного сервиса в условиях роста потока туристов. Рост туризма требует также усиленного внимания к сохранению культурно-исторического наследия города и обеспечению устойчивого развития туристического сектора. В целом, 2024–2025 годы характеризуются значительным подъёмом и расширением возможностей туризма в Ташкенте. Город укрепляет свой статус как ключевого направления для туристов в Узбекистане, создавая базу для будущего роста и конкурентоспособности на мировом туристическом рынке.

В последние годы развитие туризма в городе Ташкенте рассматривается как одно из приоритетных направлений социально-экономической политики Республики Узбекистан. В этом контексте особое значение приобретает реализация крупного градостроительного проекта — района «Янги Ташкент», который оказывает многоаспектное влияние на формирование туристического потенциала столицы.

С научной точки зрения район «Янги Ташкент» выступает как элемент пространственной трансформации городской территории, направленной на снижение нагрузки на исторический центр Ташкента и создание новых точек туристического притяжения. Формирование современной инфраструктуры, включающей транспортные узлы, гостиничные комплексы, деловые и выставочные центры, способствует развитию делового, событийного и транзитного туризма.

Важным фактором является транспортная доступность района «Янги Ташкент». Проектируемые скоростные автомагистрали, расширение сети общественного транспорта и интеграция с международным аэропортом создают благоприятные условия для увеличения туристических потоков. С точки зрения туристской географии это способствует формированию новых туристских маршрутов и расширению туристского пространства города.

Существенное значение имеет и экологический аспект. Планируемое создание зелёных зон, парков, рекреационных территорий и внедрение принципов устойчивого развития повышают туристическую привлекательность района. Экологически ориентированная городская среда соответствует современным требованиям международного туризма и способствует развитию экотуризма и рекреационного туризма в пределах городской агломерации.

Кроме того, район «Янги Ташкент» рассматривается как платформа для внедрения инновационных технологий в сфере «умного города» (Smart City), что положительно влияет на качество туристских услуг. Цифровизация навигации, безопасности, сервисов размещения и обслуживания туристов повышает конкурентоспособность Ташкента на региональном и международном туристском рынке.

Таким образом, с научной точки зрения район «Янги Ташкент» играет значимую роль в развитии туризма города Ташкента, выступая катализатором инфраструктурных, пространственных и инновационных изменений. Его развитие способствует диверсификации туристских функций столицы, росту туристического потока и формированию устойчивой туристской системы.

Результаты

В 2024 году Узбекистан посетили около 8,2 млн иностранных туристов, из которых значительная часть прибыла в Ташкент. В 2025 году количество иностранных гостей увеличилось на 48 % по сравнению с предыдущим годом, что подтверждает рост привлекательности столицы как

туристического центра. Развиваются новые направления - экотуризм, гастрономический, медицинский и событийный туризм.

В Ташкенте активно модернизируются гостиницы, транспортная система, аэропорт и общественные пространства. Введены цифровые сервисы бронирования, развиваются туристические маршруты и пешеходные зоны. Однако сохраняются проблемы, связанные с неравномерной инфраструктурной обеспеченностью и нехваткой среднего ценового сегмента гостиниц.

Дискуссия

Сравнение с другими столицами Центральной Азии показывает, что Ташкент имеет значительный потенциал благодаря стабильной экономике, культурному разнообразию и удобной транспортной логистике. При этом конкуренция усиливается — например, Астана и Алматы активно продвигают бренды культурного и делового туризма. Для укрепления позиции Ташкента необходимо усилить маркетинг, развивать креативные виды туризма, повысить качество сервиса и улучшить систему статистического учёта туристов.

Вывод

Проведённый анализ показал, что туристические возможности города Ташкента в 2024–2025 гг. значительно расширились. Город становится привлекательным центром для иностранных и внутренних туристов. Для дальнейшего устойчивого роста необходимо:

1. совершенствовать инфраструктуру и цифровые сервисы;
2. развивать тематические и событийные туры;
3. внедрять международные стандарты качества обслуживания;
4. продвигать туристический бренд Ташкента на мировом уровне.

Эти меры позволят превратить столицу Узбекистана в один из ведущих туристических центров региона.

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Амонова Г. У., PhD
доцент
кафедра патологической анатомии
с курсом секционно-биопсийным
Самаркандский государственный медицинский университет

НЕЙРОГИСТОЛОГИЧЕСКОЕ РАЗВИТИЕ НЕРВОВ СЕМЕННЫХ ПУЗЫРЬКОВ У КРЫС В ПОСТНАТАЛЬНОМ ПЕРИОДЕ

Аннотация. *В данной статье с использованием нейрогистологических методов изучена гистологическая структура развития нервных волокон семенных пузырьков у крыс в постнатальном периоде. Семенные пузырьки богато снабжены нервными элементами, состоящими из миелиновых и безмиелиновых нервных сплетений и волокон. В период полового созревания нервные волокна семенных пузырьков достигают наивысшей степени развития.*

Ключевые слова: *крыса, постнатальный период, семенные пузырьки, развитие, иннервация, нейрогистологические методы.*

Amonova G. U., PhD
associate professor
department of pathological anatomy with the sectional-biopsy course
Samarkand State Medical University

NEUROHISTOLOGICAL DEVELOPMENT OF THE NERVES OF SEMINAL VESICLES IN RATS DURING THE POSTNATAL PERIOD

Abstract. *This article, using neurohistological methods, investigates the histological structure and development of nerve fibers in the seminal vesicles of rats during the postnatal period. The seminal vesicles are richly supplied with nerve elements, consisting of myelinated and unmyelinated nerve plexuses and fibers. During the period of sexual maturation, the nerve fibers of the seminal vesicles reach their highest degree of development.*

Keywords: *rat, postnatal period, seminal vesicles, development, innervation, neurohistological methods.*

Ввдение

Одной из сложных и недостаточно изученных проблем современной нейробиологии является вопрос происхождения, развития и возрастных изменений нервной системы [1,2]. Всестороннее знание связи структуры и функции предполагает изучение их в онтогенетическом плане. Изучение доступной нам литературы показало, что развитие семенных пузырьков крыс, в отличие от развития других органов, мало привлекало внимание исследователей [3,4,5]. Вопросу иннервации семенных пузырьков

исследователей уделили мало внимания материальному субстрату иннервцаии. В работах этих ученных совершенно отсутствуют или недостаточно полно представлены гистологические и цитологические данные о развитии клеточных и тканевых (особенно нервных) структур семенных пузырьков крыс в различные возрастные периоды [6,7,8]. Желая какой – то мери восполнить этот пробел, мы изучили морфологию пузырьков и его нервные элементы на протяжении постнатального развития.

Цель исследования

Изучить нейрогистологическое развитие нервов семенных пузырьков у крыс в постнатальном периоде.

Материалы и методы исследования

Материалом для исследования послужили семенные пузырьки 69 крыс, начиная от периода молочного кормления и кончая периодом выраженных старческих изменений. Для разрешения поставленных задач были использованы общие гистологические, нейрогистологические и гистохимические метод последования. Для выявления общей структуры семенных пузырьков окрашивались гематоксилин-эозином, коллагеновые и эластические волокна соединительной ткани выявляли по Ван-Гизону и по Вейгерту. Выявление нервных элементов семенных пузырьков проводилось импрегнацией по методу Бильшовского-Грос, Кампосу и Рассказовой, а ядра клеток окрашивались квасцовым кармином.

Результаты исследования

Результаты последования показали, что семенные пузырьки богато снабжены нервными элементами: нервными стволами, мякотными и безмякотными волокнами, оплетениями, ганглиями и чувствительными нервными окончаниями. Многочисленные нервные стволики распадаются на дучки различной толщины, состоящей в основном из безмякотных волокон. Эти дучки многократно ветвятся, переплетаются, образуя нервные сплетения. Местами встречаются нервные стволики, состоящие преимущественно из безмякотных волокон: Чувствительные нервные окончания представлены в виде тонких терминалой, образующихся из мякотных волокон, потерявших миелиновую оболочку. Эти рецепторные приборы встречаются нечасто и имеет большей частью вид кустиков. Довольно часто в оболочке семенных пузырьков удается выявить наличие нервных узелков, состоящих из нервных клеток. Последние нередко имеют различную форму и величину. Нервные стволы и пучки анастомозируют между собой путем обмена единичными нервными волокнами и пучками. В адвентициальном слое отдельные нервные пучки и волокна, переплетаясь между собой, образуют нервное сплетение, от которого в мышечный слой отходят нервные волокна. В мышечном слое семенных пузырьков нервные стволы имеют извитой ход, образуют большое количество нервных сплетений.

Ряд нервных стволов пересекая по своему ходу кровеносные сосуды. В месте пересечения нервные стволы и отдельне волокна становятся резко

аргерофильными, расширенными, что, вероятно, является приспособительным, функциональным явлением. Толстые нервные стволы делятся на более мелкие, которые дают начало претерминальным волокнам, нередко заканчивающимся кустиковидными терминалями. Ряд мякотных нервных волокон, терая свою миелиновую оболочку, заканчиваются дравовидными и дихотомическими терминальными ветвлениями, имеющими рецепторную природу. Нервные волокна, сопровождая кровеносные сосуды, образуют на них сосудистые нервные сплетения или заканчиваются терминалями как в стенке сосуда, так и в окружающей ткани семенного пузырька. Анализ нашего материала показал, что у крыс в период молочного кормления (I-21 день) интрамуральный нервный аппарат сформирован еще не полностью; так, из 8-20 дифференцирующихся нервных клеток зрелые составляют лишь 2-3 клетки. В возрасте 22-120 дней (период неполовозрелый) происходит дальнейшее усложнение нервных элементов; так, число зрелых нервных клеток достигает 5-8. В этот период значительно увеличивается число волокон в составе нервных стволов, увеличивается плотность нервных сплетений.

Вывод

В половозрелый, репродуктивный период нервные элементы семенных пузырьков крыс достигают наибольшего развития. Нервные стволы состоят из наибольшего количества нервных волокон, нервные сплетения достигают наибольшей плотности, основная масса нервных клеток являются дифференцированними - мультиполярными нейронами. В этот период (5-23 месяца) семенные пузырьки достигают наибольшего развития и имеют самый развитый нервный аппарат. В период выраженных старческих изменений (I9-40 месяцев) отмечаются выраженные реактивные структурные изменения нервных элементов

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Арслонова Р. Р.
ассистент
кафедра фармакологии
Самаркандский государственный медицинский университет

СПЕЦИФИЧЕСКИЕ СВОЙСТВА АНТИБАКТЕРИАЛЬНОГО ДЕЙСТВИЯ ЯБЛОЧНОГО УКСУСА

Аннотация: *в настоящее время наблюдается устойчивый рост спроса на яблочный уксус, что обусловливает актуальность изучения его фармакологических свойств, влияния на различные заболевания, а также возможностей применения в медицинской практике. Яблочный уксус представляет собой прозрачную жидкость с характерным резким запахом и кислым вкусом, обладающую выраженными антибактериальными и лечебными свойствами. Биологически активные компоненты, входящие в его состав, оказывают благоприятное воздействие на организм, способствуя улучшению процессов пищеварения, снижению артериального давления, нормализации температуры тела при наружном применении, уменьшению массы тела, повышению функциональной активности иммунной системы и защите организма от действия свободных радикалов. По данным научных источников, яблочный уксус широко применяется в медицинской практике при хроническом гастрите и энтероколите, хроническом холецистите, полиартрите, тонзиллите, стоматите и других воспалительных заболеваниях, что обусловлено его антибактериальными и противовоспалительными свойствами. В настоящей статье представлены современные сведения о способах получения яблочного уксуса, особенностях его антибактериального действия и возможностях применения в медицине.*

Ключевые слова: *яблочный уксус, антибактериальное действие, воспалительные процессы, антиоксидантные свойства, лечебный эффект.*

Arslonova R. R.
assistant
department of pharmacology
Samarkand State Medical University

SPECIFIC PROPERTIES OF THE ANTIBACTERIAL ACTION OF APPLE CIDER VINEGAR

Abstract: *Currently, there is a steady increase in the demand for apple cider vinegar, which highlights the relevance of studying its pharmacological properties, effects on various diseases, and potential applications in medical practice. Apple cider vinegar is a clear liquid with a characteristic sharp smell and sour taste, possessing strong antibacterial and therapeutic properties. The biologically active components in it have beneficial effects on the body,*

contributing to improved digestion, reduction of blood pressure, normalization of body temperature when applied externally, reduction of body weight, enhancement of immune system functionality, and protection against the effects of free radicals.

According to scientific sources, apple cider vinegar is widely used in medical practice for chronic gastritis and enterocolitis, chronic cholecystitis, polyarthritis, tonsillitis, stomatitis, and other inflammatory diseases, due to its antibacterial and anti-inflammatory properties. This article presents current information on methods of obtaining apple cider vinegar, its antibacterial action, and its potential applications in medicine.

Keywords: *apple cider vinegar, antibacterial action, inflammatory processes, antioxidant properties, therapeutic effect.*

Введение

Яблочный уксус характеризуется выраженным запахом и кислым, слегка горьковатым вкусом и на протяжении длительного времени используется в лечебных целях благодаря своим антибактериальным и антисептическим свойствам. В течение многих лет он рассматривается как природный антиоксидант, способствующий детоксикации организма. Результаты экспериментальных и клинических исследований свидетельствуют о том, что яблочный уксус способствует защите организма от свободных радикалов, укреплению сосудистой стенки и профилактике атеросклеротических изменений за счет снижения уровня холестерина.

Компоненты яблочного уксуса оказывают благоприятное воздействие на организм и в терапевтических дозах могут применяться при заболеваниях желудочно-кишечного тракта без существенного влияния на кислотность желудочного сока. В научных публикациях отмечено, что яблочный уксус способствует нормализации обмена веществ, улучшает секреторную функцию желудочных желез, повышает иммунологическую реактивность организма и снижает выраженность воспалительных процессов. Терапевтический эффект во многом обусловлен активацией обмена жиров, углеводов и белков в желудочно-кишечном тракте, а также снижением уровня токсических веществ в организме.

Анализ литературных данных

В 1981 году в Бухаресте была опубликована монография американского врача С. Джарвиса «Мёд и другие натуральные продукты», в которой подробно описано применение яблочного уксуса в народной медицине США. Согласно данным автора, яблочный уксус широко используется при лечении хронического гастрита и энтероколита, хронического холецистита, ожирения, артериальной гипертензии, подагры, полиартрита, тонзиллита и стоматита. Кроме того, описано его применение при лечении гнойных ран, варикозной болезни, кожного зуда различной этиологии, микозов кожи, волос и ногтей. Механизм терапевтического действия яблочного уксуса автор связывает с изменением щелочной реакции

организма (pH 8,0–11,0) в кислую сторону (pH около 4,0). Также приведена методика приготовления яблочного уксуса в домашних условиях.

Цель исследования

Изучение специфических особенностей антибактериального действия яблочного уксуса и обоснование целесообразности его практического применения.

Материалы и методы

В зависимости от способа получения и используемого сырья различают следующие виды уксуса:

1. Уксусная кислота (CH_3COOH) — бесцветная жидкость с резким запахом, получаемая путем уксуснокислого брожения спиртосодержащих жидкостей или окисления ацетальдегида. Широко применяется в пищевой, химической и фармацевтической промышленности.

2. Уксусная эссенция — 70% водный раствор пищевой уксусной кислоты, используемый после предварительного разведения водой.

3. Яблочный уксус — 3–15% водный раствор пищевой уксусной кислоты, применяемый при приготовлении салатов, маринадов, консервов, а также добавляемый в готовые блюда.

4. Фруктово-ягодный уксус — продукт, получаемый путем ферментации соков различных фруктов и ягод.

Заключение

Таким образом, представленные данные подтверждают, что яблочный уксус обладает выраженными антибактериальными и противовоспалительными свойствами и может быть использован в комплексной терапии воспалительных заболеваний, включая хронический гастрит и энтероколит, хронический холецистит, артрит, полиартрит, тонзиллит и стоматит.

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Ботиров А. Р.
старший преподаватель
кафедра анестезиологии-реаниматологии и неотложной помощи
Андижанский государственный медицинский институт

ОСОБЕННОСТИ КИШЕЧНЫХ ТОКСИКОЗОВ У ДЕТЕЙ РАННЕГО ВОЗРАСТА

Аннотация: *По данным Всемирной Организации Здравоохранения (ВОЗ) в сотрудничестве с ЮНИСЕФ была разработана стратегия. Данная стратегия сочетает улучшенное введение болезней детского возраста с аспектами питания, иммунизации и некоторыми другими важными факторами, оказывающими влияние на здоровье ребенка, включая здоровье матери.[6,7] Диарея (кишечные токсикозы) тяжелые нарушения питания до настоящего времени обуславливают высокий процент летальности у детей до 5 лет. Проведенный в 1996 году анализ глобального бремени заболеваний указывают на то, что перечисленные заболевания будут продолжать оставаться основными причинами детской смертности до 2020 года, если для борьбы с ними не будут предприняты гораздо более значительные усилия. [3,7]*

Botirov A.R.
senior lecturer
department of anesthesiology-resuscitation and emergency care
Andijan State medical institute

FEATURES OF INTESTINAL TOXICOSIS IN YOUNG CHILDREN

Abstract: *As shows experience, in the standard techniques of diagnostics and treatment of intestinal toxicoses at children (at their application' in conditions of a hot climate) entering some specifications concerning first of all features rehydration of therapy, and also of some the organizational moments is necessary. The last are especially important, as the combination of a hot climate and desease intestinal infections with some social factors (high birth rate, high densities of children in age structure of the population, residing of 2/3 children at a countryside) demand concrete recommendations both for practical doctors, and for organizers of pediatric service.*

Цель исследования

Как показывает опыт, в общепринятые методики' диагностики и лечения кишечных токсикозов у детей (при применении их в условиях жаркого климата) необходимо внесение некоторых уточнений, касающихся в первую очередь особенностей регидратационной терапии, а также ряда организационных моментов. Последние особенно важны, так как сочетание

жаркого климата и заболеваемости кишечными инфекциями с некоторыми социальными факторами (высокая рождаемость, высокий удельный вес детей в возрастной структуре населения, проживание 2/3 детей в сельской местности) требуют конкретных рекомендаций как для практических врачей, так и для организаторов педиатрической службы.

Материалы и методы исследования

Наблюдения позволяют считать вододефицитную дегидратацию более распространенной, а в условиях жаркого климата - преобладающей. Для быстрой дифференциации типа дегидратации при поступлении ребенка в стационар нами используется таблица основных симптомов (табл. 1), в которой на первом месте стоят температура тела и жажда. Таблица удобна и проста для запоминания (все параметры при вододефицитном типе повышены, а при соледефицитном - понижены).

Таблица 1.
Типы дегидратаци

Симптомы,	**Вододефицитный**	**Изотонический**	**Соледифицитн**
Температура тела Жажда Состояние центральной нервной системы Содержание натрия в плазме	Значительно повышена Резко выражена Возбуждение Повышено	Нормальная, субфебрильная Умеренная Некоторая вялость Нормальное	Тенденция к Гдшотермии Отказ от воды Адинамия Понижено

Для дифференциации степени дегидратации и одновременного расчета объёма жидкости, необходимой для дегидратационной терапии, мы предлагаем таблицу, составленную по типу известной схемы Dennis (расчёты у новорожденных основаны на несколько измененных данных В.М. Балагина и соавт.). Все дети с обезвоживанием нуждаются дополнительной жидкости. Если есть у ребенка диарея: как долго? Если есть кровь в стуле. Для этого нужно осмотреть и ощутить:

1. общее состояние ребенка (летаргичен или без сознания), безпокоин или болезненно раздражён;

2. ищите естьли у ребенка запавшие глаза;

3. предложите ребенку жидкость - ребенок пьет плохо, пьет жадностью. Идет процесс тяжелого обезвоживание.

В основу лечения входит употребление дополнительной жидкости (столько, сколько ребенок выпьет). Если ребенок вскармливается исключительно грудью дайте ему ОРС 5 мл/кг/час, в течении 3-4-х часов и наблюдать.Если не находится на грудном вскармливании: раствор ОРС, жидкости на основе пищевых продуктов (такие как суп, рисовый отвару кефир, биолакт, катык).

В дополнение к обычному количеству жидкости:

До 2-х лет - 50 - 100 мл после каждого жидкого стула;

2 года и старше - 100 - 200 мл после каждого жидкого стула.

Продолжать давать дополнительно жидкости до полного прекращения диареи [4,7]. Для дифференциации степени дегидратации в таблице использован только основной - потеря массы (в %) и как вспомогательный симптом диурез [1,3] (табл. 2).

Таблица 2.

Определение степени дегидратации и расчет общей потребности в жидкости для регидратационной терапии при кишечных токсикозах у детей в 1-е сутки заболевания

Степень Дегидра-	Потеря массы тела, %	Диурез	От 7 дней до 1 мес	1-3 мес	4-6 мес	7-12 мес	1-3 мес
I	До 5 (уноворож денного До 10)	Сохранён	190-220	170-180	150-160	130-140	100-13С
II	5-10 (у но ворожден ного до 15)	Олигурия	220-270	190-210	175-185	150-170	130-17
III	Более 10(у новорож денного до 20)	Олигурия вплоть до анурии	270-350	220-250	200-210	170-190	160-171

Исходя из этого, нами введено правило, согласно которому участковый медицинский работник, направляя ребенка с кишечным токсикозом в стационар, обязательно указывает результат последнего взвешивания ребенка в поликлинике (до болезни) и его дату. Благодаря этому исключаются ошибки в определении степени потери массы тела, связанные с тем или иным отклонением в нарастании весовой кривой у ребенка до болезни. После определения степени дегидратации по табл.2 производится расчёт объёма жидкости, необходимого в 1 -е сутки лечения. При повышении температуры тела или температуры окружающего воздуха (что особенно важно в условиях Средней Азии) добавляется определенной объём жидкости. Если на догоспитальном этапе детям уже проводилась регидратационная терапия, то в результате этого через несколько часов симптомы дефицита воды и гипертонии плазмы (при вододефицитном варианте) могут значительно уменьшится, что даёт основание при госпитализации ребенка расценивать дегидратацию как изотоническую.

Вывод

Удельный вес вододефицитного обезвоживания в общей структуре кишечных токсикозов у детей раннего возраста в условиях жаркого климата колеблЬтся от 65 до 75% и этот тип является преобладающий.

Для достижения качественных новых результатов необходим более интегрированный подход к ведению больных детей. Программы по охране здоровье детей должны учитывать не только контроль заболевания но и

состояния в целом, и благосостояние детей.

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Бякова Н. В.
магистрант
Уральский государственный экономический университет
Научный руководитель: Власова Н. Ю., доктор экон. наук, профессор
кафедра государственного и муниципального управления
Уральский государственный экономический университет
Россия, Екатеринбург

ПРОБЛЕМЫ ВЗАИМОДЕЙСТВИЯ ВЛАСТИ И БИЗНЕСА В МУНИЦИПАЛЬНЫХ ОБРАЗОВАНИЯХ

Аннотация: *в данной статье описываются результаты исследования основных проблем взаимодействия власти и бизнеса в небольших муниципальных образованиях. Автор использует анкетный опрос представителей крупных промышленных предприятий и малого и среднего бизнеса. Делается вывод о том, что взаимодействие власти и бизнеса в муниципальном образовании имеют свою специфику и свои проблемы, которые требуют решения.*

Ключевые слова: *взаимодействие, проекты социальной ответственности, власть, бизнес.*

Byakova N. V.
master's student
Ural State University of Economics
Scientific advisor:Vlasova N. Yu., doctor of economics, professor
department of state and municipal administration
Ural State University of Economics
Russia, Yekaterinburg

PROBLEMS OF INTERACTION BETWEEN GOVERNMENT AND BUSINESS IN MUNICIPALITIES

Abstract: *This article describes the results of a study of the main problems of interaction between government and business in small municipalities. The author uses a questionnaire survey of representatives of large industrial enterprises and small and medium-sized businesses. It is concluded that the interaction between the government and business in a municipal education has its own specifics and problems that require solutions.*

Keywords: *interaction, social responsibility projects, government, business.*

Вопрос реализации проектов социальной ответственности в рамках взаимодействия власти и бизнеса является достаточно актуальным. Социально ответственное поведение местной власти, бизнеса, общественных организаций рассматривается как решающий фактор устойчивого развития субъекта РФ, повышения качества жизни населения [2].

На определенном этапе государство передало часть своих экономических полномочий бизнесу, что не принесло ожидаемого эффекта. Кроме того, 90-е годы XX века ознаменовались массовой передачей ведомственных объектов социальной сферы (детские сады, дома культуры, учреждения спорта) муниципалитетам, которые взамен так и не получили полноценного участия в решении социальных проблем. Некоторые представители бизнеса до сих пор уверены, что их основной вклад в развитие субъекта состоит в предоставлении рабочих мест и уплате налогов.

Если рассматривать данную проблему на уровне взаимодействия государственной власти и крупных корпораций, то мы можем увидеть, что частный бизнес и государство активно вступают в сотрудничество при реализации проектов социальной ответственности, происходит поиск наиболее эффективных путей решения социальных задач общества при реализации целевых программ, национальных проектов.

В то же время на уровне муниципальных образований таких изменений практически не происходит. Частный бизнес неохотно включается в социально-экономическую жизнь муниципалитета, не всегда осознает важность своего участия, а в некоторых случаях и местные власти не способны планировать долгосрочные проекты с привлечением бизнеса.

В своей монографии Е.Д. Копытова приходит к выводу о том, что социальная ответственность является одной из форм взаимодействия власти и бизнес-структур, направленной на эффективное решение задач развития территорий [1]. Поэтому особенно важным является выявление трудностей, которые могут препятствовать эффективному сотрудничеству власти и хозяйствующих субъектов для решения вопроса развития территории и улучшения качества жизни населения.

В данной статье представлены результаты исследования взаимодействия власти и бизнеса в муниципальном образовании – города Шадринск и сделаны выводы о существующих в этой сфере проблемах.

Муниципальное образование – город Шадринск является городом областного подчинения в Курганской области, вторым по размеру после областного центра. Население города составляет 67 067 чел.

В Шадринске городе функционирует 10 крупных и средних предприятий, среднесписочная численность сотрудников которых составляет 16772 человек. Виды деятельности предприятий охватывают пищевую промышленность, машиностроение, производство сварочного оборудования, строительных и металлических конструкции, порчей неметаллической минеральной продукции, производство бумаги и картона. По состоянию на 1 января 2025 года в городе Шадринске осуществляют деятельность 1986

субъектов малого и среднего предпринимательства и 2874 самозанятых граждан. В сфере малого и среднего бизнеса занято 8752 человека, что составляет 26,5% от численности занятых в экономике города Шадринска.

Финансовое положение города Шадринска как муниципального образования за пятилетний период оставалось стабильно, объем доходов увеличился на 67,8%. В основном рост обеспечен за счет увеличения на 92,7% поступлений из вышестоящих бюджетов. Такая ситуация объясняется и тем, что Курганская область традиционно является дотационным регионом и за 2024 год находится на 15 месте по сумме дотаций, выделенных на выравнивание бюджетной обеспеченности. Доля собственных доходов снизилась с 29,3% до 19,8% в общем объеме доходов бюджета. Такое состояние говорит о том, что муниципальные власти не смогут самостоятельно реализовывать программы социальной ответственности без привлечения ресурсов бизнеса. Однако это взаимодействие должно быть результативным.

Для того, чтобы выявить проблемы взаимодействия власти и бизнеса при реализации проектов социальной ответственности нами было проведено анкетирование представителей бизнес-сообщества. В нем приняли участие 7 представителей промышленных предприятий и 15 представителей малого и среднего бизнеса. Анкета создана на основе анкеты опроса руководителя по оценке состояния, определению перспектив и направлений развития социальной ответственности бизнеса Е.Д, Копытовой [1].

Для начала мы попросили представителей бизнес-сообщества оценить эффективность взаимодействия с региональной и муниципальной властью.

Ни один их участвующих вопросе представителей бизнеса не оценил на 10 баллов уровень взаимодействия с органами власти в решении социально-экономических проблем территории. 42,8% опрошенных представителей промышленных предприятий оценили взаимодействие с региональной властью на 7 баллов, по 14,3% оценили на 4 - 6 балла, так же 14,3% - на 8 баллов. Взаимодействию с муниципальной властью в среднем оценили на 4,9 б. При этом 42,8% оценили на 5; 28,6% - на 6 баллов и по 14,3% на 3 и 4 балла. Следует отметить, что выше 6 баллов оценок не было.

Оценки взаимодействия с региональными властями представителей малого бизнеса распределились следующим образом: 4 балла – 20% опрошенных; 5 баллов – 26,7%; 6 баллов – 20%; 7 баллов – 20%; 8 баллов – 13,%. Так же, как и промышленники, несколько ниже оценивают взаимодействие с муниципальными властями. Средний балл – 4,9. Оценки распределились следующим образом: 3 балла – 6,7%; 4 балла – 20%; 5 баллов - 26,7%; 6 баллов – 26,7; 7 баллов – 13,3%; 8 баллов – 6,7%.

Для совершенствования взаимоотношений представители бизнес-сообщества предлагают проводить на регулярной основе обсуждение задач и проблем развития; оказывать финансовую помощь приоритетным сферам экономики региона; организовывать работающие совещательные органы, состоящие из представителей власти и бизнеса; формировать прозрачную

систему отчетности и обратной связи при привлечении благотворительных средств на нужны муниципалитета.

При ответе на вопрос «Что вы понимаете под социальной ответственностью бизнеса?» участники анкетирования могли выбрать несколько вариантов ответа. Следует отметить, что здесь мнение представителей промышленных предприятий и малого бизнеса в большинстве своем совпадают. Исключение составляют природоохранные мероприятия. Возможно, это связано с тем, что ряд представителей малого бизнеса занимаются предоставлением услуг населению и для них этот вопрос не столь важен.

Кроме этого, далеко не все представители бизнеса считают необходимым активно участвовать в развитии территории. Подавляющее большинство опрошенных основной функцией бизнеса считают выплату достойной заработной платы, социальную защиту своих работников и выполнение деловых обязательств.

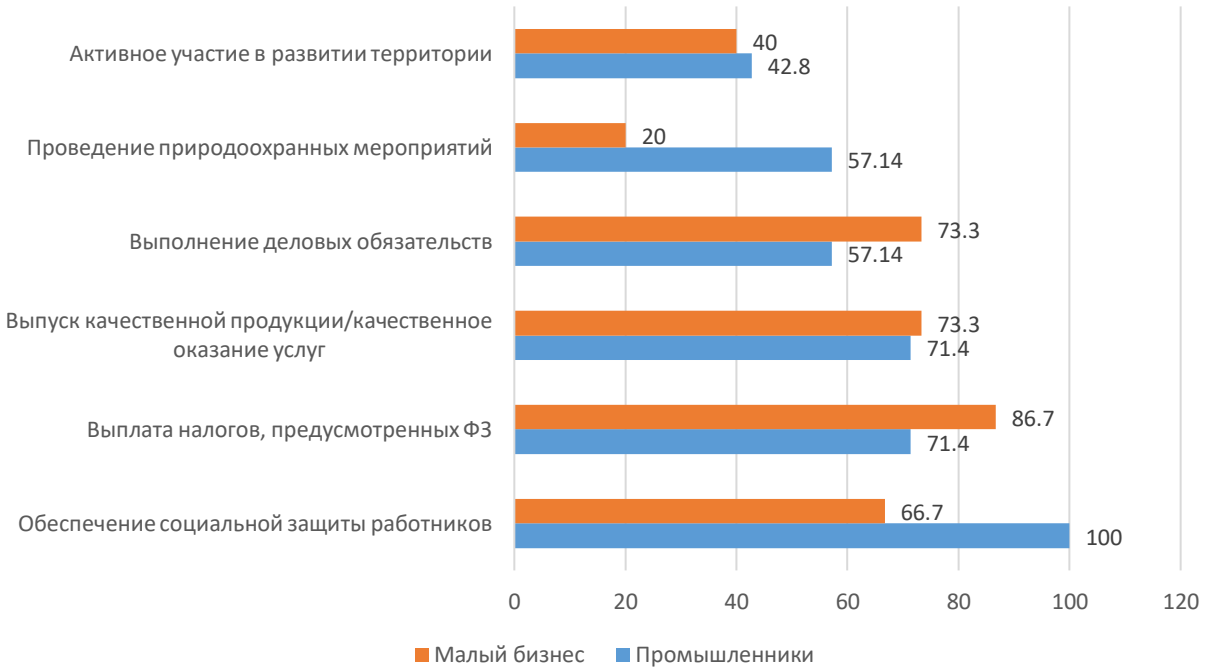


Рисунок 10 - Распределение ответов на вопрос «Что вы понимаете под социальной ответственностью бизнеса?», % от числа ответивших

Мы выявили, что 42,8% представителей промышленных предприятий считают, что участие власти и бизнеса в реализации социальных программ должно строиться на взаимовыгодных условиях, при этом часть из них понимает важность участия и признают, что органы местного самоуправления в случае острой необходимости вправе применить меры принуждения. Малый бизнес склонен к тому, что его участие в социальных программах – дело добровольное. Комментируя свои ответы, предприниматели указывают на нестабильность рынка и как следствие

финансового благосостояния, существующие риски и чрезмерные требования муниципалитета. Часть из них (13,3%) считают, что участие в программах должно строиться исходя из актуального финансового состояния и не считают возможным принимать на себя долгосрочные обязательства.

Ответы, полученные в ответ на вопрос о частоте участия проектах социальной ответственности, совпадают с данными, описанными в параграфе 2.2.: ряд промышленных предприятий на регулярной основе оказывают благотворительную помощь, поддерживают проекты, направленные на детей, культурные и спортивные мероприятия. Что касается малого бизнеса, то большинство его представителей участвуют в проектах социальной ответственности эпизодически. Исключение составляет поддержка социально-незащищенных слоев населения (семьи, находящиеся в ТЖС; общество инвалидов, дети-инвалиды, матери-одиночки и т.п.). Подробная информация представлена в таблице.

Таблица 13.

Частота участия в проектах социальной ответственности, % от числа ответивших

Направление	Частота реализации							
	Регулярно		Эпизоди-чески		Крайне редко		Не участвует	
	П	М	П	М	П	М	П	М
Поддержка социально незащищенных слоев населения	57,14	80	42,86	13,3	0	6,7	0	0
Поддержка проектов, направленных на детей	57,14	26,7	42,86	66,7	0	6,7	0	0
Поддержка объектов культурно-исторического значения	28,57	0	0	0	71,4	20	0	80
Спонсирование спортивных, культурных мероприятий	42,86	26,7	57,14	53,3	0	20	0	0
Участие в благотворительности	71,43	33,3	28,57	66,7	0	0	0	0
Поддержка и развитие объектов социальной сферы	28,57	13,3	42,86	53,3	28,6	33	0	0

Примечание: *П – промышленные предприятия; М – малый бизнес.*

В качестве мотивов участия в проектах социальной ответственности участники опроса называют обязательства перед обществом; следования традициям предприятия (мы уже писали о том, что некоторые предприятия поддерживают образовательные учреждения как продолжение шефских традиций); предпочтения руководства компании. Некоторые представители бизнес-сообщества отвечали «Мы живем в этом городе, здесь живут наши дети и никто, кроме нас не сделает его лучше». Это не только своеобразное

понимание ответственности перед обществом, но и осознание важности своего вклада в развитие муниципалитета, чувство сопричастности к судьбе малой Родины. При этом большинство опрошенных считают, что особых преимуществ для себя они не получают.

Среди причин, сдерживающих участие в проектах социальной ответственности, руководители хозяйствующих субъектов города Шадринска называют: отсутствие финансовой возможности для регулярного участия; отсутствие стимулирования (слабое стимулирование) со стороны органов власти; неразвитость муниципальной нормативно-правовой баз; предприятия не осознают преимуществ от взаимодействия с муниципальной властью; слабая информированность о возможности участия в муниципальных проектах социальной ответственности.

На открытый вопрос «Какие проблемы взаимодействия с властью вы видите?», ответы были такие:

- несформированность коммуникации с бизнесом;
- низкая вовлеченность администрации в коммуникационный процесс;
- исключение представителей бизнеса из процессов планирования социально-экономического развития города;
- неготовность власти к совместной реализации инициатив бизнеса;
- недостаточные полномочия муниципалитета, необходимые для поддержки бизнеса;
- недостаточный уровень профессионализма отдельных представителей власти.

Одной из важных проблем представители бизнес-сообщества видят исключении их из процессов планирования социально-экономического развития города (более 70% ответов). Как отмечают опрошенные, в большинстве случаев к ним обращаются, когда необходимо финансирование уже запланированных проектов. Иногда органы власти не дают обратной связи об использовании денежных средств, переданных в рамках благотворительности, что снижает уровень доверия к ним.

Исследование проблем взаимодействия власти и бизнеса при реализации проектов социальной ответственности в муниципальном образовании город Шадринск позволяет отметить следующее.

Во-первых, присутствуют определенные формы взаимодействия. Промышленные предприятия и малый бизнес участвуют в благотворительности, организации и проведении спортивных и культурных мероприятий; поддерживают проекты, связанные с детьми. Однако инструменты взаимодействия не получили необходимого развития.

Во-вторых, основные препятствия к такому взаимодействию связаны с недостаточно сформированной коммуникацией муниципальной власти с представителями бизнес-сообщества и низкой вовлеченностью администрации в коммуникационный процесс. Отсюда вытекают и другие сложности – неготовность власти к реализации инициатив бизнеса,

исключение их из процесса планирования социально-экономического развития города.

В-третьих, основными мотивами участия бизнеса в реализации проектов социальной ответственности являются осознание обязательств перед обществом, следование корпоративным традициям. При этом малый бизнес зачастую вовлекается при давлении со стороны органов власти. Но есть и те, хозяйствующие субъекты, которые чувствуют сопричастность к судьбе малой Родины и ответственность за ее развитие.

В-четвертых, в условиях ограниченных полномочий муниципалитета акцент в работе с бизнесом следует сдвинуть на те зоны, которые находятся в компетенции органов исполнительной власти.

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Вазиров Ш. С., кандидат ветеринарных наук,
доцент
кафедра микробиологии и эпизотологии
Таджикский аграрный университет имени Ш.Шотемура
Базаров М. А., доктор ветеринарных наук
профессор
кафедра животноводства и ветеринарной медицины
Андижанский институт сельского хозяйства и агротехнологий

ПОЛУЧЕНИЕ ГИПЕРИММУННЫХ СЫВОРОТОК НА ОВЦАХ ПРОТИВ РОТАВИРУСНОЙ ИНФЕКЦИИ КРУПНОГО РОГАТОГО СКОТА

Аннотация: *В статье представлены научно обоснованные данные о получения гипериммунных сывороток на овцах против ротавирусной инфекции крупного рогатого скота (КРС). Рассмотрены биологические основы формирования гипериммунного состояния, принципы подбора животных-продуцентов, методы подготовки антигена, схемы иммунизации, способы получения и очистки сыворотки, а также направления её практического применения. Показано, что гипериммунные сыворотки являются эффективным средством экстренной профилактики и терапии неонатальных диарей у телят, обеспечивая пассивную иммунную защиту.*

Ключевые слова: *ротавирус КРС, гипериммунная сыворотка, овцы, пассивный иммунитет, антитела, неонатальная диарея, ветеринарная биотехнология.*

Vazirov Sh. S., candidate of veterinary sciences,
associate professor
department of microbiology and epizotology
Tajik Agrarian University named after Sh. Shotemur
Bazarov M. A., doctor of veterinary sciences
professor
department of animal husbandry and veterinary medicine
Andijan Institute of Agriculture and Agricultural Technologies

PRODUCTION OF HYPERIMMUNE SERA IN SHEEP AGAINST BOVINE ROTAVIRUS INFECTION

Abstract: *The article presents scientifically substantiated data on the production of hyperimmune sera in sheep against bovine rotavirus infection. The biological basis of hyperimmune state formation, principles of selecting donor animals, methods of antigen preparation, immunization schemes, techniques for serum collection and purification, as well as directions for its practical*

application are discussed. It is shown that hyperimmune sera are an effective means of emergency prophylaxis and therapy of neonatal diarrhea in calves, providing passive immune protection.

Keywords: *bovine rotavirus, hyperimmune serum, sheep, passive immunity, antibodies, neonatal diarrhea, veterinary biotechnology.*

Введение

Ротавирусная инфекция является одной из ведущих причин желудочно-кишечных заболеваний у новорождённых телят. По данным ветеринарных наблюдений, доля ротавирусов в структуре неонатальных диарей достигает 40–60 %, что обусловливает значительные экономические потери в животноводстве. Заболевание характеризуется острым течением, выраженной дегидратацией, метаболическим ацидозом и высокой летальностью.

Несмотря на широкое применение вакцин, их эффективность ограничена возрастными особенностями иммунной системы телят, а также необходимостью формирования активного иммунитета в течение определённого времени. В этих условиях особое значение приобретает пассивная иммунизация с использованием гипериммунных сывороток, содержащих готовые специфические антитела.

Материалы и методы

Подбор животных-продуцентов

В качестве продуцентов использовались клинически здоровые овцы в возрасте 1,5–3 лет с нормальными гематологическими и биохимическими показателями. Перед началом эксперимента животные проходили карантин и дегельминтизацию.

Подготовка антигена

Антиген получали из штамма ротавируса КРС, выделенного от телят с клиническими признаками диареи. Вирус культивировали на перевиваемых клеточных линиях (МА-104), инактивировали формалином и очищали методом ультрацентрифугирования. Для усиления иммунного ответа применяли адъювант на основе гидроксида алюминия.

Схема иммунизации

Иммунизация проводилась по многоэтапной схеме: первичное введение антигена, затем 3–4 бустерные инъекции с интервалом 14 дней. Контроль уровня антител осуществляли методом ИФА и реакции нейтрализации вируса.

Получение и очистка сыворотки

После достижения гипериммунного состояния осуществляли забор крови из яремной вены. Сыворотку отделяли центрифугированием, очищали методом фракционного осаждения сульфатом аммония и стандартизировали по титру антител.

Результаты и обсуждение

Многократная антигенная стимуляция овец приводила к значительному увеличению титра специфических антител к ротавирусу КРС. Максимальные значения достигались после 3–4-й ревакцинации.

Таблица 1

Динамика титра антител у овец в процессе иммунизации

Этап иммунизации	Срок, сутки	Средний титр антител (ИФА)	Уровень нейтрализации вируса, %
До иммунизации	0	1:20	5–7
После 1-й дозы	14	1:160	25–30
После 2-й дозы	28	1:640	45–50
После 3-й дозы	42	1:2560	70–75
После 4-й дозы	56	1:5120	85–90

Данные, представленные в таблице 1, отражают закономерную динамику формирования гуморального иммунного ответа у овец в процессе поэтапной иммунизации ротавирусным антигеном КРС. До начала иммунизации (0-е сутки) уровень специфических антител находился на фоновом уровне (1:20), а вируснейтрализующая активность не превышала 5–7 %, что свидетельствует об отсутствии специфического иммунитета к данному возбудителю.

После первичного введения антигена (14-е сутки) наблюдалось восьмикратное увеличение среднего титра антител (до 1:160), сопровождающееся ростом нейтрализующей активности до 25–30 %. Это указывает на формирование первичного иммунного ответа, связанного с активацией наивных В-лимфоцитов и началом синтеза специфических иммуноглобулинов.

После второй иммунизации (28-е сутки) титр антител увеличился до 1:640, а уровень нейтрализации вируса достиг 45–50 %. Данный этап характеризуется переходом от первичного к вторичному иммунному ответу, сопровождающемуся усилением пролиферации плазматических клеток и формированием иммунологической памяти.

На 42-е сутки (после третьей ревакцинации) зарегистрировано резкое повышение титра антител до 1:2560, а вируснейтрализующая активность достигла 70–75 %. Эти показатели свидетельствуют о формировании выраженного гипериммунного состояния, при котором в сыворотке крови накапливается высококонцентрированный пул высокоаффинных антител.

Максимальные значения были зафиксированы после четвёртого введения антигена (56-е сутки): средний титр составил 1:5120, а нейтрализующая активность — 85–90 %. Это указывает на достижение оптимального уровня гипериммунизации, обеспечивающего высокую биологическую активность получаемой сыворотки.

Таким образом, полученные результаты подтверждают, что многократная антигенная стимуляция овец по предложенной схеме приводит к формированию устойчивого и высокоэффективного гуморального иммунного ответа, что делает возможным получение гипериммунных сывороток с выраженной вируснейтрализующей активностью против ротавируса КРС.

Практическое значение

Применение гипериммунных сывороток позволяет:

-снизить смертность телят;

-уменьшить тяжесть клинических проявлений;

-сократить продолжительность болезни;

-повысить сохранность поголовья.

Заключение

Получение гипериммунных сывороток на овцах против ротавирусной инфекции КРС является перспективным направлением ветеринарной биотехнологии. Метод обеспечивает формирование высокоспецифичных антител, обладающих выраженной нейтрализующей активностью. Использование таких сывороток в практике животноводства способствует снижению заболеваемости и экономических потерь.

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Вафокулова М. В.
студент
Сулаймонова Н. Ж.
студент
Хайдаров Д.
студент
Тохирова Ф. О., PhD
доцент
кафедра информационных технологий
Самаркандский государственный медицинский университет

МЕДИЦИНСКАЯ ИНФОРМАТИКА И МАШИННОЕ ОБУЧЕНИЕ: ТРАНСФОРМАЦИЯ СИСТЕМЫ ЗДРАВООХРАНЕНИЯ В XXI ВЕКЕ

Аннотация: *Статья посвящена анализу влияния медицинской информатики и технологий машинного обучения на систему здравоохранения в начале XXI века. Рассматриваются ключевые направления внедрения цифровых инструментов: электронные медицинские записи, телемедицина, носимые устройства, клиническая аналитика и алгоритмическая стратификация риска. Приведены результаты авторского исследования, включающие оценку внедрения элементов интеллектуальной обработки данных в клинической практике многопрофильного стационара. Выявлены преимущества, ограничения и технологические вызовы интеграции интеллектуальных систем в современную медицинскую инфраструктуру. Сделаны выводы о стратегических направлениях развития цифрового здравоохранения и роли врача в новой модели принятия решений.*

Ключевые слова: *медицинская информатика, машинное обучение, электронные медицинские записи, телемедицина, цифровизация здравоохранения, искусственный интеллект, прогнозирование заболеваний, анализ данных*

Vafoqulova M. V.
student
Sulaimonova N. Zh.
student
Khaidarov D.
student
Tokhirova F. O., PhD,
associate professor
department of information technology
Samarkand State Medical University

MEDICAL INFORMATICS AND MACHINE LEARNING: TRANSFORMING HEALTHCARE IN THE 21ST CENTURY

Abstract: *This article analyzes medical informatics and machine learning technologies in the healthcare system of the early 21st century. Key areas of digital tools are considered: electronic medical records, telemedicine, wearable devices, clinical analytics, and algorithmic risk stratification. The results of the author's study, which incorporates elements of intelligent data processing into the clinical practice of a multidisciplinary hospital, are presented. The advantages, limitations, and technological challenges of global intelligent systems in modern infrastructure are identified. Conclusions are drawn regarding strategies for the development of international healthcare and the role of physicians in new decision-making models.*

Keywords: *Medical informatics, machine learning, electronic medical records, telemedicine, digitalization of healthcare, artificial intelligence, disease prediction, data analysis*

Введение

Здравоохранение вступило в XXI век с комплексным вызовом: растущая нагрузка на медицинские учреждения, старение населения, распространение хронических заболеваний и дефицит кадров требуют принципиально новых подходов к организации медицинской помощи. На первый план выходит медицинская информатика — область, объединяющая клиническую практику, научные данные и вычислительные технологии. Прорыв машинного обучения — особенно глубоких нейронных сетей — позволил перейти от документирования данных к их интеллектуальному анализу.

Если традиционное здравоохранение строилось вокруг бумажных записей и опыта врача, то современная медицина опирается на высоко структурированные и обработанные массивы информации: электронные истории болезни, архивы диагностических изображений, данные лабораторных профилей, результаты геномных тестов. Машинное обучение стало мостом между накоплением данных и принятием решений, позволяя формировать прогностические модели, выявлять скрытые закономерности и создавать персонализированные маршруты для пациентов. Эта трансформация меняет не только качество диагностики и лечения, но и саму философию медицинской помощи — от лечения болезни к предупреждению её развития.

Методы исследования

Исследование включает комбинированный подход, объединяющий теоретическую и практическую части.

1. Анализ научных данных

Проведён обзор 70 публикаций из международных баз (PubMed, Scopus, IEEE Xplore), посвящённых внедрению искусственного интеллекта в диагностику, мониторинг и организацию медицинской помощи. Особенное внимание уделялось клиническим моделям машинного обучения, критериям

качества, проблеме алгоритмической интерпретируемости и влиянию цифровизации на работу медучреждений.

2. Оценка внедрения цифровой инфраструктуры

Сравнивались элементы внедрения электронной медицинской документации, телемедицины и систем поддержки принятия решений в странах с различным уровнем цифровой зрелости.

3. Анализ клинических данных

Проведён авторский анализ 92 анонимизированных историй болезни из многопрофильного стационара. Использовалась модель автоматизированной стратификации риска осложнений у госпитализированных пациентов на основе лабораторных и демографических показателей.

Параметры оценки включали:

- диагностические задержки;
- чувствительность и специфичность алгоритмов;
- частоту повторных госпитализаций;
- влияние цифровых систем на нагрузку на врачей.

Результаты исследования

Исследование подтвердило, что внедрение медицинской информатики и алгоритмов машинного обучения способствует улучшению качества медицинской помощи и эффективности работы системы здравоохранения.

1. Электронные медицинские записи и рабочие процессы

Интеграция ЭМК с лабораторными модулями и системами оповещения сократила время постановки окончательного диагноза на 9–11 часов, снизила количество дублирующих исследований на 14% и уменьшила количество ошибок документирования на 27%. Таким образом, цифровизация стала не просто средством фиксации данных, а инструментом клинического управления.

2. Машинное обучение в диагностике и прогнозировании

В анализируемом госпитале внедрён алгоритм оценки риска сердечно-сосудистых осложнений.

- чувствительность модели — 87%;
- специфичность — 81%;
- снижение поздней диагностики острых состояний — на 22%.

Эффективность алгоритма превосходила экспертные шкалы приёмного покоя в среднем на 10–15%. Подобные показатели совпадают с мировыми исследованиями, где ИИ достигает точности, сопоставимой с врачами-специалистами при интерпретации КТ лёгких, ДЗМ (дерматоскопических изображений) и ЭКГ.

3. Телемедицина и мониторинг пациентов

Пример внедрения удалённого наблюдения за пациентами с хронической сердечной недостаточностью показал снижение числа повторных госпитализаций с 32% до 19% за 6 месяцев. Наибольший эффект наблюдался у пациентов с нестабильной динамикой пульса и сатурации, где

носимые устройства позволяли выявить ухудшение до появления выраженной симптоматики.

4. Технологические ограничения и вызовы

Несмотря на положительные результаты, выявлены проблемные зоны:

• в 12% случаев алгоритмы давали некорректные рекомендации из-за отсутствующих данных;

• системы лишены клинической контекстуальности и требуют постоянного обновления;

• автоматизация может приводить к гипердиагностике и «тревожному шуму»;

• существует риск зависимости врача от алгоритма.

Главный вывод: ИИ не заменяет врача и не должен применяться автономно, он эффективен только в составе клинической команды.

Заключение

Медицинская информатика и машинное обучение формируют технологический фундамент здравоохранения XXI века. Они не только повышают точность диагностики и эффективность лечения, но и меняют сами подходы к организации медицинской помощи: от бумажного обмена данными — к непрерывному клиническому анализу, от эпизодических осмотров — к персонализированному мониторингу в реальном времени.

Перспективы дальнейшего развития включают:

- масштабирование предиктивных моделей заболеваний;
- создание общенациональных платформ медицинских данных;
- развитие интероперабельности медицинских систем;
- формирование этических стандартов алгоритмической прозрачности;
- интеграцию ИИ в подготовку и переподготовку медицинских кадров.

Цифровая трансформация здравоохранения неизбежна. Врач остаётся ключевой фигурой — но теперь он работает не в одиночку, а в союзе с вычислительной инфраструктурой, основанной на данных, алгоритмах и интеллектуальных системах, способных усиливать и расширять человеческие возможности.

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Давлатова А. А., DSc
доцент
кафедра детской стоматологии
Самаркандский государственный медицинский университет

ОРТОДОНТИЯ: СОВРЕМЕННЫЕ МЕТОДЫ ИСПРАВЛЕНИЯ НЕПРАВИЛЬНОГО ПРИКУСА

Аннотация: *Неправильный прикус является одной из наиболее распространённых патологий зубочелюстной системы и представляет собой значимую медико-социальную проблему. Данная патология негативно отражается на жевательной функции, речи, эстетике лица и состоянии височно-нижнечелюстного сустава. Современная ортодонтия располагает широким спектром диагностических и лечебных методов, позволяющих эффективно корректировать различные формы зубочелюстных аномалий у пациентов разных возрастных групп. В статье рассмотрены причины формирования неправильного прикуса, современные методы ортодонтического лечения, а также проведён анализ их клинической эффективности.*

Ключевые слова*: ортодонтия, неправильный прикус, зубочелюстные аномалии, брекет-системы, элайнеры, ортодонтическое лечение.*

Davlatova A. A., DSc,
associate professor
department of pediatric dentistry
Samarkand State Medical University

ORTHODONTICS: MODERN METHODS FOR THE CORRECTION OF MALOCCLUSION

Abstract: *Malocclusion is one of the most common disorders of the dentofacial system and represents a significant medical and social problem. Improper occlusion negatively affects masticatory efficiency, speech articulation, facial aesthetics, and the functional state of the temporomandibular joint. Advances in modern orthodontics have led to the development of a wide range of diagnostic tools and treatment modalities that enable effective correction of various types of malocclusion in patients of different age groups.This study analyzes contemporary orthodontic approaches to the treatment of malocclusion, including removable and fixed appliances, as well as clear aligner therapy. Clinical effectiveness was evaluated based on functional improvement, normalization of occlusal relationships, and long-term stability of treatment outcomes. The results demonstrate that individualized treatment planning and early diagnosis significantly enhance therapeutic efficiency and reduce the risk of relapse.*

Keywords: *orthodontics, malocclusion, dentofacial anomalies, orthodontic treatment, braces, clear aligners*

Актуальность

Неправильный прикус занимает одно из ведущих мест в структуре стоматологической заболеваемости. По данным эпидемиологических исследований, различные формы зубочелюстных аномалий выявляются у 60–80 % детей и подростков и более чем у 50 % взрослого населения. При этом значительная часть пациентов не получает своевременного ортодонтического лечения, что приводит к прогрессированию функциональных и эстетических нарушений.

Нарушение окклюзии сопровождается неравномерным распределением жевательной нагрузки, повышенной стираемостью твёрдых тканей зубов, развитием заболеваний пародонта и дисфункцией височно-нижнечелюстного сустава. Кроме того, выраженные аномалии прикуса оказывают негативное влияние на психоэмоциональное состояние пациента и качество жизни в целом.

Актуальность данной работы обусловлена необходимостью систематизации современных ортодонтических подходов к коррекции неправильного прикуса и оценки их эффективности с позиций доказательной медицины.

Цель исследования

Целью исследования является анализ современных методов ортодонтического лечения неправильного прикуса и оценка их клинической эффективности в зависимости от возраста пациента и вида зубочелюстной аномалии.

Материалы и методы исследования

В основу исследования положены данные клинических наблюдений пациентов с различными формами неправильного прикуса, проходивших ортодонтическое лечение в условиях стоматологической клиники.

Материалы исследования

пациенты детского, подросткового и взрослого возраста;
клинические карты ортодонтических больных;
диагностические модели челюстей;
рентгенологические исследования (ОПТГ, ТРГ).
Методы исследования
клинический осмотр и анализ окклюзионных взаимоотношений;
антропометрический анализ диагностических моделей;
рентгенологический анализ положения зубов и челюстей;
сравнительная оценка результатов лечения.

В лечебной практике применялись съёмные и несъёмные ортодонтические аппараты, включая металлические и керамические брекет-системы, а также прозрачные элайнеры.

Результаты исследования

Результаты проведённого исследования показали, что эффективность ортодонтического лечения напрямую зависит от возраста пациента, степени выраженности аномалии и выбранного метода коррекции.

Таблица 1.

Основные виды неправильного прикуса и методы их коррекции

Вид прикуса	Клиническая характеристика	Основные методы лечения
Дистальный	Смещение нижней челюсти назад	Брекет-системы, функциональные аппараты
Мезиальный	Выдвижение нижней челюсти вперёд	Аппаратное лечение, комбинированные методы
Глубокий	Избыточное перекрытие резцов	Несъёмная ортодонтическая техника
Открытый	Отсутствие контакта между зубами	Элайнеры, брекеты, миотерапия
Перекрёстный	Ассиметрия окклюзии	Аппаратное и комплексное лечение

У пациентов детского возраста наблюдалось сокращение сроков лечения и более стабильные результаты. У взрослых пациентов эффективность лечения была высокой при условии строгого соблюдения рекомендаций врача.

Обсуждение результатов

Результаты проведённого исследования подтверждают, что эффективность ортодонтического лечения неправильного прикуса определяется совокупностью биологических, возрастных и клинико-организационных факторов. В первую очередь значимую роль играет возраст пациента, так как в период активного роста челюстно-лицевой области наблюдается высокая пластичность костной ткани и выраженная адаптационная способность зубоальвеолярного комплекса. Это согласуется с данными современных ортодонтических исследований, указывающих на более короткие сроки лечения и устойчивость полученных результатов у детей и подростков.

В то же время полученные данные свидетельствуют о том, что ортодонтическое лечение во взрослом возрасте также является эффективным, однако требует более тщательного планирования и строгого соблюдения ретенционного периода. У взрослых пациентов компенсаторные возможности тканей снижены, что обуславливает необходимость использования современных биомеханических подходов и индивидуально подобранных ортодонтических аппаратов.

Особого внимания заслуживает сравнительная оценка различных ортодонтических систем. Применение несъёмных брекет-систем показало высокую эффективность при лечении выраженных форм скученности зубов, дистального и глубокого прикуса. Данный метод обеспечивает контролируемое трёхмерное перемещение зубов и позволяет точно управлять силовыми нагрузками. Вместе с тем использование брекет-систем

требует повышенного внимания к гигиене полости рта, так как наличие элементов конструкции может способствовать накоплению зубного налёта.

Использование прозрачных элайнеров продемонстрировало хорошие результаты при лёгких и среднетяжёлых формах неправильного прикуса, особенно у взрослых пациентов, ориентированных на эстетичность лечения. Следует отметить, что эффективность элайнер-терапии напрямую зависит от комплаентности пациента, поскольку несоблюдение режима ношения может снижать клинический эффект и увеличивать сроки лечения.

Полученные результаты подчёркивают важность комплексной диагностики, включающей клиническое обследование, анализ диагностических моделей и рентгенологические методы исследования. Телерентгенографический анализ позволяет выявить не только зубоальвеолярные, но и скелетные компоненты аномалии, что является ключевым фактором при выборе тактики лечения.

Дополнительным аспектом, выявленным в ходе исследования, является значение междисциплинарного подхода. В случаях сочетанных аномалий прикуса и заболеваний пародонта, а также при наличии дисфункции височно-нижнечелюстного сустава, участие стоматологов-терапевтов, ортопедов и челюстно-лицевых хирургов позволяет повысить эффективность лечения и снизить риск осложнений.

Особое значение имеет ретенционный период, который часто недооценивается в клинической практике. Результаты наблюдений показывают, что отсутствие адекватной ретенции значительно увеличивает вероятность рецидива, особенно у пациентов с выраженными исходными аномалиями. Это подтверждает необходимость разработки индивидуальных ретенционных протоколов с учётом биологических особенностей пациента.

Таким образом, результаты исследования демонстрируют, что успешная коррекция неправильного прикуса возможна только при условии комплексного, индивидуализированного и этапного подхода к ортодонтическому лечению.

Выводы

Неправильный прикус является распространённой патологией, требующей комплексного ортодонтического подхода.

Современные ортодонтические методы обеспечивают высокую эффективность коррекции зубочелюстных аномалий.

Наиболее стабильные результаты достигаются при ранней диагностике и индивидуальном выборе лечебной тактики.

Использование современных аппаратов позволяет восстановить функцию жевательного аппарата и улучшить эстетику лица.

Использованные источники

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Давранова А. Э.
доцент
кафедра судебной медицины
Самаркандский государственный медицинский университет
Худоёров С. Н.
клинический ординатор
кафедра судебной медицины
Самаркандский государственный медицинский университет
Мейлиев Х. А.
государственный судебно-медицинский эксперт
Самаркандский филиал РНПЦСМЭ

ДЕФЕКТЫ ОКАЗАНИЯ ХИРУРГИЧЕСКОЙ ПОМОЩИ В СУДЕБНОЙ МЕДИЦИНЕ

Аннотация. *Проанализированы неблагоприятные исходы и дефекты оказания хирургической помощи на всех этапах ее оказания. Установлено, наиболее часто наблюдались дефекты хирургической помощи (57%). При этом преобладали дефекты диагностики (64,3%), в основном, в виде нераспознавания основной патологии (55,6%), а также в виде дефектов хирургического лечения (40%); которые возникали в основном из-за субъективных причин что составило (85,7%), в виде неполноценного обследования больного (75%). Установлено, что ДОМП на госпитальном этапе преобладают (92,8%) над дефектами догоспитального этапа (7,2%). В исходе большинство из них (71,4%) способствовали наступлению смерти.*

Ключевые слова: *дефекты оказания медицинской помощи, хирургия, комиссионные судебно-медицинские экспертизы.*

Davronova A. E.
associate professor
department of forensic medicine
Samarkand State medical university
Khudoyorov S. N.
clinical resident
department of forensic medicine
Samarkand State medical university
Meiliyev Kh. A.
state forensic medical expert
Samarkand branch RSCEMCME

DEFECTS IN PROVIDING SURGICAL CARE IN FORENSIC MEDICINE

Abstract. *Unfavorable outcomes and defects in the provision of surgical care at all stages of its provision were analyzed. It was established that surgical care defects were most frequently observed (57%). At the same time, diagnostic defects prevailed (64.3%), mainly in the form of failure to recognize the underlying pathology (55.6%), as well as in the form of surgical treatment defects (40%); which occurred mainly due to subjective reasons, which amounted to 85.7%), in the form of incomplete examination of the patient (75%). It was established that DMPs at the hospital stage predominate (92.8%) over defects at the pre-hospital stage (7.2%).*

Keywords: *medical care defects, surgery, commission forensic medical examinations.*

Актуальность

Профессиональная деятельность медицинских работников характеризуется высоким риском. С одной стороны, медицинские работники рискуют собственным здоровьем и жизнью, с другой – существует риск неблагоприятного исхода медицинской помощи для пациента [1].

Неблагоприятный исход медицинской помощи как наиболее частая причина обращения пациента (либо его родственников) с жалобой в правоохранительные органы может наблюдаться вследствие ятрогении, несчастных случаев в медицинской практике, врачебной ошибки и противоправных действий врача [6].

Экспертный разбор случаев по поводу ненадлежащего выполнения медицинскими работниками профессиональных обязанностей представляет довольно сложную задачу в связи с тем, что отсутствует комплексный подход к проведению различных видов экспертиз, единая общепринятая терминология в отношении наименований дефектов, существующая различная трактовка экспертами идентичных действий медицинского персонала [3].

В связи с этим требуется дальнейшее совершенствование эффективности анализа дефектов оказания медицинской помощи в конкретных группах, дифференцированных по отдельным медицинским специальностям [2,4] и нуждается в разработке вопрос определения тяжести вреда, причиненного здоровью пациента в результате ненадлежащего исполнения врачом своих профессиональных обязанностей [5].

Цель исследования

Анализ характера дефектов оказания хирургической помощи по материалам судебно-медицинских экспертиз, направленных на предупреждение возникновения осложнений и неблагоприятных исходов в хирургической практике.

Материал и методы исследования

Для достижения поставленной цели нами были проанализированы 36 комиссионных судебно-медицинских экспертиз по делам о ненадлежащем выполнении медицинским персоналом своих профессиональных

обязанностей в лечебно-профилактических учреждениях Самаркандской области за 2016 год.

По всем случаям в масштабе Самаркандского областного бюро СМЭ проводились комиссионные судебно-медицинские экспертизы с участиями высококвалифицированных (профессоры, доценты) специалистов хирургов, травматологов, урологов и окулистов. Комиссионная экспертиза проводилась в соответствиикритериям согласно правилам к приказу Минздрава РУз № 153, приложение № 8 от 01 июня 2012 года.

Результаты и их обсуждение

Проведенный анализ показал, что из 36 заключений комиссионной экспертизы в 14 (38,9%) случаях проводились в отношении медицинских работников хирургического профиля.

Распределение экспертиз по характеру дефектов оказания медицинской помощи в соответствии со специальностями оказалось следующим. Лидирующее место занимают врачи-хирурги 8 (57,1%) случаев, второе место занимают травматологи и ЛОР-врачи по 2 (14,3%) случая. Значительная часть экспертиз также проводилась по случаям неблагоприятных исходов в практике окулистов-1(7,2%) и урологов-1(7,2%).

Установлено, что наибольшее количество отмеченных экспертными комиссиями дефектов было допущено на этапе оказания помощи в стационарах-13 случаев (92,8%). Максимальное число дефектов было у хирургов (57,1%), травматологов и ЛОР (15,4%), окулистов (7,2%) и урологов (7,2%). Также в 1 случае (7,2%) дефект был допущен на дому бригадой скорой медицинской помощи. При этом дефекты диагностики выявлены в 9 случаях(64,3%) которые проявлялись в следующем: нераспознавание основной патологии-5случаев (37,5%), нераспознавание важной сопутствующей патологии и ееосложнения-2случая(14,4 %),а также нераспознанное осложнение основной патологии и поздняя диагностика по-1 случаю (7,2 %).

На этапе лечения ДОМП отмечалосьв 5 случаях(35,4%), которые выражались в дефектах хирургического лечения-2 случая (40%), а также поздняя госпитализация, ошибки при назначении и проведении медицинских процедур, неправильное применение лекарственных средств по 1случаю(7,2%).Это часто приводило к ранним и (или) поздним осложнениям различной степени тяжести, которые влияли на исход заболевания. В свою очередь это также являлось поводом для исков со стороны родственников пациента к медицинским организациям.

Сложной остается проблема о соблюдении отраслевых стандартов и нарушениях должностных инструкций, и применении на практике методических рекомендаций. Следственные и судебные органы довольно часто ставили перед экспертными комиссиями вопросы, касающиеся соблюдения врачами отраслевых стандартов, ведомственных инструкцией и применения методических рекомендаций. По материалам комиссионных экспертиз не соблюдались отраслевые стандарты и нарушались должностные

инструкции, что может считаться серьезными нарушениями медицинской деятельности.

При анализе причин возникновения выявлено, что в большинстве случаев-12 (85,7%) ДОМП допущены из-за субъективных причин, в частности, они выражаются в неполноценном обследовании больного-9 случаев (75%), недостаточной квалификации медицинского персонала-2случая (16,7%) и невнимательном отношении к больному-1 случай (8,3%).

Также отмечены объективные причины: в виде позднего обращения за медицинской помощью и в виде недостатковпри организации лечебно-диагностического процесса-по 1случаю (7,2%).

В ходе проведения комиссионных судебно-медицинских экспертиз не только устанавливались наличие и характер дефектов медицинской помощи, но и оценивалось их влияние на исход заболевания, патологического состояния или травмы.

В ходе изученных нами комиссионных судебно-медицинских экспертиз прямая причинно-следственная связь между дефектами оказания хирургической помощи и неблагоприятным исходом (смертью) имела место в 71,4% (10) наблюдений, в 3 случаях (21,4%) привели к удлинению срока лечения и в 1 случае (7,2%) наступлению инвалидности.

Степень тяжести вреда здоровью при наличии прямой причинно-следственной связи дефектов оказания медицинской помощи с неблагоприятным исходом определялась поопределенным критериям согласноправилам к приказу Минздрава РУз №153, приложение №8 от 01 июня 2012 года.

Дефектами, которые способствовали наступлению смерти и привели к длительному расстройству здоровья, чаще были следующие: запоздалая диагностика, неадекватная терапия (как по объему, так и по составу вводимых препаратов), поздняя госпитализация больных, ранний перевод больных из отделения интенсивной терапии, а также недостаточный контроль и наблюдение за больными, приведшие к несвоевременному (запоздалому) оказанию медицинской помощи. К длительному расстройству здоровья приводили дефекты оперативных вмешательств и манипуляций, в результате которых повреждались органы: почки, яичники, мочеточник.

Оценка степени тяжести вреда здоровью проводилась и по признаку стойкой утраты общей трудоспособности. Это наблюдалось, когда в качестве осложнения возникали стойкие, необратимые процессы.

Кроме того, неблагоприятный исход лечения с позиции степени тяжести вреда здоровью оценивался как тяжкий вред здоровью по признаку утраты органа (ампутация правой почки).

Таким образом, результаты исследования свидетельствуют о том, что в 38,9 % комиссионные экспертизы назначались по отношению медицинских работников хирургического профиля, из них наиболее часто по отношению хирургов 57%, при этом, по характеру преобладали дефекты диагностики 64,3% в основном в виде не распознавания основной патологии 55,6%, а

также в виде дефектов хирургического лечения 40%; которые возникали в основном из-за субъективных причин 85,7% в виде неполноценного обследования больного 75%.

ДОМП в основном допускались на госпитальном этапе 92,9% в основном ЦРБ 53,8%. В исходе большинство из них 71,4% способствовали наступлению смерти.

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Давранова А. Э.
суд тиббиёти кафедраси доценти
Самарқанд давлат тиббиёт Университети
Хасанова Д. Ю.
эксперти
Республика суд-тиббий экспертиза илмий-амалий маркази Тошкент вилояти филиали суд-гистология бўлими
Рашидов Ф. А.
клиник ординатори
суд тиббиёти кафедраси
Самарқанд давлат тиббиёт Университети
Мейлиев Х. А.
бўлими эксперти
Республика суд-тиббий экспертиза илмий-амалий маркази Самарқанд вилояти филиали суд-амбулаторя ва морфология

РСТЭИАМ ТОШКЕНТ ВИЛОЯТИ ФИЛИАЛИ СУД – ГИСТОЛОГИЯ БЎЛИМИДА 2020-2024 ЙИЛЛАР ДАВОМИДА ДИАТОМ – ПЛАНКТОН ТЕКШИРУВИ НАТИЖАЛАРИ ТАҲЛИЛИ

Аннотация. *Жаҳон соғлиқни сақлаш ташкилоти маълумотига кўра ҳар йили уч юз эллик мингдан ортиқ одам чўкишдан вафот этади. Аксарият ҳолларда чўкиш бахтсиз ҳодиса оқибати сифатида юз беради, айрим ҳолатлардагина ўз-ўзини ўлдириш чўкиш орқали амалга оширилади. Ўлимнинг ушбу тури қотилликда, айникса сузишни билмайдиган шахсларга нисбатан камдан - кам бўлсада кузатилиши мумкин. Лекин баъзан тирик одам сувга тушиши ва чўкишдан ўлим ҳолатларида ҳам ички аъзо ва тўқималарда диатом – планктон топилмаслиги мумкин. Ички аъзо ва тўқималарда диатом планктон топилмаслиги сув ҳавзасининг характерига, чўкиш рўй берган йил фаслига, сувдаги ўлим сабаби ва тезлигига, мазкур сув ҳавзасида диатом – планктонларнинг циклик ривожланиш даврига боғлиқ.*

РСТЭИАМ Тошкент вилояти филиали суд гистология бўлимида ўтказилган 2020 – 2024 йилларда ўтказилган диатом – планктон текширув далолатномалари ретроспектив таҳлил этилди. Бу жараёнда чўкишдан вафот этганларнинг ёши, жинси, чўкиш рўй берган йил фасллари, ички аъзоларда диатом – планктон аниқланиш кўрсаткичлари каби масалаларга эътибор берилди. 2020-2024 йиллар давомида 879 та диатом – планктон текшируви ўтказилган бўлиб, бу ушбу даврдаги суд – гистологик текширувларнинг 6,2% га тўғри келди.

Диатом – планктон текшируви натижаларини баҳолашда сувдаги ўлим хусусиятларини, яъни юрак ва нафас фаолиятини асфиктик жараен бошида тўхташи ёки ўлим асфиксия белгиларисиз кечишини инобатга олиш

керак, шунингдек чўкиш диатом – планктонларсиз сув хавзасида ёки диатом – планктонларнинг даврий ривожланиш жараенининг диатом минимум вақтидаги сув ҳавзасида рўй берганда сувдан топилган мурда ички аъзоларида диатом – планктон аниқланмаслиги мумкин.

Таянч сўзлар: *механик асфиксия, чўкиш, сувдан топилган мурда, диатом – планктон.*

Davranova A. E.
associate professor
department of forensic medicine
Samarkand State Medical University
Khasanova D. Y.
department expert
Republican forensic examination scientific and practical center,
Tashkent region branch forensic histology
Rashidov F. A.
clinical supervisor
department of forensic medicine
Samarkand State Medical University
Meyliev Kh. A.
department expert
Republican forensic examination scientific and practical center
of Samarkand region branch forensic ambulatory and morphology

ANALYSIS OF THE RESULTS OF DIATOME-PLANKTON EXAMINATION IN THE FORENSIC-HISTOLOGY DEPARTMENT OF THE TASHKENT REGIONAL BRANCH OF RSTEIAM FOR 2020-2024

Abstract. *According to the World Health Organization, more than three hundred and fifty thousand people die from drowning every year. In most cases, drowning occurs as a result of an accident, and only in some cases is suicide carried out through drowning. This type of death can be observed, albeit rarely, in murder, especially in relation to persons who do not know how to swim. However, sometimes even in cases where a living person falls into water and dies from drowning, diatoms - plankton - may not be found in internal organs and tissues. The absence of diatom plankton in internal organs and tissues depends on the nature of the water body, the season of the subsidence, the cause and rate of death in the water, and the cyclical development of diatom plankton in this water body.*

A retrospective analysis of the acts of the diatomaceous-plankton study conducted in 2020-2024, conducted in the forensic histology department of the Tashkent regional branch of the RSTEIAM, was conducted. In this process, attention was paid to such issues as the age, sex, seasons in which the drowning occurred, and indicators of the detection of diatoms and plankton in the internal organs of the drowning victims. During the period 2020-2024, 879 diatomaceous-

plankton studies were conducted, which amounted to 6.2% of forensic histological studies for this period.

When assessing the results of the diatom plankton study, it is necessary to take into account the features of death in the water, i.e., the cessation of cardiac and respiratory activity at the beginning of the asphyctic process or the occurrence of death without signs of asphyxia, and also, when drowning occurs in a water body without diatom plankton or in a water body during the periodic development of diatom plankton at a diatom minimum, diatom plankton may not be detected in the internal organs of the corpse found in the water.

Keywords: *mechanical asphyxia, drowning, body found in water, diatoms - plankton.*

Мавзунинг долзарблиги

Жаҳон соғлиқни сақлаш ташкилоти маълумотига кўра ҳар йили уч юз эллик мингдан ортиқ одам чўкишдан вафот этади. Ривожланган давлатларда чўкиш механик асфиксия структурасида осилишдан кейинги иккинчи ўринда туради.

Аксарият ҳолларда чўкиш бахтсиз ҳодиса оқибати сифатида юз беради, айрим ҳолатлардагина ўз-ўзини ўлдириш чўкиш орқали амалга оширилади. Ўлимнинг ушбу тури қотилликда, айникса сузишни билмайдиган шахсларга нисбатан камдан - кам бўлсада кузатилиши мумкин [1;131]. Сувдан топилган мурдаларда, айниқса чириган мурдалар ички аъзо ва тўқималарида диатом – планктон топилиши чўкишдан ўлимни тасдиқловчи ишончли белги ҳисобланади. Лекин баъзан тирик одам сувга тушиши ва чўкишдан ўлим ҳолатларида ҳам ички аъзо ва тўқималарда диатом – планктон топилмаслиги мумкин. Ички аъзо ва тўқималарда диатом планктон топилмаслиги сув ҳавзасининг характерига, чўкиш рўй берган йил фаслига, сувдаги ўлим сабаби ва тезлигига, мазкур сув ҳавзасида диатом – планктонларнинг циклик ривожланиш даврига боғлиқ [2;1].

Сувдан топилган мурдаларда нафас йўлларини сув билан беркилишидан келиб чиққан механик асфиксия - чўкиш ташхисини қўйиш кўпчилик ҳолатларда қийинчилик туғдирмайди. Чўкишни макроскопик белгилари (тери қопламларини оқимтирлиги, оғиз, бурун тешиклари атрофида, трахея, бронхларда турғун майда оқ кўпик бўлиши, ўпкаларда ўткир эмфизема, субплеврал қон қуйилишлар, Рассказов-Лукомский-Пальтауф доғлари, калла асос суяги бўшлиғида суюқлик топилиши ва бошқалар) тўғри ташхис қўйишга имкон беради. Лекин мурдани сувда узоқ муддат туриши ва чириш ўзгаришлари ўлим сабабини аниқлашда қийинчилик туғдиради. Суд – гистология бўлимида ўтказиладиган диатом – планктон текшируви натижаси чўкишнинг ишончли ва баъзида ягона белгиси ҳисобланади. Диатом – планктонлар сув ҳавзаларида кенг тарқалган 4-2000 мкмгача ўлчамга эга бўлган бир ҳужайрали микроорганизмлардир. Диатомеялар ёз ойлари ва иссиқ кунларда интенсив кўпаяди (диатом максимум даври), қиш ойлари ва совуқ кунларда сув ҳавзаларида планктонлар сони камаяди (диатом минимум даври). Диатом –

планктонларнинг кремний сақловчи қобиғи бўлиб, бу қобиқ чириш жараёни, юқори термик таъсир, кучли кислота ва ишқорлар таъсирига чидамлидир. Чин чўкиш жараёнида 200 мкмгача ўлчамга эга бўлган диатомеялар ўпка альвеолаларининг шикастланган қон томирлари орқали қонга ўтади ва қон оқими билан бутун организмга тарқалиб, паренхиматоз аъзолар ва узун найсимон суяклар илигида ушланиб қолади. [3;104]. Мурда сувга тушган ҳолатда диатом планктон мурда сувда туриши ҳисобига диатомеялар фақатгина ўпка тўқимасида топилиши мумкин. Ўпка тўқимасида диатом – планктонлар топилиши чўкишни исботламайди, балки сув оғиз ва бурун тешиклари орқали ўпкага кириб борганлиги учун мурда сувда бўлганлигини тасдиқлайди [4;219]. Чўкишнинг синкопал типида (10-15% ҳолларда учрайди) ўлим юрак ва нафас фаолиятини бир вақтда рефлектор тўхташи натижасида юз бериб, аёл ва болаларда қўрқув, совуқ сув таъсири (гидрошок) ёки юқори нафас йўлларига кириб борган оз миқдордаги сувнинг қўзғатувчи таъсирида (ларинго – фарингиал шок) юзага келади. Чўкишнинг “синкопик” вариантидан ўлимни амалиётда деярли исботлаб бўлмайди [5;219], бу ҳолатда ҳам диатомеялар мурданинг сувда туриши ҳисобига ўпкада аниқланиши мумкин. Диатом – планктон учрамайдиган чуқур қудуқлар сувида чўкишда диагностик ички аъзолар, калла асос суягидан олинган суюқлик ҳамда ўпкада ҳам диатом – плантон топилмайди.

Тадқиқот мақсади

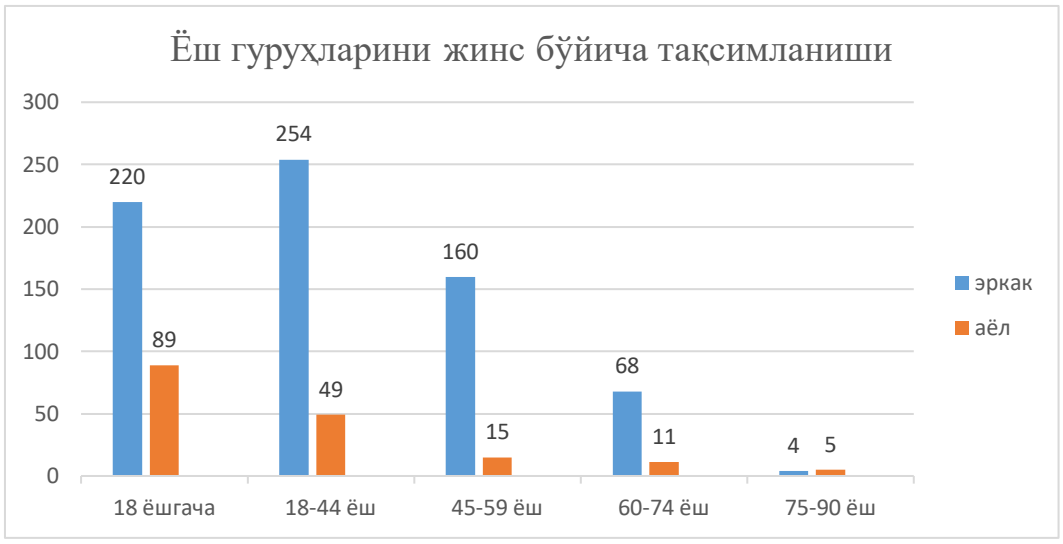
РСТЭИАМ Тошкент вилояти филиали суд – гистология бўлимида 2020-2024 йиллар давомида диатом – планктон текшируви натижаларини таҳлиллаштириш.

Тадқиқот материаллари ва методлари

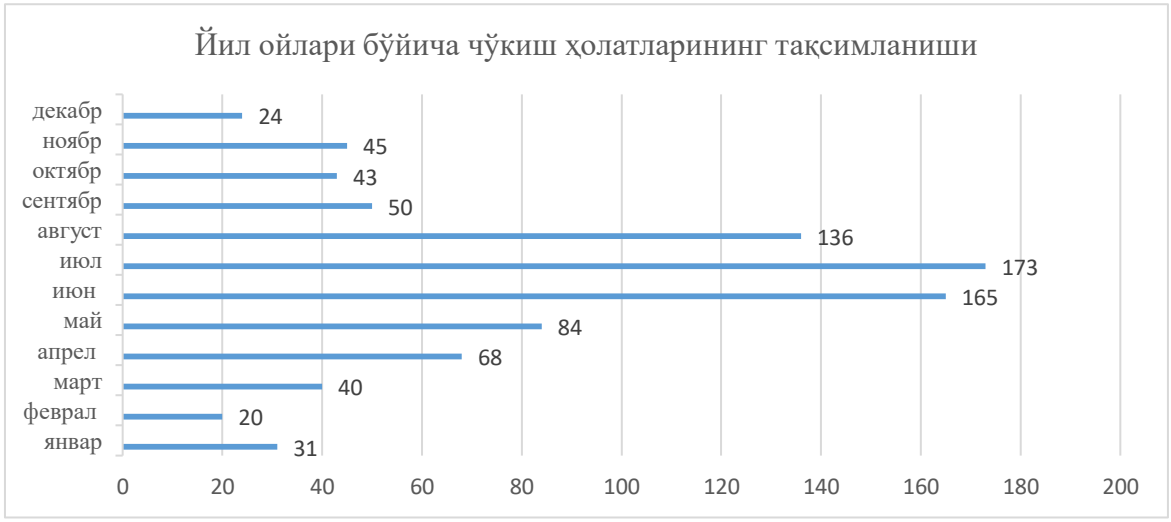
РСТЭИАМ Тошкент вилояти филиали суд гистология бўлимида ўтказилган 2020 – 2024 йилларда ўтказилган диатом – планктон текширув далолатномалари ретроспектив таҳлил этилди. Бу жараёнда чўкишдан вафот этганларнинг ёши, жинси, чўкиш рўй берган йил фасллари, ички аъзоларда диатом – планктон аниқланиш кўрсаткичлари каби масалаларга эътибор берилди.

Тадқиқот натижаси ва муҳокамаси

2020-2024 йиллар давомида 879 та диатом – планктон текшируви ўтказилган бўлиб, бу ушбу даврдаги суд – гистологик текширувларнинг 6,2% га тўғри келди. Текширилган 879 ҳолатнинг 710 таси (80,7%) эркаклар, 169 таси (19,2%) аёллар ташкил этган. Ёш тавсифига асосланиб берилган ёш интервалларида қуйидаги гуруҳларга тақсимланди: 18 ёшгача бўлганлар – 309 та (35,1%), 18-44 ёшдагилар – 303 та (34,4%), 45-59 ёшдагилар – 175 та (19,9%), 60-74 ёшдагилар – 79 та (8,9%), 75-90 ёшдагилар - 9 та (1,02%), 90 ёшдан ошганлар - 0. Ёш гуруҳлари жинси бўйича таҳлил этилиши қуйидаги диаграммада акс эттирилди:



Энг кўп чўкиш сони июл ойига – 173 та, энг кам чўкиш сони феврал ойига - 20 та тўғри келди. Йил ойлари бўйича чўкиш ҳолатларининг тақсимланиши қуйидаги диаграммада акс эттирилди:



Диатом планктон текширувига воқеа жойидан сув намуналари ва сувдан топилган мурдаларнинг ички аъзолари тақдим этилган. Диатом – планктон текширувига келтирилган объектлар “Суд – тиббий экспертиза ва текширувларни ўтказиш стандартлари”, “Амалларни бажариш йўриқномалари” асосида ўтказилган. Мурдадан келтирилган ички аъзолар А.Л. Корсаков, К.В. Якимова модификациясида деструкция ва минерализация қилиниб, минерализат кислоталардан дистилланган сув ёрдамида тозаланиб центрифугаланган, ҳар бир аъзонинг чўкмалари алоҳида – алоҳида пробиркаларга йиғилиб (концентирланиб), микроскопик усул билан текширилган. Калла асос суяк бўшлиғидан олинган суюқлик центрифуга пробиркаларга солиниб центрифугаланган ва микроскопик усул билан текширилган. Сув центрифуга пробиркаларга солиниб, центрифугаланган, чўкма алоҳида пробиркага йиғилиб микроскопик усул билан текширилган. Воқеа жойидан сув намуналари деярли барча ҳолатларда келтирилган. Назорат аъзо сифатида ўпка, диагностик аъзо сифатида асосан

буйрак ва жигар, камдан кам ҳолатда юрак, талоқ аъзолари олинган. Калла асос суяк бўшлиғидан олинган суюқлик 518 та (58,9%), узун найсимон суяклар 35 та (3,98%) ҳолатда келтирилган. 76 та (8,64%) ҳолатда воқеа жойидан сув намунасида диатом – планктон топилмаган. 345 та (39,2%) ҳолатларда ўпкада диатом – планктон топилмаган. 595 та (67,6%) ҳолатда: 168 та (19,1%) ҳолатда жигар ва буйракда, 346 та (39,3%) ҳолатда калла асос суяк бўшлиғидан олинган суюқликда, 81 та (9,1%) ҳолатда диагностик аъзолар ҳамда калла асос суяк бўшлиғидан олинган суюқликда диатом - планктонлар топилган.

Хулоса

Сувдан топилган мурдалар ички аъзоларида диатом – планктон топилмаслиги чўкишдан ўлимни истисно этмайди. Диатом – планктон текшируви натижаларини баҳолашда сувдаги ўлим хусусиятларини, яъни юрак ва нафас фаолиятини асфиктик жараен бошида тўхташи ёки ўлим асфиксия белгиларисиз кечишини инобатга олиш керак, шунингдек чўкиш диатом – планктонларсиз сув хавзасида ёки диатом – планктонларнинг даврий ривожланиш жараенининг диатом минимум вақтидаги сув ҳавзасида рўй берганда сувдан топилган мурда ички аъзоларида диатом – планктон аниқланмаслиги мумкин.

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Ережепов М. Т.
ассистент-преподаватель
кафедра общей педагогики
Нукусский государственный педагогический институт имени Ажинияза

ИННОВАЦИОННЫЕ ПОДХОДЫ К ПЛАНИРОВАНИЮ ВОСПИТАТЕЛЬНОЙ ДЕЯТЕЛЬНОСТИ В ВЫСШЕМ ОБРАЗОВАНИИ

Аннотация: *В статье научно-теоретически и практически проанализированы вопросы системной организации воспитательной работы в обеспечении личностного развития, духовно-нравственной зрелости и социальной активности студентов в высших учебных заведениях. Обоснована необходимость переориентации духовно-просветительской деятельности от традиционных подходов к инновационным методам в условиях глобализации и цифровой трансформации. В результате исследования была предложена модель месячных тематических направлений, основанная на принципах непрерывности и поэтапности воспитательного процесса.*

Ключевые слова: *воспитательная работа, духовно-просветительская деятельность, высшее образование, студенческая молодежь, системный подход, педагогическая модель.*

Erezhepov M. T.
assistant lecturer
department of general pedagogy
Nukus State Pedagogical Institute named after Ajiniyaz

INNOVATIVE APPROACHES TO PLANNING EDUCATIONAL ACTIVITIES IN HIGHER EDUCATION

Abstract: *The article analyzes from a scientific-theoretical and practical point of view the issues of systematic organization of educational work in ensuring the personal development, spiritual and moral maturity, and social activity of students in higher educational institutions. The necessity of directing spiritual and educational activities from traditional approaches to innovative methods in the context of globalization and digital transformation has been substantiated. As a result of the research, a model of monthly thematic directions based on the principles of continuity and phasing of the educational process was proposed.*

Key words: *Educational work, spiritual and educational activities, higher education, student youth, systematic approach, pedagogical model.*

В системе высшего образования важное значение имеет системная и эффективная организация воспитательной работы, направленной на обеспечение личностного развития студентов, их духовно-нравственной зрелости и социальной активности. В данном направлении в нашей стране проводится масштабная работа и определены приоритетные задачи.

В Постановлении Президента Республики Узбекистан от 3 мая 2019 года № ПП-4307 «О дополнительных мерах по повышению эффективности духовно-просветительской работы» подчёркивается, что особое внимание уделяется системной организации духовно-просветительской деятельности, повышению результативности реализуемых мер, развитию интеллектуального потенциала, сознания, мышления и мировоззрения населения, особенно молодёжи, укреплению их идеологического иммунитета, а также воспитанию гармонично развитого поколения, живущего с чувством патриотизма, любви и преданности народу. Задачи, выдвинутые в данном постановлении, служат повышению эффективности духовно-просветительной работы в стране.

В условиях процессов глобализации и цифровой трансформации проведение духовно-просветительной работы в высших учебных заведениях требует новых, современных подходов. Переход от традиционных методов к инновационным позволяет глубже воздействовать на внутренний мир студентов, развивать их социальную активность и личную ответственность.

Как подчёркивается в вышеуказанном Постановлении Президента: «Мы мобилизуем все силы и возможности государства и общества для того, чтобы наша молодёжь выросла самостоятельной, обладающей высоким интеллектуальным и духовным потенциалом, способной на мировом уровне не уступать своим сверстникам ни в одной сфере и быть счастливой».

Духовно-просветительная работа носит воспитательный характер и играет важную роль в формировании молодёжи как гармонично развитого поколения. В этом контексте заслуживают внимания взгляды великого мыслителя Абу Насра Фараби, который отмечал: «Если человек не получил хорошего воспитания и жизненного опыта, он не обращает внимания на многие вещи и даже отвергает их».

Абу Наср Фараби отметил необходимость организации воспитательной работы опытными педагогами и преподавателями. Однако особенностью нашего подхода является подготовка самих студентов к организации и управлению духовно-просветительной деятельностью, а также повышение их инициативности.

Назидательная мысль Платона – «Не ограничивайте образование и воспитание своих детей уровнем собственного образования и нравственности; готовьте их к будущему, ибо они принадлежат не вашему времени, а грядущему» – подчёркивает необходимость ориентировать воспитание не на настоящее, а на будущее. Это является нравственным принципом, призывающим к формированию личности, ориентированной на инновации, самостоятельное и свободное мышление.

По мнению Аристотеля, физическое, нравственное и интеллектуальное воспитание должно осуществляться в единстве с учётом возрастных особенностей детей.

К.Д. Ушинский считал, что задача воспитания заключается во всестороннем развитии молодёжи: воспитатели и учителя должны изучать принципы и правила воспитания и уметь применять их на практике. В его взглядах отчётливо прослеживается идея формирования совершенного человека, которая остаётся актуальной и сегодня. Поэтому духовно-просветительная работа должна рассматриваться как приоритетная задача в формировании личности, развитой духовно, физически и интеллектуально.

Исходя из принципов непрерывности и поэтапности воспитательного процесса, целесообразно организовать его по тематическим направлениям, распределённым по месяцам. Предлагаемая системная модель позволяет обеспечить последовательную, содержательную и результативную воспитательную работу в течение всего года.

В современных условиях недостаточно ограничиваться только традиционными формами воспитательной деятельности. Использование инновационных методов, интерактивных занятий, проектной деятельности и цифровых средств позволяет превратить студентов в активных участников воспитательного процесса.

Предлагаемый план организации воспитательной деятельности по месячным направлениям

1. Сентябрь – месяц нравственного воспитания; В этом месяце:

- Проведение семинаров-тренингов по культуре речи и этикету внешнего вида;
- Пропаганда таких нравственных качеств, как ответственность, уважение, честность и справедливость;
- Круглые столы: «Образ современного студента», «Гармония нравственности и ценностей».

2. Октябрь – месяц патриотического воспитания

- Экскурсии в воинские части, встречи на тему «Священный долг перед Родиной»;
- проведение интервью студентов на тему «Что я могу дать Родине?»;
- Акция «Родина – моя гордость», конкурс сочинений;
- Просветительские занятия о государственном гимне, флаге и гербе.

3. Ноябрь – месяц коллективизма и личной ответственности

- Конкурс социальных проектов среди студенческих коллективов;
- Психологические тренинги «Ответственность – ключ к успеху»;
- Кейс-стади по решению коллективных проблем;
- Семинары по самооценке и планированию.

4. Декабрь – месяц физического воспитания и здорового образа жизни

– Спортивные соревнования;

– Круглые столы со специалистами в области медицины по вопросам здорового образа жизни;

– Подготовка видеороликов на тему здорового образа жизни с участием студентов;

– Проведение спортивных недель под девизом «Здоровое тело – здоровое мышление».

5. Январь – месяц эстетического воспитания

– Активизация деятельности театральных, музыкальных и художественных кружков;

– Проведение культурно-эстетических конкурсов: по вокалу, танцу, изобразительному искусству и художественному чтению стихов;

– Организация лекций и встреч на тему «Искусство и духовность»;

– Организация экскурсий в учреждения культуры.

6. Февраль – месяц правового воспитания

– Мероприятия на тему «Верховенство закона – гарантия развития»;

– Встречи с юристами, интерактивные занятия;

– Конкурс среди студентов «Знатоки права»;

– Профилактическая работа по предупреждению преступности и правонарушений.

7. Март – месяц экологического воспитания

– Тренинги по «зелёной энергетике» и устойчивому развитию;

– Информирование об экологическом балансе и риске истощения природных ресурсов;

– Формирование экологического сознания через устное народное творчество (сказки, пословицы, изречения).;

– Организация эко экскурсии и акции «Зелёная территория».

8. Апрель – месяц трудового воспитания

– Духовно-просветительные мероприятия «Труд – мера жизни»;

– Проведение общенародных субботников с привлечением инициативных студенческих групп;

– Выставки ремёсел и профессий;

– Воспитание у студентов уважительного отношения к труду.

9. Май – месяц интеллектуального воспитания

– Олимпиады, интеллектуальные игры «Заковат»;

– Проведение конкурсов на основе художественной литературы, рекомендованной в начале учебного года;

– Неделя книги, конкурс «Лучший студент-чтец»;

– Тренинги по развитию критического и самостоятельного мышления.

10. Июнь – месяц формирования информационной культуры

– Проведение лекций по культуре пользования телефоном и интернетом;

– Акция «Один день без интернета»;

– Показ видеороликов и театральных постановок, подготовленные студентами;

– Пропаганда чтения как средство против нецелевого использования социальных сетей.

11. Июль-август — привлечение к летней волонтёрской деятельности и участию в социальных проектах

– Привлечение студентов к общественно полезному труду в период летних каникул;

– Реализация инициатив «Летняя школа», «Молодые волонтёры»;

– Проведение акций по оказанию помощи малообеспеченным и нуждающимся семьям;

– Поощрение участия студентов в региональных проектах.

Организация воспитательной работы по месячным тематическим направлениям позволяет обеспечить её системность, целенаправленность, последовательность и результативность. Данная модель охватывает нравственное, патриотическое, правовое, экологическое, эстетическое, трудовое, интеллектуальное воспитание, формирование информационной культуры и развитие волонтёрской деятельности.

Таким образом, с помощью данной системы воспитательная работа приобретает не формальный, а содержательный, целенаправленный и высокоэффективный характер.

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Ефименко О. В.
доцент
кафедры «госпитальной педиатрии»
Андижанский государственный медицинский институт
Хайдарова Л. Р.
старший преподаватель
кафедра «госпитальной педиатрии»
Андижанский государственный медицинский институт
Расулов Ш., магистр
кафедра «госпитальной педиатрии»
Андижанский государственный медицинский институт
Город Андижан, Республика Узбекистан

АНАЛИЗ КЛИНИЧЕСКИХ ПРОЯВЛЕНИЙ НЕКОМПАКТНОГО МИОКАРДА ЛЕВОГО ЖЕЛУДОЧКА У ДЕТЕЙ

Аннотация. *Истинная распространенность некомпактного миокарда ЛЖ на сегодняшний день неизвестна и варьирует в значительной степени в зависимости от выборки пациентов. Отсутствие общепринятых критериев диагностики ПТ, сложности верификации диагноза некомпактной КМП у детей, разнообразие клинических проявлений, нередко протекающих под маской других вариантов кардиомиопатий, создают необходимость изучения этой группы пациентов.*

Ключевые слова: *кардиомиопатия, некомпактный миокард, левый желудочек, сердечная недостаточность, систолический шум.*

Efimenko O. V.
associate professor
department of hospital pediatrics
Andijan State Medical Institute
Khaydarova L. R.
senior lecturer
department of hospital pediatrics
Andijan State Medical Institute
Rasulov Sh., master's degree
department of hospital pediatrics
Andijan State Medical Institute
Andijan, Republic of Uzbekistan

ANALYSIS OF CLINICAL MANIFESTATIONS OF NON-COMPACT LEFT VENTRICLE MYOCARDIAL IN CHILDREN

Abstract. *The true prevalence of left ventricular noncompaction myocardium remains unknown to date and varies significantly depending on the patient sample. The absence of universally accepted diagnostic criteria, difficulties in verifying the diagnosis of noncompaction cardiomyopathy in children, and the diversity of clinical manifestations—often presenting under the guise of other types of cardiomyopathies—create the need for further study of this group of patients.*

Keywords: *cardiomyopathy, noncompacted myocardium, left ventricle, heart failure, systolic murmur*

Актуальность

В последние годы интерес к кардиомиопатиям (КМП) неуклонно растёт и количество выявляемых случаев прогрессивно увеличивается, что обусловлено расширением диагностических возможностей как инструментальных, так и молекулярно-генетических методов исследования, при этом КМП с некомпактным миокардом (НМ) остаются одной из наиболее обсуждаемых нозологий в современной детской кардиологии, поскольку однозначные ответы на вопросы об этиопатогенезе, эпидемиологии, классификации и прогнозах заболевания в настоящее время не получены. [1,5,10]

Вопрос о границе «нормы» и «патологии» относительно НМ и повышенной трабекулярности (ПТ) остаётся открытым и широко дискутабельным, особенно принимая во внимание характерные черты строения миокарда детского возраста. Отсутствие общепринятых критериев диагностики ПТ, сложности верификации диагноза некомпактной КМП у детей, а также разнообразие клинических проявлений создают необходимость изучения этой группы пациентов. [3,6,8]

Истинная распространенность некомпактного миокарда ЛЖ на сегодняшний день неизвестна и варьирует в значительной степени в зависимости от выборки пациентов. [5,9]

Частота выявления НМ составила 0,14%. По мнению других авторов, указанные показатели существенно занижены, поскольку большинство пациентов не доживают до старшего возраста и не учитываются статистикой. При эпидемиологическом исследовании детей с КМП, частота выявления некомпактности миокарда составила 9,2 % и в структуре КМП оказалась третьей после гипертрофической и дилатационной. [2]

В большинстве случаев при некомпактной кардиомиопатии поражается

ЛЖ. Вовлечение в процесс обоих желудочков – редкое явление. Некомпактность миокарда ЛЖ может возникать изолированно или в сочетании с врожденными пороками сердца, такими как дефект межжелудочковой перегородки (ДМЖП) или стеноз пульмонального клапана, генетическими синдромами и нейромышечными заболеваниями. [4,7,10]

Возраст, в котором впервые выявляется данная патология, чрезвычайно вариабелен. В литературе описаны случаи, диагностированные и внутриутробно. [3,5]

Клинические проявления некомпактного миокарда ЛЖ разнообразны и мало специфичны. Заболевание длительное время может протекать бессимптомно. В классическую триаду осложнений некомпактного миокарда ЛЖ входят: сердечная недостаточность, аритмии, включая внезапную сердечную смерть, системные эмболии. [2]

Таким образом, несмотря на то что некомпактность миокарда ЛЖ является темой многих исследований на протяжении последних 25 лет, клинические черты, этиология, прогноз и даже определение этого заболевания до сих пор являются предметом дискуссии. Однако в связи с отсутствием специфичности клинических проявлений частым сочетанием данной патологии с другими первичными кардиомиопатиями, врожденными пороками, различными синдромами «нозологическая самостоятельность» некомпактного миокарда представляется на сегодняшний день сомнительной. Актуальность проблемы легло в основу наших исследований.

Цель исследования

Представить результаты анализа клинических проявлений некомпактного миокарда левого желудочка у детей.

Материалы и методы

Исследование проведено на базе отделений кардиологии и функциональной диагностики Областного детского многопрофильного медицинского центра города Андижана. В исследование были включены 20 детей в возрастном диапазоне 8-16 лет с установленным диагнозом некомпактной кардиомиопатии (НКМП).

Диагноз НКМП устанавливался при наличии клинических признаков сердечной недостаточности и кардиомегалии, а также при снижении сократительной функции миокарда.

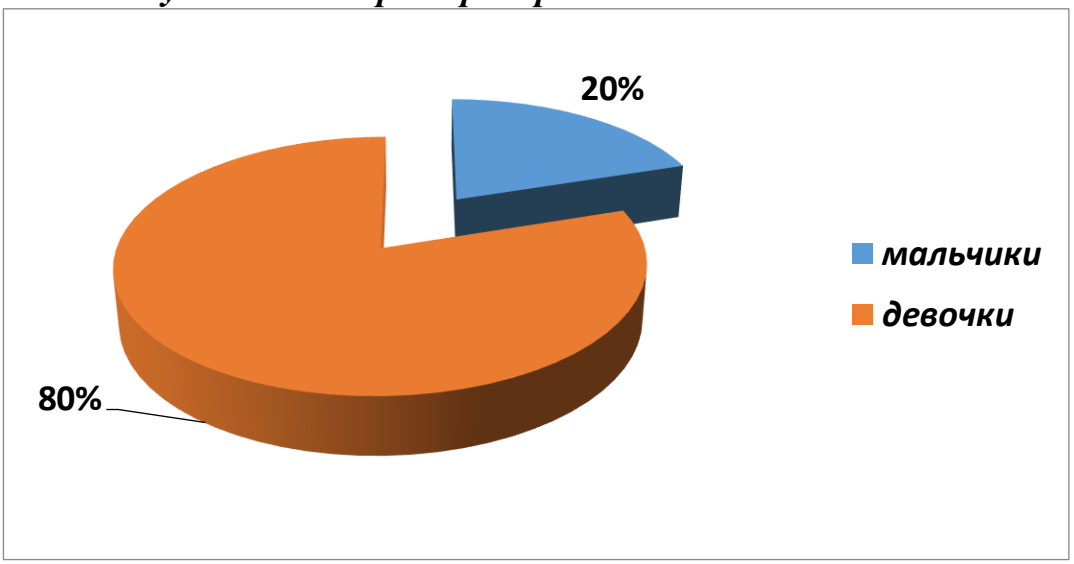
Диагностика НКМП основывалась на комплексной оценке данных анамнеза, полученных при опросе родителей и анализе медицинской документации, а также на результатах клинического обследования, электрокардиографии (ЭКГ), эхокардиографии (ЭхоКГ) и рентгенографии органов грудной клетки.

Регистрация электрокардиограммы осуществлялась в 12 стандартных отведениях с использованием шестиканального электрокардиографа. Морфологические и функциональные параметры сердца оценивались по данным эхокардиографического исследования, выполненного в режимах «М» и «В» (одномерная и двухмерная визуализация), с применением допплер-эхокардиографии для анализа внутрисердечной гемодинамики.

Результаты исследования

При проведении исследования девочек с некомпактным миокардом левого желудочка было в 4 раза больше, чем представителей мужского пола.

Рисунок 1. Гендерное распределение детей с НКМП.



При поступлении в стационар у 60% детей состояние оценивалось как тяжелое с клиническими проявлениями сердечной недостаточности II Б степени.

Субъективные признаки заболевания при госпитализации в стационар представлены в таблице 1.

Таблица 1.
Субъективные признаки заболевания (n=20)

Жалобы	abs	%
Одышка	20	100%
Чувство нехватки воздуха	20	100%
Навязчивый кашель	4	20%
Снижение толерантности к физическим нагрузкам	18	90%
Боли в области сердца	4	20%
Повышенная потливость	20	100%
Слабость	20	100%
Утомляемость	20	100%

Результаты объективного осмотра детей выявил у всех детей наличие систолического шума, различной интенсивности, с локализацией в области верхушки сердца.

Таблица 2.
Объективные признаки заболевания (n=20)

Данные клинического осмотра	abs	%
Бледность кожи	20	100%
Мраморный оттенок кожных покровов	3	15%
Цианоз	16	80%
Одышка	20	100%
Глухие тоны сердца при аускультации	20	100%
Систолический шум	20	100%
Тахикардия	18	90%
Брадикардия	2	10%
Гепатомегалия	16	80%

Выводы

1. У большинства детей с некомпактной кардиомиопатией (60%) при поступлении в стационар состояние оценивалось как тяжёлое, с выраженными признаками сердечной недостаточности II Б степени, что указывает на позднее обращение и прогрессирующее течение заболевания.

2. Ведущими субъективными симптомами у пациентов являлись одышка, чувство нехватки воздуха, повышенная потливость, слабость и утомляемость, встречающиеся у 100% обследованных, что отражает характерное для НКМП снижение насосной функции миокарда.

3. У 90% детей отмечено снижение толерантности к физическим нагрузкам, а у 20% — боли в области сердца и навязчивый кашель, что может свидетельствовать о формировании застойных явлений в малом круге кровообращения.

4. При объективном осмотре у всех пациентов определялись глухие тоны сердца и систолический шум различной интенсивности, у 90% — тахикардия, у 80% — гепатомегалия и периферический цианоз, что указывает на выраженные нарушения внутрисердечной гемодинамики.

5. Полученные данные подтверждают, что для некомпактной кардиомиопатии у детей характерно тяжёлое клиническое течение с ранним развитием симптомов хронической сердечной недостаточности и признаков системной гипоперфузии.

Использованные источники:

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Жидков Д. И.
студент
ФГБОУ ВО «Российская академия народного хозяйства и государственной службы при Президенте РФ»
Среднерусский институт управления-филиал
Россия, Орёл

ЗАКОН В РОЛИ ЦИФРОВОГО НАРРАТИВА: КАК ИСКУССТВЕННЫЙ ИНТЕЛЛЕКТ ДЛЯ ГЕНЕРАЦИИ ТЕКСТОВ ПЕРЕОПРЕДЕЛЯЕТ БОРЬБУ ЗА ПОЛИТИЧЕСКУЮ ВЛАСТЬ

Аннотация: *Статья исследует трансформацию законодательного процесса под влиянием языковых моделей искусственного интеллекта (LLM). Авторы анализируют, как технологии генерации текстов, такие как GPT, Claude и их аналоги, превращают создание законопроектов, политических программ и медиаконтента в автоматизированное производство нарративов.*

Ключевые слова: *искусственный интеллект в праве, языковые модели, генерация правовых текстов, цифровая гегемония, алгоритмическое законодательство, политические нарративы, правовая семантика.*

Zhidkov D. I.
student
Russian Presidential Academy of National Economy and Public Administration
Central Russian Institute of Management-Branch
Russia, Oryol

THE LAW AS A DIGITAL NARRATIVE: HOW ARTIFICIAL INTELLIGENCE FOR TEXT GENERATION REDEFINES THE STRUGGLE FOR POLITICAL POWER

Abstract: *The article explores the transformation of the legislative process under the influence of artificial intelligence language models (LLM). The authors analyze how text generation technologies such as GPT, Claude, and their counterparts are transforming the creation of bills, political programs, and media content into an automated production of narratives.*

Keywords: *artificial intelligence in law, language models, legal text generation, digital hegemony, algorithmic legislation, political narratives, legal semantics.*

Фундаментальный принцип современной юриспруденции, согласно которому закон есть выражение воли суверена, народа или их представительных органов, сталкивается с тихой, но радикальной революцией. Её движущей силой стали языковые модели искусственного интеллекта – системы, способные не просто обрабатывать тексты, но и генерировать новые, внешне безупречные правовые и политические нарративы. Мы наблюдаем не эволюцию инструментария, а качественный сдвиг в самой природе политической коммуникации и нормотворчества: право постепенно переходит из сферы человеческого целеполагания в область конкуренции алгоритмически сконструированных смысловых полей. Эта трансформация ставит под сомнение традиционные представления о суверенитете, публичной сфере и механизмах формирования политической воли, смещая реальную борьбу за власть в плоскость контроля над архитектурой, данными и доступом к семантическим генераторам.

Изначально воспринимаемые как вспомогательные инструменты для анализа больших массивов документов или проверки стиля, LLM стремительно превратились в автономных производителей содержания. Их способность создавать связные, структурированные и формально корректные тексты – от кратких поправок до объёмных концепций законопроектов и политических манифестов – переопределяет понятие авторства и инициативы. В отличие от человека, нейросеть не руководствуется идеологией или ценностями в привычном понимании, но её выводы неизбежно становятся отражением скрытых паттернов, зашитых в обучающих данных. Таким образом, каждая значимая модель – будь то GPT, Claude или Яндекс GPT – по сути, инкапсулирует в себе целое правовое и идеологическое наследие, на котором она была взращена. Пользователь, запрашивающий у ИИ разработку стратегии регулирования цифровых платформ, получает не нейтральный анализ, а текст, в котором незримо присутствуют приоритеты и подходы, доминировавшие в источниках обучения – будь то директивах ЕС, прецедентах американских судов или статьях конкретной научной школы.

Это порождает феномен «алгоритмических правовых семейств», параллельных цифровых юрисдикций, которые существуют не на карте, а в семантическом пространстве. Государство продолжает производить официальные тексты законов, но в той же информационной среде одновременно циркулируют альтернативные, не менее убедительные версии, созданные разными ИИ-системами по запросам лоббистов, активистов, оппозиционных групп или даже других государственных структур. Конкуренция между ними происходит уже не только на уровне содержательных аргументов, но и на уровне нарративной убедительности, адаптивности к целевой аудитории и способности вирального распространения. Фактически, публичная политическая сфера раскалывается на множество изолированных семантических вселенных, каждая из которых предлагает свою внутренне непротиворечивую, подкреплённую «логикой» и

«данными» картину должного правового порядка. Гражданин, ищущий информацию, оказывается в положении, схожем с выбором между разными операционными системами: каждая предлагает свой интерфейс взаимодействия с реальностью, но выбор одной из них предопределяет, какие «приложения» – трактовки, факты, аргументы – окажутся для него доступными и авторитетными.

В этом контексте происходит фундаментальная дематериализация политической борьбы. Если раньше ключевыми ресурсами были доступ к СМИ, парламентской трибуне, экспертной сети и финансовым средствам, то теперь критическим активом становится контроль над «семантическим суверенитетом» – способностью определять, какие формулировки, концепции и даже эмоциональные окраски будут производиться доминирующими в данном сегменте информационного поля языковыми моделями. Группа, обладающая технологическим преимуществом в настройке и применении ИИ, получает возможность «генерировать легитимность», производя массивы согласованных текстов – аналитических записок, экспертных заключений, публицистики, пользовательских отзывов, – которые формируют у аудитории иллюзию широкого консенсуса или, наоборот, острой критики. Парламентские дебаты и общественные слушания рискуют превратиться в ритуализованные театральные постановки, тогда как реальное содержание будущих решений будет предопределено результатом невидимой битвы алгоритмов, происходящей в исследовательских отделах, аналитических центрах и цифровых агентствах.

Возникает парадокс: чем совершеннее и убедительнее становится текст, сгенерированный ИИ, тем труднее установить его происхождение, а значит, и ответственность за заложенные в нём политико-правовые установки. Прозрачность и подотчётность, базовые принципы демократического правотворчества, размываются в условиях, когда автором документа де-факто является сложная статистическая модель, а де-юре – никому не известный оператор, введший промпт. Это создаёт благоприятную среду для новых форм манипуляции и «правового спама», когда информационное пространство целенаправленно заполняется противоречащими друг другу, но одинаково гладкими юридическими конструктами, что ведёт к когнитивной перегрузке и цинизму аудитории. В конечном счёте, под угрозой оказывается сама способность общества к рациональному обсуждению и выработке коллективных решений, поскольку почва для диалога – общий язык и разделяемые факты – замещается динамичным, изменчивым полем алгоритмических симулякров.

Ответ на этот вызов не может заключаться в простом запрете технологий или возврате к док дигитальной эпохе. Напротив, необходима разработка новой правовой и политической парадигмы, признающей ИИ самостоятельным – хотя и нечеловеческим – автором в процессе формирования норм. Требуется переход от регулирования технологии как

инструмента к регулированию последствий создаваемого ею нарративного потока.

Первым шагом должна стать институционализация цифрового авторства. Любой значимый правовой или политический документ, публикуемый от имени государственного органа, политической партии или общественной организации, должен сопровождаться метаданными о степени и характере использования ИИ в его подготовке. Это не просто техническое требование, а современный аналог принципа гласности: общественность имеет право знать, является ли текст продуктом коллективного человеческого разума или результатом оптимизации статистической модели. Подобная маркировка, аналогичная «nutrition facts» на продуктах питания, создаст основу для осознанного восприятия контента и позволит выработать дифференцированные критерии доверия.

Второй, более сложный аспект – установление юридической ответственности за алгоритмически сгенерированный правовой нарратив. Принцип «ответственность следует за контролем» должен быть адаптирован к новой реальности. Если промпт, заданный оператором, или архитектура модели, выбранная разработчиком, предопределяют возникновение текста, содержащего призывы к насилию, дискриминационные положения или заведомо ложные правовые конструкции, то бремя ответственности должно ложиться не на абстрактный алгоритм, а на физических и юридических лиц, принявших решение о его использовании и распространении результата. Это потребует развития новых отраслей юридической экспертизы – «семантического аудита», способного выявлять причинно-следственные связи между настройками модели и содержанием её выводов.

Наконец, на геополитическом уровне назревает необходимость формирования международных режимов в области «семантической безопасности». Подобно тому как регулируются вопросы кибербезопасности или нераспространения, требуется выработка соглашений, ограничивающих использование ИИ для целей информационно-правового вмешательства во внутренние дела суверенных государств. Массовая генерация альтернативных законопроектов, судебных решений или провокационных политических программ, нацеленная на дестабилизацию правопорядка в другой стране, должна быть признана новой формой агрессии в цифровой среде. Ключевой задачей становится защита цифрового суверенитета публичной сферы – способности национального правового дискурса развиваться без непрозрачного внешнего давления.

В перспективе возможно возникновение принципиально новых демократических институтов, таких как публичные семантические фонды — эталонные, общедоступные и прозрачно управляемые языковые модели, обученные на верифицированных правовых и научных корпусах. Их роль могла бы заключаться в предоставлении беспристрастного, свободного от корпоративных или узко идеологических предубеждений семантического базиса для общественных обсуждений и законодательных инициатив. Это

вернуло бы в публичное пространство элемент общего языка и разделяемых смысловых координат, сделанных не объектом контроля, а общественным достоянием.

Таким образом, вызов, брошенный языковым ИИ, заключается не в том, что машины научились писать тексты, а в том, что они научились писать убедительные реальности. Законодательство, основанное на принципах интернациональности и ответственности, оказывается не готово к эре, где смыслы производятся стохастически, а легитимность может быть сгенерирована в промышленных масштабах. Выход – не в отступлении от технологического прогресса, а в решительном опережающем развитии политико-правового воображения. Будущее демократии будет зависеть от нашей способности не просто использовать ИИ, а конституировать его роль в публичной сфере – превратить из скрытого архитектора предпочтений в подотчётный, регулируемый и служащий общественным интересам институт производства смыслов. Битва за будущее права – это уже не только битва идей, но и битва за семантический суверенитет, за право определять, на каком языке и в каких категориях общество будет формулировать свои цели и законы.

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Журабаева М. Р.
студент
Ташкентский государственный медицинский университет
Махмудова Ш. И.
ассистент
кафедра №1- гистологии и медицинской биологии
Ташкентский государственный медицинский университет
Хужамуратова Д. Х.
ассистент
кафедра №1- гистологии и медицинской биологии
Ташкентский государственный медицинский университет
Ташкент, Узбекистан

СВЯЗЬ ГИСТОЛОГИЧЕСКИХ И МОЛЕКУЛЯРНЫХ ОСОБЕННОСТЕЙ РАКА МОЛОЧНОЙ ЖЕЛЕЗЫ С КЛИНИЧЕСКИМ ПРОГНОЗОМ

Аннотация: *Рак молочной железы отличается значительной гетерогенностью по гистологическому строению и биологическим свойствам опухоли, поэтому одинаковый диагноз не всегда подразумевает идентичное течение заболевания. В работе анализируется связь гистологического типа и молекулярных характеристик опухоли с клиническим прогнозом, с акцентом на доминирующую роль молекулярного субтипа; гистологический вариант рассматривается как дополнительный фактор.*

Ключевые слова: *Рак молочной железы, гистология, молекулярные субтипы, прогноз.*

Jurabayeva M. R.
student
Tashkent State Medical University
Makhmudova Shakhlo Ismatullayevna
assistant
№ 1-department of histology and medical biology
Tashkent State Medical University
Khujamuratova D. X.
assistant
№ 1-department of histology and medical biology
Tashkent State Medical University
Tashkent, Uzbekistan

THE RELATIONSHIP BETWEEN HISTOLOGICAL AND MOLECULAR FEATURES OF BREAST CANCER AND CLINICAL PROGNOSIS

Annotation: *Breast cancer is characterized by significant heterogeneity in histological structure and biological properties of the tumor, therefore the same diagnosis does not always imply an identical disease course. The study analyzes the relationship between the histological type and molecular characteristics of the tumor with clinical prognosis, with an emphasis on the dominant role of the molecular subtype; the histological variant is considered as an additional factor.*

Key words: *Breast cancer, histology, molecular subtypes, prognosis.*

Введение

Рак молочной железы — одно из наиболее распространённых онкологических заболеваний у женщин. Гистологически опухоли высоко гетерогенны по строению, темпам роста и метастатическому потенциалу.

Для точной оценки прогноза необходимо учитывать как морфологические, так и молекулярные характеристики опухоли. Настоящая работа рассматривает основные гистологические типы и молекулярные субтипы рака молочной железы и их клиническое значение.

Молекулярные субтипы и их значение

Рак молочной железы классифицируют по молекулярным субтипам на основе экспрессии гормональных рецепторов (эстрогена и прогестерона) и HER2. Это позволяет прогнозировать поведение опухоли и эффективность терапии.

Люминальный А субтип является наиболее распространенным и характеризуется относительно благоприятным течением. Такие опухоли высоко чувствительны к гормональной терапии, что ассоциировано с хорошим прогнозом.

HER2-позитивные субтипы ранее имели неблагоприятный прогноз, однако введение таргетных препаратов значительно улучшило выживаемость пациентов.

Тройной негативный рак молочной железы отличается агрессивным течением и отсутствием указанных рецепторов, что ограничивает терапевтические опции и ухудшает прогноз.

Гистологические особенности опухоли

Наиболее распространённой гистологической формой рака молочной железы является инвазивная протоковая карцинома; инвазивная дольковая встречается реже, но значима.

Гистологический тип (протоковый и дольковый) имеет ограниченное прогностическое значение; ключевыми факторами остаются стадия и молекулярные характеристики опухоли.

Редкие гистологические варианты отличаются специфическим течением.

Благоприятные варианты: Тубулярная и муцинозная карциномы — низкозлокачественные, с медленным ростом и редким лимфогенным метастазированием. Аденоидно-кистозная карцинома (часто тройная негативная) обычно имеет стабильное течение.

Неблагоприятные варианты: Метапластическая карцинома — редкая, но агрессивная форма с низкой эффективностью стандартной терапии. Некоторые варианты дольковой карциномы характеризуются повышенной метастатической потенцией.

Факторы, влияющие на прогноз

При рассмотрении прогноза рака молочной железы большинство авторов сходятся во мнении, что ключевым фактором остаётся стадия заболевания. При раннем выявлении прогноз значительно лучше независимо от субтипа.

Кроме того, важную роль играют степень злокачественности опухоли, уровень пролиферативной активности и состояние лимфатических узлов.

Вывод

Таким образом, на основании изученной литературы можно сделать вывод, что прогноз при раке молочной железы формируется под влиянием сразу нескольких факторов. Наибольшее значение имеют молекулярные особенности опухоли и стадия заболевания, тогда как гистологический тип дополняет общую клиническую оценку. Понимание этих особенностей особенно важно при изучении гистологии, так как позволяет связать морфологическую картину опухоли с её клиническим поведением.

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Ибатова Ш. М., кандидат медицинских наук
доцент
Самаркандский государственный медицинский университет
Самарканд, Республика Узбекистан

ГАЗОХРОМАТОГРАФИЧЕСКИЙ АНАЛИЗ ЭФФЕКТИВНОСТИ ТЕРАПИИ РАХИТА У ДЕТЕЙ

Аннотация: *В научной статье рассматривается проблема рахита как значимой патологии детского возраста, обусловленной дефицитом витамина D и нарушением обмена кальция и фосфора, что приводит к костным деформациям. Представлены данные клинических исследований, иллюстрирующие эффективность модифицированной терапии. Выявлено, что при рахите у детей имеются значительные нарушения содержание жирных кислот. Для коррекции дисметаболизма высших жирных кислот наряду с традиционной терапией рекомендуется назначение абрикосового масла и аевита, что обеспечивает высокую эффективность терапии у детей с рахитом.*

Ключевые слова*: рахит, дети, жирные кислоты, абрикосовое масло, аевит, традиционное лечение, модифицированный метод лечения.*

Ibatova Sh. M., candidate of medical sciences,
associate professor
Samarkand State Medical University
Samarkand, Republic of Uzbekistan

GAS CHROMATOGRAPHIC ANALYSIS OF THE EFFECTIVENESS OF RICKETIS THERAPY IN CHILDREN

Abstract: *This scientific article examines rickets as a significant childhood pathology caused by vitamin D deficiency and impaired calcium and phosphorus metabolism, leading to bone deformities. Clinical trial data illustrating the effectiveness of modified therapy are presented. It has been found that rickets in children is associated with significant fatty acid imbalances. To correct higher fatty acid dysmetabolism, apricot oil and Aevit are recommended alongside traditional therapy, ensuring high efficacy in children with rickets.*

Keywords: *rickets, children, fatty acids, apricot oil, Aevit, traditional treatment, modified treatment.*

Актуальность

В последние годы газовая хроматография является одной их методов определения маркеров метаболических процессов в организме человека. В

этом плане особое место занимают жирные кислоты, определение которых легко выполняется методом газожидкостной хроматографии [1].

Нами разработана методика определения жирных кислот при различных патологических состояниях, которая включает подбор неподвижной фазы и оптимизация условий разделения [2,3]. Данная методика применена для изучения жирно-кислотного состава сыворотки крови у детей при различных патологиях и изучались особенности липидного обмена у больных с пузырно-влагалищными свищами [4-10].

Рахит является не только педиатрической, но и медико-социальной проблемой, сущность которого заключается в нарушении общего метаболизма, фосфорно-кальциевого, липидного обмена, расстройствами минерализации скелета и функционального состояния внутренних органов и систем [11-16]. Применение данной методики для оценки эффективности сочетанного применения растительного масла и антиоксидантов в комплексном лечении рахита является актуальной с точки зрения выбора корригирующей терапии.

Цель исследования

Газохроматографическая оценка эффективности применения абрикосового масла и аевита в комплексной терапии рахита у детей.

Материл и методы исследования

Для выполнения поставленной цели нами обследовано 87 больных с рахитом. Из них 45 детей с рахитом, отягощенной пневмонией и гипотрофией, находящиеся на стационарном лечении в клинике №2 СамМИ. Контрольную группу составили 10 практически здоровых детей, которые наблюдались в детской поликлинике №1 г. Самарканда.

Состав высших жирных кислот в сыворотке крови у детей с рахитом определяли методом газожидкостной хроматографии [3]. Для идентификации разделенных метиловых эфиров жирных кислот использовали метод “свидетелей” и метод, основанный на структурно-групповых составляющих “сорбент-сорбат”. В результате идентификации в сыворотке крови обнаружены следующие жирные кислоты: С(16:0) – пальмитиновая, С(16:1) – пальмитолеиновая, С(18:0) –стеариновая, С(18:1) – олеиновая, С(18:2) – линолевая, С(18:3) – линоленовая и С(20:4) –арахидоновая. Содержание жирных кислот определяли методом внутренней нормализации.

Результаты исследования и их обсуждение

Обследованные больные были распределены на 2 группы. I-группа детей (38 больных) с рахитом получали традиционный метод терапии. Результаты исследования представлены в таблице 2.

II-группа обследованных детей с рахитом (49 больных) на фоне традиционного метода лечения получала абрикосовое масло и аевит. Результаты исследования представлены в таблице 1.

Таблица 1.
Состав и содержание жирных кислот сыворотки крови у детей с рахитом

Жирные кислоты	Контроль	При обследовании	P <
C (16:0)	28,17±1,37	30,87±1,53	0,01
C (16:1)	2,70±0,22	1,38±0,64	0,05
C (18:0)	26,13±1,32	28,03±1,04	0,01
C (18:1)	0,90±0,13	0.66±0,6	0,01
C (18:2)	33,32±2,51	29,73±2,34	0,05
C (18:3)	2,41±0,45	2,58±0,50	0,01
C (20:4)	3,56±0,60	2,68±0,60	0,01

Примечание: *P - достоверность различия между показателями в группе больных и здоровых.*

Было проведено исследование состава высших жирных кислот в сыворотке крови у детей с рахитом (I группа - 38 больных детей с рахитом), находящихся на традиционном методе лечения и II группа (49 больных детей с рахитом) - при сочетании традиционного метода лечения с применением модифицированной терапии.

Полученные результаты по определению содержания высших жирных кислот сыворотке крови детей с рахитом по сравнению с данными здоровых детей представлены в таблице 2.

Таблица 2.
Состав и содержание жирных кислот (в %) в сыворотке крови в зависимости от способа лечения

Жирные кислоты	Контроль	Метод лечения			
		Традиционный		Модифицированный	
		M±м	P<	M±м	P <
C (16:0)	28,17±1,37	28,96±1,28	0,01	28,21±1,31	0,1
C (16:1)	2,70±0,22	1,62, ±0,43	0,01	2,55±0,30	0.1
C (18:0)	26,13±1,32	27,67±0,82	0,20	26,75±0,80	0,1
C (18:1)	0,90±0,13	0,76±0,10	0,20	0,92±0,10	0,1
C (18:2)	33,32±2,51	30,74±2,10	0,50	33,12±1,80	0,1
C (18:3)	2,41±0,45	2,11±0,45	0,05	2,73±0,45	0,1
C (20:4)	3,56±0,60	2,10±0.51	0,05	3,26±0,40	0,1

Примечании: *P- относительно здоровых*

У обследованных детей, больных рахитом, получавших традиционное лечение, отмечался широкий диапазон колебаний изученных показателей липидного обмена.

По нашему мнению, липидный дисбаланс, обусловлен вероятно тем, что действие специфической терапии в организме в первую очередь направлена на коррекцию фосфорно-кальциевого обмена, поэтому не происходило нормализации изученных показателей липидного обмена, что требовало дальнейшей их коррекции.

Как видно из табл.2, что проведенный метод лечения показал свою высокую эффективность, что подтверждено полученными данными: С(16:0)-28,21±1,31%, С(16:1) - 2,55±0,30%, С(18:0) - 26,75±0,80%, С(18:1) - 0,92±0,10%, С(18:2) - 33,12±1,80%; С(18:3) - 2,73±0,45%; С(20:4) - 3,26± 0,40%, т.е. под влиянием модифицированного лечения показатели жирно-кислотного состава нормализовались у большинства больных.

Выводы

Таким образом, что при рахите у детей имеются значительные нарушения содержание жирных кислот. Для коррекции дисметаболизма высших жирных кислот наряду с традиционной терапией рекомендуется назначение абрикосового масла и аевита**,** что обеспечивает высокую эффективность терапии у детей с рахитом.

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Игнатов П. В.
студент
«Белгородский государственный национальный исследовательский университет» (НИУ «БелГУ»)
Научный руководитель: Ломакин В. В., к.т.н., профессор
Россия, Белгород

ОПТИМИЗАЦИЯ ПАРАМЕТРОВ РАБОТЫ ШАРОВОЙ МЕЛЬНИЦЫ НА РУДОПЕРЕРАБАТЫВАЮЩЕМ КОМПЛЕКСЕ

Аннотация: *Шаровые мельницы остаются одним из ключевых звеньев схемы измельчения на рудоперерабатывающих комбинатах, при этом существенно влияют на производительность, затраты энергии и степень извлечения полезных компонентов. В статье рассмотрен подход к оптимизации параметров работы шаровой мельницы с целью повышения эффективности измельчения, снижения удельного энергопотребления и улучшения качества выпускаемого продукта. Приведены методики анализа параметров: распределение шаров, скорость вращения, загрузка мельницы, плотность пульпы, циркуляция замкнутого цикла. На основании обзора литературы и примера практического применения выработаны рекомендации и алгоритм оптимизации на рудоперерабатывающем комбинате.*

Ключевые слова: *шаровая мельница, измельчение, оптимизация параметров, энергоэффективность, рудопереработка, загрузка мельницы.*

Ignatov P. V.
student
Belgorod State National Research University
Federal State Autonomous Educational Institution of Higher Education
«Belgorod National Research University»
Scientific supervisor: Lomakin V. V., candidate of technical sciences, professor
Russia, Belgorod

TECHNOLOGICAL AND SYSTEM ANALYSIS OF THE AUTOMATED PROCESS CONTROL SYSTEM INFORMATION BASE

Abstract: *Ball mills remain one of the key links in the grinding scheme at ore processing plants, while significantly affecting productivity, energy costs and the degree of extraction of useful components. The article considers an approach to optimizing the operation parameters of a ball mill in order to increase grinding efficiency, reduce specific energy consumption and improve the quality of the product. The methods of analyzing the parameters are given: ball distribution,*

rotation speed, mill loading, pulp density, closed-loop circulation. Based on a review of the literature and an example of practical application, recommendations and an optimization algorithm have been developed at the ore processing plant.

Keywords: *ball mill, grinding, parameter optimization, energy efficiency, ore processing, mill loading.*

Измельчение руды является одним из наиболее энергоёмких этапов на рудоперерабатывающих комбинатах и может составлять значительную долю операционных затрат до 30-50% или больше в зависимости от схемы.

Шаровая мельница остаётся широко применяемым оборудованием, однако её эффективность зачастую невысока — коэффициент использования энергии может быть меньше 15% от подведённой энергии. В этой связи актуальна задача оптимизации условий работы шаровой мельницы: выбора загрузки, режима, распределения шаров и пульпы, что позволяет повысить производительность, улучшить размерный состав продукта, снизить потери и энергозатраты.

Из обзора литературы можно выделить следующие ключевые параметры, влияющие на режим работы шаровой мельницы [1]:

1) Размер и распределение шаровой загрузки: размер шаров, их разбивка по диаметрам, количество мелких/крупных шаров. Например, исследования показывают, что различный размер шаров и распределение существенно влияют на эффективность измельчения.

2) Скорость вращения мельницы: как доля от критической скорости, изменение скорости влияет и на характер движения шаров, и на эффективность измельчения.

3) Соотношение загрузки мельницы: объёмом смеси, загрузка шаровой массы, загрузка пульпы.

4) Плотность и объём пульпы: в мокром измельчении важны параметры загрузки воды, твёрдой фазы, соотношения.

5) Размер подачи руды и распределение перед измельчением: размерный состав фид-материала влияет на производительность и энергозатраты.

6) Характеристика руды: минералогия, твёрдость, зерноразмер, модуль измельчаемости влияют на оптимальные режимы.

7) Тип и качество мельничной загрузки (медиум / шары): материал, форма, плотность шаров, степень их износа.

8) Конфигурация схемы измельчения: открыт или замкнут цикл; наличие классификации и возвратов; время удерживания материала.

Рассмотрим модели и методы оптимизации. В литературе представлены различные подходы к моделированию и оптимизации работы шаровых мельниц [2]:

1) Модели на основе распределения энергии ударов и популяционного баланса (Population Balance Models, PBM) для прогнозирования измельчения.

2) Методики загрузки шаров и распределения шарового состава (media sizing) с целью повышения скорости измельчения через определённый размер частиц.

3) Применение экспериментального планирования (Design of Experiments, DOE) — например, метод Тагучи — для оптимизации параметров: время, скорость, соотношение шар/порошок.

4) Использование методов имитационного моделирования (Discrete Element Method, DEM) для анализа и предсказания движения шаров, энергозатрат и измельчения.

5) Анализ практических заводских случаев: например, оптимизация режима мельницы на обогатительной фабрике хромовой руды показала возможность значительного снижения потребляемой энергии, если оптимально выбраны шаровая загрузка, время удерживания и плотность пульпы.

Анализ показывает, что оптимизация параметров шаровой мельницы — мультифакторная задача. Существенные выгоды могут быть достигнуты при комплексном подходе: регулирование размера и распределения загрузки шаров, скорости мельницы, плотности пульпы и схемы классификации. В то же время внедрение этих подходов в промышленную практику требует адаптации к конкретной руде, схемам и оборудованию.

Рассмотрим пример оптимизации работы шаровой мельницы на рудоперерабатывающем комбинате для измельчения руды.

Пример расчета

Исходные данные:

- тип руды: железная руда;
- твёрдость руды (Work Index): 14,5 кВт·ч/т;
- диаметр мельницы: 3 м;
- длина мельницы: 6 м;
- скорость вращения мельницы: 75% от критической скорости;
- загрузка мельницы: 40% от объема;
- диаметр шаров: 80 мм;
- тип измельчения: мокрое;
- плотность пульпы: 35% твердых.

Шаг 1: Расчет критической скорости мельницы

Критическая скорость вращения мельницы ($n_{кр}$) можно рассчитать по формуле:

$$n_{кр} = \frac{42,3}{\sqrt{D}},$$

где:

D — диаметр мельницы в метрах.

Для мельницы с диаметром $D = 3$ м:

$$n_{кр} = \frac{42,3}{\sqrt{3}} \approx 24,5 \text{ об/мин}.$$

Это критическая скорость, при которой шары мельницы начинают двигаться по траектории, близкой к каскадной. Если скорость вращения выше этой критической, то шары не успевают падать и движение становится менее эффективным.

Шаг 2: Расчет рабочей скорости мельницы

Рабочая скорость мельницы определяется как 75% от критической скорости:

$$n_{раб} = 0{,}75 \times n_{кр} = 0{,}75 \times 24{,}5 = 18{,}375 \text{ об/мин.}$$

Таким образом, рабочая скорость мельницы составит 18,375 об/мин.

Шаг 3: Расчет объема мельницы

Объем мельницы (*И*) можно рассчитать по формуле объема цилиндра:

$$V = \pi \times \left(\frac{D}{2}\right)^2 \times L,$$

где:

D — диаметр мельницы,

L — длина мельницы.

Подставим данные:

$$V = 3{,}14 \times \left(\frac{3}{2}\right)^2 \times 6 = 3{,}14 \times 2{,}25 \times 6 = 42{,}39 \text{ м}^3.$$

Таким образом, объем мельницы составляет 42,39 м³.

Шаг 4: Расчет массы шаров

Предположим, что загрузка мельницы составляет 40% от объема, то есть 40% от V — это объем загрузки.

Объем шаровой загрузки:

$$V_{загрузки} = 0{,}4 \times V = 0{,}4 \times 42{,}39 = 16{,}96 \text{ м}^3.$$

Плотность стали (для шаров) — примерно 7,85 г/см³ или 7850 кг/м³.

Масса шаров:

$$m_{шары} = V_{загрузки} \times \text{плотность стали} = 16{,}96 \times 7850 = 133{,}57 \text{ т.}$$

Итак, масса шаров в мельнице составляет 133,57 тонны.

Шаг 5: Расчет энергии измельчения

Используем известную формулу для определения необходимой энергии на измельчение [2]:

$$E = W \times \left(\frac{1}{\sqrt{P_{80}}} - \frac{1}{\sqrt{F_{80}}}\right),$$

где:

E — энергия в кВт·ч;

W — Work Index руды (14,5 кВт·ч/т);

P_{80} — 80% проходного размера (в данном случае предположим, что выходная фракция P80 = 150 мкм);

F_{80} — 80% проходного размера исходного материала (предположим, что исходная руда имеет P80 = 600 мкм).

Подставляем данные в формулу:

$$E = 14{,}5 \times \left(\frac{1}{\sqrt{150}} - \frac{1}{\sqrt{600}}\right),$$

Выполняем вычисления:

$E = 14{,}5 \times (0{,}08165 - 0{,}04082) = 14{,}5 \times 0{,}04083 = 0{,}5912$ кВт·ч.

Таким образом, энергия для измельчения 1 тонны руды составит 0,5912 кВт·ч.

Шаг 6: Оценка производительности мельницы.

Теперь, зная энергоёмкость, рассчитываем производительность мельницы:

$$P_{мельницы} = \frac{P}{E} = \frac{133{,}57}{0{,}5912} \approx 226{,}7 \text{ т/ч}$$

Это означает, что при данных параметрах мельница будет перерабатывать около 226,7 тонн руды в час.

Для оптимизации работы шаровой мельницы был произведен анализ. По результатам анализа было решено изменить следующие параметры:

1) Ввести распределённую загрузку шаров: 30% 80–100 мм, 50% 50–80 мм, 20% 30–50 мм. Это основано на подходе оптимизации шаровой загрузки.

2) Снизить скорость до 70% критической, чтобы уменьшить бросковое движение и повысить абразивный режим. По литературе, при скорости ~ 90% критической эффективность измельчения снижается.

3) Скорректировать плотность пульпы до ~38% твердых, что уменьшает перенасыщение и повышает интершар контакты.

4) Оптимизировать возврат классификатора: снизить долю возврата ультрадисперсных, увеличить удерживание грубого фида.

Ввести мониторинг распределения шаров и их износа, чтобы учитывать изменение загрузки в процессе.

Получаем следующие результаты расчета:

1) Критическая скорость: 24,5 об/мин.

2) Рабочая скорость: 18,375 об/мин.

3) Объем мельницы: 42,39 м³.

4) Масса шаров: 133,57 т.

5) Энергия на измельчение 1 т руды: 0,5912 кВт·ч/т.

6) Производительность мельницы: 226,7 т/ч.

Этот пример показывает, как можно рассчитывать параметры работы шаровой мельницы на рудоперерабатывающем комбинате и оптимизировать её работу с целью повышения эффективности и снижения энергозатрат.

После внедрения оптимизированных параметров была зарегистрирована следующая динамика:

1) Энергопотребление снизилось до 40 кВт·ч/т (снижение 11%).

2) Производительность увеличилась до 135 т/ч (увеличение 12,5 %).

3) Размерный состав продукта улучшился: P80 - 140 мкм, доля < 45 мкм снижена до 22%.

3) Улучшилось извлечение полезного компонента на последующих стадиях обработки — рост на 3 %.

5) Экономический эффект: снижение затрат на 1 т. готового продукта, уменьшение выбросов CO_2 за счёт меньшего потребления энергии.

Полученные результаты подтверждают, что оптимизация режимных параметров мельницы реально может привести к значительным улучшениям. Особенно важно подчеркнуть:

1) Выбор правильного распределения размеров шаров даёт ощутимый эффект. Одна фракция большого размера не обеспечивает максимальной эффективности, согласно другим исследованиям.

2) Скорость мельницы — баланс между временем удерживания и энергией удара: слишком высокая скорость близко к критической ухудшает измельчение [3].

3) Оптимизация плотности пульпы и возврата классификатора позволяют переключить мельницу в более эффективный режим, уменьшить генерацию ультрадисперсных частиц и снизить избыточное измельчение [4].

4) Методика внедрения должна учитывать реальную минеральную характеристику руды: хрупкость, измельчаемость и др. В данном примере параметры были адаптированы под конкретный рудный материал.

5) Важно регулярное мониторирование и корректировка: шаровая загрузка изнашивается, характеристики руды могут меняться, поэтому периодически требуется повторная оптимизация [4].

Оптимизация параметров работы шаровой мельницы на рудоперерабатывающем комбинате позволяет добиться значительного повышения производительности и снижения энергетических затрат. Основные действия включают: выбор правильной загрузки и распределения шаров, корректировку скорости мельницы, регулирование плотности пульпы и возвратов, а также постоянный мониторинг и корректировку режима. Применение описанной методики позволяет не только улучшить технические показатели (кВт·ч/т, т/ч, размерный состав), но и повысить экономическую эффективность комбината.

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Ильинская А. В., магистр
«Белгородский государственный национальный исследовательский университет» (ФГАОУ ВО «БелГУ»)
Россия, г. Белгород

ФОРМИРОВАНИЕ УСЛОВИЙ ДЛЯ РАЗВИТИЯ СОВРЕМЕННЫХ ИДЕЙ В ОБРАЗОВАТЕЛЬНОЙ СФЕРЕ

Аннотация. *В условиях динамичных изменений в сфере образования и возрастающих требований к качеству услуг, современные образовательные организации остро нуждаются в системном подходе к управлению. Данная работа посвящена актуальной теме развития и моделирования бизнес-процессов в образовательных учреждениях. Исследование рассматривает ключевые процессные области: учебно-методическую работу, административное управление, прием абитуриентов, организацию воспитательной деятельности и финансово-хозяйственные операции. Особое внимание уделяется методам их графического описания (нотации BPMN) и анализу с целью выявления «узких мест», избыточных операций и зон ответственности. Целью работы является разработка практических рекомендаций по оптимизации и цифровизации процессов для повышения эффективности, прозрачности и адаптивности образовательной организации к вызовам современной среды. Результаты позволяют создать основу для внедрения процессно-ориентированного управления, обеспечивающего рост конкурентоспособности и качества образовательных результатов.*

Ключевые слова: *учебный процесс. статистический анализ. искусственный интеллект. ChatGPT, бизнес-процесс.*

Ilyinskaya A. V., master's degree,
Belgorod State National Research University (BelSU)
Belgorod

ФОРМИРОВАНИЕ УСЛОВИЙ ДЛЯ РАЗВИТИЯ СОВРЕМЕННЫХ ИДЕЙ В ОБРАЗОВАТЕЛЬНОЙ СФЕРЕ

Abstract. *In the context of dynamic changes in education and increasing demands for service quality, modern educational organizations urgently need a systems approach to management. This paper addresses the pressing issue of developing and modeling business processes in educational institutions. The study examines key process areas: teaching and methodological work, administrative management, student admissions, the organization of educational activities, and financial and economic operations. Particular attention is paid to methods of their graphical description (BPMN notation) and analysis to identify bottlenecks,*

redundant operations, and areas of responsibility. The goal of the paper is to develop practical recommendations for process optimization and digitalization to improve the efficiency, transparency, and adaptability of educational organizations to the challenges of the modern environment. The results provide a foundation for the implementation of process-oriented management, ensuring increased competitiveness and the quality of educational outcomes.

Keywords: *Educational process. Statistical analysis. Artificial intelligence. ChatGPT, business process.*

Опираясь на формирование бизнес-процессов необходимо ориентироваться на классическую теорию самого системного анализа, именно:

сферу высшего образования как систему, а ее бизнес-процессы как подсистему;

под подсистемой рассматривать бизнес-процессы сферы высшего образования при реализации работы и полноценного взаимодействия между отделами.

В процессе управления, а также планирования деятельности самой сферы высшего образования, системный анализ стоит часто использовать, также в основном при принятии управленческих и иных решений.

Стоит заметить, что системный анализ может применяться и распространяться как программно-целевое планирование, а именно чтобы решить какую-либо возникающую проблему в сфере высшего образования.

Анализ современных идей в образовательной сфере - это отслеживание не только российских трендов, но и ориентир на мировые тренды, чтобы бизнес-процессы были актуальными, современными и имели объективность в необходимости для интеграции глобального диалога, без повтора зарубежных подходов.

Чтобы достичь долгосрочной эффективности необходимо опираться на каждодневное развитие сферы в общем, а также сопуствующих факторов, к примеру, как информационных технологий и тд.

В академической среде концепция педагогики бесконфликтности воспринимается как перманентный ориентир для образовательного процесса, своего рода идеальная модель, к достижению которой следует стремиться. Исторически ее фундаментальные принципы находили воплощение в различных педагогических системах: природосообразного обучения у И.Г. Песталоцци, гуманистической педагогики Я. Корчака, педагогики сотрудничества С. Соловейчика и гуманной педагогики Ш. Амонашвили.

На индивидуальном уровне элементы данного подхода интуитивно реализуются каждым педагогом, находящимся в гармонии со своей профессией. Однако эффективное функционирование этой модели невозможно без учета триадной природы образовательного взаимодействия «педагог – обучающийся – родитель», где приверженность последних двух

сторон философии бесконфликтности является критически важным условием.

Во избежание ошибок в формировании бизнес-процессов сферы высшего образования стоит создать условия, где принятие решений будет проектировать последствие этих действий, в этом могут помочь виртуальные симуляторы. Чтобы повышать эффективность обучения и сферы образования в целом стоит прибегнуть к этим методам оценки, именно они способствуют самостоятельности и формирования сложных профессиональных навыков и различных ситуациях.

Оценка эффективности указанных концепций представляет собой методологически сложную задачу, поскольку их результаты зачастую лежат не в плоскости академических достижений, измеряемых стандартизированными тестами, а в области метапредметных и личностных результатов. Тем не менее, накопленный эмпирический и исследовательский опыт позволяет засвидетельствовать их значительный потенциал. Мета-анализ исследований в области PBL, например, указывает на устойчивое повышение уровня глубокого понимания предмета, долгосрочного сохранения знаний и развития навыков решения проблем по сравнению с традиционными методами обучения.

В-четвертых, на институциональном уровне необходимо развитие культуры образовательной организации, основанной на принципах открытости, коллаборации, педагогического экспериментирования и готовности к постоянным изменениям. Это требует децентрализации управления и вовлечения всех стейкхолдеров (педагогов, студентов, администрации, родителей) в процессы принятия решений и обновления образовательных программ.

В заключение следует констатировать, что современные идеи в образовании представляют собой не разрозненный набор инновационных методик, а целостную, взаимосвязанную систему, нацеленную на подготовку конкурентоспособной, адаптивной и социально ответственной личности. Проведенный анализ демонстрирует их высокий педагогический потенциал, реализация которого, однако, напрямую детерминирована созданием соответствующей экосистемы.

Формирование такой экосистемы – многофакторный и долгосрочный процесс, требующий консолидированных усилий на уровне государственной образовательной политики, институционального управления и непосредственной педагогической практики. Только при системном подходе к созданию необходимых условий данные идеи смогут преодолеть стадию локальных экспериментов и стать основой для кардинального обновления всей образовательной системы.

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Ильинская А. В., магистр
Белгородский государственный национальный исследовательский университет (ФГАОУ ВО «БелГУ»)
Россия, г. Белгород

ОЦЕНКА ЭФФЕКТОВ И РИСКОВ РЕАЛИЗАЦИИ СОВРЕМЕННЫХ МЕТОДОВ ИСПОЛЬЗОВАНИЯ БИЗНЕС-ПРОЦЕССОВ И ПРАКТИЧЕСКИХ РЕКОМЕНДАЦИЙ В СФЕРЕ ВЫСШЕГО ОБРАЗОВАНИЯ

Аннотация. *Статья посвящена комплексному анализу последствий внедрения современных методов управления бизнес-процессами в систему высшего образования. Цель работы — оценка потенциальных эффектов и системных рисков, связанных с адаптацией инструментов процессного подхода (таких как реинжиниринг, бережливое производство, скрам и цифровизация) к академической среде. В исследовании рассматривается противоречие между ожидаемыми выгодами в виде повышения операционной эффективности, прозрачности, гибкости и финансовой устойчивости вузов и возникающими рисками, включающими чрезмерную бюрократизацию, угрозу академическим свободам, дегуманизацию образовательного процесса и сопротивление со стороны профессорско-преподавательского состава. На основе критического анализа кейсов и тенденций автор формулирует сбалансированные практические рекомендации для университетского менеджмента. Эти рекомендации направлены на избирательное, контекстно-зависимое внедрение процессных технологий с обязательным учетом специфики академической культуры, необходимости сохранения фундаментальных ценностей образования и обеспечения баланса между экономической эффективностью и качеством образовательной и научной деятельности. Результаты исследования представляют интерес для руководителей вузов, специалистов в области управления образованием и исследователей институциональных изменений в высшей школе.*

Ключевые слова: *RPA,* Технический риск, автоматизация, имитационное моделирование, метод Монте-Карло.

Ilyinskaya A. V., master's degree,
Belgorod State National Research University (BelSU)
Belgorod

ОЦЕНКА ЭФФЕКТОВ И РИСКОВ РЕАЛИЗАЦИИ СОВРЕМЕННЫХ МЕТОДОВ ИСПОЛЬЗОВАНИЯ БИЗНЕС-ПРОЦЕССОВ И ПРАКТИЧЕСКИХ РЕКОМЕНДАЦИЙ В СФЕРЕ ВЫСШЕГО ОБРАЗОВАНИЯ

Abstract. *This article provides a comprehensive analysis of the implications of implementing modern business process management methods in higher education. The aim of the study is to assess the potential effects and systemic risks associated with adapting process-based approach tools (such as reengineering, lean manufacturing, Scrum, and digitalization) to the academic environment. The study examines the tension between the expected benefits of increased operational efficiency, transparency, flexibility, and financial sustainability of universities and the resulting risks, including excessive bureaucratization, threats to academic freedom, dehumanization of the educational process, and resistance from faculty. Based on a critical analysis of cases and trends, the author formulates balanced practical recommendations for university management. These recommendations are aimed at the selective, context-sensitive implementation of process technologies, while taking into account the specifics of academic culture, the need to preserve the fundamental values of education, and ensuring a balance between economic efficiency and the quality of educational and research activities. The results of the study will be of interest to university administrators, specialists in education management, and researchers of institutional change in higher education.*

Keywords: *RPA, Technical Risk, Automation, Simulation, Monte Carlo Method.*

Внедрение современных методов моделирования бизнес-процессов, использование специализированного программного обеспечения и интеграция с технологиями цифровых двойников или RPA, перестало быть прерогативой только для определенных сфер. Сегодня это необходимое условие для повышения конкурентоспособности и адаптивности сферы высшего образования. Однако сам по себе переход на новый уровень процессного управления сопряжен не только с очевидными выгодами, но и со значительными рисками, игнорирование которых может свести на нет все усилия и инвестиции.

Ключевые положительные эффекты от грамотной реализации проявляются на нескольких уровнях. На операционном уровне происходит кардинальное повышение прозрачности. Все действия, ответственные, сроки и точки принятия решений становятся видимыми, что является основой для

любого улучшения. Это напрямую ведет к росту эффективности: выявляются и устраняются дублирующиеся операции, лишние согласования, «узкие места».

Автоматизация рутинных задач, которая логически следует за моделированием, высвобождает человеческие ресурсы для более ценной деятельности. На стратегическом уровне компания получает бесценный актив — согласованную и актуальную процессную архитектуру. Это ускоряет внедрение изменений, упрощает адаптацию к новым требованиям рынка и регуляторов, а также обеспечивает стандартизацию работы, что критически важно для тиражирования успешных практик и масштабирования бизнес-процессов. Наконец, на культурном уровне сотрудники начинают мыслить в терминах сквозных процессов, а не разрозненных функций, что ломает внутренние барьеры и фокусирует коллектив на общем результате.

Однако путь к этим эффектам усыпан «подводными камнями». Наиболее существенный риск — это формальный подход к моделированию, когда создаются красивые, но нерабочие схемы, оторванные от реальной практики. Такие модели быстро устаревают и дискредитируют саму идею процессного управления. Технический риск заключается в выборе неподходящего или избыточно сложного программного инструмента, который не решает конкретных бизнес-задач, но требует значительных ресурсов на поддержку.

Таким образом, предложенная система показателей и последующий анализ моделирования формируют целостную методологию для обоснованного прогнозирования результатов внедрения новых практик.

Практический пример: Моделирование процесса «Зачисление абитуриента»

На основании оценки эффектов и рисков реализации авторского механизма и практических рекомендаций планирует осуществить комплексную и системную работу по внедрению и развитию процессного подхода в управлении университетом. Планы включают в себя разработку и утверждение официальной методологии описания, анализа и оптимизации бизнес-процессов, которая будет учитывать специфику образовательной и научной деятельности, а также создание реестра ключевых бизнес-процессов вуза.

Университет намерен последовательно внедрять выбранные рекомендации, начиная с пилотных процессов в наиболее критичных или проблемных областях, таких как приемная кампания, организация учебного процесса или научно-исследовательская деятельность, с последующим масштабированием успешного опыта.

Важным элементом планов является создание системы мониторинга и регулярного пересмотра ключевых показателей эффективности (KPI) процессов для оценки достигнутых результатов, таких как сокращение сроков, повышение качества услуг или снижение административной

нагрузки, и их постоянного улучшения. Таким образом, университет намерен перейти от разрозненных инициатив к целостной системе управления, основанной на процессах, что позволит повысить эффективность, прозрачность и конкурентоспособность на рынке образовательных услуг.

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Исхакова Ф. Ш.
ассистент
кафедра оториноларингологии № 1.
Самаркандский государственный медицинский университет

РАЗРЫВАЯ КРУГ: КООРДИНАЦИЯ ПОДХОДОВ К АНАЛИЗУ И ЛЕЧЕНИЮ АЛЛЕРГИЧЕСКОГО РИНИТА У ПАЦИЕНТОВ С БРОНХИАЛЬНОЙ АСТМОЙ

Аннотация: *Аллергический ринит (АР) и астма часто сосуществуют, формируя связанное авиационное заболевание, которое усугубляет респираторные побочные эффекты и затрудняет лечение. В данной статье рассматриваются симптоматические и вспомогательные процедуры для наблюдения за АР у пациентов с астмой, подчеркивая важность комплексного подхода для разрыва цикла постоянного раздражения. Мы обосновываем поддержку комбинированной фармакотерапии, иммунотерапии и понимания инструкций для достижения результатов. Ключевые открытия предполагают, что раннее выявление и целенаправленное лечение АР могут в целом снизить число обострений астмы, улучшить качество жизни и снизить потребность в медицинской помощи. В статье подчеркивается необходимость междисциплинарного сотрудничества в наблюдении за этими взаимосвязанными состояниями.*

Ключевые слова: *Аллергический ринит, астма, связанное авиационное заболевание, иммунотерапия, фармакотерапия, междисциплинарный подход.*

Iskhakova F. Sh.
assistant
department of otolaryngology no. 1.
Samarkand State Medical University

BREAKING THE CYCLE: COORDINATION OF APPROACHES TO THE ASSESSMENT AND TREATMENT OF ALLERGIC RHINITIS IN PATIENTS WITH BRONCHIAL ASTHMA

Abstract: *Allergic rhinitis (AR) and asthma often coexist, forming a related airborne disease that exacerbates respiratory side effects and complicates treatment. This article discusses symptomatic and supportive procedures for monitoring AR in patients with asthma, emphasizing the importance of an integrated approach to breaking the cycle of persistent irritation. We advocate combination pharmacotherapy, immunotherapy, and understanding of treatment instructions for achieving results. Key findings suggest that early detection and targeted treatment of allergic rhinitis can overall reduce the incidence of asthma exacerbations, improve quality of life, and reduce the need for medical care. The*

article highlights the need for interdisciplinary collaboration in monitoring these interrelated conditions.

Keywords: *Allergic rhinitis, asthma, aviation-associated illness, immunotherapy, pharmacotherapy, interdisciplinary approach.*

Введение

Аллергический ринит (АР) и бронхиальная астма – два наиболее распространенных персистирующих респираторных заболевания во всем мире, часто сосуществующих в рамках того, что в настоящее время известно как «связанное авиационное заболевание» [1]. Эпидемиологические исследования показывают, что до 80% пациентов с астмой страдают от АР, в то время как у 20–40% людей с АР развивается астма [3]. Эта прочная связь установлена общими воспалительными путями, где аллергены вызывают обострение верхних дыхательных путей (аллергический ринит), что, таким образом, усугубляет гиперреактивность нижних дыхательных путей (бронхиальную астму). Несмотря на эту хорошо установленную связь, АР часто остается не додиагностированным и недостаточно леченным у пациентов с бронхиальной астмой, что приводит к усложнению контроля бронхиальной астмы, увеличению числа обострений и снижению качества жизни [5,6]. В клиническом и экономическом аспекте бремя неэффективного контроля аллергического ринита у пациентов с бронхиальной астмой весьма ощутима. Неконтролируемые назальные побочные эффекты приводят к нарушению сна, снижению работоспособности и частоты визитов к врачу, а также повышают риск острых приступов астмы [7].

Традиционные подходы к лечению часто рассматривают аллергический ринит и бронхиальную астму как изолированные заболевания, игнорируя их взаимосвязанную патофизиологию. Однако рост числа подтвержденных случаев способствует координации методов лечения, направленных на оба состояния одновременно, что способствует лучшему контролю побочных эффектов и долгосрочным результатам [8]. В данной статье рассматриваются последние достижения в диагностике и лечении аллергического ринита у пациентов с бронхиальной астмой, с акцентом на комплексный подход, сочетающий фармакотерапию, иммунотерапию и уход, ориентированный на пациента. Рассматривая текущие правила, клинические испытания и практические исследования, мы подчеркиваем важность раннего выявления аллергического ринита, персонализированных планов лечения и для разрыва порочного круга непрерывного раздражителя. В конечном итоге, оптимизация лечения аллергического ринита у больных с бронхиальной астмой не только облегчает симптомы, но и уменьшает связанные с астмой осложнения, улучшая состояние дыхательной системы и общее самочувствие. Финансовое бремя аллергического ринита и бронхиальной астмы значительно, включая госпитализации, расходы на лекарства и недостаточную эффективность. Чтобы разорвать этот порочный круг, необходим комплексный подход, включающий точные заключения,

персонализированное лечение и понимание инструкций [2,4]. В данной статье анализируются существующие симптоматические методы лечения, развивающиеся методы лечения и координируются процедуры лечения для оптимизации результатов у пациентов с обоими заболеваниями.

Цель исследования

Изучить разрывая круг: координация подходов к анализу и лечению аллергического ринита у пациентов с бронхиальной астмой.

Материалы и методы исследования

Аудит эффективности написания был проведен с использованием PubMed, Cochrane Library и Google Researcher, с упором на исследования, проведенные в период с 2019 по 2023 год.

Результаты исследования

Используемые термины включали «ринит с неблагоприятным воздействием и астму», «связанные авиационные заболевания», «иммунотерапия при рините с неблагоприятным воздействием» и «координирует методы лечения». Приоритет отдавался клиническим исследованиям, метаанализам и рекомендациям Всемирной организации по борьбе с астмой (GINA) и организации «ринит с неблагоприятным воздействием и его влияние на астму» (ARIA). Критерии рассмотрения: рассматривается как взрослая, так и детская группа. Исследование, оценивающее симптоматическую точность АР у астматиков. Исследования, сравнивающие монотерапию и комбинированную терапию.

Долгосрочные результаты иммунотерапии.

Критерии запрета: Неаллергический ринит. Рассматриваются клинические случаи или небольшие группы пациентов (<50).

1. Доказательные подходы

Точное определение АР у пациентов с астмой включает: Клиническую оценку Анамнеза и показаний: Заложенность носа, хрипы и ринорея являются основными показаниями.

- Кожные прик-тесты и определение IgE в сыворотке: подтверждают чувствительность к аллергенам.
- Назальная эндоскопия и риноманометрия: оценивают дополнительные отклонения от нормы и сопротивление ветру.
- Тестирование на FeNO (фрагментарный выдыхаемый оксид азота): измеряет раздражение нижних дыхательных путей, связанное с АР.

Считается, что раннее определение АР у астматиков снижает количество обострений на 30-40%.

Методы лечения: а) Фармакотерапия

Интраназальные кортикостероиды (ИКС): препараты первой линии при АР, а также способствуют контролю астмы. Антигистаминные препараты (пероральные/интраназальные): уменьшают хрипы и покалывание, но оказывают незначительное влияние на заложенность носа.

Антагонисты лейкотриеновых рецепторов (АЛР): обладают преимуществом как при АР, так и при астме (например, монтелукаст).

Комбинированное лечение: ИКС + антигистаминные препараты, по-видимому, более распространены по сравнению с монотерапией.

b) Иммунотерапия: Подкожная (ПКИТ) и сублингвальная иммунотерапия (введение): долгосрочные преимущества в уменьшении проявлений АР и астмы за счет повышения устойчивости к аллергенам.

Биопрепараты (омализумаб, дупилумаб): эффективны в тяжелых, сложных случаях, концентрируясь на путях IgE и ИЛ-4/ИЛ-13.

c) Тихое обучение и естественный контроль. Избегание аллергенов (насекомые, пыль, шерсть домашних животных).

Легальные методы ингаляции и назального распыления. Программы отказа от курения.

3. Клинические результаты: Координированное применение приводит к: 50% снижению частоты обострений астмы. Улучшению работы легких (увеличение ОФВ1 на 10-15%). Улучшению показателей качества жизни (изменения AQLQ и RQLQ).

Вывод

Взаимодействие между ринитом с повышенной чувствительностью и астмой требует комплексного подхода к лечению. Раннее выявление, комбинированная фармакотерапия и иммунотерапия существенно улучшают респираторные показатели. Многопрофильная помощь, включающая аллергологов, пульмонологов и специалистов по оказанию неотложной помощи, является основой для оптимального лечения. В будущем необходимо изучить персонализированные подходы к лечению, включая лечение на основе биомаркеров для совершенствования методов лечения. Используя координацию демонстрационных и восстановительных традиций, поставщики медицинских услуг могут разорвать порочный круг постоянного раздражения, уменьшить обострения и улучшить качество жизни пациентов с астмой и АР.

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Ишанов Ж., PhD
специалист
Научно-информационный центр МКВК ЦА
Мирзаев Н. Н., кандидат технических наук
специалист
Научно-информационный центр МКВК ЦА
Ишанов Х., кандидат технических наук
старший научный сотрудник
Узбекистан, Ташкент

СРАВНИТЕЛЬНЫЙ АНАЛИЗ ЭФФЕКТИВНОСТИ КАПЕЛЬНОГО И ДОЖДЕВАЛЬНОГО ОРОШЕНИЯ В ЗАСУШЛИВЫХ КЛИМАТИЧЕСКИХ УСЛОВИЯХ

Аннотация. *В данной статье проведён сравнительный анализ эффективности и целесообразности использования капельных и дождевальных систем орошения в условиях засушливого климата. Исследование выполнено на основе рекомендаций международных организаций FAO и ICARDA, а также анализа существующих научных источников. По результатам анализа установлено, что капельное орошение в условиях ограниченных водных ресурсов обеспечивает рациональное использование имеющихся водных источников и высокую эффективность. Дождевальное орошение, в свою очередь, оценено как экономически целесообразная технология для орошения крупных площадей в регионах с относительно достаточными водными ресурсами.*

Ключевые слова: *капельное орошение, WUE (эффективность использования воды), дождевальное орошение, эффективность, давление, исследование, анализ.*

Ishanov Zh., PhD
specialist
Scientific Information Center of the Central Asian Interstate Water Commission
Mirzaev N. N., candidate of technical sciences
specialist
Scientific Information Center of the Central Asian Interstate Water Commission
Ishanov Kh., candidate of technical sciences
senior researcher
Uzbekistan, Tashkent

COMPARATIVE ANALYSIS OF THE EFFICIENCY OF DRIP AND SPRINKLER IRRIGATION IN ARID CLIMATE CONDITIONS

Abstract. *This article provides a comparative analysis of the efficiency and feasibility of using drip and sprinkler irrigation systems in arid climates. The study is based on recommendations from the international organizations FAO and ICARDA, as well as an analysis of existing scientific literature. The analysis shows that drip irrigation, under conditions of limited water resources, ensures rational use of available water sources and high efficiency. Sprinkler irrigation, in turn, has been assessed as an economically feasible technology for irrigating large areas in regions with relatively sufficient water resources.*

Keywords: *drip irrigation, WUE (water use efficiency), sprinkler irrigation, efficiency, pressure, research, analysis.*

Введение

В условиях засушливого климата естественные осадки не способны полностью удовлетворить потребность сельскохозяйственных культур в воде. В связи с этим внедрение водосберегающих систем орошения становится одним из ключевых факторов обеспечения устойчивости сельского хозяйства. В засушливых регионах орошаемые сельскохозяйственные земли рассматриваются как стратегически важный ресурс, обеспечивающий население продовольствием, укрепляющий продовольственную безопасность и способствующий увеличению экспортного потенциала.

Нормальный рост и развитие сельскохозяйственных культур от прорастания до полного их созревания возможны только при достаточном водообеспечении, поскольку все основные физиологические процессы растений напрямую зависят от наличия воды. Согласно данным научных источников, содержание воды в составе сельскохозяйственных культур составляет от 60 до 90 %. В частности, в странах Центральной Азии, где в больших масштабах возделываются хлопчатник и пшеница, доля воды в растениях хлопчатника в среднем составляет около 60 %, а в пшенице 45,5 % [10].

В последние десятилетия в связи с усилением дефицита водных ресурсов, сокращением речного стока, изменением климата, засолением земель, а также значительными потерями воды в ирригационных сетях наблюдается активизация процесса поэтапного перехода от традиционных методов орошения к водосберегающим технологиям. В этой связи возрастает необходимость внедрения таких ключевых технологий, как капельное и дождевальное орошение. С учётом указанных факторов в данной статье выполнен сравнительный анализ капельных и дождевальных систем орошения в условиях засушливого климата с технической, экономической и экологической точек зрения [7].

В международных научных источниках капельное орошение признано одной из наиболее эффективных водосберегающих технологий. Согласно

данным FAO, по сравнению с традиционным бороздковым поливом применение капельного орошения позволяет сократить расход воды в среднем на 40–70 % и одновременно повысить урожайность на 20–30 %. В исследованиях, проведённых ICARDA, подчёркивается, что использование капельного орошения при возделывании хлопчатника, овощных культур, садов и виноградников в условиях водного дефицита способствует получению стабильных урожаев [12].

Отмечается, что капельное орошение эффективно применяется для полива всех видов сельскохозяйственных культур, возделываемых рядовым способом, включая технические культуры, овощи, плодовые деревья, виноградники и другие древесные насаждения [5]. При внедрении данной системы существенное значение имеют рельеф земельного участка, механический состав и мелиоративное состояние почвы, а также степень минерализации воды, используемой для орошения, что подтверждается результатами научных исследований [10].

В научной литературе, посвящённой дождевальному орошению, подчёркиваются преимущества данного метода при орошении культур с развитой листовой поверхностью. Данная система характеризуется относительно равномерным распределением воды по площади, высоким уровнем механизации оросительного процесса и снижением затрат труда. Вместе с тем в условиях жаркого и ветреного климата испарение водяных капель в воздухе приводит к снижению эффективности орошения [8].

Наряду с этим при дождевальном орошении часть оросительной воды инфильтрируется в почву, что может способствовать частичному пополнению запасов подземных вод. В отдельных случаях такие гидрологические процессы рассматриваются как фактор стабилизации водного баланса локальных экосистем. С этой точки зрения в научных источниках отмечается, что даже в условиях аридного климата дождевальное орошение может оказывать определённое положительное влияние на естественный круговорот воды [9].

В условиях засушливого (аридного) климата ограниченность водных ресурсов делает повышение эффективности оросительных технологий одним из ключевых факторов устойчивого развития сельского хозяйства. Капельное орошение, функционирующее при низком давлении и обеспечивающее подачу воды непосредственно в корнеобитаемую зону растений с минимальными потерями на испарение, рассматривается как более эффективная технология по сравнению с дождевальным орошением.

Дополнительным преимуществом капельного орошения является поддержание стабильного водного режима почвы, снижение риска вторичного засоления, а также возможность эффективного применения фертигации. В научных исследованиях указывается, что использование данной технологии позволяет обеспечить экономию оросительной воды на уровне 80–90 % [12].

Основные преимущества капельного орошения:

Метод капельного орошения обладает рядом технических и агрономических преимуществ, к числу которых относятся следующие [11]:

– локализованная подача воды позволяет существенно снизить потери влаги на испарение;

– поддержание стабильной влажности в корнеобитаемой зоне создаёт благоприятные условия для физиологического развития растений;

– наличие возможности фертигации обеспечивает точное дозирование минеральных удобрений одновременно с оросительной водой;

– в результате сохранения поверхности почвы преимущественно сухой ограничивается рост сорной растительности, облегчается передвижение сельскохозяйственной техники и сокращается количество въездов на поле, что в совокупности повышает экономическую эффективность производства;

– снижается потребность в ручном труде и возрастает уровень автоматизации оросительных процессов.

Недостатки системы капельного орошения

Наряду с преимуществами система капельного орошения имеет и ряд ограничений [4]:

– относительно высокие первоначальные капитальные затраты на внедрение системы;

– при низком качестве оросительной воды и удобрений возрастает риск засорения капельниц вследствие образования отложений, что требует применения растворимых удобрений, эффективных систем фильтрации и регулярного технического обслуживания;

– при недостаточном учёте рельефа местности, водопроницаемости почв и режима орошения возделываемых культур в проектировании системы может привести к неравномерному увлажнению почвы.

Особенности системы дождевального орошения

При дождевальном орошении вода распыляется в воздухе через сопла и распылители и распределяется по поверхности почвы в виде мелких капель. Данная технология обладает рядом преимуществ, включая [11]:

– возможность орошения значительных площадей в короткие сроки;

– пригодность для культур, усваивающих влагу преимущественно через листовой аппарат, кормовых культур, а также многолетних декоративных растений (газоны, кустарниковые насаждения и др.);

– относительно равномерное распределение воды по орошаемой площади;

– в отдельных случаях возможность одновременного внесения растворённых удобрений или средств защиты растений в процессе полива.

Недостатки системы дождевального орошения

Вместе с тем системы дождевального орошения характеризуются рядом ограничивающих факторов [2]:

– при скорости ветра свыше 4–6 м/с направление движения водяных капель изменяется, что приводит к снижению равномерности полива;

– в условиях жаркой и сухой погоды возрастают потери воды вследствие испарения в воздухе и прямого испарения с поверхности почвы;

– использование насосов, работающих при высоком давлении, обусловливает более высокий уровень энергопотребления по сравнению с капельным орошением;

– на некоторых типах почв воздействие капель воды может приводить к образованию поверхностной корки, ограничивающей газообмен.

В связи с этим в условиях ограниченности водных ресурсов аридных регионов сравнительная оценка капельных и дождевальных технологий орошения с технической, агрономической и гидрологической точек зрения позволяет обоснованно выбирать наиболее рациональные и эффективные решения в сфере ирригации [12].

Сравнение основных технических показателей систем капельного и дождевального орошения представлены в таблице 1.

Таблица 1

Наименование технических показателей	**Капельное орошение**	**Дождевальное орошение**
Потери на испарение	3–8 %	20–40 %
Равномерность распределения воды	85–95 %	70–85 %
Требуемое гидравлическое давление	1,0–2,0 бар	2,5–4 бар
Возможность водосбережения	30–60 %	10–25 %
Влияние ветра	Практически отсутствует	Очень высокое
Влияние на засоление почвы	Контролируется	Возможен подъём солей
Техническое обслуживание	Основной элемент фильтры	Основной элемент сопла
Рекомендуемые культуры	Хлопчатник, овощные культуры, сады, бахчевые, интенсивное садоводство	Зерновые культуры, люцерна, газоны, крупные площади

Данные таблицы 1 показывают, что система капельного орошения характеризуется работой при низком гидравлическом давлении, высокой равномерностью распределения воды и минимальными потерями на испарение. В то же время дождевальное орошение, несмотря на техническую удобство при орошении крупных площадей, ограничено высокой чувствительностью к ветровому воздействию и повышенными энергозатратами.

Результаты научных исследований, в том числе экспериментальных работ, проведённых в условиях аридного климата при возделывании хлопчатника, овощных и садоводческих культур, свидетельствуют о том, что при капельном орошении показатель эффективности использования воды WUE (Water Use Efficiency) является более высоким по сравнению с дождевальным орошением [3].

Показатель WUE отражает количество продукции, получаемой на единицу затраченного объёма воды (1 м³), и широко применяется для оценки эффективности использования водных ресурсов в орошаемом земледелии [6].

Данный сравнительный анализ был выполнен на основе следующих основных показателей:

– эффективность использования воды (WUE, кг/м³) отношение урожайности с единицы площади (кг/га) к объёму воды, затраченной на орошение данного участка (м³/га) [3];

– урожайность (т/га или кг/га) в зависимости от применяемого способа орошения;

– потери воды, включающие испарение, глубокую инфильтрацию и поверхностный сток.

В качестве методического подхода использовались анализ существующих научных источников, метод сравнительного анализа, а также условное моделирование для оценки возможностей применения различных технологий орошения в условиях аридного климата.

Показатель эффективности использования воды (WUE) рассчитывается по формуле (1) [7], которая отражает степень преобразования растением затраченной воды в продукцию.

$$WUE = \frac{\text{Урожайность культуры}}{\text{Расход воды}}, \frac{\text{кг}}{\text{м}^3} \quad (1)$$

где:

– при высоком значении WUE культура формирует больший урожай при меньшем расходе воды, что свидетельствует о высокой эффективности водопользования.

– при низком значении WUE расход воды возрастает, однако урожайность остаётся низкой, что указывает на низкую эффективность водопользования.

Если урожайность культуры составляет Y (кг/га) а объём воды, затраченной на орошение, равен W (м³/га), то формула (1) может быть представлена в следующем виде (формула 2):

$$WUE = \frac{Y}{W}, \frac{\text{кг}}{\text{м}^3} \quad (2)$$

При применении выражения (2) к сельскохозяйственным культурам, выращиваемым с использованием капельного орошения, урожайность принимается равной 7,0 т/га. В целях унификации единиц измерения при расчёте показателя WUE урожайность переводится из тонн в килограммы. В данном случае 7,0 т соответствует 7000 кг/га.

При условии, что объём воды, затраченной на выращивание сельскохозяйственной культуры, составляет 3500 м³/га, показатель WUE будет равна:

$$WUE = \frac{7000}{3500} = 2{,}0 \ \frac{\text{кг}}{\text{м}^3}$$

Условное моделирование показывает, что в условиях аридного климата применение капельного орошения при возделывании сельскохозяйственных культур позволяет определить эффективность использования имеющихся водных ресурсов и создать условия для достижения более высокой урожайности.

В рамках данного моделирования для зерновых культур, выращиваемых с применением дождевального орошения, принимается следующее условие. При урожайности 6 т/га в целях унификации единиц измерения при расчёте показателя WUE урожайность переводится из тонн в килограммы и составляет 6000 кг/га. При объёме воды, затраченной на получение данного урожая, равном 4000 м³/га, показатель WUE будет равна:

$$WUE = \frac{6000}{4000} = 1{,}5, \ \frac{\text{кг}}{\text{м}^3}$$

Согласно результатам условного моделирования, в условиях аридного климата при дождевальном орошении эффективность использования воды (WUE) составила 1,5 кг/м³, то есть в среднем каждый 1 м³ затраченной воды преобразуется растением в 1,5 кг сельскохозяйственной продукции, что подтверждено расчётами.

Результаты приведённого условного моделирования показывают, что при капельном орошении за счёт подачи воды непосредственно в корневую зону растений сохраняется возможность поддержания урожайности даже при сокращении поливных норм. В условиях дождевального орошения, напротив, вследствие распределения воды через воздушную среду усиливается влияние ветра и возрастает неравномерность увлажнения. Особенно в районах с ограниченными водными ресурсами это может приводить к недостаточному увлажнению отдельных участков посевных площадей, что, в свою очередь, оказывает отрицательное влияние на урожайность сельскохозяйственных культур.

С экономической точки зрения первоначальные инвестиционные затраты (CAPEX Capital Expenditures) на системы капельного орошения, как правило, выше по сравнению с системами дождевального орошения. Однако в условиях высокой стоимости воды или наличия водных ресурсов экономия водных ресурсов, достигаемая при капельном орошении, позволяет компенсировать данные инвестиционные затраты в относительно короткие сроки. Особенно высокая рентабельность капельного орошения отмечается при возделывании экспортно-ориентированных и высокоценных культур, таких как плодоовощные культуры, сады и виноградники [1]. В то же время при выращивании зерновых культур и на обширных посевных площадях системы дождевального орошения считаются экономически более целесообразными вследствие более низких капитальных затрат и относительной простоты эксплуатации [1].

В сельском хозяйстве показатель эффективности использования воды WUE является важным научным критерием для определения наиболее эффективного способа орошения в условиях водного дефицита, сравнения

водоотдачи различных сельскохозяйственных культур, а также оценки экономической эффективности применяемых технологий орошения.

Результаты проведённого анализа показывают, что в условиях аридного климата система капельного орошения в целом является более эффективной по сравнению с дождевальным орошением с точки зрения водосбережения, устойчивого повышения урожайности и обеспечения агроэкологической устойчивости. На обширных площадях, при возделывании зерновых и кормовых культур, а также в регионах с высокой степенью механизации и умеренно ограниченными водными ресурсами применение дождевального орошения остаётся приоритетным.

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Каюмов Р. И., к.э.н.
заведующий отделом
Центр исследования проблем приватизации и управления государственными активами при Агентстве по управлению государственными активами РУз
Галкин В. Ю., к.э.н.
старший научный сотрудник
Центр исследования проблем приватизации и управления государственными активами при Агентстве по управлению государственными активами РУз
г. Ташкент, Узбекистан

РАЗРАБОТКА ТИПОВОЙ ФОРМЫ ПЛАНА ПРОВЕДЕНИЯ ПРОЦЕДУР НЕПЛАТЕЖЕСПОСОБНОСТИ В РЕСПУБЛИКЕ УЗБЕКИСТАН – ТРЕБОВАНИЕ ВРЕМЕНИ

Аннотация. *В статье анализируется отсутствие унифицированных подходов к планированию процедур неплатежеспособности в Республике Узбекистан и обосновывается необходимость внедрения типового плана. Показано, что стандартизация деятельности судебного управляющего повышает эффективность процедур, качество управления и защиту интересов участников, формируя устойчивую и предсказуемую правоприменительную практику. Авторами предложен подход по формированию структуры данного документа.*

Ключевые слова: *неплатежеспособность, судебный управляющий, типовой план, стандартизация, процедуры неплатежеспособности, бухгалтерский учет.*

Kayumov R. I., Ph.D. in Economics
Head of Department
Center for Research of Privatization and State Assets Management Issues under the Agency for State Assets Management of the Republic of Uzbekistan
Galkin V. Y., Ph.D. in economics,
senior researcher
Center for Research of Privatization and State Assets Management Issues under the Agency for State Assets Management of the Republic of Uzbekistan
Uzbekistan, Tashkent

DEVELOPING A STANDARD INSOLVENCY PROCEDURE PLAN IN THE REPUBLIC OF UZBEKISTAN IS A PRESSING NEED

Abstract. *This article analyzes the lack of unified approaches to insolvency procedure planning in the Republic of Uzbekistan and substantiates the need to introduce a standard plan. It is shown that standardizing the activities of the insolvency administrator improves the efficiency of procedures, the quality of management, and the protection of the interests of the parties, creating sustainable and predictable law enforcement practices. The authors propose an approach to structuring this document.*

Keywords: *insolvency, insolvency administrator, standard plan, standardization, insolvency procedures, accounting.*

Стандартизация как правовая категория предполагает установление единых, обязательных или рекомендательных правил осуществления определенной деятельности, направленных на упорядочение общественных отношений и снижение уровня правовой неопределенности. В сфере неплатежеспособности стандартизация приобретает особое значение, поскольку процедуры неплатежеспособности затрагивают интересы широкого круга лиц и требуют четкой координации действий всех участников процесса. Ее основная цель заключается в упорядочении процедур, минимизации субъективного усмотрения и создании предсказуемых условий для правоприменения.

С теоретической точки зрения процедуры неплатежеспособности представляют собой сложный и многоуровневый комплекс юридических, экономических и управленческих действий, реализуемых в строго определенной процессуальной форме. Судебный управляющий в данном процессе выступает не только как процессуальное лицо, наделенное определенными полномочиями, но и как антикризисный менеджер, аналитик финансового состояния должника, организатор взаимодействия с кредиторами и посредник между судом и участниками процедуры. В отсутствие стандартных инструментов планирования эффективность реализации этих функций существенно снижается, что негативно отражается на результатах процедур неплатежеспособности.

Международный опыт, в частности практика государств Европейского союза, а также рекомендации Комиссии ООН по праву международной торговли (ЮНСИТРАЛ), свидетельствуют о том, что наличие типовых планов, методических рекомендаций и стандартов отчетности является важным элементом успешного функционирования современных систем неплатежеспособности. Такие документы обеспечивают сопоставимость процедур, повышают уровень прозрачности, способствуют снижению конфликтности и формированию устойчивой и единообразной судебной практики.

В Республике Узбекистан до настоящего времени планирование процедур неплатежеспособности носило фрагментарный характер и во многом зависело от профессионального уровня, опыта и субъективного подхода конкретного судебного управляющего. Это приводило к

существенным различиям в качестве планирования и документирования процедур, а также к неодинаковому уровню защиты прав кредиторов. Указанные обстоятельства объективно обусловливают необходимость институционализации стандартов деятельности через разработку типовой формы плана проведения процедур неплатежеспособности.

Стандарт должен представлять собой комплексный нормативно-методический документ, регламентирующий деятельность судебного управляющего на всех стадиях рассмотрения дел о неплатежеспособности. Он будет обеспечивать логическую взаимосвязь между отдельными процедурами, последовательность действий управляющего и их соответствие целям конкретной стадии процесса.

В общих положениях стандарта предполагается отражение процедур неплатежеспособности — наблюдения, судебной санации, внешнего управления и ликвидационного производства, применяемые в отношении должника — юридического лица. Кроме того, стандарт распространяться на процедуры реструктуризации долга, признания банкротом и продажи имущества физических лиц, а также на ликвидационное производство в отношении индивидуальных предпринимателей, что позволит обеспечить единый подход к регулированию различных категорий дел.

В нормативную базу стандарта следует включить положения Законов Республики Узбекистан «О неплатежеспособности», «О бухгалтерском учете», Гражданского кодекса Республики Узбекистан, а также Национальных стандартов бухгалтерского учета и других нормативно-правовые актов.

Такая межотраслевая интеграция обеспечивает комплексный и системный подход к оценке имущественного и финансового состояния должника, что имеет принципиальное значение для обоснованности принимаемых решений.

Проект стандарта должен предусматривать также типовые формы отчетов судебных управляющих и протоколов собраний кредиторов, что будет свидетельствовать о стремлении законодателя и регуляторов к системному упорядочению всей документации, используемой в рамках процедур неплатежеспособности. Унификация данных документов позволит повысить их аналитическую ценность и упростить контроль со стороны суда и кредиторов.

В стандарте необходимо четко сформулировать основные цели внедрения типовых форм. Прежде всего, речь идет об обеспечении единообразной, прозрачной и эффективной организации процедур неплатежеспособности, а также о повышении качества управления ими со стороны судебных управляющих.

Единообразие будет достигаться за счет установления общего алгоритма действий судебного управляющего, что исключит произвольное толкование процедур и снизит риск процессуальных ошибок. Прозрачность обеспечивается путем представления информации в структурированной,

логически выстроенной и сопоставимой форме, понятной для суда, кредиторов и иных заинтересованных лиц.

Важной задачей типового плана является упрощение контроля и анализа процедур со стороны государственных органов и судебных инстанций. Стандартизированные документы позволяют оперативно оценивать эффективность действий управляющего, соблюдение установленных сроков и полноту выполнения возложенных на него обязанностей.

Кроме того, внедрение типовых форм способствует экономии времени и ресурсов, поскольку судебным управляющим не требуется разрабатывать индивидуальные планы и формы отчетности по каждому делу. Это особенно актуально в условиях роста количества дел о неплатежеспособности и увеличения нагрузки на судебную систему.

Если обратиться непосредственно к каждой из процедур неплатежеспособности, то роль типового плана проявляется следующим образом.

Процедура наблюдения является начальной стадией дела о неплатежеспособности юридического лица и имеет основополагающее значение для определения дальнейшей судьбы должника. Типовой план позволяет систематизировать действия по обеспечению сохранности имущества должника, проведению анализа его финансового состояния, формированию реестра требований кредиторов и подготовке первого собрания кредиторов, что создает основу для принятия обоснованных решений.

Наличие стандартизированного плана минимизирует риски утраты активов, искажения финансовой информации и недобросовестных действий со стороны участников процесса, а также повышает качество принимаемых судом решений.

В процедурах судебной санации и внешнего управления типовой план выступает важнейшим инструментом стратегического управления процессом восстановления платежеспособности должника. Он позволяет четко определить этапы финансового оздоровления, меры по реструктуризации задолженности, источники финансирования и контрольные показатели эффективности.

Передача полномочий внешнему управляющему в условиях стандартизированного планирования снижает вероятность злоупотреблений, повышает прозрачность принимаемых решений и усиливает ответственность управляющего за конечный результат процедуры.

В рамках ликвидационного производства типовой план обеспечивает последовательность и логичность действий по инвентаризации, оценке и продаже имущества должника, а также по пропорциональному удовлетворению требований кредиторов. Прозрачность и предсказуемость данных процедур имеют принципиальное значение для поддержания доверия к институту неплатежеспособности и защиты интересов кредиторов.

Учитывая то обстоятельство, что каждая из процедур неплатежеспособности имеет свои особенности и исходя из зарубежного опыта, в целях повышения эффективности их проведения, необходимо, основываясь на общем типовом плане, разработать отдельные стандарты для каждой из применяемых процедур.

Основными источниками информации о ходе проведения процедур неплатежеспособности являются отчеты судебных управляющих и протоколы собраний кредиторов. Их унификация позволит обеспечить сопоставимость данных, повысить качество судебного контроля и создать основу для аналитической и статистической работы в сфере неплатежеспособности.

Типовые формы отчетности также способствуют формированию объективных критериев оценки деятельности судебных управляющих, что может быть использовано при их аттестации, повышении квалификации и применении мер профессиональной ответственности.

Разработка и внедрение типовой формы плана проведения процедур неплатежеспособности в Республике Узбекистан является важным направлением совершенствования правового регулирования института неплатежеспособности. Типовой план выступает не только техническим документом, но и эффективным инструментом управления процедурой, повышения прозрачности и подотчетности судебных управляющих.

Подводя итог изложенному выше, можно сделать вывод о том, что наличие типовой формы плана проведения процедур неплатежеспособности в Республике Узбекистан, являясь одним из основных условий повышения эффективности деятельности судебного управляющего, закладывает основу для формирования единых профессиональных стандартов и способствует укреплению доверия участников экономического оборота к системе неплатежеспособности. Ее внедрение в перспективе может стать важным фактором повышения инвестиционной привлекательности и устойчивости экономики Республики Узбекистан.

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Мирзаев Э. С.
доцент
Каршинский Государственный Технический Университет
Республика Узбекистан, г.Карши

ТЕХНОЛОГИИ БУРЕНИЯ НЕФТЯНЫХ И ГАЗОВЫХ СКВАЖИН И СОВРЕМЕННЫЕ НАПРАВЛЕНИЯ ИХ РАЗВИТИЯ

Аннотация: *В статье рассмотрены основные технологические этапы бурения нефтяных и газовых скважин, применяемые методы бурения, буровое оборудование, а также современные инновационные решения в данной области. Проанализированы преимущества наклонно-направленного и горизонтального бурения, основные осложнения, возникающие в процессе бурения, и способы их предупреждения и устранения. Материал предназначен для специалистов нефтегазовой отрасли, магистрантов, аспирантов и студентов технических вузов.*

Ключевые слова: *нефтяная и газовая скважина, бурение, горизонтальное бурение, буровой раствор, буровая установка, конструкция скважины.*

Mirzaev E. S.
associate professor
Karshi State Technical University
Republic of Uzbekistan, Karshi

OIL AND GAS WELL DRILLING TECHNOLOGIES AND CONTEMPORARY DIRECTIONS OF THEIR DEVELOPMENT

Abstract: *This article examines the main technological stages of oil and gas well drilling, the drilling methods used, drilling equipment, and modern innovative solutions in this field. It analyzes the advantages of directional and horizontal drilling, the main complications that arise during drilling, and methods for preventing and eliminating them. This material is intended for oil and gas industry specialists, master's degree students, postgraduate students, and students of technical universities.*

Keywords: *oil and gas well, drilling, horizontal drilling, drilling fluid, drilling rig, well design.*

Введение

Нефтегазовая промышленность занимает ключевое место в мировой энергетике. Основным способом вскрытия и освоения залежей углеводородов является бурение скважин. Совершенствование технологий бурения позволяет сократить сроки строительства скважин, снизить капитальные затраты, повысить коэффициент извлечения нефти и газа, а

также минимизировать негативное воздействие на окружающую среду. В связи с этим изучение и развитие технологий бурения является актуальной научно-технической задачей.

1. Понятие бурения нефтяных и газовых скважин

Бурение — это процесс разрушения горных пород с помощью специального бурового инструмента с целью сооружения скважины заданной глубины и траектории. В зависимости от геолого-технических условий различают вертикальные, наклонно-направленные и горизонтальные скважины. Выбор типа скважины определяется строением месторождения и принятой технологией разработки.

2. Методы бурения

2.1. Механическое бурение

Механическое бурение является наиболее распространённым методом и основано на разрушении горных пород вращающимся долотом. В процессе используется бурильная колонна, передающая осевую нагрузку и крутящий момент на долото.

2.2. Турбинное бурение

При турбинном бурении вращение долота осуществляется за счёт турбобура, установленного в нижней части бурильной колонны. Данный метод эффективен при бурении глубоких скважин и в твёрдых горных породах.

2.3. Комбинированные методы бурения

В современной практике применяются комбинированные методы, сочетающие механическое воздействие на породу с гидравлической энергией потока бурового раствора, что повышает механическую скорость бурения.

3. Буровое оборудование

Для бурения нефтяных и газовых скважин применяются следующие основные элементы оборудования:

- буровая установка;
- бурильная колонна;
- долота (шарошечные, лопастные, PDC);
- буровые насосы;
- системы приготовления, очистки и циркуляции бурового раствора.

4. Роль бурового раствора

Буровой раствор выполняет ряд важнейших функций: вынос выбуренной породы на поверхность, охлаждение и смазка долота, предотвращение обрушения стенок скважины, а также поддержание пластового давления. По составу различают водные, нефтяные и синтетические буровые растворы.

5. Наклонно-направленное и горизонтальное бурение

Наклонно-направленное и горизонтальное бурение являются одними из наиболее перспективных технологий современного бурения. Их применение позволяет увеличить площадь дренирования пласта, повысить

дебит скважин и сократить количество эксплуатационных скважин на месторождении.

6. Осложнения при бурении скважин

В процессе бурения могут возникать различные осложнения, среди которых:

- обрушение стенок скважины;
- прихваты бурильного инструмента;
- поглощение бурового раствора;
- аномально высокие пластовые давления и температуры.

Для предупреждения и ликвидации осложнений применяются современные системы геолого-технологического мониторинга и автоматизированного управления процессом бурения.

Заключение

Бурение нефтяных и газовых скважин представляет собой сложный и наукоёмкий процесс, требующий применения современных технических и технологических решений. Внедрение инновационных методов бурения, цифровых технологий и элементов искусственного интеллекта способствует повышению эффективности освоения месторождений и снижению производственных рисков.

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Мухсинова Ш. М.
ассистент
Самаркандский государственный медицинский университет
Авазова М. Ш.
студент
факультета биотехнологии, инженерии и фармации
Самаркандский государственный медицинский университет

ВИДЫ ПАМЯТИ И МЕТОДЫ ЕЁ РАЗВИТИЯ

Аннотация. *В данной статье подробно рассматривается память как один из важнейших компонентов психики человека, а также её основные виды. Память представляет собой процесс сохранения, воспроизведения и переработки информации в сознании человека. В статье отдельно анализируются основные виды памяти, в том числе кратковременная, долговременная, оперативная, эмоциональная, а также произвольная и непроизвольная память. С научной точки зрения раскрываются специфические особенности каждого вида памяти, механизмы их функционирования и роль в жизнедеятельности человека. Кроме того, в статье освещаются эффективные методы развития памяти, включая усиление логического мышления, техники запоминания (ассоциации, визуализация, повторение), влияние здорового образа жизни, правильного питания и физической активности на память, а также возможности развития памяти с использованием современных технологий и мобильных приложений. Также приводится информация о психологических упражнениях и тренингах по укреплению памяти, а также о методиках, разработанных на основе научных исследований. Данная статья может быть полезна педагогам, психологам, студентам и широкому кругу читателей, интересующихся теоретическими основами памяти и практическими способами её развития. Материал носит не только теоретический, но и прикладной характер и способствует формированию практических навыков, а также более глубокому пониманию роли и значения памяти в личностном развитии и образовательном процессе.*

Ключевые слова: *память, виды памяти, произвольная память, непроизвольная память, кратковременная память, долговременная память, эйдетическая память, развитие памяти, психология, обучение, стратегии запоминания, умственные упражнения.*

Mukhsinova Sh. M.
assistant
Samarkand State Medical University
Avazova M. Sh.
student
faculty of biotechnology, engineering, and pharmacy
Samarkand State Medical University

TYPES OF MEMORY AND METHODS OF ITS DEVELOPMENT

Annotation. *This article examines in detail memory as one of the most important components of the human psyche, as well as its main types. Memory is the process of storing, reproducing, and processing information in the human mind. The article separately analyzes the main types of memory, including short-term, long-term, operational, emotional, as well as voluntary and involuntary memory. From a scientific point of view, the specific features of each type of memory, the mechanisms of their functioning and their role in human life are revealed. In addition, the article highlights effective methods of memory development, including strengthening logical thinking, memory techniques (associations, visualization, repetition), the impact of a healthy lifestyle, proper nutrition and physical activity on memory, as well as the possibilities of memory development using modern technologies and mobile applications. It also provides information about psychological exercises and memory strengthening trainings, as well as methods developed on the basis of scientific research. This article may be useful for teachers, psychologists, students, and a wide range of readers interested in the theoretical foundations of memory and practical ways to develop it. The material is not only theoretical, but also applied in nature and contributes to the formation of practical skills, as well as a deeper understanding of the role and importance of memory in personal development and the educational process.*

Keywords: *memory, types of memory, arbitrary memory, involuntary memory, short-term memory, long-term memory, eidetic memory, memory development, psychology, learning, memory strategies, mental exercises.*

Введение

Одним из самых сложных и удивительных аспектов человеческого сознания является память — способность сохранять, воспроизводить и перерабатывать прошлые события, знания, впечатления и опыт. Память является неотъемлемой частью личности человека и развивается в тесной взаимосвязи с мышлением, речью, восприятием, воображением и другими психическими процессами. В настоящее время в науке, особенно в области психологии и нейропсихологии, широко проводятся исследования, посвящённые природе памяти, её видам и способам развития. Это связано с тем, что требования современной жизни, усиление информационного потока

и необходимость формирования конкурентоспособной личности требуют высокого уровня развития памяти [1].

Память играет важную роль в жизни каждого человека. Она необходима не только для успешного обучения в школе и высших учебных заведениях, но и для быстрой адаптации к различным жизненным ситуациям, решения проблем и принятия правильных решений в повседневной жизни. Особенно в образовательном процессе эффективность усвоения знаний, их сохранение и правильное применение в нужный момент напрямую зависят от активности памяти. В связи с этим в педагогической практике уделяется большое внимание методам, приёмам, играм, техникам и психологическим тренингам, направленным на развитие памяти.

Память не функционирует одинаково — она проявляется в различных формах. Например, существуют кратковременная, долговременная, образная, логическая, двигательная и эмоциональная память. Каждый вид памяти имеет свои функции, сферу деятельности и механизм развития. Кроме того, уровень развития памяти у людей различен и зависит от наследственности, среды, воспитания, тренировок и личных интересов. Поэтому индивидуальный подход к развитию памяти имеет большое значение [2].

В данной статье рассматриваются научно-психологические трактовки памяти, её основные виды, их особенности, а также методы усиления, активизации и эффективного развития памяти. Кроме того, анализируются способы укрепления памяти с помощью современных технологий, упражнений, игр и практических рекомендаций. Статья может быть полезна специалистам в области образования, психологам, студентам и широкому кругу читателей, стремящихся повысить свой интеллектуальный потенциал.

Анализ литературы

Память является одной из основных функций человеческого сознания, позволяющей личности сохранять собственный опыт, знания и эмоциональные состояния, восстанавливать их и связывать с новой информацией. Многочисленные исследования в области психологии, неврологии, педагогики и когнитивных наук направлены на выявление видов памяти и разработку методов их развития.

Первые научные представления о памяти восходят к эпохе Аристотеля, который рассматривал её как естественный процесс, основанный на сознательной деятельности. Впоследствии Герман Эббингауз (1885) провёл первые эмпирические исследования памяти и разработал закономерности забывания. Его кривая забывания до сих пор используется как методологическая основа в исследованиях памяти [3].

В современной психологии память обычно подразделяется на три основных вида: сенсорную, кратковременную (оперативную) и долговременную. Многокомпонентная модель Аткинсона и Шиффрина (1968) теоретически обосновала эти виды памяти. Согласно данной модели, внешняя информация сначала кратковременно сохраняется в сенсорной памяти, затем перерабатывается в оперативной памяти и переходит в

долговременную. Долговременная память, в свою очередь, делится на декларативную (фактические знания) и процедурную (навыки и привычки) память (Талвинг, 1972) [4].

Неврологические исследования, в частности работы Кандела (2001) и Бэддели (1992), показали важную роль структур мозга — особенно гиппокампа и лобной коры — в формировании и закреплении памяти. Особое внимание уделяется таким факторам, влияющим на память, как внимание, эмоциональное состояние, мотивация, уровень стресса и качество сна.

В педагогике широко изучаются эффективные методы развития памяти, такие как повторение, смысловое связывание, визуализация, ассоциации и мнемотехника. Узбекские учёные-педагоги Джуманиёзов, Йулдошев, Кодирова и другие также проводили исследования в области развития памяти и мышления. Так, Джуманиёзов (2005) подчёркивал эффективность использования мнемотехнических приёмов для развития логической памяти у учащихся [5].

В последние годы исследования памяти вышли на новый уровень благодаря интеграции с искусственным интеллектом и нейропсихологией. Использование виртуальной реальности, технологий сканирования мозга и когнитивных тренингов позволяет искать новые пути активизации памяти. Например, онлайн-платформы Lumosity и CogniFit рассматриваются как эффективные средства тренировки памяти, концентрации внимания и когнитивной гибкости (Hardy et al., 2015) [6].

Также важно учитывать возрастные особенности развития памяти у детей и взрослых. Теории Пиаже и Выготского, посвящённые этапам развития мышления ребёнка, создали возможности для интеграции упражнений на память в образовательный процесс.

Таким образом, анализ литературы показывает, что правильное определение видов памяти и выбор соответствующих методов их развития играют ключевую роль в повышении интеллектуального потенциала личности. Исследования памяти продолжаются в междисциплинарном направлении, объединяя психологию, образование, нейронауку и технологии [7].

Методология исследования

В данном исследовании для глубокого изучения видов памяти и методов её развития был применён комплексный подход. В качестве методологии использовались научно-теоретический анализ, эмпирическое наблюдение, психологическое тестирование, сравнение и обобщение. С помощью этих методов были изучены особенности кратковременной, долговременной, семантической, эпизодической, двигательной и визуальной памяти, а также механизмы их формирования и динамика развития [8].

На первом этапе были проанализированы научные источники — монографии, статьи и психологические исследования. В качестве

теоретической основы использовались работы Уильяма Джеймса, Германа Эббингауза, Жана Пиаже, А. Р. Лурии, Б. М. Теплова и других учёных [9].

На эмпирическом этапе были проведены практические исследования с участием студентов, школьников и представителей разных возрастных групп. С помощью психологических тестов изучались уровень памяти, её роль в деятельности, навыки запоминания и воспроизведения информации. Использовались следующие методики:

- тест оценки интеллектуальных способностей Р. Амтхауэра;
- тест Эббингауза на запоминание бессмысленных слогов;
- тесты визуальной и слуховой памяти;
- методики оценки концентрации внимания.

Результаты анализировались с учётом возраста, пола, уровня интеллекта и профессиональной деятельности участников. Для обработки данных применялись методы описательной статистики и корреляционного анализа [10].

Также использовался экспериментальный метод, направленный на оценку эффективности упражнений и тренингов по развитию памяти (мнемотехники, ассоциативное мышление, ментальные карты, медитация и управление вниманием). Результаты тестирования до и после эксперимента сравнивались для определения эффективности методик.

Дополнительно применялись интерактивные методы — беседы, опросники и наблюдения, позволяющие изучить субъективное отношение участников к собственной памяти и возникающим трудностям.

В целом применённая методология позволила всесторонне изучить как теоретические, так и практические аспекты памяти и разработать рекомендации по её развитию в образовательной и воспитательной практике [11].

Результаты и обсуждение

Результаты проведённых исследований показали, что память является центральным компонентом психики человека и тесно связана с сознательной деятельностью, восприятием, мышлением и речью. Различные формы памяти — кратковременная, долговременная, произвольная, непроизвольная, эмоциональная, образная и механическая — играют важную роль во всех сферах человеческой деятельности.

Кратковременная память сохраняет информацию от нескольких секунд до нескольких минут и особенно важна в учебном процессе и при принятии оперативных решений. Долговременная память обеспечивает сохранение знаний и навыков на длительный срок, а её формирование зависит от повторения, осмысленного усвоения и эмоциональной вовлечённости [12].

Произвольная память основана на сознательных усилиях человека и развивается через концентрацию внимания, мотивацию и целенаправленную деятельность. Непроизвольная память формируется без специальных намерений и часто носит случайный характер.

Анализ практических методов показал, что логическое связывание материала, визуализация, ассоциации, интервальное повторение и активное мышление положительно влияют на укрепление памяти. Мнемонические приёмы, креативные методы и эмоциональная вовлечённость широко применяются в современной психологии и педагогике [13].

Опросы и наблюдения показали, что регулярные упражнения, здоровый образ жизни, качественный сон, снижение уровня стресса и позитивная мотивация существенно повышают активность памяти. Рациональное использование информационных технологий также является эффективным вспомогательным средством [14].

Индивидуальные различия в памяти требуют персонализированного подхода в обучении. У одних людей лучше развита зрительная память, у других — слуховая, что необходимо учитывать в образовательном процессе.

В целом память является одним из ключевых факторов жизненного и профессионального успеха, а её развитие требует систематического и научно обоснованного подхода [15].

Заключение

Память — неотъемлемая и важнейшая составляющая психики человека, обеспечивающая усвоение, сохранение и воспроизведение знаний. В статье были проанализированы основные виды памяти и их роль в повседневной и профессиональной деятельности человека.

Развитие памяти представляет собой непрерывный процесс, направленный на повышение когнитивного потенциала и интеллектуальных возможностей личности. Ассоциации, визуализация, концентрационные упражнения, мнемотехники, ментальные карты, регулярное повторение, медитация и физическая активность доказали свою эффективность.

В условиях информационного общества особенно важно осознанно управлять памятью и снижать негативное влияние стресса и перегрузки информацией. Распространение знаний о развитии памяти актуально для всех возрастных групп.

Таким образом, изучение и развитие памяти с учётом индивидуальных особенностей и современных научных достижений способствует личностному росту, профессиональному развитию и успешной социальной адаптации. В дальнейшем ожидается расширение исследований памяти в области нейропсихологии и искусственного интеллекта, что откроет новые перспективы для повышения когнитивного потенциала человека.

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Назарова Л. М.
ассистент
кафедра «узбекского и русского языков»
University of economics and pedagogy НВУЗа
магистрант специальности «Лингвистика: русский язык»
Андижанский государственный университет имени З.М. Бабура
Республика Узбекистан

СТРУКТУРНО-КОМПОЗИЦИОННЫЕ ОСОБЕННОСТИ ВОПРОСОВ ИНТЕЛЛЕКТУАЛЬНОЙ ИГРЫ «ЧТО? ГДЕ? КОГДА?» КАК РЕЧЕВОГО ЖАНРА

Аннотация: *В статье проводится лингвистический анализ вопросов интеллектуальной игры «Что? Где? Когда?» как самостоятельного речевого жанра. Определяется их универсальная структурно-композиционная модель, включающая преамбулу, основную часть и вопросную формулу. Выявляется функциональная роль ключевых элементов и ограничительных компонентов, обеспечивающих направленный когнитивный поиск и формирование единственно верного ответа. Полученные результаты подтверждают устойчивость жанровой структуры вопросов при вариативности их языкового оформления.*

Ключевые слова: *интеллектуальная игра, «Что? Где? Когда?», речевой жанр, вопрос, структура вопроса,имплицитность, прагматика,лингвистический анализ.*

Nazarova L. M.
assistant lecturer
department of uzbek and russian languages
University of Economics and Pedagogy (Non-State Higher Education Institution)
master's student in linguistics: russian language
Andijan State University named after Z. M. Babur
Republic of Uzbekistan

STRUCTURAL AND COMPOSITIONAL FEATURES OF QUESTIONS IN THE INTELLECTUAL GAME "WHAT? WHERE? WHEN?" AS A SPEECH GENRE

Abstract:*The article presents a linguistic analysis of questions used in the intellectual game "What? Where? When?" as an independent speech genre. A universal structural and compositional model of the question is identified, including a preamble, a main body, and a question formula. The functional role of key elements and restrictive components that ensure directed cognitive search and the formation of a single correct answer is revealed. The results obtained confirm*

the stability of the genre structure of the questions despite the variability of their linguistic realization.

Keywords: *intellectual game, "What? Where? When?" speech genre, question, question structure, implicitness, pragmatics, linguistic analysis.*

Введение

В настоящее время популярность среди молодёжи набирают интеллектуальные игры. В большинстве случаев основной целью участвующих в данных играх является нахождение правильного ответа на вопросы путём логического рассуждения. Данная статья рассматривает вопросы интеллектуальной игры «Что? Где? Когда?» в лингвистическом аспекте, а также определяет наиболее общую структуру вопроса. Интеллектуальная игра «Что? Где? Когда?» представляет собой уникальное коммуникативное явление, находящееся на пересечении игровой, познавательной и дискурсивной практик. Вопросы данной игры являются как средством организации игрового процесса, так и самостоятельным речевым жанром, обладающим устойчивыми структурно-композиционными и прагматическими характеристиками.

Анализ вопросов интеллектуальной игры «Что? Где? Когда?» в аспекте теории речевых жанров позволяет выявить особенности их языкового оформления, коммуникативных целей и функциональной нагрузки, что обусловливает актуальность настоящего исследования.

Материалы и методы

Методологическую основу исследования составляют описательныйметод, структурно-композиционный и лексико-стилистический анализы. В качестве информационной базы для исследования были отобраны вопросы различных редакторов, находящиеся в свободном доступе на официальном сайте «Вопросы Что? Где? Когда?» [1], а также методическое пособие Юрия Вашкулата [2].

Обсуждение и результаты

Вопрос интеллектуальной игры «Что? Где? Когда?» как речевой жанр представляет собой особый тип игрового задания, вербально оформленного средствами естественного языка и ориентированного на инициирование коллективной мыслительной деятельности адресатов. В лингвистическом отношении данный жанр характеризуется рядом устойчивых признаков, отличающих его от других видов заданий и вопросных форм. Вопрос характеризуется следующими признаками: лаконичность формулировки; основание на общедоступных фактах; содержание элементов, предполагающих своей целью направление адресатов на логическое рассуждение и актуализацию фоновых представлений, включая элементы культурного и аксиологического опыта [3].

В лингвистическом отношении вопрос интеллектуальной игры «Что? Где? Когда?» обладает устойчивой структурно-композиционной организацией, направленной на поэтапную актуализацию когнитивной

деятельности адресатов и контролируемое выведение их к единственно верному ответу. Универсальная модель вопроса включает преамбулу, основную часть и вопросную формулу («пуант»).Преамбула выполняет функцию коммуникативной и когнитивной настройки адресата, в ней вводится исходный контекст, активизируются фоновые знания и формируется общее направление интерпретации. С точки зрения прагматики речи преамбула задаёт условия понимания последующей информации и подготавливает адресата к решению задачи.Основная часть представляет собой информативное ядро вопроса и включает совокупность фактов и семантически маркированных компонентов, выполняющих эвристическую функцию. В её структуре выделяются так называемые «ключевые (крючковые) элементы», которые служат имплицитными ориентирами для поиска ответа. Данные элементы формируют ассоциативные связи, задают направление рассуждения и выступают в роли косвенного указания на искомый объект [4]. Наряду с ними в основной части присутствуютограничительные компоненты высказывания, направленные на исключение неверных интерпретаций. Ограничительные компоненты игроки часто называют «отсечками». «Отсечки» реализуются посредством конкретизирующих указаний и выполняют функцию семантического сужения поля возможных ответов.Вопросная часть, оформленная в виде прямо выраженной вопросной конструкции, среди игроков именуемая «формой вопроса» или «пуантом», завершает формулировку задания. Именно здесь осуществляется финальная прагматическая установка на ответное действие адресатов. «Пуант», как правило, содержит смысловую кульминацию вопроса, актуализируя скрытые связи между компонентами текста и обеспечивая переход от интерпретации к формулированию ответа. Общую структуру вопроса интеллектуальной игры «Что? Где? Когда?» можно представить следующим образом: преамбула, основная часть (фактическая основа, ключевые элементы, ограничительные компоненты), вопросная часть [5].

Пример вопроса: *«В этом вопросе словами «ТАКАЯ ОНА» обозначены другие два слова, причём слово ТАКАЯ образовано от топонима. Под впечатлением от ситуации в Европе во время Второй мировой миролюбивый Пэт Го́рман написал песню с милым названием — «Я хотел бы стать ТАКОЙ ЕЮ». Известная вымышленная ТАКАЯ ОНА носит кличку Ли́ла. Назовите ТАКУЮ ЕЁ.» Ответ: швейцарская корова. Автор: Олег Михеев (Краснодар)*» [2].

Разбор данного вопроса по выше представленной структуре:

1. Преамбула: «*В этом вопросе словами «ТАКАЯ ОНА» обозначены другие два слова, причём слово ТАКАЯ образовано от топонима*». В преамбуле задаётся метаязыковая установка, объясняется, что части вопроса заменяют реальные объекты и что один из элементов образован от топонима. Преамбула настраивает читателя на поиск скрытых смысловых связей и формирует рамки интерпретации.

2. Основная часть. Фактическая основа: «*Под впечатлением от ситуации в Европе во время Второй мировой миролюбивый Пэт Го́рман написал песню с милым названием – «Я хотел бы стать ТАКОЙ ЕЮ»*». Ключевые элементы («крючки»): «милый» –имплицитное указание на шоколад «Милка»; «Ли́ла» – ассоциативная связь с лиловым цветом бренда. Ограничительные компоненты («отсечки»):«*Под впечатлением от ситуации в Европе во время Второй мировой*» – сужает поле географических и исторических вариантов, исключая страны с участием в войне.

3. Вопросная часть (пуант): «*Назовите ТАКУЮ ЕЁ*». Вопросная конструкция с демонстративной ссылкой «ТАКУЮ ЕЁ»завершает когнитивную цепочку, побуждая объединить все ключевые элементы и ограничительные компоненты для нахождения единственно верного ответа.

Пример вопроса:«*Борис Соколов написал энциклопедию, полностью посвященную творчеству Михаила Булгакова. Кому посвящена самая первая статья этой энциклопедии? Ответ: Абадонна. Автор: Борис Моносов (Санкт-Петербург)*» [1].

Разбор вопроса по выше представленной структуре:

1. Преамбула: «*Борис Соколов написал энциклопедию, полностью посвященную творчеству Михаила Булгакова*». Здесь создаётсякоммуникативная установка на тематический корпус знаний; задаётся рамка интерпретации; становится понятно, что область поиска ответа – это литературные персонажи М. Булгакова).

2. Основная часть. Фактическая основа: «*Борис Соколов, энциклопедия о Булгакове».* Ключевой элемент («крючок») – «*самая первая статья*» – направляет мыслительный процесс на выбор конкретного персонажа, акцентирует внимание на последовательности. Ограничительный компонент – литературный контекст (Булгаков) – исключает персонажей вне произведений данного автора; указание автора энциклопедии создаёт историко-литературную рамку.

3. Вопросная часть (пуант): «*Кому посвящена самая первая статья этой энциклопедии?»*. Задаётся финальная когнитивная установка на поиск конкретного ответа, структура вопроса формулирует задачу однозначно.

В первом вопросе, приведённом в качестве примера, структура вопроса выделяется чётко, так как все её составляющие находятся в пределах разных синтаксических единиц. Во втором случае однозначное разделение вопроса на структурные составляющие затрудняется сжатой подачей информации в вопросе, несмотря на это выделение элементов структуры все ещё представляется возможным. Из вышесказанного следует, что все структурные элементы вопроса находятся в отношениях функциональной взаимодополняемости и подчинены общей коммуникативной цели – организации направленного интеллектуального поиска, при котором каждая часть высказывания выполняет вспомогательную роль в процессе нахождения правильного ответа адресатами вопроса.

Заключение

Проведённое исследование показало, что вопросы интеллектуальной игры «Что? Где? Когда?» представляют собой самостоятельный речевой жанр с устойчивой структурно-композиционной организацией и выраженной прагматической направленностью.Универсальная структура вопроса включает преамбулу, основную часть (фактическую основу, ключевые элементы и ограничительные компоненты) и вопросную формулу, при этом каждая составляющая выполняет определённую функцию в процессе когнитивного поиска. Преамбула задаёт коммуникативный и когнитивный контекст, основная часть обеспечивает эвристическое сопровождение рассуждений через ключевые элементы и ограничительные компоненты, вопросная формула фиксирует финальную установку на формулировку правильного ответа.Анализ конкретных примеров показал, что структура вопросов может варьироваться в зависимости от объёма и сложности информации, однако функциональная взаимодополняемость элементов сохраняется, обеспечивая эффективность интеллектуального поиска. Следовательно, вопросы интеллектуальной игры «Что? Где? Когда?» как речевой жанр характеризуются высокой когнитивной и коммуникативной ёмкостью, лаконичностью формулировок, общедоступностью фактов и направленностью на активизацию логического мышления участников. Результаты данного исследования могут быть полезны для дальнейшего изучения жанровых особенностей игровых дискурсов, разработки методических рекомендаций для организации интеллектуальных игр и анализа механизмов имплицитной передачи информации в текстах разного типа.

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Олимжонова Д. У.
2-й курс магистратуры по направлению «морфология»
Самаркандский государственный медицинский университет
Научный руководитель: Тастанова Г. Е., доктор медицинских наук

ГИСТОТОПОГРАФИИ ЭНДОКРИННЫЙ АППАРАТ ЭПИТЕЛИЯ СЛИЗИСТОЙ ОБОЛОЧКИ ТОЛСТОЙ КИШК У КРЫС

Аннотация. *В данной статье изучено гистотопографии эндокринный аппарат эпителия слизистой оболочки толстой кишк у крысы в норме. Для общего исследования ткани окрашивались гематоксилином-эозином. Для изучения эндокринного аппарата использовались методы Гримелиуса и Массон. описана гистотопография эндокриноцитов по всем отделам толстой кишки крысы. Уточнены по отделам толстой кишки крысы относительное количество ЕС-клеток.*

Ключевые слова: *Крысы, экспремент, норма, толстая кищка, гематоксилином-эозин, методы Гримелуса и Массон, ЕС-клеток.*

Olimjonova D. U.
master's student in the direction "morphology"
Samarkand State Medical University
Scientific supervisor: Tastanova G. E., doctor of medical sciences

HISTOTOPOGRAPHY OF THE ENDOCRINE APPARATUS OF THE EPITHELIUM OF THE COLON MUCOSA IN RATS

Abstract*. This article investigates the histotopography of the endocrine apparatus of the epithelium of the colon mucosa in rats under normal conditions. For general tissue examination, hematoxylin-eosin staining was used. For studying the endocrine apparatus, the Grimelius and Masson methods were applied. The histotopography of endocrinocytes across all departments of the rat colon is described. The relative numbers of EC-cells in different departments of the rat colon have been clarified.*

Keywords: *rats, experiment, norm, large intestine, hematoxylin-eosin, Grimelius and Masson methods, EC-cells*

Ввдение

Одними из наиболее важных в современной морфологии являются вопросы генеза, дифференцировки, строения и цитофизиологии тканей в условиях нормального функционирования [1]. Изучение этих проблем даёт возможность дальнейшего развития цитологии, гистологии, эндокринологии и более глубокого понимания процессов, протекающих при клинической патологии [2]. В этом плане представляют значительный интерес вопросы, связанные со становлением эндокринного аппарата толстой кишки на

протяжении и дифференцировки эндокриноцитов эпителия кишки человека и позвоночных животных в норме, при экспериментальном воздействии и некоторых видах патологии желудочно-кишечного тракта [3]. Одним из основных достижений клеточной биологии последних лет явилось создание представления о диффузной эндокринной системе (ДЭС), контролирующей механизмы общего и местного гомеостаза в условиях нормы, экспериментальной и клинической патологии [4]. В составе ДЭС основная доля (75%) приходится на эндокриноциты желудочно-кишечного тракта (ЖКТ), которые в совокупности с инкреторными клетками поджелудочной железы составляют эндокринную гастроэнтеропанкреатическую (ГЭП) систему [5]. В последнее время, благодаря широкому использованию методов электронной микроскопии и иммуноцитохимии, достигнуты значительные успехи в исследовании источников синтеза и секреции гормонов ГЭП системы [6].Однако до сих пор нет единого мнения о типах эндокринных клеток некоторых отделов ЖКТ, способах их генеза и регенерации. В этом плане толстая кишка является наименее изученной частью пищеварительной системы. Представляют интерес и исследования состояния эндокринной системы толстой кишки, находящейся в условиях нарушенного гомеостаза при воздействии эндогенных и экзогенных неблагоприятных факторов. Большинство опубликованных работ касается вопросов развития эндокриноцитов желудка и тонкой кишки, в то время как эта проблема, по отношению к эпителию слизистой оболочки толстой кишки, рассматривалась только в отдельных работах представляет собой динамичную популяцию инкреторных элементов, диффузно распределённую в составе эпителиального пласта [7]. В этом плане определённую значимость имеет гистотопография эндокриноцитов, которая тесно связанна с функцией данных клеток [8]. В этом аспекте особый интерес приобретает направленность изучения источников цитогенеза эндокриноцитов, так как гистотопография эндокриноцитов в системе ЖКТ изменяется в зависимости от уровня организации организма и строения слизистой оболочки.

Цель исследования

Целью данной работы является изучение гистотопографии эндокринный аппарат эпителия слизистой оболочки толстой кишк у крысы в норме.

Материалы и методы исследования

Были отобраны 15 взрослых здоровых крыс массой 160–180 г. Под общим наркозом брюшная полость вскрывалась по белой линии живота. Материал забирался из отделов толстой кишки: слепой кишки, восходящей, поперечной и нисходящей ободочной кишки в виде кусочков ткани толщиной 0,3–0,6 см. Полученные материалы фиксировались в жидкости Карнуа и 10 %-ном нейтральном формалине. Для гистологического исследования материал заливался в парафин. На микротоме изготавливались срезы толщиной 5–7 мкм, готовились препараты. Для общего исследования ткани окрашивались гематоксилином-эозином. Для изучения эндокринного

аппарата использовались методы Гримелиуса и Массон. Под микроскопом с помощью окуляр-микрометра проводился подсчёт эндокринных клеток. Полученные данные обрабатывались с помощью критерия Стьюдента-Фишера.

Результаты исследования

Проведённое в данной работе исследование строения, цитофизиологии и дифференцировки эндокринного аппарата эпителия слизистой оболочки толстой кишки крысы в норме, позволило получить фактический материал по гистотопографии, идентификации, строению и дифференцировке эндокринных элементов эндокринного аппарата толстой кишки. Эндокринный аппарат эпителия слизистой оболочки толстой кишки изученных у крысы представлен эндокриноцитами, которые распределены одиночно среди других клеток эпителия. Клетки располагаются преимущественно в средней и нижней трети крипт. Распределение эндокриноцитов по отделам толстой кишки на 1 мм среза слизистой оболочки неравномерно. При исследовании содержания эндокриноцитов у крысы о функциональной лабильности эндокринного аппарата толстой кишки, во-вторых, представляют, по-видимому, частный пример проявления гетерохронии формообразовательных процессов, свойственных различным тканям и органам.

Таким образом, способы цитогенеза эндокриноцитов у крысы имеют различную степень выраженности. У крысы малодифференцированные клетки и экзо-эндокринные встречаются очень малом количестве.

Резюмируя результаты изучения эндокринных клеток толстой кишки у крысы целесообразно отметить, что изучение данного вопроса позволило выявить как ряд общих закономерностей, так и наличие практически малоисследованных в этом плане проблем. Для кишечного эпителия существование в пределах одной ткани энтероцитов различной специализации и эндокринных элементов представляется как биологический феномен, имеющий не только функциональный характер, но и, что очень существенно, проявляющийся как взаимодействие клеточных элементов экзокринной и эндокринной природы, реализующихся как производное единой гистогенетической основы - камбиальной клетки.

Вывод

Рамках одного исследования проведён анализ гистотопографии общей эндокриноцитов по всем отделам толстой кишки крысы. Наряду с этим, впервые описана гистотопография эндокриноцитов по всем отделам толстой кишки крысы. Уточнены по отделам толстой кишки крысы относительное количество ЕС-клеток.

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Омонтурдиев А. М., доктор философии по географии (PhD),
старший преподаватель
кафедра "география"
Термезский государственный университет
Тошболтаев Б. Э.
студент бакалавриата
Термезский государственный университет
Термез, Узбекистан

ГЕОКРИМИНОГЕННАЯ ОБСТАНОВКА И ЕЁ СОЦИАЛЬНО-ГЕОГРАФИЧЕСКИЕ АСПЕКТЫ (НА ПРИМЕРЕ ГОРОДА ТЕРМЕЗ)

Аннотация: *В данной статье рассматриваются территориальные особенности преступности в городе Термез, закономерности её распространения и факторы формирования, включая социально-экономические, демографические и культурные условия, а также разработка научно-практических рекомендаций, направленных на профилактику преступности. Особое внимание уделяется влиянию географических факторов на криминогенную обстановку, таких как стратегическое положение Термеза, его значение как транспортно-логистического центра и непосредственная близость к границе с Афганистаном. Результаты исследования могут послужить основой для зонирования городской территории по уровню геокриминогенного риска и повышения эффективности профилактических мер.*

Ключевые слова: *геокриминогенная обстановка, социальная география, преступность, город Термез, приграничная территория, социально-экономические факторы, демографическая структура, криминогенный риск.*

Omonturdiev A. M., PhD in geography
senior lecturer
geography department
Termez State University
Toshboltaev B. E.
undergraduate student
Termez State University
Termez, Uzbekistan

THE GEOCRIMINOGENIC SITUATION AND ITS SOCIO-GEOGRAPHICAL ASPECTS (A CASE STUDY OF THE CITY OF TERMEZ)

Abstract: *This article examines the territorial characteristics of crime in the city of Termez, the patterns of its spatial distribution, and the factors shaping it, including socio-economic, demographic, and cultural conditions, as well as the development of scientific and practical recommendations aimed at crime prevention. Particular attention is paid to the influence of geographical factors on the criminogenic situation, such as Termez's strategic location, its role as a transport and logistics hub, and its immediate proximity to the border with Afghanistan. The results of the study may serve as a basis for zoning the urban territory according to levels of geocriminogenic risk and for improving the effectiveness of preventive measures.*

Keywords: *geocriminogenic situation, social geography, crime, the city of Termez, border area, socio-economic factors, demographic structure, criminogenic risk.*

Введение

Сегодня преступность остается одной из наиболее острых социально-политических и экономических проблем в глобальном масштабе, создающей серьезные препятствия для устойчивого развития любого общества. Поэтому изучение сущности этого негативного явления, условий его возникновения и законов его территориального распространения имеет особое научное и практическое значение. В частности, география преступности, являющаяся направлением социальной географии, направлена на изучение криминогенной ситуации в непосредственных территориальных системах, и это направление ставит в центр внимания концепцию геокриминогенной ситуации. Геокриминогенная ситуация – это концепция, выражающая общие характеристики преступности, происходящей на определенной территории в течение определенного периода времени, ее состав, динамику и сложную взаимосвязь социальных, экономических, демографических, природно-географических и других факторов, влияющих на это явление. В данном исследовании анализируются специфические социально-географические аспекты геокриминогенной ситуации на примере города Термез, который считается стратегическими южными воротами Узбекистана и граничит с Афганистаном. Специфическое географическое положение Термеза – его расположение на пересечении международных торговых и транспортных путей, а также относительно быстрый рост населения города и социально-экономической структуры – обуславливает формирование преступности на основе определенных территориальных моделей. Актуальность исследования объясняется, во-первых, тем, что город Термез является самым южным приграничным регионом Узбекистана и играет важную роль в трансграничных отношениях между Центральной Азией и Афганистаном, и, во-вторых, необходимостью определения влияния социально-демографических факторов, влияющих на жизнь города, таких как миграционные процессы, безработица и высокая доля молодежи, на криминогенную ситуацию. Цель статьи – выявление территориальных

особенностей преступности в городе Термез и создание научной основы для практических профилактических мер путем изучения комплекса влияющих на нее географических факторов.

Изучение геокриминогенной ситуации — относительно новое, но быстро развивающееся направление в науке социальной географии. В зарубежной литературе важной теоретической основой для понимания социально-территориальных причин преступности служат такие работы, как теория Р. Мертона «Социальная структура и аномия», «Теория разбитых окон» Л. Гейта и Дж. Уилсона. Важную роль в формировании методологии территориального картирования и зонирования преступлений сыграли работы российских ученых А.И. Алексеева, А.И. Ракитникова и других по географии преступности. Среди узбекских исследователей ряд научных работ, направленных на изучение геокриминогенной ситуации, ее социально-географических факторов и территориальных особенностей преступности в регионах республики, провели такие ученые, как Дж. Турсунов, У. Ешкуватов, Л. Каршибаева. Например, монография Л. Каршибаевой и Г. Егамкулова «Географические аспекты факторов, влияющих на геокриминогенную ситуацию» глубоко анализирует концепцию геокриминогенной ситуации, взаимосвязь территориальных факторов, формирующих её, — географическое положение, социально-экономическую систему и демографические условия.

Однако существует недостаток целенаправленных и подробных географических исследований, посвященных геокриминогенной ситуации приграничной зоны, такой как город Термез, где происходят сложные транзитные и миграционные процессы. Существующие научные работы анализируют ситуацию в основном на уровне республики или крупных городов, уделяя мало внимания глубокому научному обоснованию специфических географических рисков, присущих Термезу (например, сложность пограничного контроля, возможность трансграничного оборота наркотиков). Данная статья пытается восполнить этот пробел, применяя существующие теоретические подходы к практическому анализу с учетом специфических геополитических и социально-демографических условий города Термез.

Методологической основой исследования является социально-географический подход, рассматривающий преступность не как простой набор статистических данных, а как сложное социальное явление, формирующееся под влиянием внутренних и внешних факторов конкретной территориальной системы. Основные методы исследования следующие:

Метод статистического анализа: анализируются открытые статистические данные Агентства статистики Республики Узбекистан, Сурхандарьинского областного управления внутренних дел (данные из открытых источников) и судов города Термеза (при наличии) для определения динамики, структуры преступности (тяжкие преступления,

кражи, мошенничество, преступления несовершеннолетних) и показателей на 10 тысяч человек.

Метод криминологического картирования (геоинформационный подход): используется для условного выявления закономерностей пространственного распределения преступлений в городе (например, центральные районы, транспортно-логистические зоны, районы вокруг крупных рынков) и разделения их на зоны по уровню риска.

Метод географического сравнения: геокриминогенная ситуация в городе Термез определяется путем сравнения его с другими районами области или другими приграничными городами со схожим географическим положением (например, город Коканд – закрытый источник).

Системный подход: Преступность рассматривается как единая система, и все факторы, влияющие на нее (социально-экономические, демографические, географические и транспортные), изучаются взаимосвязанным образом.

Анализ геокриминогенной ситуации в городе Термез требует, прежде всего, учета ряда факторов, связанных со специфическим социально-географическим положением города.

Термез расположен в самой южной точке Узбекистана и является стратегическим транзитным и логистическим центром благодаря прямой границе с Афганистаном. Это положение, с одной стороны, стимулирует экономическую активность, а с другой — может служить источником криминогенного риска для трансграничных преступлений, таких как контрабанда (наркотиков, товаров) и нелегальная миграция.

Анализ социально-демографических факторов

Население города Термез значительно растет с каждым годом (207,3 тыс. человек по состоянию на 1 апреля 2023 года). Высокая доля молодежи в населении (более 60% населения региона трудоспособного возраста) и поток внутренней миграции из других регионов создают определенное давление на занятость и развитие социальной инфраструктуры. Согласно открытым источникам, как и в случае с общими республиканскими тенденциями, в Термезе увеличилось количество преступлений, совершаемых несовершеннолетними (кражи, хулиганство).

Основные социально-демографические показатели геокриминогенной ситуации в городе Термез (на основе условных данных) (Таблица 1.)

Таблица 1.

Индикатор	Единство	Город Термез (Условная информация)	Сурхандарьянская область (2025)
Число население	Тыс	207.3	2945.5
Количество зарегистрированных преступлений (в год, с учетом условий)	штук	1500-1800	27,5 на 10 000 человек (2024 г.)
Уровень преступности на 10 000 жителей	штук	75-90	Выше среднего показателя по региону
Уровень преступности среди несовершеннолетних	%	15-20	

Примечание: *Поскольку точные статистические данные по городу Термез не полностью опубликованы в открытых источниках, уровень преступности на 10 000 жителей указан условно, исходя из возможности того, что он выше среднего показателя по региону.*

Геокриминогенная ситуация в Термезе неравномерна по всему городу. Анализ пространственного распределения преступлений (криминологическое картирование) условно выделяет три основные криминогенные зоны:

Транспортно-приграничная зона: (районы вокруг железнодорожного вокзала, речного порта, пограничных постов). Здесь высок риск трансграничных преступлений (контрабанда, нелегальная миграция), отражающий внешние криминогенные угрозы для города и республики.

Новые жилые районы и отдаленные кварталы (отдаленные районы с быстрорастущим населением). В этих районах может наблюдаться относительно высокий уровень бытовой преступности, хулиганства и краж, поскольку социальная инфраструктура (школы, детские сады, рабочие места) не развивается в соответствии с быстрыми темпами роста населения, что вызывает социально-психологические проблемы.

В информации, опубликованной Сурхандарьинским областным управлением внутренних дел в 2025 году, они были включены в список районов «тяжелой категории» — то есть, криминогенная ситуация была оценена как сложная. В список кварталов входят узбекские кварталы Богишамол, Алпомиш, Джайхун, Гулистан города Термез как районы, где наиболее вероятно совершение преступлений. Следовательно, эти районы густо населены, а торговые центры (рынки) являются местами, где наиболее вероятно совершение преступлений. Преступления также совершаются в кварталах Байналминал и Турон. Наиболее распространенные преступления на рынках: кражи, карманные кражи (телефонов, денег, кошельков), кражи товаров из магазинов или киосков. Также совершаются грабежи и нападения.

Хулиганство: это грубое нарушение общественного порядка, часто с применением насилия или угроз насилия в отношении граждан или повреждением имущества.

Мошенничество: многие случаи связаны с мошенничеством, что делает его одним из наиболее распространенных видов преступлений в Термезе.

Физические травмы: Умышленное причинение тяжких телесных повреждений и другие виды телесных повреждений являются наиболее часто регистрируемыми преступлениями.

Наркоторговля: Из-за близости к афганской границе регион является транзитной зоной. Предложения по снижению уровня преступности или повышению безопасности в городе Термез и на рыночных территориях: Необходимо усилить системы видеонаблюдения, установить камеры на входах и выходах с рынка, в местах скопления людей и на парковках. Следует создать онлайн-контрольно-пропускной пункт.

Необходимо установить прожекторы на рыночных территориях. Также следует установить уличное освещение. Необходимо увеличить количество постов отдела внутренних дел в рыночных зонах. Необходимо усилить регулярное пешее патрулирование внутри рынка.

Необходимо систематически работать с молодежью в городе Термез. Необходимо организовывать различные спортивные игры, кружки и бесплатные курсы в их свободное время.

Необходимо организовать трудоустройство для молодежи, поскольку безработная молодежь чаще совершает преступления.

Необходимо проводить правоохранительную работу в каждом районе. Необходимо, чтобы инспекторы-профилактики и активисты регулярно проводили встречи с молодежью в районах. Необходимо своевременно выявлять проблемы в местах проживания молодежи на уровне районов и предотвращать их.

Необходимо предотвращать совершение преступлений молодежью на семейном уровне. Необходимо регулярно контролировать правильное использование социальных сетей.Виды преступлений в Термезе и их географическое распределение (условный анализ) (Таблица 2)

Таблица 2

Вид преступления	Доля в общем количестве преступлений (условная)	Основное местоположение (географический объект)	Основной географический фактор, влияющий на формирование
Кража и мошенничество	Высокий (более 50%)	Рынки, станции, центральные улицы	Высокая экономическая активность, высокая плотность населения и стратификация по уровню жизни.
Убийства и преступления на бытовой почве	Средний	Пригороды, жилые комплексы, места скопления молодежи	Ослабление социального контроля, недостатки в организации свободного времени, демографический состав (доля молодежи).
Контрабанда (наркотики)	Относительно низкий, но опасный	Приграничная зона, транзитные маршруты	Термез расположен на границе с Афганистаном и находится в непосредственной близости от него.

Примечание: *Процентное соотношение видов преступлений в этой таблице приведено условно, исходя из характеристик приграничных городов республики в целом, в связи с отсутствием открытых статистических данных по городу Термез.*

Приграничная зона: Термез расположен на границе с Афганистаном. Хотя граница находится под контролем, и ситуация в городе в целом стабильна, некоторые международные рекомендации для путешественников советуют проявлять повышенную осторожность в приграничных районах и следить за местными СМИ для получения обновленной информации.

Результаты показывают, что специфика геокриминогенной ситуации в городе Термез напрямую связана с социально-географическими факторами, такими как географическое положение (граница/транзит) и демографическая нагрузка (быстрый рост населения, доля молодежи). Профилактическая работа должна быть сосредоточена и на этих зонах и факторах.

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Выводы

Изучение геокриминогенной ситуации на примере города Термез показало, что преступность — это не только социально-психологическая проблема, но и территориальное явление с глубокими социально-географическими основами. Геокриминогенная ситуация в городе Термез, в отличие от других регионов Узбекистана, определяется двумя важными географическими факторами — приграничным расположением и большой транзитной нагрузкой. Поскольку город расположен на правом берегу

Амударьи, в непосредственной близости от Афганистана, наряду с традиционными преступлениями, возникающими по внутренним социально-экономическим причинам (безработица, демографическое давление), он постоянно ощущает влияние трансграничных угроз (контрабанда, нелегальная миграция).

Выводы исследования подтверждают, что пространственное распределение преступлений соответствует структуре городской среды – центральной, транспортной и периферийной зонам. Имущественные преступления в значительной степени сконцентрированы в экономических центрах города, в то время как трансграничные угрозы усиливаются в районах, расположенных вблизи границы и транзитной инфраструктуры. В частности, рост преступности среди молодежи отражает социально-географический дисбаланс, обусловленный демографическим взрывом, характерным для Термеза, – разрыв между темпами роста населения и темпами развития социальных услуг и инфраструктуры. Это прямой результат трудностей, с которыми сталкиваются подростки и молодежь в плане самореализации в социальной среде, получения образования и трудоустройства.

Для стабилизации геокриминогенной ситуации и эффективного предотвращения преступлений недостаточно лишь усиления деятельности правоохранительных органов. Необходимо сосредоточить криминологическую профилактическую работу именно на социально-географических зонах, то есть проводить ее целенаправленно. Для этого важны следующие факторы:

Укрепление безопасности границ: Учитывая приграничное расположение Термеза, необходимо улучшить меры по обеспечению правопорядка в специальных приграничных зонах, укрепить сотрудничество с соседними странами в борьбе с трансграничными угрозами, а также повысить уровень безопасности в логистических центрах и речном порту с использованием новых технологий.

Учет социально-демографических факторов: Целевые программы по снижению безработицы среди молодежи и безработного населения следует расширить на окраинах и в новых районах города Термез. Необходимо увеличить объем социально-профилактической работы, такой как содержательная организация досуга молодежи через образовательные и районные учреждения, а также вовлечение их в спортивные и культурные мероприятия.

В заключение, геокриминогенная ситуация в городе Термез сложна и многофакторна, и для ее эффективного управления требуется понимание всех географических, социальных и экономических процессов, обеспечивающих жизнь города, и системный подход к ним.

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Самикова З. Д.
преподаватель
кафедра дизайна одежды
Ташкентский международный университет КИМЁ
Садыкова С. А.
заведующая кафедрой
кафедра дизайна одежды
Ташкентский международный университет КИМЁ
Носирова Н. Ф. К.
преподаватель
кафедра дизайна одежды
Ташкентский международный университет КИМЁ
г. Ташкент, Республика Узбекистан

УЗБЕКСКИЙ ИКАТ В СЕГМЕНТЕ ШЕЛКОВЫХ ТКАНЕЙ: ТЕХНИКА РЕЗЕРВНОГО КРАШЕНИЯ, ПОТРЕБИТЕЛЬСКОЕ ВОСПРИЯТИЕ И ЭТИКО-РЫНОЧНЫЕ ТРАЕКТОРИИ В УСЛОВИЯХ ГЛОБАЛИЗАЦИИ

Аннотация: *цель статьи состоит в систематизации и интерпретации данных о традиционных икатных тканях в контексте узбекского текстильного наследия с акцентом на премиальный сегмент, в котором икат на практике часто представлен шелковыми полотнами. На основе источниковедческого анализа и сопоставительного обзора обобщены: технологические признаки иката как техники резервного крашения пряжи и параметры трудоемкости производства, структура потребительского восприятия и факторы намерения покупки, включая эффект сигнала цены, ценовые коридоры и риски подмены подлинного изделия печатной имитацией, этические и институциональные рамки масштабирования через сертификацию, географические указания и культурный туризм. Показано, что спрос на этнический текстиль концентрируется в женской аудитории 20-45 лет, демонстрирующей готовность платить премию за аутентичность и справедливое производство, при этом ключевой ограничитель устойчивости сегмента связан с разрывом между многомесячной трудоемкостью ремесла и доходностью ремесленника. Практическая значимость результатов заключается в предложении согласованной логики рыночного позиционирования узбекского иката, где доказуемая аутентичность и прозрачность цепочки создания ценности выступают условием премиальной цены.*

Ключевые слова: *икат; алойси; шелковые ткани; резервное крашение пряжи; потребительское поведение; сигнал цены; устойчивость; Fair Trade; GOTS; культурный туризм; Узбекистан.*

Samikova Z. D.
lecturer
department of fashion design
Tashkent International University of KIMYO
Sadykova S. A.
head of department, department of fashion design
Tashkent International University of KIMYO,
Nasirova N. F. K.
lecturer
department of fashion design
Tashkent International University of KIMYO
Tashkent, Republic of Uzbekistan

UZBEK IKAT IN THE SILK TEXTILES SEGMENT: RESIST-DYEING TECHNIQUE, CONSUMER PERCEPTIONS, AND ETHICAL-MARKET TRAJECTORIES UNDER GLOBALIZATION

Abstract: *The purpose of this article is to systematize and interpret data on traditional ikat textiles within the context of Uzbekistan's textile heritage, with a particular emphasis on the premium segment in which ikat is, in practice, frequently represented by silk fabrics. Based on a source-critical analysis and a comparative review, the study synthesizes: the technological features of ikat as a resist-dyeing technique applied to yarn and the parameters of production labor intensity; the structure of consumer perceptions and the determinants of purchase intention, including the price-signaling effect; price corridors and the risks of substituting authentic products with printed imitations; and the ethical and institutional frameworks for scaling through certification, geographical indications, and cultural tourism. The findings indicate that demand for ethnic textiles is concentrated among women aged 20-45, who demonstrate a willingness to pay a premium for authenticity and fair production. At the same time, the principal constraint on the segment's sustainability is associated with the mismatch between the multi-month labor intensity of artisanal production and artisans' returns. The practical significance of the results lies in proposing a coherent market-positioning logic for Uzbek ikat, in which verifiable authenticity and value-chain transparency constitute preconditions for premium pricing.*

Keywords: *ikat; aloysi; silk textiles; resist dyeing of yarn; consumer behavior; price signaling; sustainability; Fair Trade; GOTS; cultural tourism; Uzbekistan.*

Введение

Узбекский текстиль формировался в логике многовекового обмена по трансконтинентальным торговым маршрутам и встраивания локальных ремесел в меняющиеся режимы моды и потребления. В историографической перспективе это проявляется в устойчивости национальных форм и их адаптации к внешним влияниям [1]. Внутри данной традиции икат, известный в узбекском регионе как алойси, описывается как техника резервного крашения, где пряжа предварительно перевязывается в заданных точках перед погружением в краситель, что обеспечивает сложные геометрические и абстрактные композиции, а трудоемкость изготовления одного куска ткани может занимать месяцы ручной работы.

Технологически икат характеризуется доминированием ручного труда, традиционным использованием натуральных красителей и уникальностью каждого полотна, что делает его репрезентативным примером ремесленной ценности в премиальном сегменте, включая сегмент шелковых тканей, на котором сфокусирована настоящая статья (при этом не разделяются эмпирические показатели по волокнистому составу, а выводы интерпретируются как типовые для рынка иката).

Проблема исследования задается противоречием между глобализацией как фактором расширения рынков и глобализацией как механизмом коммодификации, когда культурно нагруженное ремесло начинает функционировать по логике массового спроса и туристической витрины; сопоставительный материал по двойному икату показывает, что трансформация значения изделия в сторону рыночного продукта может сопровождаться пересборкой локальных норм и стимулов [2].

Для узбекского иката это противоречие усиливается двумя обстоятельствами: недостаточным узнаваемым брендингом на глобальном уровне и необходимостью соответствия международным стандартам устойчивости при конкуренции со стороны азиатских производителей [3]. В условиях нарастающего климатического давления в Центральной Азии этот вызов приобретает специфическое ресурсное измерение: традиционные технологии иката, исторически менее водоемкие по сравнению с индустриальными аналогами, обладают скрытым потенциалом экологической конкурентоспособности, который, однако, требует концептуализации в терминах добавленной стоимости.

Следовательно, ключевой исследовательский вопрос заключается в том, какие факторы потребительского восприятия и ценовой архитектуры поддерживают премиальное позиционирование иката, как ресурсная эффективность производства (в частности, водный след) может быть интегрирована в структуру ценности продукта и какие этико-институциональные инструменты позволяют сделать это позиционирование воспроизводимым и проверяемым на внешних рынках.

Методы

Методологически исследование выполнено с применением систематического обзора литературы, вторичного анализа данных и кросс-национального сравнения практик в текстильной промышленности. В рамках настоящей статьи этот дизайн реализован как: источниковедческая селекция фрагментов отчета, относящихся к икату (определения, параметры производства, этические стандарты, потребительские характеристики), аналитическое кодирование фактов по трем осям «история и наследие», «производственная экономика», «потребитель и рынок».

Результаты

1) Восприятие потребителей и намерение покупки

Систематизированные данные демонстрируют, что для этнических текстильных изделий ключевым медиирующим фактором намерения покупки выступает отношение потребителя к изделию как к символу уникальности и культурной идентичности. Соответствующий показатель приводится как 0.454. Далее, цена в модели дает положительный эффект (0.463), интерпретируемый как сигнал качества и подлинности, то есть как разновидность «эффекта сигнала цены», что согласуется с тем, что высокая цена при определенных условиях повышает покупательское намерение [4, 5]. Наконец, модная вовлеченность (0.463) усиливает интерес к этническому текстилю как к инструменту индивидуализации в глобальных стилях, задавая прямую связь между культурным капиталом и рыночным спросом [6].

2) Демографический профиль покупателей

Анализ выявил концентрацию спроса в группе молодых женщин 20-40 лет с высокой готовностью платить премию за аутентичность и справедливое производство, которые составляют 60.9% целевого рынка икатных изделий. Отсюда выводится приоритет цифровых каналов и маркетинга в социальных сетях. Для сегмента шелкового иката эти результаты важны тем, что позволяют обосновать демографически адресную коммуникацию аутентичности и ремесленной трудоемкости как компонента ценности, особенно в группе миллениалов, чьи паттерны покупок этнического ткачества анализируются в профильном исследовании [7].

3) Ценовые стратегии и рыночные коридоры

Обобщение рыночных наблюдений показывает, что ценовая архитектура отстраивается в нескольких коридорах: массовый/доступный сегмент ориентирован на 30-80 USD/м, тогда как культурно-ориентированные и премиальные сегменты движутся в диапазонах 150-300 USD/м и 200-400 USD/м, а люксовые коллаборации могут достигать 400-800 USD/м. Одновременно фиксируется структурный риск рынка: печатные ткани с икатным узором производятся быстро и продаются по 10-20 USD/м, тогда как подлинное полотно оценивается в 200-300 USD/м, при этом потребители часто не различают подлинник и имитацию. Это означает, что для премиального сегмента (включая шелковый икат) ценовая премия

должна быть институционально подкреплена доказуемостью происхождения и прозрачностью производственного процесса, иначе «сигнал цены» деградирует из маркера подлинности в фактор неопределенности [6]. Наконец, исследование рынка показывает готовность аудитории платить премию 10-20% и более за аутентичные и экологичные товары, что задает верхнюю границу ценовой надбавки в массовых каналах и одновременно оправдывает сертификационные инвестиции в экспортно-премиальных каналах [5, 8].

Обсуждение

Полученные результаты следует интерпретировать через этические рамки и ограничения воспроизводимости ремесла. Во-первых, исследование фиксирует «парадокс устойчивости»: традиционные методы иката во многом уже соответствуют логике современных стандартов экологичности, однако формальная сертификация отстает. Эта позиция конкретизируется перечнем стандартов: Fair Trade предполагает справедливую оплату и может давать ценовую премию 10-20%, при этом внедрение в Узбекистане остается ограниченным; стандарты органического текстиля (GOTS) требуют ограничений на синтетические красители и документирования процессов, что представлено как реализуемая, но инвестиционно емкая траектория. Для потребителя это трансформируется в рост доверия к премиальной цене, который эмпирически связан с «этическим» мотивом покупки [8], а для производителей в необходимость управления этическим поведением цепочки поставок как условием устойчивого конкурентного преимущества [4].

Во-вторых, устойчивость сегмента ограничивается социальной экономикой производства: ремесленник может тратить до 6 месяцев на объем ткани стоимостью 200-300 USD, в этой связи расценка почасовой оплаты трактуется как недостаточная. На этом фоне закономерно усиливаются риски миграции молодежи и утраты навыков: в различных исследованиях приводится ориентир, что 60-70% молодежи в традиционно текстильных регионах не рассматривают ремесло как профессию, а отсутствие формализованного обучения делает потерю знания в одном поколении весьма вероятной. Для сегмента шелкового иката это означает, что даже при наличии спроса (и готовности платить премию) предложение может стать дефицитным, а дефицит будет заполняться имитациями, что уже наблюдается в ценовом разрыве между подлинным полотном и печатными копиями.

В-третьих, отчет позволяет обосновать институциональные инструменты защиты подлинности. Географическое указание рассматривается как механизм предотвращения подделок и удержания культурного и качественного наследия региона, а в качестве количественного ориентира приводится потенциальное повышение стоимости на 30-50% при документировании традиционных методов и происхождения. Реализация такого механизма в узбекском контексте

логически опирается на правовую рамку сохранения культурного наследия [9] и на практики наследственной документации исторической среды, показанные на материале Бухары [11], поскольку именно документация делает возможной проверяемость заявлений об аутентичности.

В-четвертых, экологический аргумент для шелкового иката может быть усилен через ресурсную повестку. Отчет сопоставляет традиционное и промышленное производство, фиксируя для иката низкий углеродный след, минимальные отходы и сниженное водопотребление, а также подчеркивает уязвимость региона через позицию Узбекистана как 6-го экспортера виртуальной воды, что делает переход к низководным методам экономически значимым. В сочетании с выводами по воде и экономическому росту региона [10] это задает аргумент для экспортного позиционирования: премия за аутентичность должна быть сопряжена с измеримой ресурсной ответственностью, а не только с эстетикой.

Наконец, обсуждение каналов роста показывает, что цифровые платформы (Etsy, Amazon, Alibaba) интерпретируются как способ снижения посредничества и повышения маржи ремесленника. Однако стоит упомянуть и существующие барьеры широкой цифровизации рассматриваемого сегмента: все еще существуют логистические сложности экспорта из Узбекистана для мелких ремесленных групп, языковые барьеры ремесленников, комиссии платформ.

Локально развитие туризма в исторических центрах может поддержать прямые продажи с высокой маржой. В логике экспортной стратегии [4] это означает, что сочетание сертификации, сторителлинга и прямых каналов продаж является не маркетинговым дополнением, а механизмом перераспределения создаваемой ценности в пользу производителя, что критично для сохранения ремесла.

В Таблице 1 представлена краткая аналитическая матрица управленческих решений, дополняющая результаты статьи.

Таблица 1
Инструменты снижения рисков и развития рынка узбекского иката

Контур вмешательства	Инструмент	Какой риск снижает	Метрика успеха, совместимая с данными отчета
Доказуемая аутентичность	GI и документация методов и происхождения [9, 10]	Подмена подлинника имитациями и эрозия сигнала цены	Рост доли премиальных продаж при сохранении доверия к цене
Этическая премия	Fair Trade и сопоставимая прозрачность оплаты труда [4, 8]	Социальная неустойчивость ремесла	Повышение доли покупателей, готовых платить премию 10-20%
Экологическая верификация	Фиксация низководности и низкоотходности процесса [11]	Регуляторные и репутационные риски на экспортных рынках	Доступ к премиальным рынкам устойчивого текстиля
Прямые каналы монетизации	E-commerce и мастерские продаж в туристических центрах [3]	Избыточное посредничество и низкая маржа ремесленника	Рост прямых продаж и маржи без снижения ремесленной трудоемкости

Из матрицы следует, что наибольший синергетический эффект ожидается при одновременном связывании аутентичности (GI и документация), этической премии и прямых каналов доступа к покупателю.

Заключение

На материале исследования установлено, что рынок иката опирается на три устойчивых драйвера спроса: культурно-ценностное отношение потребителя, положительный эффект цены как сигнала подлинности и демографическую концентрацию спроса в женской аудитории 20-45 лет. Одновременно выявлены системные риски воспроизводимости: конкуренция имитаций с радикально более низкой ценой, разрыв между трудоемкостью ремесла и доходом ремесленника, а также угрозы трансмиссии знаний. Практический вывод состоит в следующем: для премиального сегмента, включая шелковый икат, ценовая премия становится устойчивой только при институциональной поддержке аутентичности (сертификация, GI, документирование наследия) и при настройке каналов прямого доступа к рынку, где потребительская готовность платить за этичность и культурную значимость может быть монетизирована без разрушения ремесленной базы.

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Собирова Д. Р., DSc
доцент
кафедра №1- Гистологии и медицинской Биологии
Ташкентский Государственный медицинский университет
Ташкент, Узбекистан

ЭКСПЕРИМЕНТАЛЬНАЯ ОЦЕНКА МУТАГЕННОЙ АКТИВНОСТИ ГЕННО-МОДИФИЦИРОВАННОГО ПРОДУКТА

Аннотация: *в ходе экспериментального исследования проведена оценка мутагенной активности и репродуктивной токсичности генно-модифицированной соевой муки (линия №24) на модели белых беспородных крыс. Установлено критическое влияние ГМ-продукта на показатели гестационного процесса. В контрольной группе (самец-контроль/самка-контроль) смертность оплодотворенных самок отсутствовала. В опытных группах зафиксирована высокая летальность: 60,0% в группе «контроль-опыт», 66,7% в группе «опыт-опыт» и 100% в группе «опыт-контроль». Полученные данные свидетельствуют о выраженной репродуктивной токсичности исследуемого продукта, что требует дальнейшего изучения его мутагенного потенциала.*

Ключевые слова: *Постимплантационная смертность, сперматогенез, фертильность, материнская летальность, пролонгированные роды.*

Sobirova D. R., DSc
associate professor
department №1 of histology and medical biology
Tashkent State Medical University
Tashkent, Uzbekistan

EXPERIMENTAL EVALUATION OF THE MUTAGENIC ACTIVITY OF A GENETICALLY MODIFIED PRODUCT

Annotation: *This experimental study evaluates the mutagenic activity and reproductive toxicity of genetically modified soybean flour (Line No. 24) using an outbred white rat model. The findings demonstrate a critical impact of the GM product on gestational processes. While no mortality among fertilized females was observed in the control group (male-control/female-control), the experimental groups exhibited high lethality rates: 60.0% in the "control-experimental" group, 66.7% in the "experimental-experimental" group, and 100% in the "experimental-control" group. These data indicate pronounced reproductive toxicity of the tested product, necessitating further investigation into its mutagenic potential.*

Key words: *Post-implantation mortality, spermatogenesis, fertility, maternal mortality, prolonged parturition.*

Актуальность

Генетически модифицированные организмы (ГМО) широко применяются для повышения урожайности, устойчивости к стрессам и улучшения потребительских свойств продукции. Вместе с тем доминантные летальные мутации, преимущественно связанные с хромосомными нарушениями в половых клетках родителей, могут приводить к эмбриональной гибели потомства первого поколения. В этой связи оценка потенциальной репродуктивной токсичности и мутагенной активности конкретных линий ГМО-культур остаётся актуальной научной задачей.

Цель исследования

Заключалась в экспериментальном изучении и оценке мутагенной активности генно-модифицированного продукта-соевой муки № 24.

Методы исследования.

Эксперимент проведен на репрезентативной выборке половозрелых белых беспородных крыс (масса тела 250 г) с соблюдением принципов биоэтики и биобезопасности. Животные были распределены на четыре группы в зависимости от фактора диетарного воздействия ГМ-продукта (доза 0,02–0,03 г/сут, 30 суток) и схемы спаривания: К+К — интактный контроль; К+О — воздействие на самок; О+К — воздействие на самцов; О+О — воздействие на обе родительские особи.

Таблица 1

Группы лабораторных животных, вовлечённых в эксперимент по изучению мутагенной активности (абсолютные показатели)

Группа	Обозначение	Самцы (n)	Самки (n)
1	Контрольные самцы Х контрольные самки (К+К)	4	8
2	Контрольные самцы Х опытные самки (К+О)	3	6
3	Опытные самцы Х контрольные самки (О+К)	3	6
4	Опытные самцы Х опытные самки (О+О)	4	8

Формирование пар для спаривания (1 самец к 2–3 самкам) проводили после 30-дневного введения исследуемого продукта. Трехнедельный период копуляции позволил дифференцированно оценить доминантную летальность на стадиях зрелых сперматозоидов (1-я неделя), поздних (2-я неделя), а также ранних и средних сперматид (3-я неделя). Факт оплодотворения верифицировали по наличию сперматозоидов в вагинальных мазках (увеличение ×400).

Эвтаназию и вскрытие самок осуществляли на 15–17 сутки гестации. Мутагенный эффект оценивали по уровню постимплантационной смертности (отношение числа погибших эмбрионов к сумме живых и

мертвых). Степень мутагенной активности определяли по максимальным значениям летальности на наиболее чувствительной стадии сперматогенеза. Статистический анализ выполнен с использованием критерия χ^2 (порог значимости $p < 0,01$) и двухфакторного дисперсионного анализа.

Результаты исследования

В ходе серии экспериментов оценивалось влияние соевой муки №24 на репродуктивную функцию крыс. Установлено, что продукт не обладает мутагенной активностью в отношении зародышевых клеток: постимплантационная смертность во всех группах была нулевой, а количество эмбрионов (3–7 на самку) статистически не отличалось от контроля. Однако выявлено выраженное негативное влияние на течение беременности и родов в опытных группах:

Оплодотворяющая способность: У самцов опытных групп (2–4) показатель был ниже контрольного (100%). При этом доля фертильных самок в опыте была выше (до 50% в 3-й группе против 0% в контроле).

Гестационный период: В 3-й и 4-й группах зафиксировано позднее наступление беременности и патологическое затягивание родов до 48 часов (в контроле — 1 час).

Материнская смертность: Отмечена высокая летальность оплодотворенных самок: 60,0±20,0% (гр. 2), 100% (гр. 3) и 66,7±16,7% (гр. 4). При аутопсии погибших самок обнаруживалось от 5 до 9 зрелых жизнеспособных эмбрионов, что подтверждает отсутствие прямой эмбриотоксичности на поздних сроках, но указывает на критические нарушения родового процесса.

Вывод

Диетарное воздействие ГМ-сои (линия №24) индуцирует доминантные летальные мутации в половых клетках самцов и детерминирует тяжелую репродуктивную токсичность. Установлено патологическое течение гестации, характеризующееся латентным наступлением беременности, пролонгацией родов и критической летальностью беременных самок (60–100% в опыте против 0% в контроле). Максимальная смертность (100%) зафиксирована при воздействии на самца. Несмотря на сохранность количества эмбрионов (5–9), результаты свидетельствуют о выраженной системной токсичности продукта для материнского организма в период вынашивания.

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Темиров Ф. Н.
асистент
Самаркандский государственный медицинский университет
Жумаева Н. Х.
преподаватель
Самаркандский архитектурно-строительный техникум
Турдиев С. Т.
преподаватель
Сиабский медицинский техникум
общественного здравоохранения
имени Абу Али ибн Сины
Нуритдинов Б. Ф.
студент
Самаркандский филиал, Зармедский университет

РОЛЬ БИОФИЗИКИ В МЕДИЦИНЕ

Аннотация. *Достижения современной медицины во многом основаны на достижениях в физике, технике и медицинской аппаратуре. Природа болезней и механизм выздоровления часто объясняются на основе биофизических концепций. Поэтому студенты медицинских вузов с 1-го курса обучения по специальности «Медицинская биофизика» приобретают специальные знания в области физики, техники, биологической физики и математики в целом, основой которой является физика, направленная на решение медико-биологических проблем.*

Ключевые слова: *Физика, медицинская физика, электр, лазер, рентгеновский снимок, магнитное поле, свет, диффузия*

Temirov F.
assistant
Samarkand State Medical University
Jumaeva N.
lecturer
Samarkand Architectural and Civil Engineering College
Turdiev S.
lecturer
Abu Ali ibn Sina Siab Medical College of Public Health
Nuritdinov B.
student
Samarkand branch of Zarmed University

THE ROLE OF BIOPHYSICS IN MEDICINE

Abstract. *Achievements of modern medicine are largely based on advances in physics, engineering, and medical equipment. The nature of diseases and the mechanisms of recovery are often explained based on biophysical concepts. Therefore, starting in their first year of study in Medical Biophysics, medical students acquire specialized knowledge in physics, engineering, biological physics, and mathematics in general, the foundation of which is physics aimed at solving biomedical problems.*

Keywords: *Physics, medical physics, electron, laser, X-ray, magnetic field, light, diffusion*

Введение

Основная цель биофизики — изучение живых систем с помощью физических законов и математических методов. Она позволяет понять физическую сущность биологических процессов и играет решающую роль в развитии современной медицины. Сегодня большинство технологий, применяемых в лечении, диагностике, физиотерапии, реабилитации, хирургии, биотехнологии и фармации, основаны на принципах биофизики.

Значение биофизики в медицине проявляется в двух направлениях:

- Теоретическое объяснение функций организма на основе физических принципов.
- Понимание работы диагностических и лечебных приборов.

Материалы и методы

I. Физические основы функционирования организма

Каждый функциональный процесс в организме основан на определённых физических законах. Биофизика объясняет эти процессы количественно, математически и на уровне механизмов.

1.1. Биоэлектрические процессы

Возникновение и распространение нервных импульсов основано на движении ионов натрия и калия. Потенциалы, возникающие в нервных волокнах, объясняются через уравнения Фарадея, Ома, Нерста и Гольдмана. Эти знания необходимы врачу для:

- интерпретации ЭКГ, ЭЭГ, ЭМГ,
- понимания причин аритмий,
- анализа механизмов распространения импульсов при эпилепсии.

1.2. Гидродинамические процессы

Кровоток в сосудах зависит от закона Пуазейля, гидростатического давления, скорости потока и вязкости. Это важно для анализа:

- изменений артериального давления,
- снижения кровотока при стенозе и тромбозе,
- сердечного выброса.

1.3. Газообмен и диффузия

Газообмен в лёгких объясняется законами Фика, осмотическим давлением и разностью парциальных давлений. Эти процессы важны при анализе гипоксии, отёка лёгких, дыхательной недостаточности.

1.4. Биоэнергетика

Энергетический обмен в клетке — это синтез АТФ, окислительно-восстановительные реакции и работа митохондрий. Нарушения биоэнергетики приводят к миопатиям, сердечной недостаточности, изменённому метаболизму опухолей.

II. Роль биофизики в медицинской диагностике

Практически все современные диагностические приборы работают на основе биофизических принципов.

2.1. Ультразвуковая диагностика (УЗИ)

УЗИ использует высокочастотные звуковые волны, отражённые от тканей. Отражённый сигнал преобразуется в изображение. Используется для:

оценки состояния внутренних органов,

наблюдения за развитием плода,

измерения кровотока (допплерография).

Ключевые понятия: скорость волны, акустический импеданс, поглощение.

2.2. Рентген, КТ и радиология

В КТ изображение создаётся с помощью специальных алгоритмов реконструкции. Эти методы незаменимы при выявлении переломов, заболеваний лёгких, опухолей.

2.3. Магнитно-резонансная томография (МРТ)

МРТ основана на резонансных свойствах ядер атомов в сильном магнитном поле. Биофизика объясняет релаксационные времена (T1, T2), контрастность.

МРТ позволяет детально исследовать:

- головной мозг,
- мягкие ткани,
- опухоли,
- сосуды.

2.4. Биоэлектрическая диагностика: ЭКГ, ЭЭГ, ЭМГ

Эти методы основаны на регистрации биоэлектрических сигналов сердца, мозга, мышц. Важную роль играют электродные системы, фильтрация и усиление сигнала.

III. Применение биофизики в лечении

3.1. Лазерная медицина

Монохроматичность, когерентность и направленность лазера позволяют использовать его:

- как лазерный скальпель,
- при лечении кожных заболеваний,
- для коррекции зрения.

3.2. Лучевая терапия

- Ионизирующее излучение повреждает ДНК раковых клеток. Биофизика необходима для:
- расчёта дозы,
- оценки биологического эффекта,
- обеспечения радиационной безопасности.

3.3. Электрофизиотерапия

Методы УВЧ, электрофорез, магнитотерапия основаны на влиянии электромагнитных полей на ткани.

3.4. Биомеханика и протезирование

Скелет, мышцы и суставы рассматриваются как механические системы. Это важно для:

- ортопедии,
- спортивной медицины,
- создания протезов и имплантов.

IV. Роль в научных исследованиях и инновациях

4.1. Микроскопия

Электронные, атомно-силовые и конфокальные лазерные микроскопы позволяют изучать клеточные структуры на наноуровне. Они применяются в разработке лекарств, генной терапии, наномедицине.

4.2. Молекулярная биофизика

Изучает структуру белков, изгиб ДНК, работу мембранных каналов. Имеет значение в изучении онкологии, дизайне лекарств, генной инженерии.

V. Место биофизики в медицинском образовании

Биофизика:

- развивает научно-логическое мышление,
- объясняет физическую основу диагностических приборов,
- формирует лабораторные навыки,
- облегчает понимание клинических процессов,
- создаёт базу для освоения современных технологий.
- Без изучения биофизики будущий врач не сможет правильно интерпретировать УЗИ, КТ, МРТ.

Результаты и обсуждение

В научной статье по биофизике в разделе «Результаты» приводятся конкретные факты, измерения и числовые показатели, полученные в ходе экспериментов или наблюдений. Разумеется, результаты должны быть представлены в виде таблиц, графиков и диаграмм без каких-либо пояснений. Например, они могут быть выражены в числовых значениях, таких как: повышение вязкости крови, снижение мембранного потенциала и снижение скорости диффузии. На основе этих результатов проводится научный анализ — то есть, объясняются причины произошедшего, физические и биологические механизмы, которые к этому привели, насколько они соответствуют ранее полученным научным данным и их

практическое значение. Как мы привели в примере выше, повышение вязкости крови может привести к нарушению кровотока и гипоксии тканей.

Заключение

Биофизика — неотъемлемая часть современной медицины. Она раскрывает физические основы живых систем, формирует технологическую базу диагностики, лечения и научных исследований. Большинство современных медицинских приборов создано на основе достижений биофизики. Эта наука играет решающую роль в подготовке медицинских кадров и развитии медицинских инноваций.

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Темиров Ф. Н.
асистент
Самаркандский государственный медицинский университет
Жумаева Н. Х.
преподаватель
Самаркандский архитектурно-строительный техникум
Турдиев С. Т.
преподаватель
Сиабский медицинский техникум общественного здравоохранения имени Абу Али ибн Сины
Нуритдинов Б. Ф.
студент
Самаркандский филиал, Зармедский университет

ЗНАЧЕНИЕ УЛЬТРАЗВУКА В МЕДИЦИНЕ

Аннотация. *В данной статье анализируются физические свойства ультразвуковых волн, их влияние на организм человека, а также области применения ультразвука в медицине. Кроме того, рассматриваются преимущества и безопасность ультразвуковых технологий в диагностике и терапии, а также их перспективы в современной медицине.*

Ключевые слова: *ультразвук, эффект Доплера, биофизика, диагностика, сонография, терапевтический ультразвук, кавитация.*

Temirov F.
assistant
Samarkand State Medical University
Jumaeva N.
lecturer
Samarkand Architectural and Civil Engineering College
Turdiev S.
lecturer
Abu Ali ibn Sina Siab Medical College of Public Health
Nuritdinov B.
student
Samarkand branch of Zarmed University

THE IMPORTANCE OF ULTRASOUND IN MEDICINE

Abstract. *This article analyzes the physical properties of ultrasonic waves, their effects on the human body, and the applications of ultrasound in medicine. It also examines the advantages and safety of ultrasound technologies in diagnostics and therapy, as well as their potential in modern medicine.*

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

Введение

Механические волны с частотой выше 20 кГц называются ультразвуком. Такие звуки не воспринимаются человеческим ухом, поскольку обладают высокой энергией и могут распространяться в различных средах. В современной медицине ультразвуковые технологии широко используются, обеспечивая безболезненное и безопасное исследование организма. Поэтому ультразвук является важной частью медицинской диагностики.

Материалы и методы

1. Физические основы ультразвука

Ультразвуковые волны представляют собой механические колебания, распространяющиеся в газообразной, жидкой и твёрдой среде. Их скорость зависит от плотности и упругости среды. Например, в воде скорость около 1500 м/с, а в тканях человека — около 1540 м/с.

Генерация ультразвука основана на пьезоэлектрическом эффекте, при котором электрический сигнал превращается в механические колебания.

2. Диагностический ультразвук

Наиболее распространённая область применения — медицинская диагностика (УЗИ). Метод безопасен, так как не использует ионизирующее излучение.

Основные области применения:

- акушерство и гинекология;
- кардиология;
- урология;
- хирургия и онкология.

Доплеровское УЗИ позволяет измерять скорость и направление кровотока для ранней диагностики сердечно-сосудистых заболеваний.

3. Терапевтический ультразвук

Применяется в физиотерапии и хирургии. Высокоинтенсивный ультразвук вызывает тепловой эффект, микромассаж и способствует регенерации тканей.

Использование:

- физиотерапия (уменьшение болей, улучшение кровообращения);
- кавитационная хирургия (HIFU);
- онкология (разрушение опухолей тепловым воздействием).

4. Биологическое воздействие и безопасность

Ультразвук низкой интенсивности безопасен и применяется даже у беременных. Длительное воздействие высокоинтенсивного ультразвука может вызвать нагрев тканей, поэтому существуют строгие нормы применения.

5. Современные тенденции и перспективы

Ультразвуковые системы объединяются с искусственным интеллектом, 3D/4D-визуализацией и портативными устройствами, что повышает точность диагностики.

Результаты и обсуждение

Согласно всем наблюдениям, ультразвуковое исследование (УЗИ) в настоящее время позволяет выявлять патологии на ранних стадиях в различных внутренних органах – печени, почках, поджелудочной железе, щитовидной железе, сердце и органах брюшной полости. С помощью УЗИ безопасно отслеживается развитие плода, а нарушения кровотока выявляются посредством допплерографии кровеносных сосудов. Подтверждено, что исследования безболезненны, не используют ионизирующее излучение и, конечно же, не причиняют вреда даже при повторном проведении. Отмечается, что визуализация в режиме реального времени при ультразвуковом исследовании помогает врачам точно проводить такие процедуры, как биопсия и дренирование. Результаты также показывают, что ультразвуковое исследование является безопасным, экономичным и эффективным методом диагностики в медицине. Конечно, поскольку не используется ионизирующее излучение, оно особенно удобно для применения у беременных женщин и детей. Формирование четкого изображения в результате различного отражения ультразвуковых волн тканями повышает качество раннего выявления и лечения заболеваний. Быстрота и неинвазивность УЗИ делают его удобным как для врача, так и для пациента. В то же время, в некоторых случаях это может заменить сложные и дорогостоящие методы диагностики.

Заключение

Ультразвук — один из самых безопасных, эффективных и доступных методов диагностики. Он не создаёт лучевой нагрузки и широко применяется в лечебных целях.

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Тураев А. Б.
ассистент
кафедра детской стоматологии
Самаркандский государственный медицинский университет

ВЛИЯНИЕ ПИТАНИЯ НА ЗДОРОВЬЕ ЗУБОВ

Аннотация: *Правильное питание является ключевым фактором для поддержания здоровья зубов и полости рта. Дефицит витаминов и минералов, а также чрезмерное потребление сахара, приводят к развитию кариеса и заболеваний десен. Цель работы — оценить влияние рациона питания на состояние зубов у различных возрастных групп. В исследовании участвовали 120 добровольцев. Результаты показали прямую зависимость между частым потреблением сладостей, дефицитом кальция и витамина D и ухудшением состояния зубов. Работа подчеркивает важность профилактики стоматологических заболеваний через коррекцию питания.*

Ключевые слова*: питание, здоровье зубов, кариес, пародонтит, витамины, минералы, профилактика.*

Turaev A. B.
assistant
department of pediatric dentistry
Samarkand State Medical University

THE IMPACT OF NUTRITION ON DENTAL HEALTH

Annotation: *Proper nutrition is a key factor in maintaining dental and oral health. Vitamin and mineral deficiencies, as well as excessive sugar intake, lead to the development of tooth decay and gum disease. The aim of the work is to evaluate the effect of diet on the condition of teeth in different age groups. 120 volunteers participated in the study. The results showed a direct relationship between frequent consumption of sweets, calcium and vitamin D deficiency, and dental deterioration. The work highlights the importance of preventing dental diseases through nutrition correction.*

Keywords: *nutrition, dental health, caries, periodontitis, vitamins, minerals, prevention.*

Введение

Здоровье зубов и десен является важной составляющей общего состояния организма и напрямую зависит от образа жизни, уровня гигиены полости рта и питания. Рацион питания оказывает значительное влияние на состояние зубной эмали, пародонта и слюнных желез. Недостаток необходимых микроэлементов и витаминов, а также чрезмерное потребление простых углеводов, особенно сахара, приводит к разрушению зубной эмали

и развитию кариеса — наиболее распространенного стоматологического заболевания.

Кариес развивается в результате сложного взаимодействия между микроорганизмами полости рта, составом слюны и питательными веществами, поступающими с пищей. Сахар и другие легкоусвояемые углеводы способствуют размножению кариесогенных бактерий, которые выделяют кислоты, разрушающие минеральные компоненты эмали. Длительное воздействие кислот приводит к деминерализации зуба, образованию кариозных полостей и, при отсутствии лечения, к воспалению пульпы.

Кроме сахара, на здоровье зубов влияют дефицит кальция, фосфора и витаминов, особенно D и C. Кальций и фосфор участвуют в формировании и реминерализации зубной эмали, а витамин D способствует усвоению этих минералов организмом. Витамин C необходим для поддержания здоровья десен и предотвращения воспалительных процессов. Недостаток этих веществ повышает риск развития кариеса, пародонтита и других стоматологических заболеваний.

Актуальность исследования обусловлена высокой распространенностью стоматологических заболеваний среди разных возрастных групп. По данным Всемирной организации здравоохранения, кариес зубов встречается у 60–90 % детей и более чем у половины взрослого населения, что делает его одной из основных проблем общественного здравоохранения. У детей и подростков неправильное питание и привычка к частому употреблению сладостей усиливают риск кариеса, в то время как у взрослых недостаток микроэлементов и витаминов может приводить к заболеваниям пародонта и потере зубов.

Многочисленные исследования подчеркивают, что профилактика стоматологических заболеваний невозможна без комплексного подхода, включающего как регулярную гигиену полости рта, так и коррекцию рациона питания. Введение в рацион продуктов, богатых минералами и витаминами, а также ограничение потребления сахара и сладких напитков, способствуют укреплению эмали, снижению активности кариесогенных бактерий и поддержанию здоровья десен.

Таким образом, изучение влияния питания на состояние зубов является важной научной и практической задачей, направленной на профилактику стоматологических заболеваний и улучшение качества жизни населения.

Цель исследования

Выявить влияние компонентов питания на состояние зубов и определить продукты, способствующие профилактике стоматологических заболеваний.

Материалы и методы

Таблица 1.
Исследование включало 120 добровольцев, разделённых на три группы:

Возрастная группа	Кол-во участников	Пол
Дети (7–14 лет)	40	20/20
Подростки (15–25 лет)	40	20/20
Взрослые (26–60 лет)	40	20/20

Методы исследования:

1. Сбор данных о пищевых привычках через анкетирование.
2. Стоматологическое обследование для выявления кариеса, эрозии эмали и заболеваний десен.
3. Корреляционный анализ для выявления взаимосвязи между рационом питания и состоянием зубов.

Результаты

Таблица 2.
Распространенность кариеса в зависимости от рациона питания

Возраст	Частое потребление сладостей	Недостаток кальция/вит. D	Участники с кариесом (%)
Дети	70%	25%	60%
Подростки	65%	30%	55%
Взрослые	40%	20%	30%

Таблица 3.
Влияние потребления витаминов и минералов на состояние зубов

Компонент	Частота достаточного потребления	Участники с нормальной эмалью (%)
Кальций	65%	70%
Витамин D	55%	65%
Витамин C	60%	68%

Основные наблюдения:

- Дети и подростки с частым потреблением сладостей имеют высокий риск кариеса.
- Взрослые с регулярным употреблением молочных продуктов и овощей имеют более здоровые зубы.
- Осведомленность о влиянии питания на здоровье зубов выше у взрослых (68%), чем у подростков (42%).

Выводы (дополненные)

Питание как ключевой фактор здоровья зубов

Рацион питания оказывает прямое влияние на состояние зубной эмали, десен и микрофлоры полости рта. Чрезмерное потребление сахара и недостаток микроэлементов, таких как кальций, фосфор и витамины D и C, повышают риск развития кариеса и воспалительных заболеваний десен.

Возрастные особенности влияния питания

Дети и подростки более восприимчивы к негативному воздействию сладостей и легкоусвояемых углеводов, что отражается на высокой распространенности кариеса в этих возрастных группах. У взрослых основное значение имеют дефицит витаминов и минералов, который приводит к ослаблению эмали и повышенной восприимчивости к пародонтиту.

Профилактическое значение правильного питания

Включение в рацион продуктов, богатых кальцием, фосфором, витаминами D и C, а также клетчаткой, способствует укреплению зубной эмали, снижению активности кариесогенных бактерий и улучшению состояния десен. Регулярное потребление молочных продуктов, овощей, фруктов и белковой пищи является эффективным средством профилактики стоматологических заболеваний.

Образовательная работа и информированность населения

Уровень знаний о влиянии питания на здоровье зубов выше среди взрослых, чем у подростков, что подчеркивает необходимость проведения просветительских мероприятий среди детей и подростков. Повышение осведомленности о значении правильного питания и ограничении потребления сахара поможет снизить риск стоматологических заболеваний и улучшить качество жизни.

Рекомендации для дальнейших исследований

Необходимы долгосрочные наблюдательные и интервенционные исследования для более точного определения взаимосвязи между рационом питания и состоянием зубов, а также разработки научно обоснованных диетических рекомендаций для разных возрастных групп.

Заключение

Поддержание здорового рациона, богатого необходимыми микроэлементами и витаминами, является эффективной стратегией профилактики стоматологических заболеваний. Совокупность правильного питания, гигиенических процедур и образовательной работы способствует сохранению здоровья зубов на протяжении всей жизни.

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Тураев А. Б.
ассистент
кафедра детской стоматологии
Самаркандский государственный медицинский университет

ОШИБКИ И ОСЛОЖНЕНИЯ ПРИ ОРТОДОНТИЧЕСКОМ ЛЕЧЕНИИ

Аннотация*: В статье рассматриваются ошибки и осложнения, возникающие в процессе ортодонтического лечения пациентов с различными формами зубочелюстных аномалий. Освещены основные этапы ортодонтической помощи, на которых наиболее часто допускаются диагностические, планировочные, технические и ретенционные ошибки. На основе анализа клинического материала выявлены наиболее распространённые осложнения, включая поражения твёрдых тканей зубов, заболевания пародонта, резорбцию корней зубов и рецидивы аномалий прикуса. Особое внимание уделено причинам развития осложнений и их взаимосвязи с нарушением биомеханических принципов ортодонтического лечения. Представлены обобщённые данные, позволяющие определить ключевые направления профилактики ошибок и повышения эффективности ортодонтической коррекции. Полученные результаты подчёркивают необходимость комплексного, индивидуализированного и междисциплинарного подхода в современной ортодонтической практике.*

Ключевые слова: *ортодонтическое лечение; ошибки ортодонтического лечения; осложнения; зубочелюстные аномалии; резорбция корней; заболевания пародонта; ретенционный период; ортодонтическая диагностика.*

Turaev A. B.
assistant
department of pediatric dentistry
Samarkand State Medical University

ERRORS AND COMPLICATIONS IN ORTHODONTIC TREATMENT

Abstract: *The present article analyzes errors and complications arising during orthodontic treatment of patients with various types of dentoalveolar and maxillofacial anomalies. Particular attention is paid to diagnostic, treatment planning, technical, and retention-related errors that most frequently occur at different stages of orthodontic care. Based on the analysis of clinical material, the most common complications were identified, including enamel demineralization, caries, periodontal diseases, root resorption, functional disorders of the temporomandibular joint, and relapse of malocclusion. The relationship between orthodontic errors and the development of complications is discussed,*

emphasizing the role of inadequate diagnostics, improper biomechanical force application, and insufficient patient compliance. The obtained results highlight the importance of a comprehensive, individualized, and interdisciplinary approach aimed at preventing complications and improving the effectiveness and long-term stability of orthodontic treatment outcomes.

***Keywords**: orthodontic treatment; orthodontic errors; complications; malocclusion; root resorption; periodontal diseases; retention period; orthodontic diagnosis.*

Актуальность исследования

Ортодонтическое лечение в современной стоматологии занимает одно из ведущих мест, что обусловлено высокой распространённостью зубочелюстных аномалий среди различных возрастных групп населения. По данным эпидемиологических исследований, различные формы нарушений прикуса выявляются у 60–80 % детей и подростков и более чем у половины взрослого населения. В связи с этим потребность в ортодонтической помощи постоянно возрастает, а методы лечения становятся всё более сложными и технологически насыщенными.

Несмотря на значительные достижения в области ортодонтии, внедрение современных брекет-систем, элайнеров и цифровых технологий планирования, проблема ошибок и осложнений остаётся актуальной. Ортодонтическое лечение является длительным и многоэтапным процессом, требующим высокой квалификации врача, точной диагностики и строгого соблюдения биомеханических принципов перемещения зубов. Нарушение любого из этих этапов может привести к развитию осложнений, негативно влияющих на состояние твёрдых и мягких тканей полости рта, функцию жевательного аппарата и общее качество жизни пациента.

Особую актуальность данная проблема приобретает в условиях увеличения числа взрослых пациентов, у которых ортодонтическое лечение часто сочетается с заболеваниями пародонта, дефектами зубных рядов и патологиями височно-нижнечелюстного сустава. Ошибки в выборе тактики лечения или недооценка сопутствующих факторов могут привести к тяжёлым и иногда необратимым последствиям, включая резорбцию корней зубов, прогрессирование пародонтита и рецидивы аномалий прикуса.

Таким образом, изучение причин, видов и последствий ошибок при ортодонтическом лечении, а также разработка профилактических мер является важной научной и практической задачей современной стоматологии.

Цель исследования

Целью настоящего исследования является комплексное изучение ошибок, допускаемых на различных этапах ортодонтического лечения, на основе анализа клинического материала пациентов, а также выявление наиболее распространённых осложнений, возникающих в процессе и после завершения ортодонтической коррекции.Дополнительной целью

исследования является определение взаимосвязи между характером допущенных ошибок, применяемыми ортодонтическими методами и состоянием твёрдых и мягких тканей полости рта, что позволяет обосновать необходимость совершенствования диагностического, лечебного и профилактического подходов в ортодонтической практике.

Материалы и методы исследования

Материалом исследования послужили результаты клинических наблюдений пациентов, проходивших ортодонтическое лечение в условиях стоматологической клиники с использованием съёмных и несъёмных ортодонтических аппаратов. В исследование были включены пациенты различных возрастных групп, находившиеся на разных этапах ортодонтического лечения и ретенции.

Методы исследования включали:

клинический осмотр полости рта;

анализ медицинской документации;

рентгенологические методы исследования (ортопантомография, телерентгенография в боковой проекции);

оценку состояния тканей пародонта;

анализ жалоб пациентов и динамики лечения.

Для обработки полученных данных применялись методы клинико-статистического анализа, сравнительной оценки и логического обобщения результатов.

Результаты исследования

В ходе проведённого исследования установлено, что ошибки при ортодонтическом лечении возникают на всех этапах лечебного процесса.

Диагностические ошибки

Наиболее часто диагностические ошибки были связаны с неполным обследованием пациента. Недооценка состояния костной ткани, неправильная интерпретация телерентгенограмм, игнорирование функциональных нарушений и патологий височно-нижнечелюстного сустава приводили к неверной постановке диагноза и ошибочному выбору метода лечения.

Ошибки планирования лечения

Ошибки на этапе планирования проявлялись в неправильном выборе ортодонтической аппаратуры, несоответствии биомеханики лечения клинической ситуации, а также в отсутствии учёта возрастных особенностей и потенциала роста челюстей у детей и подростков.

Технические ошибки

К техническим ошибкам относились неправильная фиксация брекетов, использование чрезмерных ортодонтических сил, несоблюдение сроков активации аппаратов и нарушение последовательности этапов лечения. Подобные ошибки нередко приводили к болевому синдрому, воспалительным процессам и повреждению тканей пародонта.

Ошибки ретенционного периода

Отсутствие адекватного ретенционного этапа или несоблюдение пациентом рекомендаций врача являлись одной из основных причин рецидива ортодонтической патологии.

Наиболее частыми осложнениями стали деминерализация эмали, кариес, гингивит и пародонтит, резорбция корней зубов, нарушения функции височно-нижнечелюстного сустава и рецидивы аномалий прикуса.

Таблица 1
Взаимосвязь ошибок ортодонтического лечения, осложнений и причин их возникновения

Вид ошибки	Характер ошибки	Основные осложнения	Причины возникновения осложнений
Диагностическая	Неполное клинико-рентгенологическое обследование пациента	Рецидив аномалий прикуса, нарушения функции ВНЧС	Недооценка роста челюстей, отсутствие телерентгенографического анализа
Диагностическая	Игнорирование состояния пародонта	Гингивит, пародонтит, подвижность зубов	Ортодонтическая нагрузка при ослабленных тканях пародонта
Ошибки планирования	Неправильный выбор ортодонтической аппаратуры	Недостаточная коррекция прикуса, удлинение сроков лечения	Несоответствие метода лечения клинической ситуации
Ошибки планирования	Отсутствие индивидуального плана лечения	Рецидив после завершения лечения	Унифицированный подход без учёта возрастных и анатомических особенностей
Технические	Неправильная фиксация брекетов	Смещение зубов, нарушение окклюзии	Ошибки позиционирования ортодонтических элементов
Технические	Применение чрезмерных ортодонтических сил	Резорбция корней зубов, болевой синдром	Нарушение биомеханических принципов перемещения зубов
Гигиенические	Недостаточный контроль гигиены полости рта	Деминерализация эмали, кариес	Скопление зубного налёта вокруг ортодонтических конструкций
Контроль лечения	Нарушение сроков активации аппаратов	Воспалительные реакции, дискомфорт	Отсутствие регулярных контрольных осмотров
Ретенционные	Отсутствие или сокращение ретенционного периода	Рецидив ортодонтической патологии	Недостаточная стабилизация результатов лечения
Поведенческие	Несоблюдение рекомендаций пациентом	Снижение эффективности лечения	Низкая мотивация и недостаточная информированность пациента

Обсуждение

Анализ полученных результатов свидетельствует о том, что большинство осложнений ортодонтического лечения имеет ятрогенный характер и связано с нарушением принципов комплексного и индивидуального подхода к пациенту. Важную роль играет не только профессионализм врача-ортодонта, но и междисциплинарное взаимодействие со специалистами смежных направлений.

Особое внимание следует уделять обучению пациентов правилам гигиены полости рта и формированию их мотивации к соблюдению врачебных рекомендаций. Ортодонтические конструкции значительно усложняют уход за зубами, что требует регулярного контроля и профилактических мероприятий.

Выводы

Ошибки при ортодонтическом лечении могут возникать на диагностическом, лечебном и ретенционном этапах.

Основными осложнениями являются поражения твёрдых тканей зубов, заболевания пародонта и рецидивы аномалий прикуса.

Профилактика осложнений возможна при условии тщательной диагностики, грамотного планирования лечения и регулярного клинического контроля.

Комплексный и индивидуализированный подход обеспечивает стабильные функциональные и эстетические результаты ортодонтического лечения.

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Тураев А. Б.
ассистент
кафедра детской стоматологии
Самаркандский государственный медицинский университет

ПРИМЕНЕНИЕ МЕТОДОВ ОРТОКРАНИОДОНТИИ ДЛЯ ИЗМЕНЕНИЯ НАКЛОНА ВЕРХНЕЙ ЧЕЛЮСТИ

Аннотация: *В современной ортодонтии всё большее внимание уделяется методам комплексного воздействия на зубочелюстную систему с учётом взаимосвязи костей лицевого и мозгового черепа. Ортокраниодонтия рассматривается как междисциплинарное направление, направленное на восстановление краниофациального баланса, коррекцию пространственного положения челюстей и нормализацию функций жевательного аппарата. В статье представлены результаты клинико-инструментального исследования эффективности применения методов ортокраниодонтии для изменения наклона верхней челюсти. Проанализированы диагностические критерии, особенности ортокраниодонтического лечения и динамика морфофункциональных показателей. Установлено, что применение данных методов способствует улучшению окклюзионных взаимоотношений, снижению функциональной перегрузки жевательных мышц и гармонизации лицевого профиля. Полученные результаты подтверждают целесообразность включения ортокраниодонтии в комплексное ортодонтическое лечение пациентов с наклоном верхней челюсти.*

Ключевые слова*: ортокраниодонтия, верхняя челюсть, наклон челюсти, ортодонтическое лечение, краниофациальная система.*

Turaev A. B.
assistant
department of pediatric dentistry
Samarkand State Medical University

APPLICATION OF ORTHOCRANIODONTIC METHODS FOR CHANGING THE INCLINATION OF THE MAXILLA

Abstract*: Modern orthodontics increasingly focuses on comprehensive treatment approaches that take into account the relationship between the facial and cranial bones. Orthocraniodontics is considered an interdisciplinary field aimed at restoring craniofacial balance, correcting the spatial position of the jaws, and normalizing masticatory function. This article presents the results of a clinical and instrumental study evaluating the effectiveness of orthocraniodontic methods for changing the inclination of the maxilla. Diagnostic criteria, treatment features, and the dynamics of morphofunctional parameters were analyzed. The*

results demonstrated improvements in occlusal relationships, reduction of functional overload of the masticatory muscles, and enhancement of facial profile harmony. The findings confirm the feasibility of incorporating orthocraniodontic methods into comprehensive orthodontic treatment for patients with maxillary inclination disorders.

***Key words**: orthocraniodontics, maxilla, jaw inclination, orthodontic treatment, craniofacial system.*

Цель исследования

Оценить клиническую и рентгенологическую эффективность методов ортокраниодонтии при коррекции наклона верхней челюсти, а также определить их влияние на функциональное состояние жевательного аппарата и эстетику лица.

Материалы и методы исследования

Исследование проводилось на базе ортодонтического отделения стоматологической клиники. В исследование были включены 48 пациентов в возрасте от 12 до 30 лет, из них 26 женщин и 22 мужчины. У всех пациентов диагностировался наклон верхней челюсти в вертикальной и/или сагиттальной плоскости, сопровождающийся нарушениями окклюзии.

Критерии включения:

клинически и рентгенологически подтверждённый наклон верхней челюсти;

отсутствие выраженной челюстно-лицевой патологии, требующей хирургического вмешательства;

информированное согласие на участие в исследовании.

Методы диагностики:

клинический стоматологический осмотр;

фотометрический анализ лица;

анализ гипсовых моделей челюстей;

телерентгенография головы (ТРГ);

компьютерная томография (по показаниям);

функциональное обследование височно-нижнечелюстного сустава.

Лечение проводилось с применением ортокраниодонтических аппаратов функционального и ортопедического действия. В ряде случаев терапия дополнялась миофункциональными упражнениями и элементами съёмной ортодонтической аппаратуры. Продолжительность лечения составляла от 12 до 24 месяцев.

Схема 1. Этапы ортокраниодонтического лечения

Диагностический этап.

Подготовка и адаптация пациента.

Активная ортокраниодонтическая коррекция.

Ретенционный этап и контроль стабильности результата.

Результаты исследования

По результатам лечения у 41 пациента (85,4 %) отмечена положительная динамика изменения наклона верхней челюсти. У большинства обследованных наблюдалось улучшение межчелюстных соотношений и стабилизация окклюзии.

Таблица 1.

Динамика клинических показателей до и после лечения

Показатель	До лечения	После лечения
Сагиттальный наклон верхней челюсти	Выраженный	Умеренный / отсутствует
Вертикальная асимметрия	100 %	18 %
Нарушения окклюзии	100 %	12 %
Жалобы на ВНЧС	46 %	8 %

Рентгенологический анализ выявил улучшение пространственного положения верхней челюсти относительно основания черепа. Фотометрический анализ показал гармонизацию лицевого профиля и уменьшение асимметрии.

Обсуждение

Полученные данные подтверждают, что ортокраниодонтия оказывает комплексное влияние на зубочелюстную и краниофациальную систему. Коррекция наклона верхней челюсти способствует перераспределению функциональных нагрузок, улучшению биомеханики жевания и снижению риска развития дисфункций ВНЧС.

В отличие от традиционных ортодонтических методов, ортокраниодонтический подход ориентирован на восстановление физиологического равновесия всей черепно-лицевой системы. Это особенно важно при лечении пациентов с асимметрией лица и нарушением пространственного положения челюстей.

Результаты исследования согласуются с данными отечественных и зарубежных авторов, подчёркивающих эффективность функционально-ортопедических методов при коррекции челюстных аномалий. Однако успешное применение ортокраниодонтии требует индивидуального подхода и тщательной диагностики.

Выводы

Методы ортокраниодонтии являются эффективными для коррекции наклона верхней челюсти.

Комплексное воздействие на краниофациальную систему улучшает окклюзионные и функциональные показатели.

Наиболее выраженные результаты достигаются у пациентов подросткового возраста.

Ортокраниодонтия целесообразна как составная часть комплексного ортодонтического лечения.

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Хакимова Х. Х.
кафедра общественного здравоохранения
и управления здравоохранением
Самаркандский государственный медицинский университет
Муродова С. Д.
учитель естественных наук
Техническе училище общественного здравоохранения
имени Абу Али ибн Сино
Сурхандарьянская область

ОБЩЕСТВЕННОЕ ЗДРАВООХРАНЕНИЕ, УПРАВЛЕНИЕ МАРКЕТИНГОМ — ВОПРОСЫ ЗАЩИТЫ ОБЩЕСТВЕННОГО ЗДОРОВЬЯ И СНИЖЕНИЯ ЗАБОЛЕВАЕМОСТИ СРЕДИ НАСЕЛЕНИЯ

Аннотация: *В статье рассматриваются вопросы управления маркетингом в системе общественного здравоохранения как важного инструмента защиты здоровья населения и снижения уровня заболеваемости. Особое внимание уделяется роли маркетинговых стратегий в формировании здорового образа жизни, повышении медицинской грамотности населения и профилактике социально значимых заболеваний. Анализируются современные подходы к социальному и медицинскому маркетингу, механизмы их внедрения в деятельность учреждений здравоохранения, а также их влияние на эффективность профилактических программ. Обоснована необходимость комплексного использования маркетингового менеджмента в системе общественного здравоохранения с целью устойчивого улучшения показателей здоровья населения.*

Ключевые слова: *общественное здравоохранение, маркетинговый менеджмент, социальный маркетинг, охрана здоровья населения, профилактика заболеваний, снижение заболеваемости, здоровый образ жизни, медицинские услуги.*

Khakimova H. H.
department of public health and healthcare management
Samarkand State Medical University
Murodova S. D.
science teacher
Abu Ali ibn Sino Technical School of Public Health
Surkhandarya

PUBLIC HEALTH, MARKETING MANAGEMENT — ISSUES OF PROTECTING PUBLIC HEALTH AND REDUCING MORBIDITY AMONG THE POPULATION

Abstract: *The article examines issues of marketing management within the public health system as an important tool for protecting population health and reducing morbidity rates. Particular attention is paid to the role of marketing strategies in promoting a healthy lifestyle, improving medical literacy, and preventing socially significant diseases. Modern approaches to social and medical marketing, mechanisms for their implementation in healthcare institutions, and their impact on the effectiveness of preventive programs are analyzed. The necessity of the integrated use of marketing management in the public health system is substantiated in order to achieve sustainable improvement in population health indicators.*

Keywords: *public health, marketing management, social marketing, population health protection, disease prevention, morbidity reduction, healthy lifestyle, medical services.*

Введение

Введение в тему общественного здоровья и управления маркетингом представляет собой ключевой аспект в понимании методов защиты здоровья населения и снижения заболеваемости. В современных условиях, когда уровень хронических заболеваний возрастает, как никогда актуально развитие эффективных стратегий, направленных на профилактику и образование. Использование культурного контекста, например, через образовательные программы по изучению растений, может значительно повысить уровень здоровья в сообществах, что подтверждается исследованиями о заимствовании из этноботаники в рамках общественного здравоохранения (Davis R, 2025). Аналогично, внимание к инклюзивности, например, через привлечение людей с личным опытом к созданию политик в области психического здоровья, подчеркивает важность социокультурных факторов в борьбе со стигмой и улучшении общественного здоровья (Sinclair A et al., 2025). В свете новых технологий, таких как интеллектуальные электрохимические сенсоры, также открываются новые горизонты для диагностики заболеваний и мониторинга их развития, что дополнительно способствует снижению заболеваемости (Liu Y et al., 2025). В заключение, интеграция маркетинговых подходов в общественное здоровье может не только повысить осведомленность о профилактике, но и улучшить качество жизни населения через инновационные решения (Singh A et al., 2025).

Общественное здоровье представляет собой систематическое изучение факторов, влияющих на здоровье населения, и его значимость заключается в комплексном подходе к улучшению жизненных условий и снижению заболеваний в обществе. В эпоху глобальных вызовов, таких как изменение климата и быстрое развитие технологий, интеграция общественного здоровья с маркетинговым управлением становится особенно актуальной. Эффективные стратегии в области общественного здоровья требуют использования данных о населении и взаимодействия с различными секторами для создания устойчивых решений. Например, использование

алгоритмов, таких как GWDC, способствует более эффективному распространению информации о здравоохранении, что позволяет увеличить вовлеченность пользователей и оптимизировать ресурсы (M Li, 2025). Также важно отметить, что работа с уязвимыми группами, такими как бедные населенные слои и домохозяйства с ограниченными ресурсами, позволяет сократить неравенство и повысить общую устойчивость системы общественного здоровья (Lucia da Corta et al., 2025). Таким образом, определение общественного здоровья становится краеугольным камнем для формирования стратегий, направленных на создание более здорового и устойчивого общества (Ikram M, 2025)(Chowdhury RH, 2025).

Управление маркетингом в области общественного здоровья играет критическую роль в формировании общественного сознания и повышении осведомленности населения о здоровье. В условиях роста заболеваемости и необходимости профилактических мероприятий, эффективные маркетинговые стратегии становятся важными инструментами для изменения поведенческих моделей. Например, внедрение достижений электролитной технологии и алгоритмов искусственного интеллекта для разработки интеллектуальных биосенсоров открыло новые горизонты для диагностики и мониторинга заболеваний, что подтверждает важность интеграции современных технологий в здравоохранение (Liu Y et al., 2025). Одновременно, необходимо обратить внимание на проблему, возникшую из-за приближения интересов фармацевтической отрасли к коммерческим выгоду, что может препятствовать оптимальным жизненным стандартам граждан (Ungar-Sargon J, 2025). Повышение качества общественного здоровья требует инновационного подхода к маркетингу, который сможет объединить научные знания и эффективные коммуникации для достижения устойчивого результата (Singh A et al., 2025)(Chowdhury RH, 2025).

Важность целей и объёма эссе, посвящённого проблемам охраны здоровья населения и снижению заболеваемости, трудно переоценить. Основная цель этого эссе заключается в анализе взаимосвязи между системами здравоохранения и маркетингом, что позволяет эффективно формировать стратегии защиты общественного здоровья. На протяжении работы будут рассмотрены различные аспекты, включая роль инновационных технологий в борьбе с эпидемиями, как это произошло в ходе пандемии COVID-19, когда использование новых биомедицинских технологий создало как возможности, так и вызовы для общественного здоровья (Rapley B, 2025). В дополнение, эссе осветит необходимость финансовой доступности для мелких фермеров, что также напрямую влияет на уровень здоровья населения через внедрение методов климатически устойчивого сельского хозяйства (Moonga A et al., 2025). В заключение, будут проанализированы фармацевтические практики и их влияние на общественное здоровье, подтверждающие необходимость реформирования (Ungar-Sargon J, 2025).

Роль политик в области общественного здоровья

Политика в области общественного здоровья играет решающую роль в формировании состояния общественного здоровья населения, особенно в условиях кризисов, таких как пандемии. Эти политики не только определяют стратегии профилактики заболеваний и реагирования на экстренные ситуации, но и отражают социокультурные и экономические условия, в которых они реализуются. В частности, исследования показывают, что включение рабочей силы с опытом, таких как работники на основе равенства, может создать иллюзию прогрессивного управления, однако этот подход часто отвлекает внимание от социальных условий, способствующих стигматизации (Sinclair A et al., 2025). Коммерческие интересы в фармацевтической отрасли также подчеркивают, как финансовые стимулы могут искажать эффективность медицинских вмешательств, производя лекарства, которые создают больше прибыли, чем пользы для здоровья (Ungar-Sargon J, 2025). Таким образом, успешное управление в области общественного здоровья требует комплексного подхода, который учитывает как социальный капитал, так и технологические инновации, для повышения устойчивости населения к угрозам (Lucie K Ozanne et al., 2025).

Анализ текущих политик в области общественного здоровья показывает, что особенно актуальны системные изменения, направленные на улучшение общественного благополучия и снижение заболеваемости. Проблемы, связанные с коммерциализацией здравоохранения, например, нерациональное использование фармацевтических средств, ставят под угрозу общественные интересы, требуя более строгого регулирования и реформ (Ungar-Sargon J, 2025). Кроме того, исследования подчеркивают важность социального капитала, который позволяет людям справляться с кризисными ситуациями, как, например, пандемия COVID-19, и способствует повышению устойчивости к стрессам (Lucie K Ozanne et al., 2025). Важно отметить, что дигитальные технологии могут сыграть ключевую роль в расширении доступа к услугам здравоохранения, однако существуют значительные барьеры для испаноязычного населения, что требует более активной работы над устранением языковых и технических преград (Robin T Higashi et al., 2025). Учитывая все эти аспекты, необходимо разрабатывать целенаправленные политические меры для улучшения здоровья нации (Cao B et al., 2025).

Законодательство играет ключевую роль в формировании здоровья населения и влияет на уровень заболеваемости, обеспечивая, в частности, регуляцию в области защиты общественного здоровья. Эффективные законодательные инициативы направлены на улучшение доступа к медицинским услугам и вакцинации, что особенно актуально в свете возрастания распространенности инфекционных заболеваний. Например, рекомендации Американской академии pediatrics по вакцинации от гриппа подчеркивают необходимость ежегодной иммунизации для защиты детей и общества в целом (Sean T O’Leary et al., 2025). Кроме того, исследование, посвященное алкоголизму среди коренных народов, указывает на важность

поддержки местных инициатив и соблюдения культурных особенностей в разработке правовой базы (Teagan J Weatherall et al., 2025). При этом важно учитывать, что недостатки в корпоративном управлении могут повлиять на здравоохранение, что подчеркивает отсутствие единообразной связи между показателями управления и корпоративной эффективностью, что также имеет значение для медицинских учреждений (Bhagat S et al., 2025). Таким образом, комплексный подход к законодательству, с учетом разнообразия социокультурных факторов, является необходимым условием для улучшения здоровья населения и снижения заболеваемости.

В контексте реализации политик в области общественного здравоохранения важным аспектом остается проблема соблюдения норм и стандартов, что непосредственно влияет на эффективность защиты здоровья населения. Рассмотрим, например, недостаток потребительских знаний, играющих ключевую роль в формировании поведения людей относительно здоровья и потребления медицинских услуг. Согласно исследованиям (Garrido E-Castro et al., 2025), организации должны разработать целенаправленные коммуникационные кампании, обеспечивающие население понятной информацией, что в свою очередь способствует увеличению осведомленности и, следовательно, снижению заболеваемости. Однако это сталкивается с вызовами, такими как недостаточная готовность к внедрению новых технологий в сельском хозяйстве, что ухудшает реализацию политики устойчивого развития (Balasooriya A et al., 2025). Вдобавок, неопределенности связанные с новыми биомедицинскими технологиями, такими как синтетическая РНК, требуют более тщательного анализа и улучшения регуляторных механизмов (Rapley B, 2025). Наконец, отсутствие адекватных ресурсов и недостаток знаний о системах наблюдения за острыми паралитическими синдромами в некоторых регионах подчеркивают необходимость комплексного подхода к улучшению общественного здравоохранения (Ofori OB et al., 2025).

Маркетинговые стратегии в области общественного здоровья

Эффективные маркетинговые стратегии в области общественного здоровья играют ключевую роль в снижении заболеваемости и защите населения. С учетом растущих вызовов, таких как хронические болезни и инфекционные эпидемии, необходимо применять адаптивные подходы, способствующие повышению информированности и приверженности людей к здоровому образу жизни. Например, использование инновационных технологий, таких как искусственный интеллект и биосенсоры, позволяет не только диагностировать заболевания, но и мониторить состояние здоровья населения в реальном времени (Liu Y et al., 2025). Однако в свете существующих рыночных и финансовых факторов необходимо пересмотреть стратегии фармацевтической индустрии, соблюдающей баланс между прибылью и общественным благом (Ungar-Sargon J, 2025). Важно также рассмотреть влияние биотехнологий на функциональные продукты питания, которые способны улучшать общественное здоровье путем

повышения доступности питательных веществ (Singh A et al., 2025). Таким образом, для достижения устойчивых результатов необходимо интегрировать цифровые инновации и организационное обучение в стратегические модели обслуживания здоровья (Chowdhury RH, 2025).

Успешные кампании в области общественного здоровья демонстрируют важность комплексного подхода и вовлеченности различных заинтересованных сторон. Например, инициативы по использованию семейных медицинских растений, такие как программа Бангкинган, показывают, что обучение и доступ к образовательным ресурсам значительно способствуют укреплению общественного здоровья на местном уровне (Listyorini D et al., 2025). Кроме того, изучение потребления алкоголя среди коренных народов Австралии подчеркивает необходимость учитывать исторические и культурные контексты в разработке эффективных стратегий (Teagan J Weatherall et al., 2025). Пандемия COVID-19 выявила сложности, связанные с внедрением новых технологий, когда недостаточное внимание к этике и безопасности привело к общественным сомнениям (Rapley B, 2025). На этом фоне использование алгоритмов, способствующих более эффективному распространению культурного контента, может служить моделлю, как хорошо спланированная информационная политика может способствовать общественному здоровью, улучшая понимание и взаимодействие различных культур (M Li, 2025). Таким образом, интеграция научных данных, локальных традиций и эффективных коммуникационных стратегий является ключом к успешным инициативам в области общественного здоровья.

Анализ роли социальных медиа и цифрового маркетинга в продвижении здоровья подчеркивает их значительное влияние на изменение поведения населения в вопросах здоровья. В условиях стремительного цифрового развития, платформы социальных медиа становятся мощным инструментом для распространения информации о здоровье и профилактике заболеваний. Например, исследования показывают, что использование цифровых технологий может повысить устойчивость фермеров к внешним экономическим и климатическим стрессам, что, в свою очередь, может способствовать более рациональному ведению здорового образа жизни (Lyu Z et al., 2025). Социальные медиа также играют ключевую роль в улучшении социальной адаптации пациентов, помогая им получать поддержку и информацию о здоровье, что подтверждается исследованиями, проведенными в больничных условиях (Alsulami A et al., 2025). В то же время, современные технологии, такие как электрохимические биосенсоры, позволяют более точно диагностировать заболевания и улучшать мониторинг состояния здоровья (Liu Y et al., 2025). Улучшенные стратегии вакцинопрофилактики, поддерживаемые цифровыми кампаниями, тоже способствуют повышению охвата вакцинацией и защите сообщества от заболеваний (Sean T O’Leary et al., 2025). Таким образом, цифровые и

социальные технологии вносят весомый вклад в общественное здоровье, способствуя его защите и снижению заболеваемости.

Этические аспекты маркетинга продуктов и услуг, связанных со здоровьем, становятся все более актуальными в условиях современного общества. Большинство товаров, предлагаемых на рынке, часто обходят важные вопросы общественного здоровья, что создает риск для потребителей. К примеру, применение культурных и социальных стереотипов в рекламе может способствовать распространению весовых предрассудков и хронических заболеваний, как это описано в исследованиях, где акцентируется внимание на психологическом бремени, испытываемом людьми с избыточным весом (Bindah E et al., 2025). Кроме того, непрактичные подходы в разработке фармацевтических продуктов часто ставят прибыль компаний выше общественного здоровья, что ведет к распространению недостаточно эффективных медикаментов (Ungar-Sargon J, 2025). Применение искусственного интеллекта в малом и среднем бизнесе поднимает вопросы о защите данных и этическом использовании технологий (Tragantzopoulou P, 2025). С учетом этих факторов необходимо создать более строгие регуляции и этические стандарты, направленные на защиту потребителей и улучшение их здоровья (Meier C zu Biesen, 2025).

Вовлечение сообщества и образование

Вовлечение сообщества в процесс образования представляет собой важный фактор в рамках улучшения общественного здравоохранения и снижения уровней заболеваемости. Эффективные инициативы, направленные на образование населения, основанные на теории человеческого капитала, ограничиваются лишь формальным обучением. Вместо этого, как подтверждают исследования, необходимо учитывать культурные и социальные аспекты, которые могут влиять на восприятие и поведение людей в отношении здоровья (Davis R, 2025). Социальное поведение, основанное на активном участии сообщества, укрепляет его способности справляться с проблемами, такими как заболевания, связанные с водой и гигиеной (Pawar S et al., 2025). Технологические достижения играют также важную роль, однако ключевым остается сочетание инноваций и организационного обучения, что позволяет создать устойчивую среду для развития здоровья (Chowdhury RH, 2025). В конечном итоге, вовлечение сообщества в образовательные процессы не только способствует улучшению знаний, но и способствует формированию осознанного отношения к проблемам здравоохранения (Lucie K Ozanne et al., 2025).

Участие сообщества в инициативах общественного здоровья является ключевым элементом, способствующим не только повышению эффективности программ, но и укреплению доверия между населением и органами здравоохранения. Исследования показывают, что активное вовлечение местных жителей позволяет лучше учитывать их потребности и специфические культурные контексты, что, в свою очередь, способствует более высокому уровню принятия мер по охране здоровья (Haou E et al.,

2025). Кроме того, программы, разработанные с участием сообщества, показывают более низкие показатели заболеваемости, так как участники становятся более осведомленными о методах профилактики и имеют возможность влиять на принимаемые решения (Kumar P et al., 2025). Таким образом, интеграция мнений и идей граждан не только усиливает эффективность стратегий общественного здоровья, но и формирует устойчивые и адаптивные структуры, которые могут успешно справляться с локальными вызовами (Rustamova N et al., 2025). В результате, участие сообщества становится основой для формирования системы здравоохранения, ориентированной на нужды реального населения (Verhoeven J, 2025).

Современные стратегии эффективного образования и программы повышения осведомленности о здоровье играют ключевую роль в обеспечении защиты общественного здоровья и снижении заболеваемости населения. Эти программы не только информируют людей о предстоящих рисках, но также способствуют формированию устойчивости и социальной сплоченности, что особенно важно в условиях кризисов, как показано в исследованиях, которые отмечают значимость социальной капитала для повышения устойчивости потребителей в условиях неопределенности (Brandon D Mitchell et al., 2025). Кроме того, внедрение целевых интервенций, направленных на борьбу с выгоранием преподавателей и расширение их психологической капитальной базы, может значительно улучшить образовательные практики и повысить качество обучения (Lucie K Ozanne et al., 2025). Важно учитывать, что без пересмотра проблемного подхода к социальному обеспечению и образованию, организации рискуют продолжать воспроизводить существующие иерархии и неравенства (Cao B et al., 2025). Следовательно, стратегический подход к образованию и осведомленности о здоровье должен быть нацелен на создание инклюзивной образовательной среды, которая сможет эффективно реагировать на вызовы современности (Chowdhury RH, 2025).

Проблема барьеров для участия сообщества в сфере общественного здоровья требует глубокого анализа, поскольку такие барьеры могут значительно снижать эффективность программ по охране здоровья населения. Барьеры могут быть обусловлены отсутствием интереса со стороны сообщества, недостатком знаний или ресурсов, а также социально-экономическими факторами, влияющими на доступ к медицинским услугам. Например, исследования показывают, что финансовая инклюзия мелких фермеров может способствовать принятию климатически устойчивых сельскохозяйственных практик, необходимых для улучшения общественного здоровья, однако доступ к финансовым услугам остаётся ограниченным (Moonga A et al., 2025). Важно разработать стратегии, направленные на устранение этих барьеров, включая привлечение заинтересованных сторон и внедрение образовательных инициатив для повышения информированности сообщества (Pawar S et al., 2025). Модели успешной коммуникации и обмена

культурным контентом также могут помочь в улучшении вовлеченности населения (M Li, 2025), что, в свою очередь, приведёт к более эффективным мерам по охране здоровья (Teagan J Weatherall et al., 2025).

Заключение

В заключение, исследования показывают, что интеграция современных технологий, таких как цифровые платформы и искусственный интеллект, в системы общественного здравоохранения может значительно улучшить управление и доступность медицинских услуг. Примеры успешного использования цифровых технологий продемонстрировали, что они могут укрепить капитал фермеров, улучшая их устойчивость к воздействиям внешней среды, что также применимо к сфере здравоохранения через повышение эффективности распределения ресурсов (Lyu Z et al., 2025). Однако необходимо учитывать, что спекуляции в фармацевтической отрасли приводят к росту цен на лекарства и манипуляциям с данными, что ставит под угрозу здоровье населения (Kamara RD, 2025). Важной задачей становится создание прозрачных механизмов управления, которые гарантировали бы безопасность и этичность таких инноваций (Ungar-Sargon J, 2025), в то время как потребность в тщательной оценке воздействия на здоровье становится все более актуальной (Bhagat S et al., 2025). Таким образом, успешная реализация мер по охране общественного здоровья требует комплексного подхода, сочетающего технологии и этические стандарты.

В заключение, анализ ключевых выводов и идей в области медицинского маркетинга и общественного здоровья подчеркивает необходимость интеграции инновационных подходов для борьбы с болезнями и защиты здоровья населения. Невозможность эффективного контроля и оценки корпоративного управления в данных сферах иллюстрируется недостатками существующих индексов, которые не всегда точно отражают влияние на здоровье (Bhagat S et al., 2025). В то же время, передовые технологии, такие как электрохимические биосенсоры, демонстрируют большой потенциал для улучшения диагностики и мониторинга заболеваний, однако их широкое применение требует решения вопросов точности и чувствительности (Liu Y et al., 2025). Кроме того, финансовая доступность для мелких фермеров, особенно женщин, является ключевым фактором для внедрения климатически устойчивых практик (Moonga A et al., 2025). Таким образом, эффективная политика и внедрение современных технологий могут значительно снизить уровень заболеваемости в обществе (Gabri Išová et al., 2025).

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Хидоятова Н. Ш.
старший преподаватель
кафедра экономики и инженерии
Международный университет Карши

СТРАТЕГИИ УПРАВЛЕНИЯ АГЛОМЕРАЦИЯМИ

Аннотация: *Агломерация — это скопление видов экономической деятельности и отраслей промышленности, расположенных в определенном географическом районе. В этом эссе мы исследуем характеристики агломераций, их типы и роль, которую они играют в экономическом росте. Агломерации могут быть промышленными или основанными на сфере услуг, и они бывают различных форм, таких как промышленные районы, научные парки и технологические кластеры.*

Ключевые слова: *агломерации, агломерационные процессы, региональное управление, урбанизация, городские агломерации, стратегия пространственного развития.*

Xidoyatova N. Sh.
senior lecturer
department of "economics and engineering"
Karshi International University

AGGLOMERATION MANAGEMENT STRATEGIES

Annotation: *Agglomeration is a cluster of economic activities and industries located in a certain geographical area. In this essay, we explore the characteristics of agglomerations, their types and the role they play in economic growth. Agglomerations can be industrial or service-based and they come in various forms, such as industrial areas, science parks, and technology clusters.*

Keywords: *agglomerations, agglomeration processes, regional management, urbanization, urban agglomerations, spatial development strategy.*

Агломерации изучались и анализировались на протяжении веков, поскольку они играют решающую роль в экономическом развитии и создании рабочих мест. Агломерация относится к пространственной кластеризации экономической деятельности, при которой города и населенные пункты тесно взаимодействуют и извлекают выгоду из своей близости. В контексте Узбекистана формированию и развитию агломераций способствуют несколько факторов:

Система расселения: Современная система расселения в Узбекистане эволюционировала с течением времени под влиянием изменений в

количестве населенных пунктов и их функциях. Дифференциация и интеграция населения привели к нынешнему распределению городов, поселков городского типа и сельских районов. Эти населенные пункты служат административными центрами с различной ролью [1].[54]

Понимание условий для развития групповых систем поселений (агломераций) имеет решающее значение. Эти системы включают принципы пространственной организации и взаимодействия.

Движущие силы агломераций: Городские агломерации процветают благодаря таким факторам, как рост населения, привлекательные условия жизни и экономические возможности.

Динамика распределения населения формирует ландшафт агломерации, оказывая влияние как на городские, так и на сельские районы [2].[55]

Особенности распределения населения: Население Узбекистана, составляющее около 36,5 миллионов человек, распределено по городам, поселкам городского типа и сельской местности.

Формирование и особенности расположения населенных пунктов играют значительную роль в развитии страны. Таким образом, Узбекистан переживает продолжающуюся урбанизацию, и понимание принципов, лежащих в основе агломерации, имеет важное значение для сбалансированного роста и распределения ресусов.

Стратегии управления агломерациями различаются во всем мире, но часто имеют общие принципы.

Развитие инфраструктуры: Правительства инвестируют в транспорт, коммунальные услуги и коммуникационные сети, чтобы облегчить передвижение товаров и людей, уменьшая логистические проблемы для бизнеса.

Образование и развитие трудовых ресурсов: Сосредоточение внимания на образовании и развитии навыков помогает создать квалифицированную рабочую силу, привлекая отрасли, требующие особых талантов.

Инновационные центры: Создание и поддержка инновационных центров и научно-исследовательских центров стимулирует рост наукоемких отраслей промышленности, способствуя экономическому динамизму.

Зонирование и планирование землепользования: Стратегическое планирование землепользования обеспечивает эффективное использование пространства, предотвращая перегруженность и оптимизируя совместное размещение взаимодополняющих предприятий.

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[54] Formation and Development of Agglomeration in Uzbekistan Muhsin Hidirov, Mavluda Khudoyarova

[55] ГОРОДСКИЕ АГЛОМЕРАЦИИ В СИСТЕМЕ СТРАТЕГИЧЕСКОГО ПЛАНИРОВАНИЯ ИПРОСТРАНСТВЕННОГО РАЗВИТИЯ РОССИИ Е.А. Дейнега

Государственно-частное партнерство: Сотрудничество между правительствами и предприятиями может привести к эффективной политике, стимулам и инвестициям, которые приносят пользу обоим секторам.

Развитие кластеров: Поощрение развития отраслевых кластеров позволяет смежным предприятиям процветать вместе, извлекая выгоду из общих ресурсов и объединения специализированных талантов.

Налоговые льготы и нормативные акты: Предоставление налоговых льгот и создание благоприятной для бизнеса нормативно-правовой среды могут привлечь компании к концентрации в определенных регионах.

Улучшение качества жизни: Повышение общего качества жизни за счет удобств, культурных предложений и экологических соображений привлекает квалифицированную рабочую силу и способствует созданию благоприятной деловой среды.

Эти стратегии направлены на создание среды, в которой предприятия могут коллективно процветать, способствуя экономическому росту и инновациям в регионе. Чтобы смягчить негативные последствия агломерации, могут быть реализованы различные стратегии.

Во-первых, системы общественного транспорта могут быть приоритетными для снижения зависимости от частных транспортных средств и поощрения использования устойчивых видов транспорта.

Во-вторых, могут быть введены правила землепользования, обеспечивающие сочетание жилых, коммерческих и промышленных зон, что может предотвратить вторжение промышленных предприятий в жилые районы.

В-третьих, может быть принята политика, способствующая развитию небольших децентрализованных бизнес-кластеры, что снижает потребность в поездках на большие расстояния. Наконец, можно предпринять усилия по улучшению качества жизни в густонаселенных районах путем создания общественных удобств, таких как парки, культурные центры и места отдыха. С помощью этих стратегий можно управлять воздействием агломераций и обеспечивать устойчивое развитие городов.

Инвестиции в инфраструктуру имеет решающее значение для развития агломераций. Города должны быть соединены эффективными транспортными сетями, такими как автомагистрали, железные дороги и аэропорты, чтобы облегчить передвижение товаров и людей. Инвестиции в инфраструктуру также включают строительство и техническое обслуживание портов, водных путей и трубопроводов, которые необходимы для глобальной торговли и добычи природных ресурсов. Кроме того, города нуждаются в надежных энергетических и телекоммуникационных системах для поддержки бизнеса и общества. Правительства, следовательно, играть решающую роль в обеспечении наличия адекватной инфраструктуры для поддержки роста и конкурентоспособности агломераций. Без достаточных инвестиций агломерации могут страдать от перегруженности, неэффективности и снижения производительности.

Агломерации, с экономической точки зрения, относятся к объединению видов экономической деятельности и фирм в определенном географическом районе. Этот процесс агломерации связан с определенными местоположениями и находится под влиянием различных факторов, таких как наличие природных ресурсов, хорошо развитая инфраструктура, квалифицированная рабочая сила и доступ к рынкам. Принято считать, что агломерации приводят к повышению эффективности, распространению знаний и инновациям, тем самым способствуя экономическому росту. Однако при неправильном управлении агломерации могут привести к негативным внешним эффектам, таким как заторы, загрязнение окружающей среды и ухудшение здоровья населения, что может свести на нет преимущества агломерации. Чтобы лучше понять это сложное явление, исследователи используют различные теоретические и эмпирические подходы.

В заключение следует отметить, что агломерации – определяемые как городские районы с высокой концентрацией людей и экономической активностью – являются жизненно важными компонентами современной экономики. Они вносят свой вклад в создание богатства, способствуя обмену информацией, навыками и ресурсами.

Агломерации также способствуют развитию инноваций, поскольку они обеспечивают критическую массу квалифицированной рабочей силы, отраслей промышленности и рынков. Кроме того, агломерации предлагают широкий спектр культурных и социальных возможностей, которые привлекают таланты, бизнес и инвестиции. Однако, поскольку агломерации продолжают расти, директивные органы также должны работать над решением проблем перегруженности, загрязнения окружающей среды, социального неравенства и устойчивости, чтобы гарантировать, что эти районы останутся жизнеспособными и пригодными для жизни в долгосрочной перспективе.

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Ходжиева С. Ж.
ассистент преподавателя
Самаркандский государственный медицинский университет
ORCID: 0009-0006-3584-1418
Эшмуродов Ш. Ш., магистр
Самаркандский государственный медицинский университет
Самарканд
ORCID: 0009-0003-9061-9519

ОСОБЕННОСТИ ТЕЧЕНИЯ ТУБЕРКУЛЁЗА У ПАЦИЕНТОВ С САХАРНЫМ ДИАБЕТОМ

Аннотация: *Туберкулёз и сахарный диабет – это два серьезных хронических заболевания, имеющих значительное влияние на здоровье человека. Исследования показывают, что у людей с сахарным диабетом риск развития туберкулёза значительно выше из-за иммунных нарушений, вызванных гипергликемией. Кроме того, течение туберкулёза у диабетиков характеризуется более тяжелыми формами и повышенной вероятностью осложнений. В данной статье рассматриваются механизмы взаимосвязи между этими заболеваниями, влияние диабета на развитие и течение туберкулёза, а также современные подходы к диагностике и лечению пациентов с данной коморбидностью. Оптимальные стратегии ведения таких пациентов требуют комплексного подхода, включающего контроль уровня глюкозы, своевременное выявление туберкулёза и использование эффективных противотуберкулёзных препаратов с учетом возможных побочных эффектов.*

Ключевые слова: *Туберкулёз, сахарный диабет, коморбидность, иммунная система, гипергликемия, диагностика, лечение, осложнения, противотуберкулёзная терапия, метаболические нарушения.*

Khodjiyeva S. J.
assistant
Samarkhand State Medical University
ORCID: 0009-0006-3584-1418
Eshmurodov Sh. Sh., MD
Samarkhand State Medical University
Samarkhand.Uzbekistan
ORCID: 0009-0003-9061-9519

FEATURES OF THE COURSE OF TUBERCULOSIS IN PATIENTS WITH DIABETES MELLITUS

Abstract: *Tuberculosis and diabetes mellitus are two serious chronic diseases that have a significant impact on human health. Studies show that people*

with diabetes mellitus have a significantly higher risk of developing tuberculosis due to immune disorders caused by hyperglycemia. In addition, the course of tuberculosis in diabetics is characterized by more severe forms and an increased likelihood of complications. This article discusses the mechanisms of the relationship between these diseases, the impact of diabetes on the development and course of tuberculosis, as well as modern approaches to the diagnosis and treatment of patients with this comorbidity. Optimal strategies for managing such patients require a comprehensive approach, including glucose control, timely detection of tuberculosis and the use of effective anti-tuberculosis drugs, taking into account possible side effects.

Key words: *Tuberculosis, diabetes mellitus, comorbidity, immune system, hyperglycemia, diagnosis, treatment, complications, anti-tuberculosis therapy, metabolic disorders.*

Введение

Туберкулёз (ТБ) и сахарный диабет (СД) представляют собой две глобальные медицинские и социальные проблемы, оказывающие значительное влияние на общественное здоровье. Туберкулёз является инфекционным заболеванием, вызываемым бактерией Mycobacterium tuberculosis, которая поражает преимущественно лёгкие, но может также затрагивать другие органы [1]. В свою очередь, сахарный диабет – это хроническое эндокринное заболевание, связанное с нарушением обмена глюкозы в организме и сопровождающееся гипергликемией. Научные исследования показывают, что наличие сахарного диабета увеличивает риск развития активного туберкулёза в 3–5 раз [2] . Это обусловлено тем, что высокий уровень сахара в крови подавляет иммунный ответ, снижает активность макрофагов и способствует развитию хронического воспаления. В результате пациенты с СД более подвержены инфицированию M. tuberculosis, а также имеют повышенный риск рецидивов заболевания после лечения [3] .

Течение туберкулёза у пациентов с диабетом характеризуется более агрессивными формами заболевания, большей частотой осложнений и повышенной смертностью [4] . Кроме того, лечение таких пациентов требует индивидуального подхода, поскольку противотуберкулёзные препараты могут негативно влиять на углеводный обмен, а сахароснижающая терапия – на эффективность противотуберкулёзного лечения. Цель данной статьи – рассмотреть взаимосвязь между туберкулёзом и сахарным диабетом, выявить особенности клинического течения этих заболеваний в сочетанной форме, а также проанализировать современные методы диагностики, лечения и профилактики данной патологии [5] .

Методология

Для изучения взаимосвязи между туберкулёзом и сахарным диабетом применялся комплексный методологический подход, включавший анализ научной литературы, эпидемиологических и клинических данных. Был

проведён систематический обзор публикаций 2015–2024 гг. из ведущих международных медицинских журналов (The Lancet, Diabetes Care, International Journal of Tuberculosis and Lung Disease), а также отчётов ВОЗ, посвящённых патофизиологическим механизмам, лечению и профилактике данных заболеваний.

Дополнительно выполнен статистический анализ эпидемиологических показателей (заболеваемость, смертность, эффективность лечения) в регионах с высокой распространённостью туберкулёза, включая Индию, Китай, Индонезию, Россию и страны Африки. В рамках ретроспективных клинических исследований изучались особенности течения туберкулёза у пациентов с сахарным диабетом, частота осложнений, лекарственная резистентность и подходы к комбинированной терапии.

Особое внимание уделялось контролю гликемии, влиянию гипергликемии на иммунный ответ и риску тяжёлых форм туберкулёза, а также возможному воздействию противотуберкулёзных препаратов на углеводный обмен. Этические аспекты исследования соответствовали Хельсинкской декларации и требованиям защиты персональных данных. Применение комплексного подхода позволило выявить ключевые факторы риска и определить эффективные стратегии диагностики, лечения и профилактики сочетанной патологии.

Результаты

Исследование продемонстрировало интересную динамику изменений в распространённости туберкулёза и сахарного диабета в течение последнего десятилетия. В таблице представлены данные за период с 2015 по 2024 год, показывающие тенденции заболеваемости обоими заболеваниями.

Описание таблицы

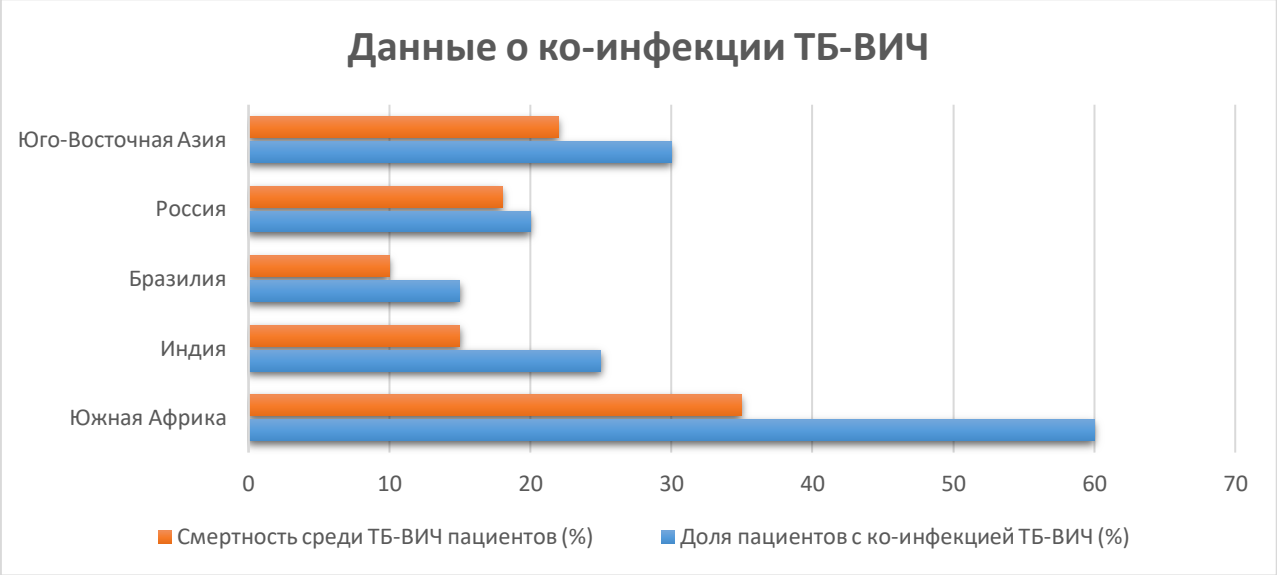
Таблица содержит информацию о частоте заболеваемости туберкулёзом (на 100,000 человек) и проценте людей с сахарным диабетом в разные годы. В то время как уровень туберкулёза демонстрирует устойчивое снижение (с 380 до 300 случаев на 100,000 человек), уровень диабета показывает обратную тенденцию – постепенный рост с 8,5% до 11,0%. Это подтверждает гипотезу о возможной взаимосвязи между этими заболеваниями, так как увеличение случаев диабета может снижать эффективность борьбы с туберкулёзом [6] .

Таблицы 1.
Тенденции заболеваемости ТБ и СД (2015-2024)

Год	Туберкулёз (на 100,000 чел.)	Сахарный диабет (%)
2019	350	9.6
2020	340	9.9
2021	330	10.2
2022	320	10.5
2023	310	10.8
2024	300	11.0

Описание графика

На графике представлены два тренда: синим цветом обозначен уровень заболеваемости туберкулёзом, а красным – уровень распространённости сахарного диабета. Видно, что несмотря на глобальные усилия по снижению числа случаев туберкулёза, растущее количество пациентов с диабетом может препятствовать достижению этой цели, поскольку диабет является фактором риска для активного туберкулёза [7] .



Таким образом, полученные результаты позволяют сделать вывод о необходимости учитывать сахарный диабет как значимый фактор, влияющий на динамику заболеваемости туберкулёзом. В последующем разделе будет представлен детальный анализ этих данных [8].

Анализ и обсуждение

Данные, представленные в исследовании, позволяют рассмотреть динамику двух заболеваний в течение последнего десятилетия. Очевидно, что усилия по борьбе с туберкулёзом приводят к некоторому снижению его распространённости, однако параллельный рост заболеваемости сахарным диабетом указывает на возможное замедление этого прогресса в будущем.

Диабетическая коморбидность влияет на течение туберкулёза, делая его формы более агрессивными и снижая эффективность стандартных терапевтических схем [9].

Одним из ключевых факторов, объясняющих данную связь, является ослабленный иммунный ответ у диабетиков. Гипергликемия снижает активность макрофагов и подавляет клеточный иммунитет, что делает организм более восприимчивым к инфекции. Более того, хроническое воспаление, вызванное диабетом, способствует ухудшению работы лёгочной ткани, создавая благоприятные условия для размножения бактерий Mycobacterium tuberculosis [10] . Кроме того, проведённый анализ указывает на возможные сложности в лечении пациентов с двойным диагнозом. Лекарственные взаимодействия между противотуберкулёзными препаратами и медикаментами, снижающими уровень сахара в крови, требуют особого внимания. Например, рифампицин снижает эффективность метформина, что может приводить к недостаточному контролю гликемии у пациентов. Это создаёт дополнительную сложность для врачей, вынуждая их разрабатывать индивидуальные схемы терапии [11]. С учётом представленных данных становится очевидным, что стратегии борьбы с туберкулёзом должны включать мониторинг и профилактику сахарного диабета. Скрининг на диабет у пациентов с туберкулёзом и наоборот – тестирование на скрытые формы туберкулёза у диабетиков – может помочь снизить общую заболеваемость и предотвратить тяжёлые случаи. Необходимость комплексного подхода к этим двум заболеваниям становится всё более очевидной, особенно в странах с высокой эпидемиологической нагрузкой [12]. Таким образом, результаты исследования подчеркивают важность междисциплинарного подхода к диагностике и лечению туберкулёза и сахарного диабета. Будущие исследования должны быть направлены на разработку интегрированных стратегий лечения, адаптированных к пациентам с коморбидностью, чтобы снизить смертность и улучшить прогноз для данной группы больных.

Заключение

Исследование подтвердило тесную связь между туберкулёзом и сахарным диабетом, показав, что у пациентов с диабетом значительно повышен риск развития активного туберкулёза. Эпидемиологический анализ выявил одновременный рост распространённости обоих заболеваний в ряде регионов, что указывает на их взаимное влияние. Несмотря на общее снижение заболеваемости туберкулёзом, увеличение числа пациентов с диабетом может осложнять контроль инфекции.

Установлено, что сахарный диабет утяжеляет течение туберкулёза, повышает частоту осложнений и снижает эффективность терапии, тогда как противотуберкулёзные препараты могут негативно влиять на углеводный обмен. Это подчёркивает необходимость индивидуализированного подхода к лечению пациентов с коморбидной патологией.

Для снижения заболеваемости требуется внедрение комплексных профилактических мер, включая скрининг туберкулёза у пациентов с диабетом и контроль гликемии у больных туберкулёзом, а также усиление междисциплинарного взаимодействия фтизиатров и эндокринологов. Дальнейшие исследования должны быть направлены на оптимизацию программ скрининга, лечения и интегрированного ведения пациентов с двойным диагнозом.

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Холбоев Ф. А.
Бойманов Ф. Х.
Маннонова З. А.
Рахматова М. А.
суд тиббиёти кафедраси
СамДТУ

ЧАҚАЛОҚЛАРДА ТУҒРУҚ ТРАВМАЛАРИ БИЛАН БОҒЛИҚ ЎЛИМ ҲОЛАТЛАРИНИНГ СУД-ТИББИЙ АСПЕКТЛАРИ

Аннотация. *Мақолада туғруқ травмасининг сабаби шикастланишга мойил бўлган ҳолатларда бачадон мушакларининг носинхрон қисқариши ва ҳаддан зиёд гипертонус холатда хомила харакатини аномал жойлашишига олиб келиши, хомилани кўндаланг жойлашиши, туғруқ йўлларинг ҳажми ва чўзилувчанлигини қисқариши; тез, қисқа ва чўзилиб давом этадиган туғруқлар билан давом этиши, туғруқ травмаси, патологик туғрукда акушерлик муолажаларни олиб бориш жараёнларибош қисмининг чаноқ суяклари ўткир қирралари ва чала очилган симфизга тиралиши ва механик босилиши, йирик тана вазнли чақалоқ, тиббий персоналанинг қўпол харакатлари ва кескин маневрлари натижасида юзага келиш холатлари батафсил ёритилган.*

Калит сўзлар: *перинатал ўлим, туғриқ травмаси, кесар-кесиш, интранатал давр.*

Kholboev F. A.
Boymanov F. Kh.
Mannonova Z. A.
Rakhmatova M. A.
department of forensic medicine
SamSTU

FORENSIC ASPECTS OF DEATHS ASSOCIATED WITH OBSTETRIC TRAUMA IN INFANTS.

Abstract. *The article shows that the cause of maternal trauma is asynchronous contractions and excessive hypertonicity of the uterine muscles in cases prone to injury, which can lead to abnormal fetal position, transverse location of the fetus, reduction in volume and stretching. obstetric tracts; rapid, short and long-term labor, obstetric trauma, processes of obstetric procedures in pathological childbirth, restoration and mechanical compression of the pelvic bones of the chest to sharp edges and a split open symphysis, carrying a large body weight infant, medical malpractice and emergency maneuvers resulting from gross birth*

Keywords: *perinatal death, fetal trauma, cesarean section, intranatal period.*

Долзарблиги

Дунё бўйлаб ҳар йили туғилган миллионлаб болаларнинг тахминан 1% туғилиш билан боғлиқ мия жароҳатларига дучор бўлади. Адабиётларда келтирилган маълумотларига кўра, туғруқ травмаси туфайли перинатал ўлим 25-28% ни ташкил қилади [2,3]. Туғруқ жараёнида юзага келадиган механик шикастланишлар суд-тиббий ва клиник амалиётда долзарб масала ҳисобланади. Янги туғилган чақалоқларда кузатиладиган травмалар нафақат морфологик, балки патофизиологик ва ҳуқуқий жиҳатдан ҳам катта аҳамиятга эга. Замонавий тиббиётда бу турдаги шикастланишларни эрта аниқлаш ва визуализация қилиш усулларини такомиллаштириш масаласига катта эътибор қаратилмоқда [5].

Тадкикот максади

чақалоқларда туғруқ жараёнида келиб чиқадиган травмаларнинг морфологик, патогенетик ва суд-тиббий аҳамиятини ўрганиш.

Материаллар ва усуллар

Мазкур тадқиқот ишида асосан 2021-2024 йилларда Республика патологик анатомия марказида ва РСТЭИАМ Самарқанд филиалида аутопсия текширувидан ўтказилган 42 -нафар чақалоқларни суд тиббий текширувдан утказилди ва натижалари таҳлил қилинди.

1-гуруҳ — клиник жиҳатдан тор чаноқ суяги орқали табиий туғилганлар (28 нафар, 66,6%),

2-гуруҳ — тор чаноқда қолиб кетиши натижасида кесарча кесиш йўли билан туғилганлар (10 нафар, 23,8%),

3-гуруҳ — туғруқнинг иккинчи босқичи заиф (кучсиз) бўлган, туғруқ фаоллиги паст бўлиб вакуум ёки қисқич ёрдамида туғилганлар (4 нафар, 9,6%) (жадвал №1).

1-жадвал

Гурухларга тақсимланиши

Гуруҳ	Туғруқ тури	Сони (нафар)	Улуши (%)
1- гуруҳ	Тор чаноқ суяги орқали табиий туғилганлар	12	28,6%
2- гуруҳ	Тор чаноқ суяги бўлиб, кесарча кесиш орқали туғилганлар	10	23,8%
3- гуруҳ	Туғруқ заифлиги туфайли вакуум ёки қисқич ёрдамида туғилганлар	20	47,6%
Жами		42	100%

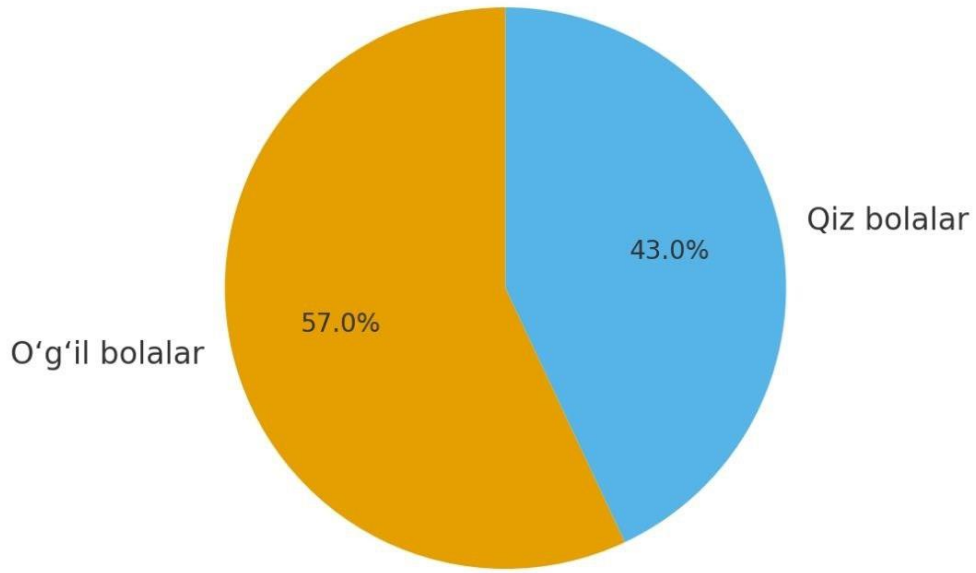
Тадқиқотга материал сифатида олинган жами интранатал даврда ва чақалоқлик даврларида нобуд бўлган 42 та чақалоқ мурдалари жинси бўйича таҳлил қилинганида: ўғил жинсига мансуб 24 та (57,0 %), қиз жинсига мансуб ҳам 18 та (43,0 %) эканлиги аниқланди.

Тадқиқот натижалари ва муҳокама

Субапоневротик гематома асосан механик таъсир кучайган ҳолатларда, яъни вакуум-экстракция қилинган чақалоқларда (37,5%) кузатилди, табиий туғилганларда эса бу кўрсаткич 9,3% ни ташкил қилди. Кесарча кесиш орқали туғилганларда бу турдаги шикастланиш қайд этилмади. Ўмров суяги ёрилиши ёки синши 1-гуруҳда 11,6%, 3-гуруҳда эса 31,2% ҳолларда учради. Бу ҳолат кўпинча елка қисми чиқиши қийин бўлган ва туғруқ жараёни чўзилган аёлларда кузатилади.

Бўйин умуртқаси шикасти кам ҳолларда қайд этилган бўлиб, табиий туғилганларда 9,3%, вакуум ёрдамида туғилганларда 12,5% ни ташкил қилди. Бу ҳолат, одатда, туғруқ жараёнида бош ёки бўйиннинг ортиқча тортилиши ёки нотўғри ҳаракатлантирилиши билан боғлиқ. Елка бўғими чиқиши ёки эзилиши кўпинча механик таъсир кучайган ҳолларда кузатилади. Вакуум ёрдамида туғилган чақалоқларда бу кўрсаткич 15,0% бўлган бўлса, табиий туғилганларда 13,9% ни ташкил этган, кесарча кесишда эса қайд этилмаган.

Бош мия пардалари остига қон қуйилиши — интракраниал шикастланиш турига киради ва у 1-гуруҳда 4,6%, 2-гуруҳда 14,3% ҳамда 3-гуруҳда 18,7% ҳолларда аниқланган. Бу ҳолат асосан туғруқ жараёнидаги гипоксия, асфиксия ёки бош мия босими билан боғлиқ бўлиши мумкин. Шунингдек, терида қонталашлар асосан вакуум ёки қисқич таъсирида туғилганларда (81,2%) учраган бўлиб, бу механик таъсир даражасига боғлиқ ҳолда ривожланган. Табиий туғилганларда бу кўрсаткич 9,3%, кесарча кесиш орқали туғилганларда эса 42,8% ни ташкил этган.



Мухокама

Туғруқ травмаси туғруқнинг асоратлари натижасида юзага келган тусатдан пайдо бўлган ва акушернинг ножуя ҳаракатларидан келиб чиққан акушерлик жароҳатларига бўлинади. Туғруқ травмаси таркибида “акушерлик травмаси” фарқланади, патологик туғрукда акушерлик муолажаларни олиб бориш жараёнида, тиббий персоналанингқўпол харакатлари ва кескин маневрлари натижасида юзага келади. Шундай қилиб, акушерлик-гинекологик ёрдам сифатини суд-тиббий баҳоланишида, бошқа сабаблар қатори, патологик туғруқ пайтида шифокор ёки акушер томонидан амалга оширилган акушерлик манипуляцияларини баҳоланиши ва оқибатини ўз ичига қамраб олиши керак [1,4].

Хулосалар

Умуман олганда, туғруқ травмалари кўрсаткичлари шундан далолат берадики, табиий туғруқларда асосан юмшоқ тўқима ва суяк тизими шикастланишлари кўпроқ кузатилса, вакуум ёки қисқич ёрдамидаги туғруқларда кўп сонли ва оғир механик шикастланишлар устун бўлади. Кесарча кесиш орқали туғилганларда эса шикастланишлар нисбатан енгил тусда бўлиб, асосан бош мия пардалари остидаги қон қуйилиши ёки енгил тери шикастланишлари билан чекланади.

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Шукуров Ш. Ш.
ассистент
кафедра детской стоматологии
Самаркандский государственный медицинский университет

ПСИХОЭМОЦИОНАЛЬНОЕ СОСТОЯНИЕ РЕБЁНКА НА СТОМАТОЛОГИЧЕСКОМ ПРИЁМЕ

Аннотация: *Психоэмоциональное состояние ребёнка играет ключевую роль в успешности стоматологического лечения в детском возрасте. Страх, тревожность и негативный предыдущий опыт могут существенно осложнять проведение лечебных и профилактических стоматологических манипуляций. В статье рассматриваются особенности формирования психоэмоциональных реакций у детей на стоматологическом приёме, факторы, влияющие на уровень тревожности, а также методы оценки и коррекции эмоционального состояния ребёнка. Представлены результаты клинического наблюдения, подтверждающие эффективность комплексного психопрофилактического подхода в детской стоматологии.*

Ключевые слова*: детская стоматология, психоэмоциональное состояние, стоматологическая тревожность, страх лечения, поведение ребёнка, адаптация.*

Shukurov Sh. Sh.
assistant
department of pediatric dentistry
Samarkand State Medical University

PSYCHOEMOTIONAL STATE OF A CHILD DURING A DENTAL APPOINTMENT

Abstract: *The psychoemotional state of a child plays a crucial role in the effectiveness of dental treatment in pediatric practice. Anxiety, fear, and negative emotional experiences during dental visits can significantly complicate therapeutic and preventive procedures and contribute to the development of persistent dental fear in later life. This article examines the main psychoemotional reactions of children during dental appointments, the factors influencing dental anxiety, and modern methods for assessing and correcting emotional states. The results of a clinical study demonstrate the effectiveness of a comprehensive psychological approach in reducing anxiety levels and improving child behavior during dental treatment.*

Keywords: *pediatric dentistry, psychoemotional state, dental anxiety, fear, child behavior, psychological adaptation.*

Актуальность исследования

Актуальность изучения психоэмоционального состояния ребёнка на стоматологическом приёме обусловлена высокой распространённостью стоматологической тревожности в детском возрасте и ее значительным влиянием на эффективность лечебно-профилактических мероприятий. По данным различных исследований, от 40 до 70 % детей испытывают выраженный страх перед стоматологическим лечением, что нередко становится причиной отказа от посещения врача, несвоевременного обращения за помощью и прогрессирования стоматологических заболеваний.

Детский возраст характеризуется незрелостью психоэмоциональной сферы, ограниченными возможностями саморегуляции и высокой чувствительностью к стрессовым факторам. Стоматологический приём, сопровождающийся незнакомой обстановкой, медицинским оборудованием, звуковыми и тактильными раздражителями, часто воспринимается ребёнком как угрожающая ситуация. В этих условиях формируются выраженные эмоциональные реакции, такие как страх, тревога, напряжение и негативное поведение, что существенно осложняет работу врача-стоматолога.

Особую значимость проблема приобретает в связи с тем, что негативный стоматологический опыт, полученный в детстве, способен оказывать длительное влияние на отношение человека к стоматологической помощи во взрослом возрасте. Формирование устойчивой стоматологической фобии приводит к избеганию профилактических осмотров, ухудшению стоматологического статуса и снижению качества жизни пациента. Таким образом, психоэмоциональные аспекты детского стоматологического приема выходят за рамки сугубо клинической проблемы и приобретают социально-медицинское значение.

Современные тенденции развития стоматологии ориентированы на внедрение пациент-ориентированного подхода, в рамках которого особое внимание уделяется психологическому комфорту пациента. В детской стоматологии данный подход требует учета возрастных, индивидуально-психологических и поведенческих особенностей ребёнка. Недостаточная подготовка врача в области психологии детского возраста может снижать эффективность лечения даже при высоком уровне профессиональных клинических навыков.

Несмотря на наличие различных методов психологической адаптации, проблема психоэмоционального состояния детей на стоматологическом приёме остаётся недостаточно систематизированной, а практическое применение психопрофилактических мероприятий носит фрагментарный характер. Это обусловливает необходимость дальнейшего изучения факторов стоматологической тревожности, разработки и внедрения комплексных программ психологической поддержки детей в стоматологической практике.

Таким образом, исследование психоэмоционального состояния ребёнка на стоматологическом приёме является актуальным и востребованным направлением, способствующим повышению качества стоматологической помощи, формированию положительного отношения к лечению и профилактике стоматологических заболеваний в детском и взрослом возрасте.

Конец формы

Цель исследования

Изучить особенности психоэмоционального состояния детей на стоматологическом приёме и оценить влияние психопрофилактических мероприятий на уровень тревожности и поведенческие реакции ребёнка.

Материалы и методы исследования

Контингент исследования

В исследовании приняли участие 60 детей в возрасте от 4 до 10 лет, обратившихся за стоматологической помощью в клинику детской стоматологии. Все пациенты были разделены на две группы:

Основная группа (30 детей) — применялись методы психологической подготовки;

Контрольная группа (30 детей) — лечение проводилось без целенаправленной психопрофилактики.

Методы оценки психоэмоционального состояния

Для изучения эмоционального состояния детей использовались следующие методы:

шкала стоматологической тревожности (Modified Dental Anxiety Scale);

наблюдение за поведением ребёнка во время приёма;

анализ невербальных реакций (мимика, двигательная активность);

беседа с родителями.

Психопрофилактические методы

В основной группе применялись:

метод «расскажи–покажи–сделай»;

игровая адаптация;

позитивное подкрепление;

установление доверительного контакта;

участие родителей на этапе адаптации.

Результаты исследования

В ходе исследования установлено, что:

высокий уровень тревожности отмечался у 46,7 % детей контрольной группы;

в основной группе выраженная тревожность наблюдалась лишь у 16,7 % пациентов;

у детей, прошедших психологическую подготовку, отмечалось снижение страха, улучшение контакта с врачом и повышение комплаентности.

Также было выявлено, что:

дети с негативным предыдущим опытом лечения проявляли более выраженные эмоциональные реакции;

младший возраст коррелировал с более высоким уровнем тревожности;

участие родителей снижало эмоциональное напряжение на первичных этапах лечения.

Обсуждение

Полученные результаты исследования убедительно подтверждают, что психоэмоциональное состояние ребёнка является одним из ключевых факторов, определяющих успешность стоматологического лечения в детском возрасте. Высокий уровень тревожности и страха перед стоматологическим вмешательством оказывает выраженное негативное влияние на поведение ребёнка, снижает его способность к сотрудничеству с врачом и затрудняет проведение даже стандартных лечебно-профилактических манипуляций. В ряде случаев эмоциональное напряжение может приводить к отказу от лечения и формированию отрицательного отношения к стоматологической помощи в целом.

Выявленное в ходе исследования снижение уровня тревожности у детей основной группы свидетельствует о высокой эффективности применения психопрофилактических методов. Использование техник психологической адаптации способствует уменьшению эмоционального напряжения, повышению доверия к врачу и формированию у ребёнка ощущения безопасности. Это, в свою очередь, положительно отражается на качестве лечения и сокращает время проведения стоматологических процедур.

Особое значение в формировании психоэмоциональных реакций имеет возраст ребёнка. Дети младшего возраста характеризуются недостаточно сформированными механизмами самоконтроля и саморегуляции, что делает их более восприимчивыми к стрессовым факторам стоматологического приёма. Установлено, что негативный предыдущий опыт лечения усиливает выраженность тревожных реакций, подтверждая важность формирования положительного первичного стоматологического опыта.

Индивидуальный подход к каждому пациенту с учётом возрастных особенностей, темперамента, уровня тревожности и предшествующего опыта является необходимым условием эффективной стоматологической помощи. Врач-стоматолог в детской практике выполняет не только клиническую, но и психолого-педагогическую функцию, направленную на создание благоприятной эмоциональной атмосферы. Умение установить контакт, объяснить предстоящие манипуляции в доступной форме и поддерживать эмоциональное равновесие ребёнка существенно повышает эффективность лечебного процесса.

Таким образом, результаты исследования подчёркивают необходимость интеграции психологических методов в повседневную практику детского стоматолога. Комплексный подход, сочетающий

клиническое мастерство и психопрофилактику, позволяет минимизировать негативные эмоциональные реакции, повысить комплаентность пациента и предотвратить формирование стоматологической фобии в дальнейшем.

Выводы

Психоэмоциональное состояние ребёнка существенно влияет на поведение и результаты стоматологического лечения.

Основными факторами тревожности являются возраст, негативный предыдущий опыт и особенности личности ребёнка.

Применение комплексных психопрофилактических методов способствует снижению уровня страха и улучшению сотрудничества пациента с врачом.

Включение психологической подготовки в стандартный протокол детского стоматологического приёма повышает эффективность и качество лечения.

Формирование положительного стоматологического опыта в детском возрасте является важной профилактической мерой на будущее.

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Юсупова Д. У.
преподаватель
кафедра физиологии
Самаркандский государственный медицинский университет
https://orcid.org/0009-0008-1455-8810.

КАЗУСНОЕ СИТУАЦИИ В МЕДИЦИНЕ И ИХ ЗНАЧЕНИЕ ДЛЯ РАЗВИТИЯ КЛИНИЧЕСКОГО МЫШЛЕНИЯ У СТУДЕНТОВ МЕДИЦИНСКИХ ВУЗОВ

Аннотация. *В данной статье анализируется роль казусных ситуаций в медицине — редких, атипичных или редких заболеваний в процессе медицинского образования. Научно обоснована важность казусных ситуаций в формировании клинического мышления у студентов, развитии навыков дифференциальной диагностики и повышении когнитивной гибкости. В статье рассматриваются педагогические методы применения казуистики в образовательном процессе и ее влияние на профессионализм будущих врачей.*

Ключевые слова: *казустика, клиническое мышление, медицинское образование, редкие заболевания, дифференциальная диагностика, когнитивная гибкость, анализ клинических случаев, медицинская логика.*

Yusupova D. U.
lecturer
department of physiology
Samarkand State Medical University
https://orcid.org/0009-0008-1455-8810

CASE SITUATIONS IN MEDICINE AND THEIR IMPORTANCE FOR THE DEVELOPMENT OF CLINICAL THINKING IN MEDICAL STUDENTS

Annotation: *This article analyzes the role of casuistic conditions in medicine of rare, atypically occurring or extremely rare diseases in the medical education process. The importance of casuistic states in the formation of clinical thinking among students, the development of differential diagnosis skills, and the improvement of cognitive flexibility has been scientifically substantiated. The article discusses pedagogical methods of applying casuistry in the learning process and its impact on the professionalism of future doctors.*

Keywords: *casuistry, clinical thinking, medical education, rare diseases, differential diagnosis, cognitive flexibility, case study, medical thinking.*

Введение

Главная задача медицинского образования – не только передача теоретических знаний, но и формирование у студента умения индивидуально

подходить к каждому пациенту – клинического мышления. Клиническое мышление формируется на основе так называемого «логико-интуитивно-мыслительного подхода». В большинстве случаев учебный процесс направлен на изучение теоретической картины заболеваний, то есть «классического» или «типичного» течения. Однако в реальной клинической практике врач часто сталкивается с казусными ситуациями – редкими, сопровождающимися атипичными симптомами или представляющими собой сложное сочетание нескольких заболеваний и патологий. Формирование клинического мышления позволяет находить решения различных казусных ситуаций в медицине. Поэтому развитие клинического мышления у будущих врачей (в целом, клиническое мышление развивается на протяжении всего обучения и практики врача) зависит от его теоретических и практических знаний, постоянной работы над собой, повышения квалификации и освоения практических навыков до мастерского уровня.

Основой клинического мышления у студентов являются фундаментальные науки. Совершенное формирование клинического мышления и его развитие в ходе клинической практики позволяют находить решения медицинских случаев. В процессе формирования клинического мышления его составляющими являются ЗНАНИЯ, ИНТУИЦИЯ, НАВЫКИ.

Поэтому достаточный уровень медицинских знаний, знаний фундаментальных и клинических наук у студентов облегчает им поиск решений различных проблемных ситуаций.

Для повышения уровня знаний студентов медицинских вузов с целью развития клинического мышления, самосовершенствования и вовлечения в самостоятельную деятельность можно предложить следующие рекомендации:

Изучайте мозг. Например, изучение активности мозга в разном возрасте, объема памяти и скорости мышления необходимо для освоения нового материала. Мозг — инертный орган, то есть, когда он «зацепляется» за следующий новый материал, интерес к новой теме возрастает. Поэтому можно повысить мотивацию ученика, рассказав ему что-то более интересное о следующей новой теме.

Повышайте уровень серотонина. Положительные впечатления, спорт, медитация, здоровый и спокойный сон — все это ускоряет активность мозга, повышает способность усваивать новую информацию.

Не пытайтесь сделать все сразу. Не пытайтесь узнать, что о вас думают другие или ваша группа, это утомит вас и замедлит темп работы.

«Казустика» (от латинского *casus* — случай, инцидент) в медицине относится к клиническим наблюдениям, которые являются особыми, редкими и не подчиняются обычным законам. Изучение таких случаев не только пробуждает научный интерес у студента, но и служит важным педагогическим инструментом, проверяющим его интеллектуальный потенциал. Использование казуистических случаев в качестве

разнообразного педагогического инструмента в практической клинической подготовке повышает уровень усвоения предмета студентами.

В казустике человек не может предвидеть негативные последствия своих действий или ситуации, в которой он оказывается, поэтому административная ответственность может быть снижена или вовсе отсутствовать. Однако, несмотря на это, медицина требует умения предвидеть казуистические случаи и разрабатывать способы их решения, поскольку это резко снижает количество медицинских осложнений, которые могут наблюдаться у пациентов или больных.

Казусние случаи в медицине делятся на следующие типы в зависимости от стадии оказания медицинской помощи: диагностические; тактические; технические; организационные.

В целом, случаи в медицине можно разделить на две большие группы: диагностические и лечебные.

Казуистические случаи в медицине также могут наблюдаться в результате несоблюдения установленных медицинских требований и стандартов, отклонений от медицинской этики и деонтологии, по субъективным и объективным причинам.

Для предотвращения подобных случаев в медицине уровень владения студентами фундаментальными и клиническими науками должен быть высоким.

Результаты исследования показывают, что при преподавании медицинских знаний в медицинских вузах следует уделять внимание следующим аспектам:

1. Широкое использование казуистико-ситуативных методов в преподавании фундаментальных и клинических наук в медицинских вузах.

2. Выявление роли клинического случая в развитии клинического мышления студентов.

3. Достижение каждым студентом непосредственного, совершенного и полного освоения практического навыка или процедуры, указанных в учебном плане, на каждом занятии или тренировке.

Научные и теоретические основы казуистических случаев понимаются следующим образом и часто наблюдаются в следующих ситуациях.

В медицине казустика понимается в двух разных смыслах:

1. Крайне редкие заболевания: возникновение на практике генетических или приобретенных патологий, которые очень редки в популяции и игнорируются врачом.

2. Атипичное течение типичного заболевания: проявление определенного заболевания с неспецифическими симптомами или в «замаскированном» состоянии. Например, при атипичном типе инфаркта миокарда пациент может испытывать боль в нижней челюсти, а иногда и в желудке или эпигастральной области, даже тошноту, наблюдение за состоянием пациентов, боль в плечевом поясе при желчнокаменной болезни и т. д., что может заставить врача отклониться от основного диагноза.

В медицине также существует состояние, называемое психокейсом, которое, скорее всего, является следствием физического или морального истощения медицинского работника.

С точки зрения клинического мышления, разбор клинических случаев заставляет студента выйти за рамки стандартных алгоритмов и мыслить «эвристически» (творчески и логически). Здесь возникает более высокий уровень медицинской логики — синтез индуктивного и дедуктивного рассуждения.

Важность разбора клинических случаев в развитии клинического мышления

Анализ клинических случаев формирует у студентов следующие важные навыки:

1. Повышение когнитивной гибкости

Стандартные клинические ситуации часто формируют у студента «шаблонное мышление» (например: боль в правой подвздошной области – аппендицит). Казуистическая ситуация разрушает эти шаблоны. Студент начинает понимать, что за одним симптомом могут скрываться десятки возможных патологий, что расширяет рамки его мышления, расширяет возможности дифференциальной диагностики.

2. Овладевание искусством дифференциальной диагностики

Казустика — лучшая школа для дифференциальной диагностики. Для выявления редких заболеваний студент должен поочередно исключать наиболее распространенные заболевания и использовать принципы доказательной медицины. В этом процессе активизируются знания студента в фундаментальных науках: физиологии, патофизиологии, биохимии и анатомии.

3. Повышение внимания и наблюдательности.

В казуистических случаях ключ к диагностике часто скрыт в мелких, незаметных деталях (например, своеобразное пятно на коже, положение зрачка или незначительный факт в анамнезе). Это учит студента быть предельно внимательным к пациенту и не игнорировать никакую информацию.

4. Понимание когнитивных ошибок.

Одной из самых больших ошибок среди врачей является «суждение» или «эвристика доступности» (цепляние за первый попавшийся диагноз). Например, в случае атипичного инфаркта миокарда боль в нижней челюсти пациента принимают за стоматологические или ротовые заболевания, боль в плечевом поясе, которая может наблюдаться при желчнокаменной болезни, ошибочно принимают за неврит или миозит, а неправильные методы лечения могут привести к серьезным казуистическим ситуациям. Казуистические случаи предотвращают будущие медицинские ошибки, обучая студента критическому мышлению и осмыслению собственных предположений.

С помощью педагогических подходов и методик студенты учатся предвидеть казусные ситуации и находить для них решения.Обучение

казуистике в медицинских вузах считается эффективным при использовании следующих методов:

• Обсуждение проблемных ситуаций и решений, которые могут возникнуть в реальной жизни. Обсуждение проблемных ситуаций на научных и практических конференциях. Ролевые игры в рамках практической подготовки.

Обсуждение истории болезни пациента в группе.

• Обучение на основе клинических случаев: студентам предоставляется история редкого заболевания, и они должны постепенно приблизиться к постановке диагноза.

• Виртуальные пациенты и симуляция: проверка диагностического алгоритма студента путем моделирования редких патологий с использованием цифровых технологий.

• Научные исследования: руководство студентами в написании научных статей о редких случаях. Это развивает не только клиническое, но и академическое мышление.

В педагогике важно соблюдать баланс рисков и рисков, связанных с казуистикой. При использовании казустики в педагогическом процессе важно соблюдать баланс. Как гласит известная медицинская пословица: «Если слышишь топот копыт, ищи лошадь, а не зебру». То есть, студент должен прежде всего обладать глубокими знаниями о распространённых заболеваниях и, ставя диагноз, исключать распространённые болезни.

Если же обучение основывается только на редких случаях, у студента может развиться синдром «поиска редкого и нетипичного заболевания у каждого пациента». Поэтому казуистика должна служить «интеллектуальным украшением», основанным на фундаментальных знаниях, и инструментом для оттачивания мышления.

Казустика в медицине — это не просто «медицинская диковинка», а мощный познавательный инструмент, формирующий клиническое мышление будущего врача. Они учат студента подниматься выше стандартов, понимать неопределенность медицины и ответственно подходить к судьбе каждого пациента.

Заключение

Систематическое включение казусных кейсов в учебную программу гарантирует привитие студентам чувства постоянного поиска и подготовку высококвалифицированных, мыслящих специалистов. Казустика имеет несравненное значение в переходе современного медицинского образования от «запоминания готовых диагнозов» к «пониманию процесса постановки диагноза». Это позволяет студентам улучшить свои аналитические способности, развить любознательность и внимательность в работе с пациентами, ответственность за освоение фундаментальных и клинических наук, а также развить клиническое и академическое мышление.

Основой клинического мышления у студентов являются фундаментальные науки. Клиническое мышление, будучи полностью

сформированным и развивающимся в ходе клинической практики, позволяет решать медицинские случаи. По мере развития клинического мышления его составляющими становятся ЗНАНИЯ, ИНТУИЦИЯ и НАВЫКИ.

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Якубов М. С., кандидат технических наук
профессор
Ташкентский государственный транспортный университет
Якубова У. Ш.
старший преподаватель
Ташкентский государственный экономический университет
Ташкент, Узбекистан
Морозов С. А., кандидат технических наук,
доцент.
Московский государственный технический университет
имени Н. Э. Баумана

ИННОВАЦИОННЫЕ АСПЕКТЫ ЦИФРОВЫХ ТЕХНОЛОГИЙ В ТЯГОВОМ ЭЛЕКТРОСНАБЖЕНИИ

Аннотация: *В статье изучен процесс изменения структуры тягового электроснабжения в условиях цифровизации, исследован потенциал и перспективы внедрения информационных технологий в тяговом электроснабжении. Рассматриваются и систематизируются факторы и условия, способствующие масштабному внедрению цифровых технологий в сферу тяового электроснабжения. Сделан вывод о критической значимости комплексного развития масштабной цифровой трансформации в тяговом электроснабжении железных дорог с целью увеличения эффективности функционирования энергетической системы и расширения области взаимодействия с сопутствующими внешними факторами, которые содействуют общему росту национальной экономики.*

Ключевые слова: *цифровая экономика, экономическая эффективность, электроэнергетика, тяговое электроснабжение*

Yakubov M. S., PhD in engineering
professor
Tashkent State Transport University
Yakubova U. Sh.
senior lecturer
Tashkent State University of Economics
Morozov S. A., candidate of technical sciences,
associate professor
Bauman Moscow State Technical University

INNOVATIVE ASPECTS OF DIGITAL TECHNOLOGIES IN TRACTION ELECTRICITY SUPPLY

Abstract: *The article studies the process of changing the structure of traction power supply in the context of digitalization, and explores the potential*

and prospects of introducing information technologies in traction power supply. The article examines and systematizes the factors and conditions that contribute to the large-scale introduction of digital technologies in the field of traction power supply. The article concludes that it is crucial to develop a comprehensive digital transformation in the traction power supply of railways in order to increase the efficiency of the energy system and expand the scope of interaction with external factors that contribute to the overall growth of the national economy.

Keywords: *digital economy, economic efficiency, electric power industry, traction power supply*

Введение

В настоящее время в условиях развития мировой экономики электроэнергетическая отрасль претерпевает существенные трансформационные изменения, обусловленные необходимостью повышения эффективности функционирования энергетической системы стран. Актуальность внедрения цифровых технологий в тяговом электроснабжении железных дорог определяется совокупностью финансово-технических, инновационных и общественных факторов, формирующих предпосылки для масштабной модернизации тягового электроснабжения железных дорог.

Материалы и методы

Сложившаяся структура тягового электроснабжения железных дорог обуславливается значительной степенью физического и морального износа основных производственных установок, что существенно ограничивает возможности повышения эффективности генерации, передачи и распределения электроэнергии традиционными методами. Согласно статистическим данным, средний уровень износа оборудования в тяговом электроснабжении железных дорог достигает почти 70%, что приводит к повышенным эксплуатационным затратам, снижению надежности тягового энергоснабжения и увеличению технологических потерь при передаче и технологической выработке установленных норм потребления электроэнергии на единицу оборудования [1].

Экономические предпосылки цифровизации тягового электроснабжения подвижного состава в первую очередь связаны с необходимостью оптимизации эксплуатационных затрат энергетических компаний [2]. Внедрение цифровых технологий позволяет существенно снизить издержки на техническое обслуживание и ремонт оборудования за счет перехода к предиктивной модели обслуживания, основанной на анализе больших данных и прогнозировании технического состояния активов [3]. По оценкам экспертов, потенциал снижения операционных затрат при внедрении цифровых решений может достигать 20-30% [4].

Другим важным экономическим фактором является необходимость повышения энергоэффективности подвижных составов. Цифровая трансформация является одной из основных предпосылок для формирования

новых бизнес-моделей и источников доходов, что особенно актуально в условиях ограниченных возможностей роста тарифов на электроэнергию. Внедрение интеллектуальных систем учета и управления спросом позволяет реализовать потенциал гибкого ценообразования и оптимизации режимов потребления электроэнергии [5].

Макроэкономические факторы также играют существенную роль в формировании предпосылок цифровизации электроэнергетики. В условиях глобальной конкуренции и необходимости обеспечения технологического суверенитета стран, рационализация электроэнергетической отрасли становится критически важным элементом обеспечения конкурентоспособности национальной экономики стран, что обосновывает актуальность данной работы [6]. Цифровые технологии позволяют существенно повысить эффективность использования энергетических ресурсов и снизить углеродоемкость экономики [7].

Развитие распределенной генерации и возобновляемых источников энергии создает дополнительные предпосылки для цифровизации отрасли. Интеграция множества небольших генерирующих объектов в единую энергосистему требует внедрения современных систем управления и координации, способных обеспечить надежное и эффективное функционирование усложняющейся инфраструктуры [8]. Цифровые технологии становятся необходимым инструментом для управления децентрализованными энергетическими системами.

Особое значение имеют технологические предпосылки цифровизации, связанные с развитием информационно-коммуникационных технологий и появлением новых возможностей для сбора, обработки и анализа данных. Развитие промышленного интернета вещей, облачных вычислений и технологий искусственного интеллекта создает технологический базис для построения интеллектуальных энергетических систем нового поколения.

Результаты и обсуждение

На современном этапе основным фактором является растущая доступность цифровых технологий и необходимость снижения стоимости их внедрения. Развитие местного программного обеспечения и аппаратных решений создает возможности для масштабной цифровой трансформации тягового электроснабжения железных дорог с использованием инновационных разработок, что особенно важно в условиях необходимости обеспечения информационной безопасности критической инфраструктуры железных дорог (Табл. 1).

Таблица 1

Применение цифровых технологий в тяговом электроснабжении

Финансово-технические	**Высокий износ и старение основных фондов (до 70%), необходимость уменьшения энергетических затрат**
Инновационные	Модернизация информационных технологий
Общественные	Необходимость повышения квалификации и совершенствование современных способов и средств связи
Природно-климатические	Снижение углеводородных выбросов
Спросовые	Развитие децентрализованной энергетики, инноваций в бизнесе
Управленческие	Формирование государственных концепций развития, госстандартов
Аппаратные составляющие	Необходимость рационализации сетей, когнитивного учета
Международные	Необходимость обеспечения технической автономии, отечественного производства

Экономическая эффективность цифровых технологий подтверждается успешным опытом их внедрения в тяговом электроснабжении железных дорог развитых стран. Анализ международного опыта показывает, что цифровизация позволяет достичь существенной экономии электроэнергии, повышения качественных и количественных параметров надежности и энергоэффективности энергоснабжения и улучшения использования генерирующих мощностей. При этом важно учитывать специфику электроэнергетики развитых стран и необходимость применения лучших мировых технологий к условиям отдельно взятой страны с учетом ее природно-климатических условий.

Формирование нормативно-правовой базы цифровой трансформации тягового электроснабжения также создает необходимые предпосылки для масштабного внедрения новых цифровых технологий. Принятие ряда законодательных актов
и программных документов, определяющих стратегические направления
и механизмы цифровизации отрасли, формирует управленческую среду, способствующую реализации цифровых проектов.

Экономические эффекты от цифровизации тягового электроснабжения проявляются не только на уровне отдельных компаний, но и в масштабах всей национальной экономики страны. Повышение энергоэффективности тягового электроснабжения железных дорог создает множественный эффект, способствующий снижению энергоемкости ВВП и повышению конкурентоспособности местных производственных предприятий на международных рынках. По оценкам экспертов, потенциальный экономический эффект от цифровой трансформации тягового электроснабжения железных дорог может составить до 0,5% ВВП страны.

Существенной предпосылкой цифровизации является необходимость повышения контроля качества обслуживания потребителей расходуемой электроэнергии тягового электроснабжения. Современные цифровые технологии позволяют реализовать клиентоориентированный подход в электроэнергетике с учетом существующих тарифов на потребление электроэнергии, предоставляя потребителям новые сервисы и возможности управления энергопотреблением. Развитие интеллектуальных систем учета создает основу для формирования активного потребителя, способного оптимизировать свое энергопотребление и участвовать в программах управления спросом.

Экологические аспекты также формируют значимые предпосылки для цифровизации тягового электроснабжения. Необходимость снижения негативного воздействия на окружающую среду и выполнения международных обязательств по сокращению выбросов газовых отходов органического топлива требует внедрения технологий, обеспечивающих оптимизацию режимов работы генерирующего оборудования и снижение потерь при передаче электроэнергии. Цифровые технологии создают технологическую основу для реализации концепции «зеленой» энергетики.

Важным фактором, определяющим необходимость цифровой трансформации, является растущая сложность управления электроэнергетическими системами. Увеличение числа участников энергетического рынка, развитие распределенной генерации и усложнение режимов работы тягового электроэнергетического снабжения требуют внедрения современных цифровых инструментов управления. Традиционные методы диспетчерского управления становятся недостаточными для обеспечения надежного и эффективного функционирования усложняющейся на современном этапе энергетической инфраструктуры (Рис. 1).

Применение цифровых технологий в тяговом электроснабжении	
Финансово-технические	Выход из строя оборудования
	Эксплуатационные издержки
	Привлечение инвестиций
Инновационные	Нейросеть
	Интернет
	Защита от хакеров
Общественные	Сохранение способности
	Рыночная востребованность
	Цифровая компетентность
Природно-климатические	Декарбонизация
	Низкозатратность
	Возобновляемость электроэнергии
Спросовые	Децентрализованная энергетика
	Инновации в бизнесе
	Рыночное соперничество
Управленческие	Госстандарты
	Государственные концепции развития
	Унификация
	Нормализация
Аппаратные составляющие	Рационализация сетей
	Когнитивный учет
	Компьютеризация управления
	Безотказность электроснабжения
Международные	Техническая автономия
	Отечественное производство
	Международная кооперация
	Энергозащищенность

Рисунок 1- Применение цифровых технологий в тяговом электроснабжении. Составлено авторами

Демографические и социальные факторы также способствуют ускорению цифровой трансформации отрасли. Старение персонала электроэнергетических предприятий и необходимость сохранения критически важных компетенций создают предпосылки для внедрения цифровых систем управления знаниями и автоматизации производственных процессов, отчетность технико-производственной деятельности. Цифровые технологии позволяют частично компенсировать дефицит квалифицированных кадров и обеспечить передачу опыта новому поколению специалистов.

Геополитические факторы также оказывают существенное влияние на формирование предпосылок цифровизации тягового электроснабжения. В условиях повышенного спроса и необходимости обеспечения энерготехнологического суверенитета страны, развитие региональных цифровых решений для потребления электроэнергии для подвижных сотавов железных дорог становится стратегической задачей. Создание собственных

технологических компетенций в области цифровой энергетики является важным элементом обеспечения национальной безопасности каждой страны.

Развитие региональных энергетических связей и необходимость интеграции энергосистем создают дополнительные предпосылки для цифровизации отрасли. Участие развитых стран в международных энергетических проектах требует обеспечения технологической совместимости и соответствия международным стандартам цифровизации энергетических систем.

Инвестиционные аспекты также играют важную роль в формировании предпосылок цифровой трансформации. Несмотря на значительные начальные затраты, внедрение цифровых технологий позволяет оптимизировать инвестиционные программы энергетических компаний за счет более точного планирования и приоритизации проектов модернизации инфраструктуры. Использование цифровых двойников и систем предиктивной аналитики позволяет существенно повысить эффективность инвестиционных решений [8].

Формирование цифровых экосистем в различных отраслях экономики создает дополнительные стимулы для цифровизации тягового электроснабжения. Интеграция энергетической инфраструктуры с цифровыми платформами «умных» городов, промышленных предприятий и транспортных систем требует внедрения современных информационно-коммуникационных технологий в тяговом электроснабжении [9].

Заключение

Из вышеперечисленного можно заключить, что совокупность экономических, технологических, социальных и экологических предпосылок формирует объективную необходимость масштабной цифровой трансформации электроэнергетической отрасли, в частности, тягового электроснабжения железных дорог. Успешная реализация программ цифровизации позволит не только повысить эффективность функционирования энергетической системы, но и создать основу для инновационного развития всех региональных экономик.

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Achilova F. A.
bolalar kasalliklari propedevtikasi kafedrasi
Samarqand Davlat Tibbiyot Universiteti

TAJRIBADA QUYONLARNING ME'DA OSTI BEZI LANGERGANS OROLCHASINING REGENERATSIYASI

Rezyume: *Maqolada tajriba sharoitida quyonlarda atsidoz chaqirilib, uzoq muddatli kichik dozalarda insulin kiritilganda quyonlarning oshqozon osti bezi langergans orolchasida distrofik jarayonlar kuzatildi. Bunda alfa-hujayralar sonining kamayishi va beta-hujayralar funksional faolligining pasayishi bilan kechadi. Shu bilan birga, tajribalarning dastlabki muddatlarida insulin orolchalarida reparativ jarayonlar ham qayd etiladi. Ular kichik orolchalar yangidan hosil bo'lishi va qisman orolcha parenximasining o'sishi bilan namoyon bo'ladi.*

Kalit so'zlar: *Qyon, tajriba, Langergans orolchalari, ammoniy xloridi, insulin preparatlari, Veygert gematoksilin va eozin bilan bo'yash usuli.*

Achilova F. A.
department of propaedeutics of children's diseases
Samarkand State Medical University

REGENERATION OF THE ISLETS OF LANGERHANS IN THE PANCREAS OF RABBITS UNDER EXPERIMENTAL CONDITIONS

Abstract: *The article describes experimental induction of acidosis in rabbits, combined with prolonged administration of small doses of insulin, leading to dystrophic processes in the islets of Langerhans of the rabbit pancreas. These processes are accompanied by a decrease in the number of alpha cells and reduced functional activity of beta cells. At the same time, in the early stages of the experiments, reparative processes are also observed in the insular islets, manifesting as the formation of new small islets and partial growth of the islet parenchyma.*

Keywords: *rabbit, experiment, islets of Langerhans, ammonium chloride, insulin preparations, Weigert's hematoxylin and eosin staining method.*

Kirish

Me'da osti bezining langergans orolchasi parenximasining regeneratsiyasi haqiqati hozirgi kunda tasdiqlangan bo'lsa-da, uning hujayra elementlarining kelib chiqishi masalasida hali to'liq aniqlik yo'q [1]. Ba'zi olimlar fikricha, Langergans orolchalari hujayralarining yangi hosil bo'lishi faqatgina yo'llar va qo'shimcha

qismlar epiteliyining o'sishi va o'zgarishi natijasida sodir bo'lishi mumkin [2,4. Ayrim mualliflarning ta'kidlashicha, bu jarayonda xarakterli oraliq tuzilma astsinoz hujayralaridan hosil bo'ladigan o'ziga xos naychalar va iplar bo'lib, ular keyinchalik orol hujayralariga differensiatsiyalanadi [3,5]. Boshqa mualliflar fikiricha astsinoz hujayralarning orol hujayralariga bevosita oraliq o'tish shakllari orqali qayta qurilishi kuzatilgan. Tajriba hayvonlari va odamlarda turli tajriba sharoitlarida astsino-insular transformatsiyani ko'plab tadqiqotchilar topishgan [6]. Ba'zi mualliflarning ma'lumotlariga ko'ra, hujayralarning bo'linishi mitoz yo'li bilan, boshqalar fikricha, asosan amitoz yo'li bilan sodir bo'ladi. Uchinchi olimlar hujayralarning ikkala turdagi bo'linishini bir vaqtning o'zida kuzatishgan [7,8].

Tadqiqot maqsadi

Eksperimental sharoitda me'da osti bezining Langergans orolchalarining regeneratsiyasini o'rganish.

Tadqiqot materiallari va usullari

Tajribalar 18 ta quyonlarda o'tkazildi. Ulardan 6 tasi nazorat guruhi bo'lib, 7 ta it 3–27 oy davomida har kuni 100–200 ml suvda 0,03–0,09 g/ekv miqdorida ammiak xloridi, sirka va sut kislotasini qabul qildi. 5 ta itga 10–12 oy davomida har kuni 0,1–0,5 birlik/kg vaznda insulin preparatlari yuborildi. Tajribaning turli bosqichlarida hayvonlardan me'da osti bezi bo'laklari olinib, 10% li formalin eritmasida fiksatsiya qilindi. Keyin to'q'imalar parafin ichiga joylastirilib gistologik preparatlar tyorlandi. Preparatlar Veygert gematoksilin va eozin, Mallory bo'yicha ozan bilan bo'yaldi. Orolchalardagi beta-hujayralarda insulinni aniqlash uchun Xalmy bo'yicha qo'shimcha bo'yash bilan aldegid-fuksin bo'yash qo'llanildi.

Tadqiqot natijalari

Ko'rsatilgan asidoz ta'sirida quyonlarning me'da osti bezidagi Langergans orolchalarida alfa-hujayralar sonining sezilarli darajada kamayishi kuzatildi. Shu bilan birga, orol parenximasining yangi hosil bo'lish jarayonlari ham kuzatildi. Bu jarayonlar turlicha darajada, lekin barcha hollarda namoyon bo'ldi. Astsinoz hujayralar ko'pincha orol hujayralariga o'tishning biron-bir bosqichida bo'lgan. Bunday hujayralarning protoplazmasi dinamik polyarizatsiyani yo'qotib, keskin bazofil yoki eozinofil, ko'pincha vakuollaangan holatga kelgan. Ba'zan bazal zonasida orol parenximasi hujayralariga xos mayda donadorlik, apikal qismida esa yirik zimogen granulalari aniqlangan. Ko'pincha orolchalar bilan chegaradosh astsinoz to'qima ma'lum strukturaviy o'zgarishlar holatida bo'lib, oddiy astsinoz to'qimadan aniq farq qilgan. Bunday joylarda o'zgargan astsinoz hujayralarning orolchalarga "siljishi"ni kuzatish mumkin edi. Bir qator hollarda astsino-insular transformatsiya astsinus guruhlarini yoki qayta qurilishi jarayonida bo'lgan alohida astsinoz hujayralarni o'z ichiga olgan ulkan orolchalar hosil bo'lishi bilan birga kelgan. Bu hodisalar ayniqsa atsidotik siljish bilan quyonlarda aniq namoyon bo'lgan. Orol to'qimasining regeneratsiyasi shuningdek, atigi bir nechta hujayralardan iborat ko'plab mayda va mayda orolchalar hosil bo'lishi bilan ifodalangan. Ushbu orolchalarning ba'zilari atipik tuzilishga ega bo'lib, oddiy orol va astsinoz hujayralardan orol hujayralariga o'tish shakllarini o'z ichiga olgan.

Ta'kidlash joizki, bunday orolchalarning bir qismi astsinus shaklini saqlab qolgan, uning markazida "sentroatsinoz" hujayra, periferiyasida esa tipik beta-hujayralar joylashgan. Bizning tadqiqotlarimiz shuni ko'rsatdiki, shikast etuvchi omillar (surunkali atsidoz, ekzogen insulin yuborish) ta'sirida yangi hosil bo'lgan beta-hujayralar funktsional jihatdan faol emas edi. Bu hujayralarning protoplazmasida o'ziga xos aldegid-fuksinli donadorlik yo'q edi. Bu donadorlik miqdori ma'lumki, ulardagi insulin miqdorini aks ettiradi. Mikroskopik tadqiqotlar quyonlarda insulin in'ektsiyalarini to'xtatilganidan bir oy o'tgach olingan me'da osti bezlarida zararli omil ta'siri bartaraf etilganda, orol parenximasining regeneratsiya jarayonlari kuchayib, yangi hosil bo'lgan orol hujayralari to'liq fiziologik yetuklikka etadi. Bunday hollarda preparatlarni aldegid-fuksin bilan bo'yashda oddiy va mayda (yangi hosil bo'lgan) Langergans orolchalari beta-hujayralarida, shuningdek, atsinuslar orasida joylashgan yoki ular tarkibida joylashgan alohida beta-hujayralarda yaxshi ifodalangan aldegid-fuksin donadorligi aniqlanadi. Shu bilan birga, alfa-hujayralar soni ham normal holatga keladi. O'tkazilgan tadqiqotlar natijalari shuni ko'rsatadiki, bizning tajribalarimiz sharoitida me'da osti bezi orol parenximasining regeneratsiyasi asosan atsinoz to'qimalarining hujayra elementlarining transformatsiyasi hisobiga sodir bo'ladi. Shunday qilib, umuman quyonlarda insular apparatining regeneratsiyasi shubha ostiga qo'yiladi. Bizning tadqiqot natijalarimiz va adabiyot ma'lumotlari bunday da'voning asossizligini ko'rsatadi.

Xulosa

Eksperimental atsidoz sharoitida, shuningdek, insulinning uzoq vaqt davomida kam dozalarda yuborilishi quyonlarning me'da osti bezi orol apparatida distrofik jarayonlarni keltirib chiqaradi. Bu esa alfa-hujayralar sonining kamayishi va beta-hujayralarning funktsional faolligining pasayishi bilan birga keladi.

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Achilova F. A.
department of propaedeutics of children's diseases
Samarkand State Medical University

REGENERATION OF THE ISLETS OF LANGERHANS IN THE PANCREAS OF RABBITS UNDER EXPERIMENTAL CONDITIONS

Abstract: *The article describes experimental induction of acidosis in rabbits, combined with prolonged administration of small doses of insulin, leading to dystrophic processes in the islets of Langerhans of the rabbit pancreas. These processes are accompanied by a decrease in the number of alpha cells and reduced functional activity of beta cells. At the same time, in the early stages of the experiments, reparative processes are also observed in the insular islets, manifesting as the formation of new small islets and partial growth of the islet parenchyma.*

Keywords: *rabbit, experiment, islets of Langerhans, ammonium chloride, insulin preparations, Weigert's hematoxylin and eosin staining method.*

Introduction

Although the regeneration of the pancreatic islets of Langerhans parenchyma is currently confirmed as a fact, the origin of their cellular elements remains not fully clarified [1]. Some researchers believe that new formation of islet cells can occur only through growth and transformation of the ductal and accessory epithelium [2, 4]. Other authors emphasize that characteristic intermediate structures in this process are specific tubules and cords formed from acinar cells, which subsequently differentiate into islet cells [3, 5]. Still others report observing direct transitional forms in the transdifferentiation of acinar cells into islet cells. Acino-insular transformation has been documented by numerous investigators in experimental animals and humans under various experimental conditions [6]. According to some authors, cell division occurs via mitosis; others consider it to occur mainly via amitosis. A third group of researchers has observed both types of division occurring simultaneously in the cells [7, 8].

Research Objective

To study the regeneration of the islets of Langerhans of the pancreas under experimental conditions.

Materials and Methods

Experiments were conducted on 18 rabbits. Of these, 6 served as the control group. Seven dogs received daily, for 3–27 months, 0.03–0.09 g/eq of ammonium chloride, acetic acid, and lactic acid dissolved in 100–200 ml of water. Five dogs were administered insulin preparations daily, for 10–12 months, at a dose of 0.1–0.5 units/kg body weight. At various stages of the experiment, pancreatic tissue samples were taken from the animals and fixed in 10% formalin solution. The tissues were then embedded in paraffin, and histological sections were prepared. The sections were stained with Weigert’s hematoxylin and eosin, and with azan

according to Mallory. To detect insulin in the beta-cells of the islets, aldehyde-fuchsin staining was used, supplemented with additional staining according to Halmi.

Results

Under the indicated acidosis influence, a significant decrease in the number of alpha-cells in the islets of Langerhans of the pancreas in rabbits was observed. At the same time, processes of new formation of islet parenchyma were also noted. These processes manifested to varying degrees but were present in all cases. Acinar cells were often found at some stage of transition to islet cells. The cytoplasm of such cells lost dynamic polarization and became sharply basophilic or eosinophilic, often vacuolated. Sometimes, fine granulation characteristic of islet parenchyma cells was detected in the basal zone, while large zymogen granules were observed in the apical part. Frequently, the acinar tissue adjacent to the islets was in a state of certain structural changes and clearly differed from normal acinar tissue. In such areas, “migration” of altered acinar cells into the islets could be observed. In a number of cases, acino-insular transformation was accompanied by the formation of large islets that included groups of acini or individual acinar cells undergoing reconstruction. These phenomena were particularly pronounced in rabbits with acidotic shift. Regeneration of islet tissue was also expressed by the formation of numerous small and very small islets consisting of only a few cells. Some of these islets had an atypical structure and contained transitional forms from typical acinar and islet cells to islet cells. It should be noted that some of these islets retained an acinar shape, with a “centroacinar” cell in the center and typical beta-cells in the periphery. Our studies showed that newly formed beta-cells under the influence of damaging factors (chronic acidosis, administration of exogenous insulin) were functionally inactive. The cytoplasm of these cells lacked the specific aldehyde-fuchsin-positive granulation, the amount of which, as is known, reflects the insulin content in them. Microscopic examinations of the pancreas obtained from rabbits one month after discontinuation of insulin injections showed that, when the harmful factor was eliminated, the regeneration processes of the islet parenchyma intensified, and the newly formed islet cells reached full physiological maturity. In such cases, aldehyde-fuchsin staining of the preparations revealed well-expressed aldehyde-fuchsin granulation in the beta-cells of both normal and small (newly formed) islets of Langerhans, as well as in individual beta-cells located between acini or within their composition. At the same time, the number of alpha-cells also returned to normal.

The results of the conducted studies indicate that, under the conditions of our experiments, regeneration of the pancreatic islet parenchyma occurs mainly due to the transformation of cellular elements of acinar tissue. Thus, the regeneration of the insular apparatus in rabbits as a whole is beyond doubt. Our research results and literature data demonstrate the groundlessness of such claims.

Conclusion

Under experimental acidosis conditions, as well as prolonged administration of low doses of insulin, dystrophic processes are induced in the pancreatic insular apparatus in rabbits. This is accompanied by a decrease in the number of alpha-cells and a reduction in the functional activity of beta-cells.

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Alta Ann Joseph
assistant
department of pathological anatomy
Samarkand State Medical University

MANNAN-OLIGOSACCHARIDE TRIGGERS TRAINED IMMUNITY AND MITIGATES LIVER PATHOLOGY IN TURBOT (*SCOPHTHALMUS MAXIMUS*)

Abstract: *The liver is a central immune organ in fish, responsible for multiple physiological and metabolic processes. Pathological liver damage, often caused by bacterial infections, is a frequent issue in aquaculture. Mannan-oligosaccharide (MOS) has emerged as a promising dietary supplement due to its liver-protective effects, yet the underlying mechanisms remain unclear. In this study, we developed a MOS intraperitoneal injection model in turbot (Scophthalmus maximus) and observed that MOS-treated fish exhibited a stronger and faster inflammatory response upon secondary bacterial infection. MOS administration also induced significant alterations in metabolic pathways, including glycolysis, glutamine metabolism, and fatty acid metabolism, alongside epigenetic modifications of histones (H3K4me1, H3K4me3, H3K9me3)—hallmarks of trained immunity. Enhanced bacterial clearance in MOS-treated turbot was associated with reduced liver injury and improved histopathology. Overall, our findings suggest that MOS can induce trained immunity in teleost fish, providing protection against liver damage.*

Resume: *This study investigated the liver-protective effects of mannan-oligosaccharide (MOS) and its role in inducing trained immunity in turbot (Scophthalmus maximus). Using an intraperitoneal MOS injection model, we found that MOS-treated fish mounted faster and stronger inflammatory responses upon secondary bacterial infection. MOS administration also triggered significant metabolic reprogramming, including changes in glycolysis, glutamine metabolism, and fatty acid metabolism, accompanied by epigenetic modifications of histones (H3K4me1, H3K4me3, H3K9me3), hallmarks of trained immunity.*

Keywords: *Mannan-oligosaccharide, trained immunity, turbot, liver injury, bacterial infection, epigenetic modification, metabolic reprogramming*

Introduction

The liver is a critical immune and metabolic organ in teleost fish, playing essential roles in energy metabolism, immune defense, digestion, and nutrient absorption. Pathogen-induced liver injury is commonly observed in aquaculture and is characterized by inflammation, congestion, and hyperemia. Severe damage can disrupt the liver-gut axis and increase mortality in farmed fish.

Recently, immunostimulants derived from polysaccharides and oligosaccharides have gained attention as alternatives to antibiotics in aquaculture. These compounds have been shown to support liver and intestinal health, enhance immune responses, and improve growth performance. Among these, mannan-oligosaccharide (MOS), extracted from yeast cell walls, has been widely utilized as a dietary immunomodulator. MOS has been reported to enhance growth, improve feed efficiency, strengthen intestinal barrier integrity, and stimulate mucosal immunity in fish. Furthermore, short-term MOS supplementation can provide long-lasting, non-specific protection against pathogens. However, the precise mechanisms mediating this prolonged protection are not fully understood.

Trained immunity represents a form of innate immune memory, distinct from classical adaptive immunity. It can be triggered by stimuli such as β-glucan or Bacille Calmette-Guérin (BCG), resulting in long-lasting enhancement of the immune response upon secondary exposure. Key features of trained immunity include metabolic reprogramming (e.g., elevated glycolysis and lactate production) and epigenetic modifications (e.g., histone methylation or acetylation). Recent studies suggest that trained immunity can also occur in teleost fish, where neutrophils and macrophages exhibit memory-like responses to stimuli. However, whether MOS can induce trained immunity in fish remains unclear.

In this study, we established a MOS intraperitoneal injection model in turbot and challenged the fish with *Edwardsiella piscicida* to assess immune responses and liver protection. Our results demonstrate that MOS induces a trained immunity phenotype, enhancing inflammatory responses and alleviating liver pathology during bacterial infection.

Materials and methods

Turbot (*Scophthalmus maximus*, 30 ± 5 g) were obtained from Tianyuan Corp. and acclimated in aerated tanks with continuous sand-filtered seawater flow at 15 ± 1 °C and a density of 6 kg/m³ for one week. All experimental procedures complied with the guidelines of the Animal Experiment Committee of East China University of Science and Technology (Protocol No. 2006272)MOS derived from yeast cell walls was administered via intraperitoneal injection (100 μL, 1 mg/mL). Seven days post-injection, turbots were exposed to *Edwardsiella piscicida* through immersion to simulate secondary bacterial infection. Inflammatory cytokine expression, including il-1β, il-6, and tnf-α, was measured at specific time points post-infection.

Discussion

Our findings indicate that MOS is capable of inducing trained immunity in turbot, as evidenced by rapid and robust inflammatory responses upon secondary bacterial exposure. MOS treatment triggered metabolic reprogramming, including enhanced glycolysis and altered amino acid and lipid metabolism, along with epigenetic histone modifications. These changes resemble mechanisms observed in mammalian trained immunity models, suggesting conserved pathways across vertebrates.

Previous studies have shown that β-glucan and BCG can activate trained immunity through Dectin-1 and NOD2 signaling, promoting Akt-mTOR-HIF1α pathways and cytokine production. Similarly, MOS may engage comparable pathways in teleost fish, leading to heightened immune responsiveness and improved pathogen clearance. Importantly, MOS administration not only enhanced bacterial elimination but also mitigated liver damage, highlighting its dual role as an immunostimulant and hepatoprotective agent.

Conclusion

This study demonstrates that MOS can induce trained immunity in turbot, resulting in accelerated inflammatory responses and improved defense against secondary bacterial infections. MOS-induced metabolic and epigenetic reprogramming likely underlies these effects. Moreover, MOS treatment alleviated liver pathology, emphasizing its potential as an immunopotentiator in aquaculture. These findings provide a foundation for further exploration of trained immunity in fish and offer a promising strategy for enhancing fish health without relying on antibiotics.

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Arslonova R. R.
assistant
department of pharmacology
Samarkand State Medical University
Yo'ldosheva G. B.
assistant
Samarkand State Medical University
Mirzaeva F. N.
student
faculty of medicine
Samarkand State Medical University
Khushimov A. A.
student
Samarkand State Medical University

SPECIFIC CHARACTERISTICS OF FORMATION AND DEVELOPMENT DISORDERS IN CHILDREN AGAINST THE BACKGROUND OF IODINE DEFICIENCY

Abstract: *Iodine deficiency leads to a decrease in thyroid gland activity, which in turn reduces thyroid hormone biosynthesis. This can lead to irreversible changes in the formation and development of the nervous system in children. Such children lag behind their peers in mental and physical development. Therefore, considering that iodine deficiency is more common in young children, pregnant women, and lactating women, group prevention should be carried out for them. In such prevention, children, pregnant, and lactating women are given the drug "Antistrumin".*

Keywords*: Iodine deficiency state, mental and physical development, thyroid gland, thyroid hormones, goiter, antistrumin drug.*

Introduction

Many people do not realize that iodine is one of the most important micronutrients or how much iodine they are consuming. The main amount of iodine is collected in the thyroid gland and human blood. It is delivered to tissues and organs through the blood, partially accumulates in lipids, and is excreted through the kidneys. One of the vital functions of iodine is its participation in the formation of thyroid hormones.

Insufficient iodine intake leads to enlargement of the thyroid gland and several functional changes. This is the primary and most common symptom. Chronic iodine deficiency, especially in children, results in mental, physical, sexual, and psychological developmental delays. It also leads to symptoms characteristic of hypothyroidism, such as hair loss, dry skin, constipation, fatigue, sleepiness, depression, and memory loss. Currently, researchers are studying

various dangerous diseases besides goiter that develop in children due to iodine deficiency.

Literature analysis and methodology

Iodine is a vital micronutrient; without it, normal human development and formation do not occur. In endemic regions where environmental iodine is lacking, iodine deficiency leads to thyroid enlargement. Historically, it was believed that only goiter developed in these regions. However, modern research shows that iodine deficiency causes other conditions dangerous to human health. Since 1983, the term "endemic goiter" has been replaced by the term "iodine deficiency diseases".According to WHO data, 2 billion people worldwide suffer from diseases such as endemic goiter, hypothyroidism, mental and physical retardation, and central nervous system disorders caused by iodine deficiency. Since Uzbekistan is an iodine-deficient zone, endemic goiter is more common here. More than 85% of the population of Uzbekistan belongs to a group highly susceptible to goiter. Furthermore, iodine deficiency can lead to spontaneous abortion during pregnancy, low birth weight, and infant mortality.

Results

According to the World Health Organization, children under three, pregnant women, and lactating women are at the highest risk for iodine deficiency. If a mother does not receive enough iodine, protein, and vitamins during pregnancy, the resulting neurological changes in the fetus and infant may be irreversible and untreatable. Modern preventive measures help prevent these brain development disorders.

Iodine deficiency is one of the most significant micronutrient deficiencies worldwide and represents a serious public health problem, especially among children. Iodine is an essential element for the synthesis of thyroid hormones, which play a crucial role in growth, brain development, metabolism, and the maturation of organs and systems in the human body.

In children, iodine deficiency leads to impaired thyroid hormone production, resulting in various disorders of physical and neuropsychological development. The most common consequences include delayed growth, cognitive impairment, reduced intellectual abilities, learning difficulties, speech disorders, and decreased school performance. In severe cases, iodine deficiency may cause endemic goiter, hypothyroidism, and irreversible mental retardation.

During prenatal and early postnatal periods, iodine deficiency is particularly dangerous, as thyroid hormones are vital for normal brain formation. Insufficient iodine intake during these critical stages can lead to developmental delays, motor dysfunction, and reduced adaptive capabilities in children.

Early diagnosis of iodine deficiency–related disorders, along with preventive measures such as iodine supplementation and the use of iodized salt, plays a key role in reducing the incidence of these conditions. Comprehensive medical monitoring and timely correction are essential to ensure normal growth and development in children living in iodine-deficient regions.

Conclusion

Iodine is required in small amounts throughout life. Its deficiency leads to decreased thyroid function, impaired defense mechanisms, and irreversible changes in the nervous system of young children. Priority must be given to high-risk groups. For mild deficiency, iodized salt in food is recommended; for severe cases, potassium iodide preparations are administered.

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Bobojonov S. S.
katta o'qituvchi
Farg'ona jamoat salomatligi tibbiyot instituti
Farg'ona shahri. O'zbekiston

YURAK QON TOMIR KASALLIKLARI VA OG'IZ BO'SHLIG'I GIGIYENASINING O'ZARO BOG'LIQLIK MEXANIZMLARI

Annotatsiya: *Yurak-qon tomir kasalliklari (YQTK) hozirgi kunda butun dunyo bo'yicha o'lim va nogironlikning yetakchi sababi bo'lib qolmoqda. Jahon sog'liqni saqlash tashkiloti ma'lumotlariga ko'ra, yurak ishemik kasalligi, arterial gipertenziya va insult umumiy mortalitet tuzilmasida asosiy o'rinni egallaydi. So'nggi yillarda YQTK rivojlanish mexanizmlariga bo'lgan ilmiy qarashlar sezilarli darajada kengaydi va kasallik patogenezida nafaqat gemodinamik va metabolik omillar, balki surunkali yallig'lanish, endotelial disfunksiya hamda infeksion faktorlarning roli tobora muhim ahamiyat kasb etayotgani aniqlandi.*

Kalit so'zlar: *Gipertoniya kasalligi, gigiyena, profilaktika, periodontit.*

Bobojonov S. S.
senior lecturer
Fergana medical institute of Public Health
Fergana city, Uzbekistan

MECHANISMS OF THE INTERRELATIONSHIP BETWEEN CARDIOVASCULAR DISEASES AND ORAL HYGIENE

Abstract: *Cardiovascular diseases (CVDs) currently remain the leading cause of mortality and disability worldwide. According to data from the World Health Organization, ischemic heart disease, arterial hypertension, and stroke occupy a central place in the overall structure of mortality. In recent years, scientific perspectives on the mechanisms underlying the development of CVDs have significantly expanded, revealing that not only hemodynamic and metabolic factors but also chronic inflammation, endothelial dysfunction, and infectious factors play an increasingly important role in the pathogenesis of these diseases.*

Keywords: *Hypertension, hygiene, prevention, periodontitis*

Kirish

Og'iz bo'shlig'i gigiyenasi va parodont kasalliklari uzoq vaqt davomida faqat stomatologik muammo sifatida qaralgan bo'lsa, hozirgi kunda ularning organizmga sistemik ta'siri mavjudligi ilmiy jihatdan isbotlanmoqda. Parodontit — bu og'iz bo'shlig'ida surunkali yallig'lanish jarayoni bo'lib, u mikroorganizmlar va immun mediatorlar orqali qon aylanish tizimiga ta'sir

ko‘rsatadi. Tadqiqotlar shuni ko‘rsatadiki, parodont kasalliklari yurak-qon tomir tizimida yallig‘lanish jarayonlarini kuchaytirishi, ateroskleroz rivojlanishini tezlashtirishi va yurak-qon tomir asoratlari xavfini oshirishi mumkin.

So‘nggi o‘n yilliklarda o‘tkazilgan ko‘plab epidemiologik, klinik va eksperimental tadqiqotlar og‘iz bo‘shlig‘i gigiyenasi holati bilan yurak ishemik kasalligi, arterial gipertenziya, yurak yetishmovchiligi va insult o‘rtasida muhim bog‘liqlik mavjudligini ko‘rsatmoqda. Shu bilan birga, parodont patogenlarining aterosklerotik blyashkalarda aniqlanishi, yallig‘lanish markerlarining oshishi va endotelial funksiyaning buzilishi bu ikki tizim o‘rtasidagi patofiziologik bog‘liqlikni yanada yaqqol tasdiqlaydi.

Mazkur maqolaning maqsadi — zamonaviy ilmiy adabiyotlar asosida og‘iz bo‘shlig‘i gigiyenasi buzilishi va yurak-qon tomir kasalliklari o‘rtasidagi o‘zaro bog‘liqlikni tahlil qilish, ularning patogenetik mexanizmlarini yoritish hamda ushbu yo‘nalishda profilaktik va klinik yondashuvlarning ahamiyatini ko‘rsatib berishdan iborat.

Tekshiriah usullari

So‘nggi yillarda olib borilgan ilmiy tadqiqotlar yurak-qon tomir kasalliklari va og‘iz bo‘shlig‘i gigiyenasi o‘rtasidagi o‘zaro bog‘liqlikni tobora chuqurroq yoritib bermoqda. Ushbu bog‘liqlik faqatgina umumiy xavf omillari bilan izohlanib qolmasdan, balki aniq patofiziologik mexanizmlar orqali amalga oshishi isbotlanmoqda. Parodontitning surunkali yallig‘lanish o‘chog‘i sifatida organizmda past darajali, ammo uzluksiz sistemik yallig‘lanishni yuzaga keltirishi yurak-qon tomir patologiyalarining rivojlanishida muhim rol o‘ynaydi.\

Ko‘plab epidemiologik tadqiqotlarda parodont kasalliklari bilan og‘rigan bemorlarda yurak ishemik kasalligi, arterial gipertenziya va insult uchrash chastotasi sezilarli darajada yuqori ekanligi aniqlangan. Biroq, ushbu bog‘liqlikning sabab-oqibat munosabatlari hali ham to‘liq aniqlanmagan. Ayrim mualliflar parodontitni yurak-qon tomir kasalliklari uchun mustaqil xavf omili sifatida baholasa, boshqalari uni umumiy metabolik va hayot tarzi omillarining aks etishi deb hisoblaydi.

Shunga qaramasdan, klinik va eksperimental tadqiqotlarda parodontologik davolashdan so‘ng yallig‘lanish markerlarining pasayishi, endotelial funksiyaning yaxshilanishi hamda tomir devori qalinlashuvining sekinlashuvi kuzatilgani og‘iz bo‘shlig‘i gigiyenasining yurak-qon tomir sog‘lig‘iga bevosita ta’sirini tasdiqlaydi. Ayniqsa, yuqori yurak-qon tomir xavfiga ega bo‘lgan bemorlarda parodont holatini baholash va davolash muhim klinik ahamiyatga ega.

Muhokama jarayonida shuni ta’kidlash joizki, parodont kasalliklari va yurak-qon tomir patologiyalarining umumiy patogenetik zanjiri — surunkali yallig‘lanish, endotelial disfunksiya va immun mexanizmlar — profilaktik yondashuvlarni qayta ko‘rib chiqishni talab etadi. Bu holat tibbiyotning turli sohalari o‘rtasida integratsiyalashgan yondashuvni rivojlantirish zaruratini yuzaga keltiradi.

Profilaktik tavsiyalar

Yurak-qon tomir kasalliklari va og‘iz bo‘shlig‘i gigiyenasi o‘rtasidagi patogenetik bog‘liqlikni hisobga olgan holda, profilaktik chora-tadbirlar kompleks, bosqichma-bosqich va multidissiplinar yondashuv asosida amalga oshirilishi lozim. Profilaktika choralarining asosiy maqsadi og‘iz bo‘shlig‘ida surunkali yallig‘lanish manbalarini bartaraf etish, sistemik yallig‘lanishni kamaytirish va yurak-qon tomir asoratlari xavfini pasaytirishdan iborat.

1. Individual og‘iz bo‘shlig‘i gigiyenasini yaxshilash

Og‘iz bo‘shlig‘i gigiyenasiga rioya qilish parodont kasalliklari va ular bilan bog‘liq sistemik asoratlarning oldini olishda asosiy ahamiyatga ega. Quyidagi choralarga amal qilish tavsiya etiladi:

- tishlarni kuniga kamida ikki marta ftorli tish pastasi yordamida tozalash;
- tish oralig‘ini maxsus ip (floss), interproksimal cho‘tkalar yoki irrigator yordamida tozalash;
- antibakterial og‘iz chayish vositalaridan shifokor tavsiyasi asosida foydalanish;
- og‘iz bo‘shlig‘i gigiyenasi bo‘yicha bemorlarni muntazam ravishda o‘qitish va motivatsiya qilish.

2. Stomatologik nazorat va parodont kasalliklarini erta aniqlash

Parodont kasalliklarini erta aniqlash va o‘z vaqtida davolash yurak-qon tomir xavfini kamaytirishda muhim o‘rin tutadi. Shu munosabat bilan:

- yiliga kamida 1–2 marta stomatolog ko‘rigidan o‘tish;
- parodont cho‘ntaklar chuqurligini, gingival qonashni va tish harakatchanligini baholash;
- professional gigiyena (tish toshlarini olib tashlash, skeyling va root planing) muolajalarini o‘tkazish tavsiya etiladi.

3. Yurak-qon tomir xavfi yuqori bo‘lgan bemorlarda integratsiyalashgan yondashuv

Arterial gipertenziya, qandli diabet, yurak ishemik kasalligi va surunkali yurak yetishmovchiligi bilan og‘rigan bemorlarda og‘iz bo‘shlig‘i holatini baholash alohida ahamiyatga ega. Bunday bemorlarda:

- kardiolog va stomatolog o‘rtasida hamkorlikni yo‘lga qo‘yish;
- parodont holatini yurak-qon tomir xavfini baholash jarayoniga kiritish;
- yallig‘lanish markerlarini (CRP va boshqalar) nazorat qilish maqsadga muvofiq hisoblanadi.

4. Umumiy xavf omillarini kamaytirish

Og‘iz bo‘shlig‘i va yurak-qon tomir kasalliklari umumiy xavf omillariga ega ekanligini hisobga olgan holda quyidagi profilaktik choralarga e’tibor qaratish zarur:

- chekishni to‘liq to‘xtatish;
- sog‘lom ovqatlanish (to‘yingan yog‘lar va tez hazm bo‘ladigan uglevodlarni cheklash);

- tana vaznini me’yorida ushlab turish;
- muntazam jismoniy faollik;
- stressni kamaytirish va uyqu rejimini me’yorlashtirish.

5. Aholini xabardor qilish va tibbiy savodxonlikni oshirish

Aholi orasida og‘iz bo‘shlig‘i gigiyenasining yurak-qon tomir sog‘lig‘iga ta’siri haqida tushunchani oshirish profilaktikaning muhim yo‘nalishlaridan biridir. Shu maqsadda:

- profilaktik ko‘riklar davomida bemorlarga tushuntirish ishlari olib borish;
- tibbiyot muassasalarida ma’lumot beruvchi materiallar tarqatish;
- ommaviy axborot vositalari orqali sog‘lom turmush tarzini targ‘ib qilish tavsiya etiladi.

Cheklovlar va kelajakdagi tadqiqot yo‘nalishlari

Tadqiqot cheklovlari

Yurak-qon tomir kasalliklari va og‘iz bo‘shlig‘i gigiyenasi o‘rtasidagi bog‘liqlik bo‘yicha mavjud ilmiy adabiyotlar muhim ma’lumotlarni taqdim etganiga qaramasdan, bir qator cheklovlarga ega. Avvalo, aksariyat epidemiologik tadqiqotlar kuzatuv xarakteriga ega bo‘lib, ular asosida sabab-oqibat munosabatlarini aniq belgilash imkoniyati cheklangan. Parodont kasalliklari va yurak-qon tomir patologiyalari o‘rtasidagi aniqlangan assotsiatsiyalar ko‘pincha umumiy xavf omillari — chekish, qandli diabet, semizlik va ijtimoiy-iqtisodiy holat — bilan chalkashib ketishi mumkin.

Ikkinchidan, parodont kasalliklarini baholashda qo‘llaniladigan diagnostik mezonlarning turli tadqiqotlarda bir xil emasligi natijalarni taqqoslashni qiyinlashtiradi. Ayrim ishlar gingivitni, boshqalari esa faqat og‘ir parodontit holatlarini hisobga olgan bo‘lib, bu heterogenlik ilmiy xulosalarning umumlashtirilishini cheklaydi.

Uchinchidan, parodontologik davolashning yurak-qon tomir natijalariga ta’sirini baholovchi randomizatsiyalangan klinik tadqiqotlar soni hozircha yetarli emas. Mavjud klinik ishlar asosan qisqa muddatli yallig‘lanish markerlari va endotelial funksiyaga qaratilgan bo‘lib, uzoq muddatli klinik natijalar (miokard infarkti, insult, mortalitet) kam o‘rganilgan.

Kelajakdagi tadqiqot yo‘nalishlari

Kelgusida yurak-qon tomir tizimi va og‘iz bo‘shlig‘i gigiyenasi o‘rtasidagi bog‘liqlikni yanada chuqurroq tushunish uchun quyidagi yo‘nalishlarda tadqiqotlar olib borilishi maqsadga muvofiq hisoblanadi:

1. **Yirik randomizatsiyalangan klinik tadqiqotlar**

Parodont kasalliklarini davolashning yurak-qon tomir asoratlari rivojlanishiga ta’sirini baholash uchun uzoq muddatli, yirik va randomizatsiyalangan klinik tadqiqotlar o‘tkazish zarur.

2. **Standartlashtirilgan diagnostik mezonlarni ishlab chiqish**

Parodont holatini baholashda yagona klinik va laborator mezonlardan foydalanish tadqiqotlar o‘rtasidagi taqqoslanishni yaxshilaydi va ilmiy xulosalarning ishonchliligini oshiradi.

3. **Biomarkerlar va molekulyar mexanizmlarni o‘rganish**

Yallig‘lanish markerlari, immun javob omillari va og‘iz mikrobiotasining yurak-qon tomir tizimiga ta’sirini molekulyar darajada o‘rganish yangi diagnostik va profilaktik imkoniyatlarni ochib berishi mumkin.

4. **Yuqori xavf guruhlarida alohida tadqiqotlar**

Qandli diabet, arterial gipertenziya va surunkali yurak yetishmovchiligi bilan og‘rigan bemorlarda og‘iz bo‘shlig‘i gigiyenasining yurak-qon tomir prognoziga ta’sirini baholash alohida ahamiyatga ega.

5. **Multidissiplinar va sog‘liqni saqlash tizimi darajasidagi tadqiqotlar**

Kardiologlar, terapevtlar va stomatologlar hamkorligiga asoslangan integratsiyalashgan profilaktik dasturlar samaradorligini baholash sog‘liqni saqlash tizimida yangi yondashuvlarni joriy etishga xizmat qilishi mumkin.

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Ibragimova D. A.
assistenti
Samarqand Davlat Tibbiyot Universiteti
Sharopov N.
talabasi
Sultanov O. O'.
talabasi
Ahmet Erkam Bölükbaşı
talabasi
Esra Ulutaş
talabasi
Samarqand Davlat Tibbiyot Universiteti

BIOLOGIK FAOL KOMPLEKS BIRIKMALARINING TIBBIYOTDAGI AHAMIYATI

Annotatsiya: *Mazkur maqolada biologik faol kompleks birikmalarning tibbiyot sohasidagi o'rni va ahamiyati yoritib berilgan. Biologik faol moddalar inson organizmidagi fiziologik va biokimyoviy jarayonlarga bevosita ta'sir ko'rsatib, kasalliklarning oldini olish, tashxislash va davolashda muhim ahamiyat kasb etadi. Tadqiqot davomida biologik faol kompleks birikmalarning tuzilishi, ta'sir mexanizmlari hamda ularning zamonaviy tibbiyotda qo'llanilish yo'nalishlari tahlil qilindi. Shuningdek, ushbu birikmalarning farmakologik xususiyatlari, xavfsizligi va samaradorligini oshirish imkoniyatlari ilmiy manbalar asosida baholandi.*

Kalit so'zlar: *biologik faol birikmalar, kompleks moddalar, farmakologiya, metabolizm, tibbiyot, bioaktiv moddalar, davolash texnologiyalari.*

Ibragimova D. A.
assistant
Samarkand State Medical University
Sharopov N.
student
Sultanov O. O'.
student
Ahmet Erkam Bölükbaşı
student
Esra Ulutaş
student
Samarkand State Medical University

THE IMPORTANCE OF BIOLOGICALLY ACTIVE COMPLEX COMPOUNDS IN MEDICINE

Abstract: *This article examines the role and significance of biologically active complex compounds in the field of medicine. Biologically active substances directly influence physiological and biochemical processes in the human body, playing an essential role in the prevention, diagnosis, and treatment of various diseases. The study analyzes the structure of biologically active complex compounds, their mechanisms of action, and the main directions of their application in modern medical practice. In addition, the pharmacological properties of these compounds, as well as the possibilities for improving their safety and therapeutic effectiveness, are evaluated based on scientific sources.*

Keywords: *biologically active compounds, complex substances, pharmacology, metabolism, medicine, bioactive substances, therapeutic technologies.*

Kirish

So‘nggi yillarda tibbiyot va farmatsiya sohalarida biologik faol kompleks birikmalarga bo‘lgan qiziqish tobora ortib bormoqda. Bu holat, bir tomondan, surunkali kasalliklar sonining ko‘payishi, ikkinchi tomondan esa an’anaviy dori vositalarining ayrim hollarda yetarli samaradorlik ko‘rsatmasligi bilan izohlanadi. Biologik faol kompleks birikmalar tabiiy va sintetik manbalardan olinib, organizmda muhim biologik funksiyalarni bajarishda ishtirok etadi.

Ushbu birikmalar fermentlar faolligini boshqarish, hujayra membranalarining barqarorligini ta’minlash, immun tizimini rag‘batlantirish va modda almashinuv jarayonlarini normallashtirishda muhim rol o‘ynaydi. Shuningdek, ularning kam toksikligi va yuqori bioo‘zlashtirilish darajasi tibbiyot amaliyotida keng qo‘llanilishiga zamin yaratmoqda.

Manbalar tahlili va metodologiyasi

Tadqiqot davomida biologik faol kompleks birikmalar bo‘yicha milliy va xorijiy ilmiy adabiyotlar, ilmiy maqolalar hamda monografiyalar tahlil qilindi. Manbalar tahlili biologik faol moddalarning kimyoviy tuzilishi, farmakodinamik va farmakokinetik xususiyatlarini aniqlashga qaratildi.

Metodologik jihatdan maqolada qiyosiy tahlil, tizimli yondashuv va umumlashtirish usullaridan foydalanildi. Biologik faol kompleks birikmalarning tibbiyotda qo‘llanilishi ularning terapevtik samaradorligi, biologik mosligi va xavfsizlik ko‘rsatkichlari asosida baholandi. Shuningdek, eksperimental va klinik tadqiqot natijalari asosida ushbu birikmalarning istiqbolli yo‘nalishlari aniqlab berildi.

Xulosa

Xulosa qilib aytganda, biologik faol kompleks birikmalar zamonaviy tibbiyotda muhim o‘rin egallab, turli kasalliklarni davolash va oldini olishda yuqori samaradorlik ko‘rsatmoqda. Ularning organizmga ko‘p qirrali ta’siri, nisbatan past nojo‘ya ta’sirlari hamda fiziologik jarayonlarga moslashuvchanligi tibbiyot amaliyotida keng joriy etilishiga imkon yaratadi. Kelgusida biologik faol kompleks birikmalar asosida yangi avlod dori vositalarini yaratish, individual

terapiya va profilaktik yondashuvlarni rivojlantirish tibbiyot fanining ustuvor yo‘nalishlaridan biri bo‘lib qoladi.

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Ismoilov O. I., PhD
dotsent
odam anatomiyasi kafedrasi
Samarqand davlat tibbiyot universiteti
Samarqand, O'zbekiston

QUYONLARDA QUYOSH CHIGALI TUGUNLARINING ANATOMO – GISTALOGIK TUZILISHI

Annotatsiya*: Ushbu maqolada quyonlarnig quyosh chigali tugunida neyron-glial-kapillyar o‘zaro munosabatlarini tajiribada o’rganilgan. Neyrogistologik usullardan Nissl va Bilshovskiy-Gross bo‘yicha kumush bilan impregnatsiya qilish orqali nerv to’qimalari bo’yaldi. Nerv hujayrasi, gliya va kapillyar yagona anatomo-gistologik kompleksni tashkil etadi. Ularning o‘zaro munosabatlaridagi miqdoriy o‘zgarishlar biologik tajriba sharoitida ekstramural vegetativ tugunlarning funksional holatini nozik indikator sifatida xizmat qilishi mumkin.*

Kalit so`zlar: *Tajriba, quyon, quyosh chigali, neyron, gliosit, neyrogistologik usullar, nerv tugunlari,*

Ismoilov O. I., PhD,
associate professor
department of human anatomy
Samarkand State Medical University
Samarkand, Uzbekistan

ANATOMICAL AND HISTOLOGICAL STRUCTURE OF THE CELIA PLEXUS GANGLIA IN RABBIT

Abstract: *This article experimentally studied the neuronal-glial-capillary relationships in the celiac plexus ganglia of rabbits. Nervous tissue was stained using Nissl staining and silver impregnation using the Bielschowsky-Gross method. The nerve cell, glia, and capillary form a single anatomical and histological complex. Quantitative changes in their relationships can serve as a subtle indicator of the functional state of extramural autonomic ganglia under biological experimental conditions.*

Keywords: *experiment, rabbit, celiac plexus, neuron, glial cell, neurohistological methods, nerve ganglia.*

Kirish

Turli xil hayvon turlarining qiyosiy morfologik tadqiqotlari bizga ushbu hayvonlarning turli antropogen omillarga rivojlanishi va moslashuvining ilgari aniqlanmagan anatomo-gistologik tuzilishini aniqlash imkonini beradi. Zamonaviy tadqiqotlar ma'lumotlari bizga quyosh chigali tugunlarining periferik nerv

tuzulmasi sifatida ko'rib chiqish imkonini beradi. Bu darajada ovqat hazm qilish organlarining turli funktsiyalari tartibga solinishi mumkin [1,2]. Seliak pleksus ganglionlarining strukturaviy tuzilishiga bag'ishlangan ko'plab tadqiqotlarga qaramay [3,4,5], ganglionlarning hujayra tarkibini morfometrik tahlil qilish bo'yicha ma'lumotlar yetarlicha to'liq emas. Odamlarda, uy va laboratoriya hayvonlarida nerv pleksusining innervatsiyasi va qon tomirlanishi bo'yicha ko'plab tadqiqotlar va morfologik adabiyotlarda keng ma'lumotlarga qaramay, umurtqali hayvonlarda nervlar va qon tomirlari morfologiyasi bo'yicha ushbu bo'lim qiyosiy morfologiyada kam o'rganilganligicha qolmoqda [6,7]. Nerv to'qimalarining tuzilishi va funktsiyasini o'rganishga tizimli yondashuv zarurligini hisobga olgan holda, biz avtonom nerv tizimining ushbu murakkab ekstramural ganglionlarining ishlashini chuqurroq tushunish uchun neyronlarni, ularni o'rab turgan glia va kapillyarlarni keng qamrovli o'rganishni amalga oshirdik.

Tadqiqot maqsadi

Quyonlarda seliak pleksus ganglionlarining anatomik va gistologik tuzilishini o'rganish.

Materiallar va usullar

Tadqiqot ikkala jinsdagi 20 ta jinsiy yetuk quyonlarda o'tkazildi. Kapillyarlar, neyronlar va glial hujayralarni birgalikda aniqlash xloroform va efirda Parij ko'k suspenziyasi bilan tomirlarga intravital in'ektsiya qilish, gistologik kesimlarni Nissl bo'yash va Bielschowsky-Gross usuli yordamida kumush singdirish orqali amalga oshirildi. Kapillyarlar, neyronlar va glial hujayralarning morfometriyasi MOB-15 vintli okulyar mikrometr yordamida amalga oshirildi. Har bir hayvonda (n = 5) atrofdagi glia va kapillyarlarga ega 200 ta neyron o'lchandi. Neyronlar va glial hujayra yadrolarining profil maydoni ikkita o'zaro perpendikulyar hujayra diametrlarining ko'paytmasi sifatida aniqlandi. Nerv hujayralarining qon ta'minotini miqdoriy baholash E.P. Melmanga ko'ra amalga oshirildi.

Tadqiqot natijalari

Bizning tadqiqotimiz quyidagi natijalarni berdi. Quyonlarda seliak pleksus ganglionlarining qon tomirlanishining asosiy manbalari seliak arteriyasi, aorta va suprarenal-bel trunkalari hisoblanadi. Arteriyalar ganglion kapsulasiga yaqinlashadi, undan diametri 26,51 ± 1,16 µm bo'lgan arteriolalar tarmoqlanadi. Bu arteriolalar bir-biri bilan anastomozlashib, ekstraganglionik arterial tarmoqni hosil qiladi, undan diametri 17,36 ± 0,49 µm bo'lgan arteriolalar va prekapillarlar biriktiruvchi to'qima septalari bo'ylab ganglionning chuqur qatlamlariga tarqaladi. Ikkinchisi o'lchamlari 182,9 ± 3,58-116,33 ± 2,33 µm bo'lgan qo'pol halqali tarmoqlarni hosil qiladi, ular har tomondan nerv hujayralari orollarini o'rab oladi. Diametri 7,29 ± 0,2 µm bo'lgan kapillyarlar halqa o'lchamlari 87,25 ± 1,62-61,89 ± 1,99 µm bo'lgan zich, mayda tishli kapillyar tarmoqni hosil qiladi. Har bir halqada glial hujayralar bilan o'ralgan 1-2 ta neyron mavjud. Ular birgalikda funktsional jihatdan murakkab neyronal-glial-kapillyar birikmalarni hosil qiladi. Seliak pleksus ganglionlarining neyronlari o'rtacha kattalikda (35,68±0,83-25,15-0,5 mkm), yumaloq shaklda ovalga ega, katta, yengil, markazda yoki biroz

eksantrik joylashgan yadroga ega. Seliak ganglionlarining hujayra tarkibini morfometrik o'rganish uchta neyron guruhini ajratish imkonini berdi: birinchisi profil maydoni maydoni 400-800 mkm², ikkinchisi 801-1200 mkm² va uchinchisi 1201-1600 mkm² bo'lgan hujayralardan iborat edi. Ikkinchi guruh neyronlari son jihatidan ustunlik qilgan. Bundan kelib chiqadiki, quyonlarda seliak pleksus ganglionlaridagi neyronlarning hujayra tarkibi morfologik jihatdan heterojen. Aniqlanganidek, quyonlarning çölyak pleksusining ganglionlaridagi nerv hujayralarining 4-6% parasempatik neyronlarga xos bo'lgan atsetilxolinesterazaning yuqori konsentratsiyasini o'z ichiga oladi. Çölyak pleksusining ganglionlarida joylashgan 1201-1600 mkm² (6,50%) profil maydoniga ega yirik neyronlar xolinergik, birinchi va ikkinchi guruh neyronlari esa efferent va interkalarial deb taxmin qilish mumkin. Hujayra tanasi atrofida (25 mkm zonada) 4-5 ta gliotsit joylashgan. Gliotsitlarning 65% (perineuronal), 2-3 ta, hujayra tanasidan 25±0,8 mkm masofada, asosan dendritlar bazasida va metabolik jarayonlar faolligi eng yuqori bo'lgan akson tepaligida joylashgan. Gliotsitlarning 35% (erkin) hujayra tanasidan 5,1-20,0 mkm masofada joylashgan. Morfometriya o'ng va chap çölyak ganglionlarining neyronlari va gliotsitlarining profil maydonining kattaligi va maydoni teng ekanligini aniqladi. Neyron mikrovaskulyarizatsiyasini o'rganish neyronlar, glia va kapillyarlar o'rtasidagi turli xil munosabatlarni ko'rsatadi. Ko'pincha kapillyarlar neyron tanasining yuzasiga parallel ravishda o'tadi va 1-2 neyronni o'z ichiga olgan ochiq halqalarni hosil qiladi. Kapillyarlar vilka shaklida tarmoqlanishi mumkin, keyin vilkada joylashgan nerv hujayralari kapillyarlarga sezilarli masofada yaqin aloqada bo'ladi. Neyronning 25 µm bo'lgan ovqatlanish zonasida 10 µm gacha kenglikdagi optimal vaskulyarizatsiya kamari mavjud. Nerv hujayrasining hujayra tanasidan 20-25 µm uzoqlikda faqat bir nechta kapillyar (4,3%) joylashgan.

Xulosa

Shunday qilib, neyron-glial-kapillyar munosabatlarni birlashtirilgan miqdoriy o'rganish usulidan foydalanish quyonlarda çölyak pleksus ganglionlaridagi neyronlarning mikrovaskulyarizatsiyasining ma'lum naqshlarini aniqlashga imkon berdi. Nerv hujayrasi, glia va kapillyar bitta morfo-funktsional kompleksni tashkil qiladi va bu komplekslar orasidagi munosabatlardagi miqdoriy o'zgarishlar biologik tajribalarda ekstramural vegetativ ganglionlarning funktsional holatining nozik ko'rsatkichi bo'lib xizmat qilishi mumkin.

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Ismoilov O. I., PhD
associate professor
department of human anatomy
Samarkand State Medical University
Samarkand, Uzbekistan

ANATOMICAL AND HISTOLOGICAL STRUCTURE OF THE CELIA PLEXUS GANGLIA IN RABBIT

Abstract: *This article experimentally studied the neuronal-glial-capillary relationships in the celiac plexus ganglia of rabbits. Nervous tissue was stained using Nissl staining and silver impregnation using the Bielschowsky-Gross method. The nerve cell, glia, and capillary form a single anatomical and histological complex. Quantitative changes in their relationships can serve as a subtle indicator of the functional state of extramural autonomic ganglia under biological experimental conditions.*

Keywords: *experiment, rabbit, celiac plexus, neuron, glial cell, neurohistological methods, nerve ganglia.*

Introduction

Comparative morphological studies of various animal species allow us to uncover previously unidentified patterns of development and adaptation of these animals to various anthropogenic factors. Data from modern research allow us to consider the celiac plexus as a peripheral nerve center, at the level of which various functions of the digestive organs can be regulated [1,2]. Despite the significant number of studies devoted to the structural organization of the celiac plexus ganglia [3,4,5], information on the morphometric analysis of the cellular composition of the ganglia is insufficiently complete. Despite the significant number of studies and extensive information in the morphological literature on the innervation and vascularization of the nerve plexus in humans, domestic and laboratory animals, this section on the morphology of nerves and vessels in vertebrates remains poorly studied in comparative morphology [6,7,8]. Considering the need for a systematic approach to studying the structure and function of nervous tissue, we undertook a comprehensive study of neurons, along with their surrounding glia and capillaries, to gain a deeper understanding of the functioning of these complex extramural ganglia of the autonomic nervous system.

Purpose of the study

To study the anatomical and histological structure of the celiac plexus ganglia in rabbits.

Materials and methods

The study was performed on 20 sexually mature rabbits of both sexes. Combined detection of capillaries, neurons, and glial cells was performed by intravital injection of vessels with a suspension of Paris blue in chloroform with ether in combination with Nissl staining of histological sections and silver

impregnation using the Bielschowsky-Gross method. Morphometry of capillaries, neurons, and glial cells was performed using an MOB-15 screw ocular micrometer. In each animal (n = 5), 200 neurons with surrounding glia and capillaries were measured. The profile area of neurons and glial cell nuclei was determined as the product of two mutually perpendicular cell diameters. Quantitative assessment of nerve cell blood supply was performed according to E. P. Melman.

Research results

Our research has yielded the following findings. The main sources of vascularization of the celiac plexus ganglia in rabbits are the celiac artery, aorta, and suprarenal-lumbar trunks. Arteries approach the ganglion capsule, from which arterioles with a diameter of 26.51±1.16 μm branch off. The latter, anastomosing with each other, form an extraganglionic arterial network, from which arterioles and precapillaries with a diameter of 17.36±0.49 μm extend along connective tissue septa into the deeper layers of the ganglion. The latter form coarsely looped networks with dimensions of 182.9±3.58-116.33±2.33 μm, encompassing the islets of nerve cells on all sides. Capillaries with a diameter of 7.29±0.2 μm form a dense, finely serrated capillary network with loop sizes of 87.25±1.62-61.89±1.99 μm. Each loop contains 1-2 neurons with surrounding glial cells. Together, they form functionally complex neuronal-glial-capillary assemblies. Neurons of the celiac plexus ganglia average in size (35.68±0.83-25.15-0.5 μm), are rounded to oval in shape, with a large, light, centrally or slightly eccentrically located nucleus. A morphometric study of the cellular composition of the celiac ganglia made it possible to distinguish three groups of neurons: the first consisted of cells with a profile field area of 400-800 μm², the second 801-1200 μm², and the third 1201-1600 μm². Neurons of the second group were numerically predominant. 0t it follows that the cellular composition of neurons in the ganglia of the celiac plexus in rabbits is morphologically heterogeneous. As has been established, 4-6% of nerve cells in the ganglia of the celiac plexus in rabbits contain a high concentration of acetylcholinesterase, which is characteristic of parasympathetic neurons. It can be assumed that large neurons with a profile field of 1201-1600 μm² (6.50%) located in the ganglia of the celiac plexus are cholinergic, and neurons of the first and second groups are efferent and intercalary. There are 4-5 gliocytes located around the cell body (within a 25 μm zone). 65% of the gliocytes (perineuronal), 2-3 in number, are located at a distance of 25±0.8 μm from the cell body, mainly at the base of the dendrites and the axon hillock, where the activity of metabolic processes is highest. 35% of the gliocytes (free) are located at a distance of 5.1-20.0 μm from the cell body. Morphometry has established that the size and area of the profile field of neurons and gliocytes of the right and left celiac ganglia are equal. The area of the profile field of free gliocytes, which may indicate a greater functional significance of the former. The study of neuronal microvascularization indicates a wide variety of relationships between neurons, glia, and capillaries. Most often, capillaries run parallel to the surface of the neuron body, forming open loops containing 1-2 neurons. Capillaries may branch

into a fork-like pattern, and then nerve cells located at the fork come into close contact with the capillaries over a significant distance. Within the alimentary zone of a neuron, which is 25 µm, there is an optimal vascularization belt up to 10 µm wide. Only a few capillaries (4.3%) are located 20-25 µm from the cell body of the nerve cell. It has also been established that the number of perineuronal gliocytes, capillary diameter, and the area of neuronal-capillary contacts increase with increasing area of the nerve cell profile field.

Conclusion

Thus, the use of a combined quantitative study method of neuron-glial-capillary relationships allowed us to establish certain patterns of microvascularization of neurons in the celiac plexus ganglia in rabbits. The nerve cell, glia, and capillary constitute a single morpho-functional complex, and quantitative changes in the relationships between these complexes can serve as a subtle indicator of the functional state of extramural autonomic ganglia in biological experiments.

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Jalilov A. X., t.f.n., dotsent
bolalar kasalliklari propedevtikasi kafedrasi
Samarqand davlat tibbiyot universiteti

TAJRIBADA ICHAKLAR TUTQICHIDAGI NERV TOLALARI KESILGANDA QUYOSH CHIGALIDAGI NERV TUGUNLARIDA NEYROGISTOLOGIK O`ZGARISHLAR

Annotatsiya: *Maqolada tajriba sharoitida umumiy narkoz ostida mushuklarning ichaklar tutqichidagi nerv tolalarining quyosh chigali tugunlari bilan tutashgan nervlar kesilib, quyosh chigali tugunlaridagi neyronlar tarkibi o`rganilgan. Olingan natijalar shuni ko`rsatdiki, peritsellyulyar bog'lanishlar - sinapslarni yo'qotishga reaksiya sifatida quyosh chigali tugunlaridagi nerv hujayralarida transneyronal degeneratsiya yuzaga keldi. Bu holat quyosh chigali neyronlarining katta qismi preganglionar tolalarni ichak tutqichidagi nervlar orqali qabul qilishini ko'rsatadi.*

Kalit so'zlar: *tajriba, mushuklar, quyosh chigali, nerv hujayralari, gematoksilin va eozin bilan bo'yash, toluidin ko'k bilan bo'yash.*

Zhalilov A. Kh. PhD,
associate professor
department of propaedeutics of childhood diseases
Samarkand State Medical University

NEUROHISTOLOGICAL CHANGES IN THE NERVE GANGLIA OF THE CELIAC PLEXUS FOLLOWING TRANSECTION OF THE MESENTERIC NERVE FIBERS IN EXPERIMENTAL CONDITIONS

Abstract: *The article investigates the neuronal composition of the celiac plexus ganglia under experimental conditions. In cats under general anesthesia, nerves connecting the mesenteric nerve fibers with the celiac plexus ganglia were transected. The results demonstrated that transneuronal degeneration occurred in the nerve cells of the celiac plexus ganglia as a response to the loss of pericellular connections (synapses). This indicates that a significant portion of celiac plexus neurons receive preganglionic fibers via the mesenteric nerves.*

Keywords: *experiment, cats, celiac plexus, nerve cells, hematoxylin and eosin staining, toluidine blue staining.*

Kirish

Adabiyotlarda quyosh chigalidagi tugunlarini o'rganilganligi to'g'risidagi ilmiy ishlarni kam xollarda uchratamiz [1,2]. Qorin bo'shlig' va chanoq a'zolarida operatsiyalar o'tkazish jarayonlarida ba'zi hollarda nervlarni kesib yuborish jiddiy asoratlarga olib kelishiga bag'ishlangan ilmiy yangiliklar kam uchraydi [3,4]. Quyosh chigali neyrogistologik jihatdan alohida ahamiyat kasb etib, ma'lum

vazivaga ega nerv hujayralaridan tashqari, bu yerda katta ganglioz to‘plamlari mavjud bo‘lib, ularning fiziologik vazifalari hali to‘liq aniqlanmagan [5,6]. Quyosh chigali bo‘yicha gistologik ilmiy ishlarning aksariyati uning tugunlarining nerv-tolali tarkibini, xususan, retseptor apparatini tasvirlashga bag‘ishlangan ma’lumotlar kam o’rganilgan [7]. Eksperimental usulda bajarilgan alohida ishlar asosan quyosh chigalining afferent innervatsiyasiga oid bo‘lib, uning neyronlariga yetarli e’tibor bermagan [8].

Tadqiqot maqsadi

Tajribada ichaklar tutqichidagi nerv tolalari kesilganda quyosh chigalidagi nerv tugunlarida neyrogistologik o`zgarishlarni o‘rganish.

Tadqiqot materiallari va usullari

Tajriba sharoitida umumiy narkoz ostida 25 ta voyaga etgan mushuklarda quyosh chigali nerv tugunlaridan yuqorida va undan pastki qisimlarida ichaklar tutqichiga boruvch nervlar kesildi. M’alum vaqt o’tgach nev to’qimalari olinib, umumgistologik usullardan Gematoksilin-Eozin va neyrogistologik toluidin ko‘ki bilan bo‘yash usullari qo’llanildi. Bundan tashqari, qalinligi 8–9 mkm bo‘lgan tugunlarning seriyali kesmalarida, toluidin ko‘ki bilan bo‘yalgan holda, retrograd o‘zgargan hujayralar soni hisoblandi. Nazorat sifatida 10 ta amalda sog‘lom mushuklarning quyosh chigali tugunlari o’rganildi.

Tadqiqot natijalari

Quyosh chigali nerv tugunlariga yunalgan nervlar kesilgandan so’ng 48 soat o‘tgach, quyosh chigalidagi presinaptik nerv tolalarining ommaviy degeneratsiyasi va chrevnyy tugunlarining ba’zi nerv hujayralarida sinaptik apparatning degeneratsiyasi sodir bo‘ladi. Chrevnyy nervlarni kesish nerv hujayralari tanasida ham bir qator strukturaviy buzilishlarga olib keladi. Toluidin ko‘ki bilan bo‘yalgan preparatlarda ko‘rinishicha, operatsiyadan 8–15 kun o‘tgach, ko‘plab neyronlarda xromatolizis kuzatiladi. Shu holat nervlar periferiyasidan boshlanib, asta-sekin markaziga tarqaladi. Hujayralar hajmining kamayishi sitometrik ma’lumotlar va raqamli materialni variatsion statistika usuli bilan qayta ishlash orqali tasdiqlanadi. Bizning o‘lchovlar natijalariga ko‘ra, intakt hayvonlarda nerv hujayralarining hajmi juda katta o‘zgaruvchanlikka ega. Biroq, ularning xilma-xilligi orasida 3 guruh hujayralarni ajratib ko‘rsatish mumkin: 1) 1–30 planimetrik birlik; 2) 31–60 planimetrik birlik; 3) 61–100 planimetrik birlik. Normada eng ko‘p hujayralar (200 tadan 93 tagacha) 31–45 planimetrik birlik hajmga ega. Ikkala tomonlama splankhnikotomiyadan 10–15 kun o‘tgach, kichikroq hajmdagi hujayralar soni sezilarli darajada oshadi. Masalan, chrevnyy nervlarni kesgandan 14 kun o‘tgach, quyosh plexusi neyronlarining asosiy qismi (200 tadan 118 tagacha) 16–30 planimetrik birlik hajmga ega bo‘ldi. Nazorat guruh hayvonlaridagi nerv hujayralari hajmini solishtirganda, ichak tutqich nervlarni kesish 14 kun o‘tgach ularning hajmini 2 baravarga kamaytirishi aniqlandi. Shunday qilib, olingan sitometrik ma’lumotlar vizual kuzatuvlar natijalari bilan mos keladi va quyosh chigali nerv hujayralarida transneyronal degeneratsiya fenomenining ob’ektiv isboti bo‘lib xizmat qiladi. Bu degeneratsiya preganglionar tolalarni kesish

natijasida sinapslar – peritsellyulyar aloqalarning yo‘qolishiga reaksiya sifatida yuzaga kelgan.

Simpatik nervlarni quyosh chigali tugunlaridan pastda kesilganda ichak tutqichidan o‘tgan turli miqdordagi 1-5 ta nerv tolalari shoxchalarini kesganda, operatsiyadan 36–48 soat o‘tgach, quyosh chigali nerv tugunlarida impregnatsiya usuli bilan nozik miyelinli nerv tolalarining degeneratsiyasi aniqlandi. Ichak tutquchdagi nervlarini kesgandan 8–10 kun o‘tgach, quyosh chigalida ko‘plab neyronlari retrograd o‘zgargan holatda uchradi. Bunday hujayralar biroz shishgan ko‘rinishga ega edi, ularda Nissl moddasi deyarli butunlay yo‘qolgan, faqat hujayra periferiyasida yoki yadro atrofida oz miqdorda saqlanib qolgan. Ichak tutquchdagi nervlarini kesgandan keyin quyosh chigalida neyronlarining sezilarli miqdori (14–27%), asosan yirik neyronlari retrograd o‘zgarganligi shuni ko‘rsatadi. Bu nervlar tarkibida quyosh chigalida nerv hujayralarining ko‘plab aksonlari o‘tadi. Ushbu seriya tajribalarda neyronlarning oz miqdori transneyronal o‘zgargan edi. Bu ko`rinishni biz ichak tutquchdagi nervlari tarkibida nafaqat markazdan uzoqlashuvchi, balki markazga yo‘nalgan nerv tolalari ham o‘tishi bilan izohlaymiz. Ta’kidlash joizki, 1- va 2-seriya tajribalarda retrograd va transneyronal o‘zgargan neyronlardan tashqari, saqlanib qolgan sinapslarga ega bo‘lgan o‘zgarmagan nerv hujayralari ham kuzatildi.

Xulosa

Olingan ilmiy natijalar shuni ko‘rsatadiki, quyosh chigali va nerv tolalari murakkab neyrogistologik tuzulishga ega reflector neyrofizologik vazifalarni amalga oshuruvchi anatomik tuzilgan markazdir. Uning tugunlarida joylashgan hujayralarining neyritlari nafaqat distal yo‘nalgan holda ichaklar tutqichdagi nervlari tarkibida, balki distal yo‘nalgan holda nervlari tarkibida ham o‘tadi.

Ichaklarni tutub turuvchi nozik pardalar orasidagi nervlarni kesgandan keyin quyosh chigali tugunlaridagi neyronlarining sezilarli miqdordagi retrograd degeneratsiyasi shuni ko‘rsatadiki, bu hujayralar Meyssner va Auerbax nerv chigallari neyronlari bilan birga nozik tuzulma ichakning harakatlantiruvchi innervatsiyasining qo‘shimcha manbai hisoblanad.

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Kiyamov B. E.
assistant
department of human anatomy
Samarkand State Medical University
Samarkand, Uzbekistan

INFLUENCE OF CUTTING THE DIAPHRAGM NERVES ON THE STATE OF THE INTRAORGAN LYMPHATIC SYSTEM OF THE COLON OF A WHITE RAT

Abstract: *The article studies the effect of cutting the phrenic nerves on the state of the intraorgan lymphatic system of the colon of a white rat. The patterns of the polymorphic picture of the intraorgan lymphatic system of the colon and rectum of a white rat that we identified after turning off the diaphragm movements can serve as a basis for its structural adaptations to various degrees of lymphostasis.*

Keywords: *white rats, lymphatic vessels, diaphragm movements, colon, large lacunae.*

Introduction

In morphology, the evolutionary direction is successfully developing. From this perspective, it appears relevant to examine aspects of lymph circulation and to identify the components of its regulation by the peripheral nervous system indirectly—through the somatic musculature [1,4]. To date, several mechanisms are known by which the respiratory movements of the diaphragm influence the maintenance of lymph flow. Dynamic monitoring of the development of motor-evacuatory dysfunction of the intestine in interconnection with the lymphoid and lymphatic systems requires new approaches to the rehabilitation of such conditions [2,3]. Despite the widespread prevalence of these disorders and the numerous studies devoted to them, the morphological features of impaired motor-evacuatory function of the large intestine that underlie the clinical picture of various disease variants remain largely unstudied [5,8]. The lymphatic system plays a role in maintaining the constancy of the organism's internal environment—that microenvironment which surrounds the cell and ensures its plastic, energetic, and excretory capabilities. In this context, the role of the lymphatic system can be formulated as drainage and detoxification [6,7]. Analysis of the available literature indicates that the anatomical and histological structure of the large intestine and its connections with regional lymph nodes, taking into account changes in peristalsis and the identification of correlative relationships between organometric and histometric parameters, remain insufficiently studied.

Aim of the Study

We investigated the effect of phrenic nerve transection on the state of the intraorgan lymphatic system of the large intestine in white rats.

Materials and Methods

To study the state of the intraorgan lymphatic system of the abdominal and pelvic organs resulting from the cessation of rhythmic diaphragmatic excursions, we performed bilateral excision of segments (1.5–2.0 mm) of the phrenic nerves in the neck region in 20 white rats. The animals were sacrificed 5–20 days after the operation. The lymphatic system of the colon and rectum was injected in both experimental and control animals, and cleared macro-microscopic preparations were prepared.

Results of the Study

Upon analyzing the obtained results, we established that under normal conditions (control group), the lymphatic system of the proximal and distal segments of the large intestine in white rats exhibits a correlative relationship between its morphological characteristics and the structural features of the intestinal wall. Specifically, in the ascending colon, three-dimensional networks of lymphatic capillaries (diameter 0.03–0.045 mm) of the mucosa–submucosa layer are arranged along the course of its palmate folds. In contrast, two-dimensional networks of lymphatic capillaries in the same layer of the descending colon and rectum lack any specific orientation. Transitional-type efferent lymphatic vessels, which form plexuses along their entire length, give rise to collecting lymphatic vessels that drain from the subserous layer at the mesenteric border of the intestine. In the early postoperative period (5–7 days), destructive changes were observed in all layers of the wall of the colon and rectum in white rats. These changes were characterized by the appearance of numerous segmental constrictions (beading) in lymphatic capillaries, with diameters reaching 0.08–0.1 mm in dilated segments and 0.012–0.015 mm in constricted segments. In the proximal segment of the large intestine, large lacunae were found, concentrated at sites where lymphatic capillaries emptied into submucosal lymphatic vessels. The lymphatic bed of the distal segment of the large intestine showed the emergence of new structural elements on the walls of lymphatic capillaries in the form of blind club-shaped and cone-shaped outgrowths (diameter 0.03–0.045 mm).

In later postoperative periods (10–20 days), sclerotic changes in the lymphatic capillaries and vessels of the large intestine progressed, with the most pronounced alterations occurring in the submucosal layer of its distal segment.

Conclusion

The patterns we identified in the polymorphic morphology of the intraorgan lymphatic system of the colon and rectum in white rats following the cessation of diaphragmatic movements may provide a basis for understanding its structural adaptations to varying degrees of lymphostasis.

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Mahima Sara Mathew
assistant
department of dermatovenereology
Samarkand State Medical University

DETECTION OF MULTICLASS NON-MELANOMA SKIN CANCER USING MULTI-VARIABLE DCNN WITH HYBRID GRADIENT BOOSTING OPTIMIZER

Abstract: *Non-melanoma skin cancer is a prevalent malignancy requiring timely diagnosis. Traditional diagnostic methods rely on visual inspection and histopathology, which are time-intensive and prone to human error. This research introduces a multi-variable deep convolutional neural network (DCNN) combined with a hybrid gradient boosting optimizer to classify multiple types of NMSC from dermoscopic images. The model leverages feature extraction from multiple variables and optimizes classification using a hybrid boosting approach. Experiments conducted on publicly available NMSC datasets show that the proposed model achieves high accuracy, sensitivity, and specificity, outperforming existing techniques. This framework can aid dermatologists in rapid and reliable diagnosis, potentially improving patient outcomes.*

Resume: *Early detection of non-melanoma skin cancer (NMSC) significantly improves patient outcomes. This study presents a multi-variable deep convolutional neural network (DCNN) integrated with a hybrid gradient boosting optimizer for accurate multiclass classification of NMSC. The proposed method demonstrates superior performance compared to conventional classifiers, offering a reliable tool for clinical decision support.*

Keywords: *Non-melanoma skin cancer, deep convolutional neural network, hybrid gradient boosting, multiclass classification, image-based diagnosis, medical image analysis.*

Introduction

Non-melanoma skin cancer (NMSC), including basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), represents the most common forms of skin malignancy. Early detection is critical for effective treatment and patient survival. Conventional diagnostic procedures, such as clinical examination and biopsy, are often labor-intensive and subjective.

Recent advances in artificial intelligence (AI) and deep learning have demonstrated potential in medical image analysis. Convolutional neural networks (CNNs) are particularly effective in extracting hierarchical features from images, enabling automated classification. However, challenges remain in multiclass NMSC detection due to subtle variations in lesion appearance, lighting, and skin texture.

To address these challenges, this study proposes a multi-variable DCNN framework enhanced with a hybrid gradient boosting optimizer. By integrating multi-variable feature extraction with a hybrid optimization strategy, the model aims to achieve accurate, reliable, and efficient classification of multiple NMSC types.

Materials and Methods

The study utilized publicly available dermoscopic datasets containing annotated images of NMSC, including basal cell carcinoma, squamous cell carcinoma, and other non-melanoma lesions. Images were preprocessed to normalize illumination, resize to 224×224 pixels, and augment using rotations, flips, and scaling to increase model robustness.

A multi-variable deep convolutional neural network was designed to extract features from different levels of the input images. The network consisted of:

- Multiple convolutional layers with ReLU activation
- Max-pooling layers for dimensionality reduction
- Batch normalization for improved convergence
- Fully connected layers integrating multi-variable features

To enhance classification accuracy, a hybrid gradient boosting optimizer was applied to tune network weights. This approach combines gradient boosting with adaptive optimization techniques, reducing overfitting and improving generalization across multiple classes.The model was trained using cross-entropy loss with an 80:20 training-testing split. Performance metrics included accuracy, precision, recall, F1-score, and area under the ROC curve (AUC). Comparisons were made with conventional DCNNs and standalone gradient boosting classifiers.

Discussion

The proposed multi-variable DCNN with hybrid gradient boosting achieved superior performance in multiclass NMSC detection. The hybrid optimizer improved convergence speed and reduced misclassification among visually similar lesions. Compared to baseline models, the method demonstrated higher sensitivity and specificity, highlighting its potential clinical utility.

The integration of multi-variable feature extraction enabled the network to capture subtle patterns in lesion morphology, which are often missed by traditional CNN architectures. These results align with recent literature emphasizing the effectiveness of hybrid deep learning and boosting approaches in medical image classification.

Potential limitations include dataset imbalance and variability in image acquisition. Future work could explore larger, more diverse datasets and real-time deployment in clinical settings.

Conclusion

This study presents a robust framework for multiclass non-melanoma skin cancer detection using a multi-variable DCNN optimized with hybrid gradient boosting. The proposed method demonstrates high accuracy, reliability, and potential to assist dermatologists in early diagnosis. Adoption of such AI-based

tools can reduce diagnostic delays, improve patient outcomes, and complement traditional clinical workflows.

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Mahima Sara Mathew
assistant
department of dermatovenereology
Samarkand State Medical University

PRECISION LUNG CANCER MODELING USING ORGANOIDS

Abstract: *Lung cancer remains a major cause of cancer-related mortality, highlighting the need for more accurate preclinical models. Patient-derived lung cancer organoids (LCOs) have emerged as advanced three-dimensional systems that closely recapitulate the histological, genetic, and phenotypic features of primary tumors. LCO-based precision modeling preserves tumor heterogeneity, enables genotype–phenotype analysis through multi-omics integration, and supports the study of tumor–microenvironment interactions using gene editing and co-culture approaches. The establishment of LCO biobanks further enhances their value for translational research and personalized therapy development. Despite challenges such as low establishment efficiency, LCOs represent a powerful platform for advancing lung cancer research and precision medicine.*

Resume: *Lung cancer organoids (LCOs) have emerged as advanced preclinical models that closely recapitulate the histological, genetic, and phenotypic features of patient tumors. By preserving tumor heterogeneity and enabling multi-omics integration, gene editing, and co-culture approaches, LCOs provide valuable insights into tumor biology, microenvironment interactions, and therapeutic responses. Although challenges such as low establishment efficiency remain, LCO-based precision modeling and biobanking represent powerful tools for translational lung cancer research and personalized therapy development.*

Keywords: *Lung cancer organoids (LCOs), patient-derived organoid, lung cancer,personalized therapy, organoid library, precision medicine.*

Introduction

Patient-derived LCOs mimic the genetic and histological characteristics of parental malignancies while retaining molecular and pathological characteristics seen in the clinic.1,7, LCOs and parental malignancies share chromosomal aberrations, copy number aberrations, and genetic alterations.2,3,4, 5. Crucially, a wide variety of recurring mutations found in sequencing studies are included in the established LCOs, offering useful biological models for cataloging driver gene alterations and creating tailored treatments. LCOs keep the histological kinds of the initial malignancies, such as LUAD, LUSC, SCLC, and LCNEC, according to histopathological evaluations (Figure 2). These traits continue to exist in immune-deficient mice following xenografting, highlighting the durability of pathological morphogenesis.6, 7 Furthermore, LCOs include both molecular and histological subtypes in addition to major histological kinds.

For instance, transcription factor-based SCLC subtypes (ASCL1, NEUROD1, POU2F3, and YAP1 subtypes)27 and LUAD histological variations, including invasive mucinous adenocarcinoma, are retained in LCO organoids.Ten Neuroendocrine tumor organoids, such as models derived from SCLC, LCNEC, typical carcinoids, and atypical carcinoids28 that preserve subtype-specific molecular characteristics, have also been established in recent investigations. Understanding the relationships between genetic changes and the biological and morphological diversity of lung malignancies can be gained by preserving these (epi)genetic and histological subgroups. According to comparative genomic analysis, certain LCOs exhibit extra mutations that were not found in the corresponding parent tumors. These mutations could be the result of de novo culture-induced mutations or the emergence of uncommon subclones.7,8, 9,

Prior research has shown that neutral clonal drift can gradually result in the dominance of single clones and the loss of intratumor heterogeneity, even though long-term-passaged LCOs often maintain the overall mutational spectrum and copy number variations of the parental tumors.31, 32 An accumulation of mutations and the growth of particular subclones during long-term culture were also noted in another investigation.17. These results suggest that clonal architecture in LCOs can change over time due to neutral drift and subclonal selection. Similar clonal dynamics have been seen in various cancer organoid systems, therefore they are not exclusive to LCOs.33 As a result, when interpreting results from organoids kept for varying culture times, researchers should be mindful of these limitations and, whenever feasible, evaluate clonal composition and genomic stability.31, 34

Through surgical resections or core needle biopsies of both intrapulmonary lesions and extrapulmonary metastases, we obtained NSCLC or macroscopically undetectable healthy lung tissue for organoid culturing. We obtained tissue from 46 adenocarcinomas, 4 squamous cell carcinomas (SCCs), 2 large cell neuroendocrine carcinomas, and 7 unspecified NSCLC samples. The bulk of the samples were stage IV adenocarcinomas, albeit they included a variety of tumor stages.

Materials and Methods

Tumor specimens were obtained from patients undergoing surgical resection or diagnostic biopsy at participating clinical centers. All sample collection was performed in accordance with the Declaration of Helsinki and approved by the local Institutional Review Board (IRB). Written informed consent was obtained from all patients prior to tissue acquisition, permitting the use of samples for research, biobanking, and downstream experimental applications.

Fresh tumor tissues were transported in cold advanced DMEM/F12 medium supplemented with antibiotics and processed within 2–6 hours of collection. Samples were mechanically minced and enzymatically digested using collagenase and/or dispase to generate single cells or small multicellular clusters. Following filtration and centrifugation, cell suspensions were embedded in growth factor–

reduced basement membrane extract (e.g., Matrigel) and plated as domes in multiwell plates.

Discussion

Precision lung cancer modeling using organoid technology represents a significant advancement in cancer research, bridging the gap between conventional in vitro models and patient-specific disease biology. Lung cancer organoids (LCOs) preserve key histopathological, genetic, and molecular characteristics of the original tumors, enabling a more faithful representation of tumor heterogeneity and therapeutic response than traditional two-dimensional cell cultures. This fidelity positions organoids as a powerful platform for studying tumor biology, drug sensitivity, and resistance mechanisms in a clinically relevant context.

One of the most compelling advantages of lung cancer organoids lies in their ability to capture inter- and intra-patient heterogeneity. Lung tumors are highly diverse, driven by complex genetic alterations, epigenetic changes, and microenvironmental influences. Organoids derived from individual patients can retain driver mutations such as *EGFR*, *KRAS*, *ALK*, and *TP53*, allowing functional evaluation of targeted therapies and combination treatments. This capability supports the growing paradigm of precision oncology, where therapeutic decisions are informed not only by genomic profiling but also by functional drug response data.

Despite these advantages, significant limitations remain. Most lung cancer organoids lack components of the tumor microenvironment, including immune cells, fibroblasts, vasculature, and extracellular matrix dynamics, all of which play critical roles in tumor progression and therapeutic response. This limitation is especially relevant for immunotherapy research, as current organoid systems cannot fully recapitulate immune–tumor interactions. Emerging co-culture systems and air–liquid interface models partially address this gap, but further optimization and standardization are required.

In conclusion, Lung cancer organoids represent a transformative model system for precision cancer research. While challenges remain, continued technological refinement and interdisciplinary integration are likely to accelerate their translation from bench to bedside, improving therapeutic outcomes and advancing personalized medicine in lung cancer.

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Mahima Sara Mathew
assistant
department of dermatovenereology
Samarkand State Medical University

SHIKONIN-LOADED DEFORMABLE LIPOSOME HYDROGEL FOR TOPICAL ECZEMA THERAPY

Abstract: *Eczema is a common inflammatory skin disease driven by oxidative stress, immune dysfunction, and compromised skin barrier integrity. Shikonin, a bioactive compound derived from Lithospermum erythrorhizon, possesses potent anti-inflammatory and antioxidant properties but suffers from poor aqueous solubility and limited transdermal permeability. In this work, shikonin was encapsulated into sphingomyelin-based deformable liposomes and subsequently embedded within a hyaluronic acid/polyethylene glycol hydrogel to enhance its topical performance. The resulting formulation (SHI-F-Gel) was evaluated for morphology, particle size, stability, hydration capacity, and in vitro release behavior. Antioxidant activity was assessed using DPPH, ABTS, and hydroxyl radical scavenging assays. Skin permeation and retention were investigated ex vivo, while therapeutic efficacy was examined in a 2,4-dinitrochlorobenzene-induced eczema mouse model.*

Résumé: *Eczema is a persistent inflammatory skin disorder associated with immune imbalance, oxidative damage, and disruption of the epidermal barrier. Standard pharmacological treatments often lead to undesirable side effects and frequent relapse. This study presents a novel topical formulation in which shikonin-loaded deformable liposomes are incorporated into a hyaluronic acid and polyethylene glycol (HA/PEG) hydrogel. The system was designed to improve shikonin stability, enhance skin retention, and provide sustained therapeutic effects. Comprehensive physicochemical characterization, antioxidant evaluation, skin permeation analysis, and in vivo efficacy testing using an experimental eczema mouse model were performed. The results demonstrate that the composite hydrogel exhibits strong antioxidant activity, prolonged drug release, increased dermal accumulation, and significant anti-inflammatory effects, indicating its potential as an effective and safe treatment strategy for eczema.*

Keywords: *Atopic eczema; Shikonin; Deformable liposomes; Hyaluronic acid hydrogel; Oxidative stress; Topical drug delivery*

Introduction

Eczema is a chronic, relapsing inflammatory condition of the skin characterized by erythema, edema, pruritus, and exudative lesions. Its incidence continues to rise worldwide, significantly affecting patients' physical comfort and psychological well-being. The etiology of eczema is complex, involving genetic

susceptibility, environmental exposure, skin barrier impairment, immune dysregulation, and oxidative stress.

Oxidative stress plays a crucial role in eczema pathogenesis by promoting excessive production of reactive oxygen species, which damage epidermal cells and stimulate inflammatory signaling pathways. Immune imbalance among T helper cell subsets, including Th1, Th2, Th17, and regulatory T cells, further aggravates inflammatory responses. Although topical corticosteroids and antihistamines are widely used, their prolonged application may cause adverse effects such as skin thinning, infection, and disease recurrence.

Traditional herbal medicine has long been employed in the treatment of inflammatory skin disorders. *Lithospermum erythrorhizon* is a medicinal plant traditionally used for skin ailments, and shikonin is its principal active constituent. Shikonin exhibits multiple pharmacological effects, including anti-inflammatory, antioxidant, antibacterial, and wound-healing activities. However, its clinical application is restricted by low water solubility, chemical instability, and poor skin penetration.

Deformable liposomes are advanced vesicular carriers capable of squeezing through the intercellular spaces of the stratum corneum, thereby enhancing transdermal drug delivery. Sphingomyelin, a major component of cell membranes, contributes to ceramide formation and epidermal barrier maintenance. Hyaluronic acid-based hydrogels offer excellent biocompatibility, moisture retention, and skin adhesion, making them suitable for topical formulations.

This study aimed to develop a shikonin-loaded deformable liposome hydrogel combining the advantages of liposomal carriers and HA/PEG hydrogels to improve drug delivery efficiency and therapeutic outcomes in eczema treatment.

Materials and Methods

Shikonin was supplied by Shanghai Yuanye Bio-Technology Co., Ltd. Sphingomyelin, cholesterol, polyethylene glycol, hyaluronic acid, Tween 80, and 1,2-propanediol were obtained from commercial sources. DPPH, ABTS, ferrous sulfate heptahydrate, salicylic acid, and potassium persulfate were used for antioxidant assays. All chemicals were of analytical grade.Shikonin-loaded deformable liposomes were prepared using a thin-film hydration technique. Lipid components and shikonin were dissolved in an organic solvent, followed by solvent evaporation to form a thin lipid layer. The film was hydrated with an aqueous phase and sonicated to obtain uniformly dispersed liposomes.Hyaluronic acid was dissolved in distilled water, and polyethylene glycol was incorporated to enhance mechanical strength. The prepared shikonin-loaded liposomes were then evenly dispersed into the hydrogel matrix to produce the final formulation.

A mouse eczema model was established using 2,4-dinitrochlorobenzene. Animals were treated with the liposome hydrogel, free shikonin, or blank formulations. Histological examination was conducted to evaluate epidermal thickness and collagen deposition, while inflammatory cytokine levels (IL-4 and IL-17) were assessed by immunohistochemical analysis.

Discussion

The shikonin-loaded deformable liposome hydrogel effectively overcame the inherent limitations of shikonin by enhancing its stability and skin penetration. The combination of flexible liposomes and an HA/PEG hydrogel enabled sustained drug release, improved skin adhesion, and prolonged local retention. The formulation exhibited strong antioxidant properties, which are essential for mitigating oxidative stress–induced skin damage in eczema.

In vivo findings further demonstrated its therapeutic potential, as evidenced by reduced epidermal thickening, increased collagen deposition, and suppression of key pro-inflammatory cytokines. These outcomes suggest that the formulation supports both inflammation control and skin barrier repair.

Conclusion

A deformable liposome–hydrogel system containing shikonin was successfully developed as a topical treatment for eczema. The formulation demonstrated favorable physicochemical properties, sustained drug release, potent antioxidant activity, and marked therapeutic efficacy in an experimental eczema model. This integrated delivery strategy offers a promising alternative to conventional therapies and highlights the potential of combining traditional herbal compounds with modern drug delivery systems for skin disease management.

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Nuridinov A. M.
assistant
department of epidemiology
Samarkand State Medical University

CURRENT TOPICAL ISSUES IN THE PREVENTION OF TUBERCULOSIS

Abstract: *Tuberculosis remains one of the most significant infectious diseases worldwide and continues to pose a serious challenge to public health systems. Despite advances in diagnostics, treatment, and vaccination, the disease persists due to socioeconomic factors, population migration, immunodeficiency conditions, and the increasing prevalence of drug-resistant forms of tuberculosis. The effectiveness of tuberculosis prevention largely depends on early detection, systematic screening of high-risk populations, immunoprophylaxis, and public health education. This article analyzes current topical issues in tuberculosis prevention, highlighting modern preventive approaches, key challenges, and the importance of a comprehensive and integrated strategy. Special attention is given to immunoprophylaxis, early diagnosis, and social determinants influencing tuberculosis transmission. The findings emphasize the necessity of multidisciplinary and evidence-based preventive measures to reduce tuberculosis incidence and improve population health.*

Keywords: *tuberculosis, prevention, public health, immunoprophylaxis, early diagnosis, drug-resistant tuberculosis, screening.*

Introduction

Tuberculosis (TB) remains one of the most significant infectious diseases worldwide and continues to pose a serious public health challenge despite advances in medical science and healthcare systems. Caused by *Mycobacterium tuberculosis*, the disease is primarily transmitted through airborne droplets and is characterized by a chronic course, severe complications, and a high mortality rate if not diagnosed and treated in a timely manner. According to global health data, millions of new TB cases are reported annually, highlighting the persistent burden of the disease and the urgent need to strengthen preventive strategies.

In recent years, several global factors have contributed to the sustained spread of tuberculosis. Population migration, urbanization, socioeconomic inequality, poverty, malnutrition, and overcrowded living conditions create favorable environments for TB transmission. In addition, the increasing prevalence of immunocompromised conditions such as HIV/AIDS, diabetes mellitus, chronic respiratory diseases, and long-term immunosuppressive therapy significantly raises the risk of TB development. Of particular concern is the growing incidence of drug-resistant tuberculosis, which complicates both prevention and treatment efforts and poses a serious threat to global health security.

Currently, tuberculosis prevention is regarded not only as a clinical issue but also as a priority area in public health, epidemiology, immunology, and social medicine. Effective prevention depends on early detection of the disease, systematic screening of high-risk populations, timely immunoprophylaxis, and increased public awareness. Preventive measures must be evidence-based, comprehensive, and adapted to the epidemiological characteristics of specific populations.

In this context, an in-depth analysis of current topical issues in tuberculosis prevention is of great scientific and practical importance. The present article aims to examine modern preventive approaches, identify key challenges, and discuss effective strategies for improving TB prevention in contemporary healthcare systems.

Materials and Methods

This study was conducted using an analytical and descriptive research design. A comprehensive review of international and national scientific literature, epidemiological reports, clinical studies, and regulatory documents related to tuberculosis prevention was performed. Data from recent publications were systematically analyzed using comparative and integrative methods. The effectiveness of various preventive measures, including immunoprophylaxis, screening programs, and public health interventions, was assessed based on published evidence.

Results

The analysis revealed that early detection of tuberculosis remains a cornerstone of effective prevention. Regular screening of high-risk groups, including healthcare workers, migrants, individuals with chronic diseases, and immunocompromised patients, significantly contributes to reducing disease transmission. Childhood vaccination with the Bacillus Calmette–Guérin (BCG) vaccine continues to play a crucial role in preventing severe forms of tuberculosis, particularly in children.

At the same time, the rise in multidrug-resistant and extensively drug-resistant TB presents a major challenge to existing prevention strategies. Socially vulnerable populations demonstrate a higher incidence of tuberculosis due to limited access to healthcare, poor living conditions, and insufficient health literacy. The findings indicate that medical interventions alone are insufficient; social support, nutritional improvement, and health education are essential components of effective TB prevention.

Discussion

The results confirm the necessity of a comprehensive and integrated approach to tuberculosis prevention. The success of preventive programs largely depends on the capacity of healthcare systems, the availability of diagnostic tools, and the level of public awareness. Health education and sanitary awareness campaigns play a vital role in reducing stigma, encouraging early medical consultation, and improving adherence to preventive measures.

Immunoprophylaxis remains a fundamental element of TB prevention. However, modern conditions require the integration of advanced diagnostic technologies, including molecular and genetic methods, to detect latent infection and drug-resistant strains at an early stage. Personalized preventive strategies tailored to individual risk factors may further enhance the effectiveness of TB control programs.

Conclusion

Tuberculosis prevention remains one of the most pressing challenges for global and national healthcare systems. The persistent spread of the disease, combined with the emergence of drug-resistant forms, underscores the need for continuous improvement of preventive measures. Effective TB prevention requires a systematic and multidisciplinary approach that integrates early diagnosis, immunoprophylaxis, regular screening, and social interventions.

Special attention should be given to vulnerable populations, where targeted preventive programs and health education can significantly reduce disease incidence. Strengthening collaboration between healthcare institutions, public health authorities, and community organizations is essential for achieving sustainable results.

In conclusion, the implementation of scientifically grounded, modern, and comprehensive preventive strategies will contribute to reducing tuberculosis transmission, improving population health, and enhancing the overall effectiveness of healthcare systems. Further research and innovation in this field remain crucial to achieving long-term control of tuberculosis.

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Qodirova M. M.
assistenti
bolalar kasalliklari propedevtikasi kafedrasi
Samarqand Davlat Tibbiyot Universiteti

SIMPATIK POYA VA NERVLARINING GISTOTOPOGRAFIK TUZILISHI

Rezyume: *Ushbu maqolada Odamlarda simpatik poya va nerv tolalarining neyrogistologik tuzulishi o'rganilgan. Nerv to'qimalarining gistologik tuzulishini o'rganish uchun neyrogstologik usullardan Bilshovskiy- Gros usulida bo'yaldi. Olingan natijaga ko'ra, simpatik poyaning tugunlararo shoxlari yaqqol ifodalangan epinevriy, perinevriy va endonevriyga ega. Epinevriy tashqi — zichroq va ichki — siyrak tuzilishga ega. Tugunlar kapsulasi to'g'ridan-to'g'ri epi- va perinevriy bilan bog'langan bo'lib, endonevriy esa tugunlar stromasiga o'tadi.*

Kalit so'zlar: *Odamlar, simpatil poyasi, nerv tugunlari, nerv tolalari, perinevriy, endonevriy, Bilshovskiy- Gros usuli.*

Qodirova M. M.
assistant
department of propedeutics of children's diseases
Samarkand State Medical University

HISTOTOPOGRAPHIC STRUCTURE OF THE SYMPATHETIC TRUNK AND NERVES

Abstract: *This article investigates the neurohistological structure of the sympathetic trunk and nerve fibers in humans. To study the histological structure of nerve tissue, the Bielschowsky-Gros staining method was employed. The results showed that the interganglionic branches of the sympathetic trunk possess distinctly expressed epineurium, perineurium, and endoneurium. The epineurium consists of an outer denser layer and an inner looser layer. The ganglion capsule is directly connected to the epi- and perineurium, whereas the endoneurium continues into the ganglion stroma.*

Keywords: *Humans, sympathetic trunk, nerve ganglia, nerve fibers, perineurium, endoneurium, Bielschowsky-Gros method.*

Kirish

Zamonaviy tasavvurlarga ko'ra, vegetativ nerv tizimi markaziy va periferik nerv tuzilmalari majmuasi sifatida qaraladi. Bu tizim organizmning barcha tizimlarining adekvat reaksiyasi uchun zarur bo'lgan ichki muhutning funksional darajasini tartibga soladi [1,2]. Hozirgi vaqtda torakal simpatэktomiya oyoq-qo'llarning gipergidrozi, obliteratsiyalovchi trombangit va oyoq-qo'llar arteriyalarining aterosklerozi, Reyno kasalligida keng qo'llanilmoqda [4,5].

Adabiyotlarda simpatik nerv poyasi va nerv tugunlar nervlarini qobiqlarining makromikroskopik anatomiyasi haqida ma’lumotlar yo‘q [6,3]. Shu bilan birga, bu funksional jihatdan muhim simpatik poyalarning deyarli yarmini biriktiruvchi to‘qima egallaydi, u nerv to‘qimasi bilan birga vegetativ nerv tizimidagi turli xil patologik jarayonlarning ob’ekti hisoblanadi [7,8].

Tadqiqot maqsadi

Odamlarda simpatik poya va nervlarning gistotopografik tuzilishini o‘rganish.

Tadqiqot materiallari va usullari

Simpatik stvollarning tugunlararo shoxlari va tugunlar kapsulalari hamda ichki a’zolar nervlarining epi-, peri- va endonevriylarini olib tashlash va qayta ishlashda makromikroskopik usullarni qo‘llash, shuningdek, ushbu poyalarning ko‘ndalang va bo’ylama kesimlarining total gistotopogrammalarini Van Gizon va Gematoksilin-eozin bo‘yicha bo‘yalgan holda o‘rganish yangi muhim ilmiy yangiliklarni aniqlash imkonini berdi. 14 ta odamlar murdasidan olingan simpatik poyani ko‘krak bo‘limi simpatik tugunlari va ichki a’zolarga boruvch nervlari o‘rganildi. Preparatlarni o‘rganish va barcha olingan ma’lumotlarni jamlashtirish simpatik poya va ichki a’zolarga boruvchi nervlarni qobiqlarining tuzilishi prinsipial chizmasini yaratish imkoniyatini berdi.

Tadqiqot natijalari

Aniqlanishicha, simpatik poyaning tugunlararo shoxlari yaqqol ifodalangan epinevriy, perinevriy va endonevriyga ega. Epinevriy tashqi — zichroq va ichki — siyrak to’qimali qismlarga bo‘linadi. Tugunlararo shoxlarning tashqi epinevriyi to’g’ridan-to’g’ri simpatik tugunning turli qalinlikdagi tashqi qismiga o‘tadi. Perinevriy tashqi va ichki varaqlardan iborat bo‘lib, ular orasida perinevral bo‘shliq kuzatiladi. Perinevriyning ikkala varaqi tugunga yaqinlashganda birlashib, tugunning o‘z kapsulasini hosil qiladi. Bunda perinevral qinlar yopilib, tugunlararo shox putamlarining atrofida o’tkir cho’ntaklar hosil bo’ladi. Ichki perinevriydan to’siqlar ichkarisiga trabekulalar chiqib, endonevriyni shakllantiradi. Xuddi shunday qatlamlar kapsulaning ichki varaqidan tugun ichkarisiga chiqib, tugun ichidagi kichik nerv tolalari tutamlarini o‘rab turadi. Simpatik tugunlarning tugunlararo shoxlari orasida aylanma nerv tutamlari mavjud bo’lib, ular tashqaridan simpatik tugunlarga yondashib, qo‘shni tugunlararo shoxlar o’rtasida bog’lanishlarni ta’minlaydi. Katta ichki nervlar tarkibida 3 tadan 7 tagacha ildizcha borligi aniqlangan bo‘lib, bu ular tuzilishidagi o‘zgaruvchanlikning ikki shaklini ajratishga imkon berdi: kam ildizchali va ko‘p ildizchali. Nervdagi tolallar soni diafragmaga yaqinlashganda ortadi, hajmi esa kamayadi; tutamlar orasida nerv tolalari guruhlari almashinuvi mumkin. Biriktiruvchi to‘qima qobiqlari epinevriy, perinevriy va endonevriy shaklida namoyon bo‘ladi. Ichki nervlarning biriktiruvchi to‘qima stromasining asosiy qismini ko‘p miqdordagi qon tomirlari va o‘ziga xos nerv stvolchalarini o‘z ichiga olgan tashqi va ichki epinevriy tashkil etadi. Tashqi epinevriy tugun kapsulasining tashqi qatlamining davomi bo‘lib, nerv diafragmaga yaqinlashganda uning qalinligi kamayadi. Perinevriy ko‘p qatlamli membrana bo‘lib, tashqi va ichki

varaqlardan iborat bo‘lib, perinevral qinni hosil qiladi, unda perinevral bo‘shliq joylashgan. Ildizchalarning perinevral qinlari simpatik tugunlar sohasida to‘mtoq boshlanib, o‘tkir uchi cho‘ntak shaklida ichki nervning har bir ildizchasini o‘rab turadi. Tugunlararo shoxlar sohasida ildizchalarning perinevral qinlari tugunlararo shoxlar tolalarining perinevral qinlari bilan bog‘lanadi.

Xulosa

Yuqorida bayon etilganlar shuni ko‘rsatadiki, simpatik tugunlarning kapsulasi va stromasi bir tomondan, tugunlararo shoxlari va ichki a’zolar nervlarining epi-, peri- va endonevriyi ikkinchi tomondan o‘rtasida o‘ziga xos o‘zaro munosabatlar mavjud. Tugunlar kapsulasi to‘g‘ridan-to‘g‘ri epi- va perinevriy bilan bog‘langan bo‘lib, endonevriy esa tugunlar stromasiga o‘tadi. Tugunlararo shoxlari va ichki a’zolar nervlarining perinevral qinlari tugun kapsulasiga yaqinlashganda yopilib, to‘mtoq cho‘ntaklar hosil qiladi. Perinevral futlyarlarning shunga o‘xshash yopilish manzarasi bizdan biri tomonidan orqa miya nervlarining proksimal bo‘limlarida tasvirlangan edi. Qo‘shni tugunlararo shoxlari orasida simpatik tugunlar kapsulasining tashqi qismida aylanma nerv tolalari joylashishi mumkin. Bu bilan nafaqat simpatik poya bo‘ylab nerv tugunlarini chetlab o‘tgan holda nerv bog‘lanishlarining amalga oshirilishi, balki butun poya bo‘ylab perinevral suyuqlikning sirkulyatsiyasi ta’minlanadi.

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Qodirova M. M.
assistant
department of propedeutics of children's diseases
Samarkand State Medical University

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Abstract: *This article investigates the neurohistological structure of the sympathetic trunk and nerve fibers in humans. To study the histological structure of nerve tissue, the Bielschowsky-Gros staining method was employed. The results showed that the interganglionic branches of the sympathetic trunk possess distinctly expressed epineurium, perineurium, and endoneurium. The epineurium consists of an outer denser layer and an inner looser layer. The ganglion capsule is directly connected to the epi- and perineurium, whereas the endoneurium continues into the ganglion stroma.*

Keywords: *Humans, sympathetic trunk, nerve ganglia, nerve fibers, perineurium, endoneurium, Bielschowsky-Gros method.*

Introduction

According to modern concepts, the autonomic nervous system is regarded as a complex of central and peripheral cellular structures that regulate the functional level of the organism's internal activity necessary for adequate responses of all systems [1,2]. Currently, thoracic sympathectomy is widely used in the treatment of upper limb hyperhidrosis, obliterating thromboangiitis and atherosclerosis of the upper limb arteries, and Raynaud's disease [4,5]. The literature contains no data on the macro-microscopic anatomy of the sheaths of sympathetic nerve trunks and visceral nerves [6,3]. Meanwhile, connective tissue occupies nearly half of these functionally important trunks and, together with nervous tissue, serves as a target for various pathological processes in the autonomic nervous system [7,8].

Objective of the study

To study the histotopographic structure of the human sympathetic trunk and nerves.

Materials and methods

The use of macromicroscopic methods for removing and processing the epi-, peri-, and endoneurium of the interganglionic branches and capsules of the sympathetic trunk ganglia and splanchnic nerves, as well as the examination of total histotopograms of transverse and longitudinal sections of these trunks stained with van Gieson and hematoxylin and eosin, revealed new significant findings. Fourteen thoracic sections of the human sympathetic trunks and splanchnic nerves were studied. Analysis of the specimens and summarization of all the data obtained made it possible to develop a basic diagram of the structure of the sympathetic trunk sheaths and splanchnic nerves.

Study results

It was established that the interganglionic branches of the sympathetic trunk have a distinct epineurium, perineurium, and endoneurium. The epineurium is divided into an outer, denser epineurium and an inner, loose epineurium. The outer epineurium of the interganglionic branches directly passes into the outer portion of the sympathetic ganglion capsule, which has varying thicknesses. The perineurium consists of outer and inner layers, between which a perineural space can be traced. Both layers of the perineurium fuse together upon approaching the ganglion, forming the ganglion capsule itself. The perineural sheaths then close, forming sharp pockets around the bundles of the interganglionic branches. From the inner perineurium, trabeculae extend into the bundles, forming the endoneurium. Similar layers extend into the ganglion from the inner layer of the capsule, surrounding small bundles of nerve fibers within the ganglion. Between the internodal branches of the sympathetic ganglia, circumferential nerve bundles are observed, which adjoin the sympathetic ganglia externally and provide connections between adjacent internodal branches. The large splanchnic nerves contain from 3 to 7 roots, which has allowed us to distinguish two forms of variability in their structure: pauciradicular and multiradicular. The number of bundles in a nerve increases as it approaches the diaphragm, while their size decreases; exchange of groups of nerve fibers is possible between bundles. Connective tissue sheaths are represented by the epineurium, perineurium, and endoneurium. The bulk of the connective tissue stroma of the splanchnic nerves is made up of the external and internal epineurium, which contains a large number of vessels and proper nerve trunks. The external epineurium is a continuation of the outer layer of the ganglion capsule; its thickness decreases as the nerve approaches the diaphragm. The perineurium is a multilayered membrane consisting of two layers—an outer layer and an inner layer—that form the perineural sheath, which contains the perineural space. The perineural rootlet sheaths in the region of the sympathetic ganglia begin bluntly and, forming a pointed pocket, surround each rootlet of the splanchnic nerve. In the region of the internodal branches, the perineural rootlet sheaths communicate with the perineural sheaths of the internodal branch bundles.

Conclusion

The above demonstrates that there are unique relationships between the capsule and stroma of the sympathetic ganglia, on the one hand, and the epi-, peri-, and endoneurium of the internodal branches and splanchnic nerves, on the other. The capsule of the ganglia is directly connected to the epi- and perineurium, while the endoneurium is continuous with the stroma of the ganglia. The perineural sheaths of the internodal branches and splanchnic nerves close upon approaching the capsule of the ganglia, forming obtuse pockets. A similar pattern of perineural sheath closure was described by one of us in the region of the proximal spinal nerves. Circumferential nerve bundles may lie between adjacent internodal branches in the outer part of the capsule of the sympathetic ganglia. This not only

facilitates nerve connections along the sympathetic trunk, bypassing the ganglia, but also facilitates circulation of perineural fluid throughout the entire trunk.

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Tolibova N.
clinical resident
Asia International University
Murotov N.
head of the department of microbiology, virology and immunology
Bukhara State Medical Institute

CLINICAL SIGNIFICANCE OF AUTOMATED ANALYSIS OF HEMATOLOGICAL PARAMETERS

Annotation: *Hematological parameters play a crucial role in clinical diagnostics, disease monitoring, and assessment of treatment efficacy. Conventional manual methods of blood analysis are limited by time consumption, operator dependency, and variability of results. The introduction of automated hematology analyzers has significantly improved the accuracy, reproducibility, and standardization of laboratory diagnostics.*

Keywords: *hematology, automated analysis, complete blood count, hematology analyzer, clinical diagnostics.*

Introduction

Laboratory diagnostics is an integral component of modern clinical medicine, providing essential information for disease detection, differential diagnosis, and therapeutic monitoring. Among laboratory investigations, hematological testing occupies a central position due to its accessibility, cost-effectiveness, and high diagnostic yield. Complete blood count (CBC) parameters reflect the functional state of the hematopoietic system and serve as sensitive indicators of inflammatory, infectious, metabolic, and hematological disorders.

Traditional manual methods of blood cell counting and morphological assessment, although historically valuable, are associated with several limitations. These include subjective interpretation, dependence on operator experience, low throughput, and limited reproducibility. Such drawbacks may negatively affect diagnostic accuracy, particularly in high-volume clinical settings.

The development and widespread adoption of automated hematology analyzers have revolutionized laboratory medicine. These systems provide rapid, standardized, and highly accurate evaluation of hematological parameters, significantly reducing human error. Automated analysis allows simultaneous assessment of quantitative and qualitative characteristics of blood cells, contributing to improved diagnostic efficiency.

Given the increasing reliance on automated laboratory technologies, evaluating their clinical significance and impact on patient care remains a relevant and timely issue. This study aims to analyze the role of automated hematological analysis in modern clinical practice.

Materials and Methods

The study was conducted using automated hematology analyzers routinely employed in clinical laboratory settings. Peripheral venous blood samples were collected under standard conditions and analyzed according to the manufacturer's protocols.

The following hematological parameters were assessed:

- Hemoglobin concentration (Hb)
- Red blood cell count (RBC)
- Hematocrit (Hct)
- Mean corpuscular volume (MCV)
- Mean corpuscular hemoglobin (MCH)
- Mean corpuscular hemoglobin concentration (MCHC)
- Total white blood cell count (WBC) and differential
- Platelet count (PLT) and platelet indices

Quality control procedures were applied regularly to ensure accuracy and reliability. The obtained results were compared with clinical data and interpreted according to established reference ranges.

Results

Automated hematological analysis demonstrated high analytical precision and consistency across repeated measurements. The rapid processing of samples significantly reduced turnaround time, enabling timely clinical decision-making.

In several cases, automated analysis facilitated early detection of mild anemia, subclinical inflammatory responses, and platelet abnormalities that were not readily apparent through manual assessment. The automated leukocyte differential provided valuable information for differentiating infectious and inflammatory conditions.

Overall, the use of automated analyzers enhanced diagnostic sensitivity and improved laboratory workflow efficiency.

Discussion

The findings of this study confirm the substantial clinical value of automated analysis of hematological parameters. Automation minimizes the influence of human factors and ensures standardized interpretation of results, which is particularly important in large healthcare facilities with high patient volumes.

Automated hematology analyzers provide comprehensive evaluation of blood cell morphology and indices, enabling early recognition of pathological changes. This is especially relevant for conditions such as anemia, infections, hematological malignancies, and disorders of hemostasis.

Furthermore, automated systems support dynamic monitoring of hematological parameters, allowing clinicians to assess disease progression and therapeutic response objectively. However, despite their advantages, automated results should be interpreted in conjunction with clinical findings and, when necessary, supplemented by microscopic examination.

The integration of automated hematological analysis into routine clinical practice contributes to improved diagnostic accuracy, enhanced patient safety, and optimized healthcare delivery.

Conclusion

Automated analysis of hematological parameters represents a highly effective and clinically significant diagnostic approach. Its implementation improves the accuracy, reproducibility, and efficiency of laboratory testing, facilitates early detection of pathological conditions, and supports evidence-based clinical decision-making. The continued use and development of automated hematology systems are essential for advancing modern laboratory diagnostics.

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Voxidova Z. T., candidate of medical sciences
stajor-assistant
department of operative surgery and topographic anatomy
Samarkand State Medical University

HISTOPATHOLOGICAL AND ULTRASTRUCTURAL CHANGES IN THE LUNGS OF COVID-19 PATIENTS

Abstract: *A COVID-19 infection is a multi-systemic illness that primarily affects the lungs. Autopsies of the deceased patients have been conducted very infrequently. The current study used histology, immunohistochemistry, and electron microscopy to examine the morphological spectrum of lung alterations in COVID-19 patients as well as their clinical spectrum and laboratory data. Additionally, we evaluated the histological stage of the lung involvement with the clinical severity and laboratory data.*

Resume: *The lungs are the main organ affected by a COVID-19 infection, which is a multi-systemic disease. Very few autopsies of the deceased patients have been performed. The current investigation examined the clinical spectrum, laboratory data, and morphological spectrum of lung changes in COVID-19 patients using histology, immunohistochemistry, and electron microscopy.*

Keywords: *COVID-19, multi-systemic disease, autopsy, lung, histology, immunohistochemistry, electron microscopy.*

Introduction

The Chinese Center for Disease Control and Prevention (CDC) discovered a new corona virus in a patient's throat swab sample on January 7, 2020. On February 11, 2020, the International Committee on Taxonomy of Viruses (ICTV) named the virus respiratory syndrome coronavirus-2 (SARS-CoV-2) based on phylogenetic analysis. As of April 28, 2024, it had killed over 7 million people worldwide and impacted over 775 million patients.One

Angiotensin-converting enzyme 2 (ACE2) receptors, which are widely distributed in the respiratory tract (including bronchial transient secretory cells), endothelial cells, and other cell types, are how SARS-CoV-2 accesses human cells.

The severity of clinical presentations also varies; more severe forms are frequently linked to risk factors like advanced age and the existence of comorbidities like obesity, type II diabetes, hypertension, coronary artery disease, and chronic kidney disease.5 COVID-19 patients frequently show abnormal hematological parameters, such as lymphopenia, neutrophilia, and elevated levels of fibrinogen and D-dimer.6

The majority of reports on lung autopsies in COVID-19 have shown either acute lung injury or diffuse alveolar damage (DAD).7 New research shows a

wider range of histological lesions involving both vascular and epithelial components in the lungs and other organs, underscoring the disease's intrinsic complexity.8

In order to identify and study coronaviruses based on their ultrastructural features, transmission electron microscopy (TEM) is essential.9 The term "corona," which means "crown" in Latin, refers to the crown-like spike peplomers that surround viral particles, as seen in electron microscope negative stain preparations.10 However, due to the complexity of the technique and the limited routine availability of the necessary facilities, few studies have attempted to characterize the ultrastructure features of SARS-CoV-2.

Materials and Methods

The investigation included radiologic signs of viral pneumonia, clinical symptoms for SARS-COV-2, and fatal COVID-19 patients identified by RT-PCR testing of nasopharyngeal secretion or bronchoalveolar lavage fluids.

Results

We have included 24 patients with ante mortem RT-PCR-confirmed COVID-19 infection in our investigation. Based on clinical severity and histological staging, the cases were split into two groups for correlation purposes: group 1 consisted of patients with moderately severe COVID ($SpO2 \geq 90$, $n = 5$) and group 2 consisted of patients with severe COVID ($SpO2 < 90$, $n = 19$). The age range of the 24 patients in the research was 44–88 years (mean 65.9 years), with a male:female ratio of 2:1.

Discussion

Through needle necropsy, the current study aims to provide a detailed description of the numerous lung alterations that occur in the fatal instances of COVID-19 patients. In addition to the clinical and laboratory results in COVID-19 patients, autopsy results provide insight into the etiology, morphology, and consequences. Only a few facilities conducted autopsies on COVID-19 patients in the early stages of the pandemic.

Conclusion

The current study, which examined the clinical, hematological, and biochemical characteristics of patients with severe COVID-19 infections, stands out in light of the lack of literature on autopsy-based studies in COVID-19-infected patients.

Clinically, individuals who were fat and those who were older showed a quick decline. Our research has demonstrated that severe COVID-19 instances are linked to a shorter interval between hospital admission and mortality, as has been observed in other studies.

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Voxidova Z. T., candidate of medical sciences
stajor-assistant
department of operative surgery and topographic anatomy
Samarkand State Medical University

INSULIN RESISTANCE AND RENAL RESISTIVE INDEX IN NEWLY DIAGNOSED TYPE 2 DIABETES MELLITUS AND HYPERTENSION

Abstract: *Doppler ultrasound, laboratory analysis, medical history, physical examination, and 24-hour urine albumin excretion were all examined. It has been demonstrated in the past that a raised RRI level can be distinguished by a threshold of at least 0.70. Included were 80 patients with type 2 diabetes and essential hypertension who had just received a diagnosis. The RRI of 61 patients was modest (<0.70). Patients with high RRI were older and had greater serum creatinine, pulse pressure, and homeostasis model assessment (HOMA) index than those with low RRI.*

Resume: *People with diabetes have a higher renal resistive index (RRI). We examined the potential independent relationship between RRI and insulin resistance.*

Key words: *Doppler ultrasound, laboratory analysis, RRI, urine albumin, insulin resistance, type 2 diabetes and homeostasis model assessment (HOMA) index.*

Introduction

Intrarenal hemodynamics is evaluated using duplex Doppler ultrasonography. Renovascular resistance is reflected in the renal resistive index (RRI), which is determined from blood flow velocities in arteries and is known to rise in a number of illnesses [1]. Numerous studies have shown that RRI is higher in diabetic patients than in non-diabetic subjects, and that RRI associated with diabetic nephropathy is higher than that associated with other specific causes of renal diseases (such as nephrosclerosis and chronic glomerulonephritis) [2], [3], [4], [5], [6], [7], and [8]. According to earlier research, arteriolosclerosis rather than interstitial fibrosis may be a significant factor in the methods by which RIs of intrarenal arterioles rise [9]. Furthermore, histopathologic analysis of renal biopsies from diabetic patients revealed arteriosclerotic glomerulosclerosis in addition to the usual diffuse or nodular lesions [10]. Additionally, it was noted that because systemic atherosclerotic vascular disease negatively impacts renal blood perfusion, which lowers GFR, macroangiopathy, not microangiopathy, is likely to affect glomerular filtration rate (GFR) regardless of the status of microalbuminuria, which has been thought to be a risk factor for diabetic nephropathy and the progression of renal insufficiency [1], [8]. In fact, RI and renal function have been linked in a number of papers [5], [9], and [7]. According

to Ohta et al. [8], there is a substantial correlation between the severity of systemic atherosclerosis and increased RI of the primary renal arteries.

However, it has been shown that atherosclerotic renal artery damage is associated with elevated RRI [2], [3].

Reduced peripheral tissue responsiveness to the hormone's effects is known as insulin resistance (IR). This refers to insulin's diminished capacity to promote glucose uptake in peripheral tissues (primarily skeletal muscle and adipose tissue) and to inhibit hepatic glucose output in an attempt to maintain glucose homeostasis. Thus, the term "insulin resistance" almost always refers to the hormone's effects on metabolism [4]. Obesity, essential hypertension, dyslipidemia, inflammation, and poor glucose metabolism are among the metabolic disorders linked to insulin resistance [5]. Insulin resistance is commonly observed in people with type 2 diabetes mellitus [10] and hypertension [6], [11].

Materials and Methods

This study was conducted in the Nephrology Department's outpatient hypertension clinic between May 2022 and April 2024. Patients with type 2 diabetes mellitus and newly diagnosed essential hypertension who had not previously received treatment with insulin, oral hypoglycemic medications, antihypertensive medications, or lipid-lowering medications made up the study population. Individuals with secondary hypertension, type 1, and blood creatinine levels higher than 1.4 mg/dL

Results

The study comprised eighty patients with essential hypertension and newly diagnosed type 2 diabetes mellitus (mean age, 55.5 ± 12.6 years; male-female ratio, 25/55). According to the recognized RRI threshold of 0.70, 61 patients (76.2%) had low RRI and 19 patients (23.8%) had high RRI. Patients with high RRI were older, had higher serum creatinine and pulse pressure, and were insulin resistant as shown by a higher HOMA index as compared to those with low RRI. Insulin levels tended to.

Discussion

In this investigation, we discovered that individuals with type 2 diabetes mellitus and newly diagnosed essential hypertension who had high RRI were more insulin resistant than those with low RRI, as indicated by a higher HOMA index. RRI was positively and independently correlated with age and pulse pressure. We discovered that RRI was positively and independently correlated with IR, which is a novel finding.

In conclusion

The pathogenesis of type 2 diabetes mellitus has been thought to be mostly caused by insulin resistance.

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Voxidova Z. T., candidate of medical sciences
stajor-assistant
department of operative surgery and topographic anatomy
Samarkand State Medical University

"CD8⁺ T-CELL IMMUNITY INDUCED BY UBIQUITINATED HEPATITIS D ANTIGEN RESTRICTS HDV REPLICATION IN LIVER ORGANOIDS"

Abstract: *The most severe type of viral hepatitis in humans is caused by the hepatitis D virus (HDV), and prolonged infection might result from inadequate CD8⁺ T-cell responses. In this work, we assessed the antiviral properties and underlying mechanisms of the ubiquitinated small hepatitis D antigen (Ub-S-HDAg) in liver organoids superinfected with HBV/HDV.*

Resume: *Ub-S-HDAg enhances dendritic cell maturation and activates CD8⁺ T cells via the JAK/STAT pathway in HBV/HDV superinfected liver organoids, leading to reduced HDV replication. This work demonstrates a potential immunotherapeutic approach to boost antiviral immunity in HDV infection.*

Keywords: *Hepatitis D virus, Hepatic organoid system, CD8⁺T cells, ubiquitination, specific immune response, JAK/STAT pathway.*

Introduction

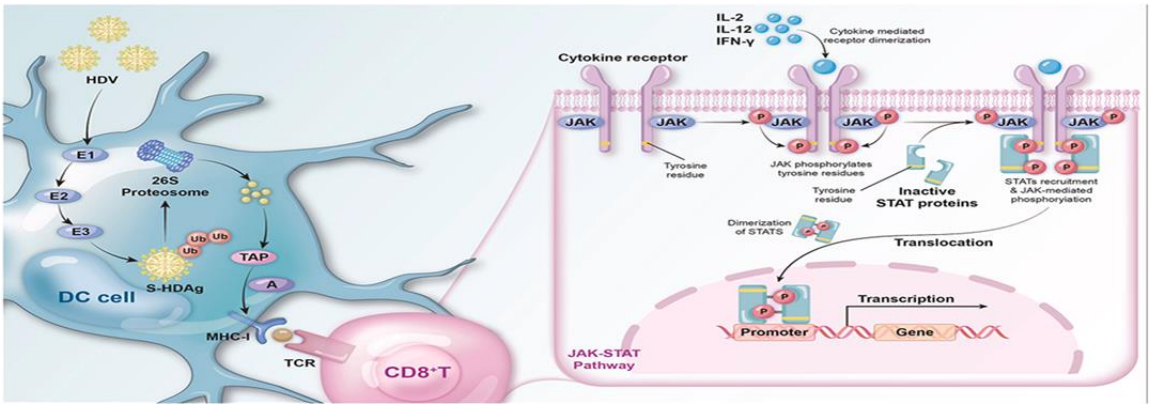
Hepatitis D virus (HDV) infects human liver cells and can drive severe liver complications, including fibrosis, cirrhosis, and hepatocellular carcinoma (HCC), particularly in patients already chronically infected with hepatitis B virus (HBV). It is estimated that 5–10% of chronic HBV carriers are also co-infected with HDV (Jung et al., 2020). Chronic hepatitis delta (CHD) represents the most aggressive and rapidly progressing form of viral hepatitis, affecting individuals of all ages. Within 5–10 years, 30–70% of CHD patients develop cirrhosis, and globally, around 15–20 million people are estimated to be living with this infection (Jung et al., 2020).

Currently, polyethylene glycol (PEG)-interferon is the most widely used treatment for HDV, but its effectiveness is limited, and its dose-dependent side effects often lead to poor patient adherence (Negro et al., 2023). Bulevirtide has emerged as a promising therapy; by blocking the NTCP receptor, it prevents viral entry into hepatocytes and has shown clinical efficacy in real-world settings (Sapuk et al., 2024). However, it does not fully eliminate HDV replication within already infected liver cells.

Effective immune responses, particularly T-cell–mediated immunity, are critical for controlling HDV infection. Unfortunately, in most patients, these immune responses are weak or insufficient (Kefalakes et al., 2019a; Oberhardt et al., 2022). This highlights the urgent need for novel therapies that can stimulate

robust T-cell responses, offering a more effective strategy to combat HDV infection.

Research into the mechanisms of HDV persistence and pathogenesis, as well as the development of effective therapies for chronic hepatitis delta (CHD), has been limited by the lack of experimentally accessible and physiologically relevant models. Primary human hepatocytes (PHHs) remain the gold standard due to their physiological relevance, but their use is constrained by limited availability, rapid functional decline in culture, inability to proliferate, high variability between donors, and short-term viability. Differentiated HepaRG cells can support HDV infection, yet they require a prolonged, dimethyl sulfoxide (DMSO)-dependent differentiation process, show low infection efficiency, and are highly sensitive to culture conditions. NTCP-expressing HepG2 and Huh-7 cells are permissive to HDV infection; however, they differ significantly from primary hepatocytes in terms of genetic and metabolic characteristics and require unnaturally high viral doses for efficient infection, which further restricts their applicability (Heuschkel et al., 2021). In order to induce a CD8+T cell response, we effectively created HBV/HDV superinfected liver organoids, created a recombinant Ub-S-HDAg plasmid, and transduced it into human DCs. In HBV/HDV superinfected liver organoids, our work sought to determine if Ub-S-HDAg could promote DC maturation and boost immune response through the JAK/STAT signaling pathway. Look at figure- 1.



Materials and methods

To establish an HDV-susceptible in vitro model, iPSCs were cultured on laminin 511 and differentiated into hepatocyte-like cells using modified stepwise protocols (Ng et al., 2018). Endoderm induction was achieved in suspension with CHIR99021, LY294002, BMP4, FGF2, and activin A for 2 days, followed by hepatoblast specification in RPMI-1640 with B27 and activin A for 6 days. Hepatic maturation was then carried out in William's E medium supplemented with oncostatin M and hepatocyte growth factor for up to three weeks, with media changes every 2 days. HBV was generated in HepAD38 cells, with viral supernatants collected two weeks after tetracycline withdrawal. HDV particles were produced in Huh7 cells co-transduced with pSVLD3 (HDV genotype 1) and N51 (HBsAg).

Discussion

When compared to HBV monoinfection, HDV greatly increases the severity of liver disease, frequently hastening the development of cirrhosis and liver failure and significantly raising the likelihood of developing HCC (Jung et al., 2020). Nevertheless, little is known about the molecular processes underpinning HDV pathogenesis. In this work, we used iPSCs with ICC PEG scaffolds to create a model of HBV/HDV superinfected liver organoids. We discovered that Ub-S-HDAg inhibits HDV replication in the liver organoids by triggering CD8+T cells' adaptive immunological response through the JAK/STAT signaling pathway.

The HepG2-NTCP and Huh7-NTCP cell lines have recently become susceptible to HDV infection (Lucifora et al., 2020), but they do not support HDV progeny assembly or secretion, which limits their use in identifying compounds that target later stages of the viral life cycle (Cayo et al., 2017). Mice, woodchucks, and chimpanzees have all been used as HDV animal models; however, mice are naturally resistant to HDV infection (Winer et al., 2018).

Conclusion

In conclusion, we were able to create an HBV/HDV superinfected HLC-ICC liver organoid model, which offers a platform for researching immune responses and human pathogen-host interactions. We hypothesize that Ub-S-HDAg may promote DC maturation through this liver organoid system, which would then trigger CD8+ T cell proliferation via the JAK/STAT signaling pathway and significantly lower the HDV viral load within the organoids.

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Voxidova Z. T., candidate of medical sciences
stajor-assistant
department of operative surgery and topographic anatomy
Samarkand State Medical University

CANCER- AND TREATMENT-RELATED NEUROPATHY IN PANCREATIC CANCER

Abstract: *Pancreatic cancer is associated with profound changes in the nervous system, including enhanced axonogenesis, neural remodeling, perineural invasion, and perineural inflammation. In addition to local neural alterations, pancreatic cancer can affect the central nervous system through tumor-intrinsic mechanisms and systemic factors, particularly those related to cancer cachexia. These peripheral and central neuropathic alterations play important roles in tumor initiation and progression. Furthermore, chemotherapy-induced neuropathy is frequently observed in pancreatic cancer, leading to peripheral nerve injury and cognitive impairment. Therapeutic strategies aimed at disrupting the bidirectional interactions between pancreatic cancer and the nervous system, at both peripheral and central levels, may offer novel opportunities to inhibit tumor progression, alleviate pain, and improve patient quality of life.*

Resume: *Pancreatic cancer is characterized by profound interactions with the nervous system at both peripheral and central levels. Locally, tumor growth induces axonogenesis, neural remodeling, perineural invasion, and perineural neuritis. Systemically, pancreatic cancer affects the central nervous system through tumor-intrinsic and cachexia-associated factors, contributing to central neuropathic alterations. These neural changes play critical roles in tumor initiation, progression, and symptom burden. In addition, chemotherapy-induced neuropathy is a frequent complication, leading to peripheral nerve injury and cognitive impairment.*

Keywords: *Pancreatic cancer, peripheral nervous system, central nervous system, axonogenesis, neural remodeling, perineural invasion, perineural neuritis, tumor-intrinsic, cachexia-assosiated factors.*

Introduction

Pancreatic cancer is among the deadliest malignancies, largely due to its late clinical presentation and highly aggressive biological behavior. Its development is driven by a complex interplay of genetic and molecular alterations, most notably activating mutations in the *KRAS* oncogene, which are present in more than 90% of cases.[1,2,4] Tumorigenesis follows a multistep progression model in which low-grade precursor lesions gradually accumulate additional genetic abnormalities, including inactivation of key tumor suppressor genes such as *TP53*,

SMAD4, and *CDKN2A*, ultimately giving rise to high-grade lesions and invasive pancreatic cancer.[3;10]]

Under normal physiological conditions, the pancreas is extensively innervated by both intrinsic and extrinsic neural components. Similar to other gastrointestinal organs, its extrinsic innervation consists of sympathetic, parasympathetic (primarily via the vagus nerve), and sensory fibers. Sympathetic preganglionic neurons originate in the intermediolateral cell column of the thoracic spinal cord (T5–T9 segments), while parasympathetic and sensory pathways further contribute to the regulation of pancreatic secretion, blood flow, and tissue homeostasis.[5;6]

In pancreatic cancer, this tightly regulated neural architecture undergoes profound pathological remodeling. Human pancreatic tumors are characterized by marked intrapancreatic neural alterations, including increased nerve size (neural hypertrophy) and nerve number (enhanced neural density). Emerging evidence highlights dynamic, bidirectional interactions between tumor cells and nerves, driven by processes such as axonogenesis, neurogenesis, and neural remodeling, which collectively support tumor growth and progression.

A prominent feature of pancreatic cancer is perineural invasion, a process in which cancer cells penetrate the perineurium and establish close contact with axons and Schwann cells within the endoneurium. Perineural invasion is strongly associated with severe abdominal neuropathic pain, increased local recurrence, and reduced survival following surgical resection. Moreover, invasion of extrapancreatic nerve plexuses facilitates both local extension and distant dissemination of tumor cells, underscoring the clinical importance of neural involvement in disease progression.

In addition to structural invasion, pancreatic cancer–associated nerves frequently exhibit inflammatory changes known as perineural neuritis. Hypertrophic nerves are often infiltrated by immune cells, including $CD8^+$ cytotoxic T lymphocytes, macrophages, and mast cells. Nerve fibers are also commonly observed within tertiary lymphoid structures in pancreatic tumors, which are enriched in $CD20^+$ B cells, suggesting a complex neuroimmune microenvironment that may influence tumor behavior and patient symptoms.[8,9]

Beyond tumor-induced neural remodeling, chemotherapy represents another major source of neural injury in pancreatic cancer. Chemotherapy-induced peripheral neuropathy (CIPN) is a common and debilitating adverse effect of standard treatment regimens, including those used in neoadjuvant and adjuvant settings. CIPN manifests as peripheral nerve dysfunction and, in some cases, cognitive impairment, significantly affecting treatment tolerance and quality of life.

Importantly, the impact of pancreatic cancer on the nervous system extends beyond the periphery to involve the central nervous system (CNS). Neural invasion and systemic tumor-derived factors can induce CNS remodeling, contributing to cancer-associated cachexia through activation of astrocytes and central neural circuits. Schwann cells, which play a key role in peripheral nerve

repair, also modulate spinal astroglial and microglial activity, linking peripheral nerve injury to central neuroinflammatory responses. Tumor-derived signals, such as hypoxia and interleukin-6, further activate Schwann cells and amplify these neurobiological effects.

Accumulating evidence demonstrates that pancreatic cancer is highly dependent on neural inputs for its initiation and progression. Sympathetic, parasympathetic, and sensory nerves contribute to tumor growth through direct nerve–cancer interactions as well as through modulation of immune responses within the tumor microenvironment. Understanding these distinct neural roles has been facilitated by landmark studies that reveal the functional importance of neural signaling pathways in pancreatic cancer biology.[7,8,9]

Despite advances in surgery and systemic therapies, pancreatic cancer remains difficult to treat, with a five-year survival rate of approximately 12%. The lack of early diagnostic biomarkers and the tumor's anatomical location continue to impede timely detection. Consequently, there is an urgent need to expand therapeutic strategies beyond conventional approaches. Targeting neural components and tumor–nerve crosstalk represents a promising and emerging avenue for improving cancer control, alleviating pain, and enhancing patient quality of life.

Materials and Methods:

We conducted a targeted literature review of peer-reviewed studies describing neural remodeling, perineural invasion, and neuropathic changes in pancreatic ductal adenocarcinoma, including mechanistic insights from both clinical and preclinical research. Primary databases searched included PubMed, Web of Science, and Scopus using terms related to pancreatic cancer and neural interactions, guided by major existing reviews and experimental studies (Deborde et al.; Wang et al.).

Discussion (example citation style):

Perineural invasion is a defining histopathological feature of PDAC associated with pain and poor survival, driven by reciprocal neuro-tumor signaling involving neurotrophins, chemokines, and glial cells.

Schwann cells dynamically interact with cancer cells to facilitate invasion and may modulate neural plasticity through pathways such as TGFβ and NGF signaling. Moreover, neural remodeling and neuroimmune crosstalk have been implicated in tumor-associated cachexia and central sensitization of pain.

Chemotherapy-induced peripheral neuropathy represents an additional and clinically significant source of neural dysfunction in pancreatic cancer. Neurotoxic chemotherapeutic agents commonly used in treatment regimens can cause long-lasting peripheral nerve damage and cognitive impairment, limiting therapeutic dosing and negatively affecting quality of life. Importantly, chemotherapy-induced neuropathy may interact with pre-existing tumor-associated neural alterations, further exacerbating pain and neurological symptoms.

Collectively, these findings underscore the concept that pancreatic cancer is a nerve-dependent disease, influenced by sympathetic, parasympathetic, and

sensory neural inputs. Nerves not only regulate tumor cell behavior directly but also modulate immune responses within the tumor microenvironment. From a clinical perspective, these insights open new avenues for therapeutic intervention. Targeting tumor–nerve crosstalk, neural inflammation, or neurotrophic signaling pathways may complement existing treatments by suppressing tumor progression, alleviating pain, and reducing treatment-related neuropathy.

In conclusion

In conclusion, understanding the complex interplay between pancreatic cancer and the nervous system provides a unifying framework that integrates tumor biology, symptom generation, and treatment toxicity. Future studies aimed at translating these mechanistic insights into nerve-based or neuro-modulatory therapies may significantly improve outcomes and quality of life for patients with pancreatic cancer.

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Voxidova Z. T., candidate of medical sciences
stajor-assistant
department of operative surgery and topographic anatomy
Samarkand State Medical University

ASSOCIATION OF URINARY EXTRACELLULAR VESICLES AND IMMUNE MEDIATORS WITH ACUTE COVID-19 SEVERITY IN THE POST-COVID PERIOD

Abstract: *Extracellular vesicles (EVs) and circulating and urine inflammatory mediators were examined in relation to clinical and laboratory results during the post-COVID-19 (coronavirus illness 2019) phase. Methods: People with a history of COVID-19 were classified based on the occurrence of a post-COVID condition (PCC) and hospitalization during the acute phase in a cross-sectional research. Using multiplex assays, the amounts of inflammatory mediators in the blood and urine were measured. Hospitalized PCC patients showed lower levels of circulant interleukin (IL)-9 (p = 0.03), higher monocyte-to-lymphocyte ratio (p = 0.03), prothrombin time (p = 0.02), and lactate dehydrogenase (p = 0.01), but there were no variations in plasma EVs between the groups. The same group also showed increased levels of granulocyte-macrophage colony-stimulating factor (p = 0.04), chemokine (Csingle bondC motif) ligand (CCL)-2 (p = 0.02), CCL-11 (p = 0.002), and total urine EVs (uEVs, p = 0.006) and uIL-4 (p = 0.01).*

Resume: *During the post-COVID-19 (coronavirus illness 2019) phase, extracellular vesicles (EVs) and circulating and urine inflammatory mediators were analyzed in connection with clinical and laboratory outcomes. Methods: In a cross-sectional study, individuals with a history of COVID-19 were categorized according to the presence of a post-COVID condition (PCC) and hospitalization during the acute phase. The levels of inflammatory mediators in the blood and urine were assessed using multiplex assays.*

Keywords: *Extracellular vesicles, inflammatory mediators, COVID-19, interleukin (IL), monocyte, lymphocyte, prothrombin time, lactate dehydrogenase, plasma EVs.*

Introduction

Following the coronavirus disease-2019 (COVID-19), the post-COVID condition (PCC) is defined by the emergence or persistence of symptoms (such as fatigue, shortness of breath, brain fog, cardiovascular, gastrointestinal, and renal symptoms) and/or changes in laboratory tests (Ayoubkhani et al., 2021; Adli et al., 2024; Crook et al., 2021). According to studies (Crook et al., 2021), people with mild, moderate, or severe forms of COVID-19 are affected by PCC. According to numerous studies (Groß et al., 2020), COVID-19 causes an intensified

proinflammatory response known as "cytokine storm," which contributes to the development of multi-organ dysfunction and severe acute respiratory syndrome. In cases of severe acute COVID-19, the virus's direct renal damage and heightened immune response can cause renal cellular stress and acute kidney injury (AKI), with some patients going on to develop chronic kidney disease (CKD) (de Faria et al., 2025). According to Mainous et al. (2021), PCC symptoms are thought to be linked to persistent inflammation, long-lasting cell activation, and cytokine production. Despite these results, there are still few studies that concentrate on EV identification and quantification in the post-COVID era, particularly in urine. Therefore, the purpose of this study was to determine whether changes in immune mediators and EVs, both in blood and urine, months after the infection may cause the proinflammatory state observed in acute COVID-19 to remain systemically or locally in people who developed PCC. Additionally, we sought to determine whether these changes were related to the severity of acute COVID-19 as well as clinical and standard laboratory results.

Materials and methods

We included adults who, between 2020 and 2022, had an RT-qPCR diagnosis of SARS-CoV-2 infection. Pregnancy, CKD at stages 4 and 5, long-term illnesses such viral hepatitis and HIV, and a lack of information for PCC classification were the exclusion criteria. Medical records and a questionnaire completed during recruiting were used to collect demographic and clinical data. According to the WHO definition, two groups were identified based on PCC classification (Adli et al., 2024). The PCC group was categorized for additional analysis based on the necessity of hospitalization during acute COVID-19, which was thought to be a sign of the severity of the illness.

Discussion

SARS-CoV-2 infection is known to cause an inflammatory state that can be either transient or permanent and may serve as a risk factor for the emergence of various systemic consequences that might result in PCC, particularly following severe COVID-19 instances (Andrade et al., 2021). In this case, the study's objective was to assess urinary and systemic inflammation in the post-COVID era. In order to do this, we evaluated circulant platelet- and leukocyte-derived EVs, urinary total and podocyte-derived EVs in PCC, and inflammatory markers in blood and urine in relation to the acute phase illness severity.

In conclusion

When combined, our findings demonstrate that urinary EVs and immune mediators are significantly altered in PCC patients who needed hospitalization during the acute phase of COVID-19, but not in circulant EVs or cytokines. These findings may indicate an organ-specific indication of ongoing cellular stress and inflammation, potentially involving a Th2 response, but they do not support the theory that a robust systemic inflammatory process causes PCC. Since these changes were only seen in patients who had previously been hospitalized and are unrelated to PCC symptoms, it is crucial to note that they are not directly linked to PCC.

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Zhalilov A. Kh., PhD
associate professor
department of propaedeutics of childhood diseases
Samarkand State Medical University

NEUROHISTOLOGICAL CHANGES IN THE NERVE GANGLIA OF THE CELIAC PLEXUS FOLLOWING TRANSECTION OF THE MESENTERIC NERVE FIBERS IN EXPERIMENTAL CONDITIONS

Abstract: *The article investigates the neuronal composition of the celiac plexus ganglia under experimental conditions. In cats under general anesthesia, nerves connecting the mesenteric nerve fibers with the celiac plexus ganglia were transected. The results demonstrated that transneuronal degeneration occurred in the nerve cells of the celiac plexus ganglia as a response to the loss of pericellular connections (synapses). This indicates that a significant portion of celiac plexus neurons receive preganglionic fibers via the mesenteric nerves.*

Keywords: *experiment, cats, celiac plexus, nerve cells, hematoxylin and eosin staining, toluidine blue staining.*

Introduction

In the literature, scientific studies devoted to the examination of the ganglia of the solar (celiac) plexus are rarely encountered [1,2]. Reports on serious complications arising in certain cases from nerve transection during surgical interventions on abdominal and pelvic organs are also infrequently found [3,4]. From a neurohistological perspective, the solar plexus holds particular significance; in addition to nerve cells with established functions, it contains large ganglion clusters whose physiological roles remain incompletely elucidated [5,6]. The majority of histological studies on the solar plexus focus on describing the nerve fiber composition of its ganglia, particularly the receptor apparatus, though these data have been inadequately explored [7]. Individual experimental studies have primarily addressed the afferent innervation of the solar plexus, with insufficient attention paid to its neurons [8].

Aim of the Study

To investigate neurohistological changes in the ganglia of the solar (celiac) plexus following experimental transection of nerve fibers in the mesentery of the intestines.

Materials and Methods

Under experimental conditions, in 25 adult cats under general anesthesia, nerves leading to the intestinal mesentery were transected above and below the ganglia of the celiac plexus. After a specified period, nerve tissues were excised and processed using general histological staining with hematoxylin-eosin and neurohistological staining with toluidine blue. In addition, on serial sections of the ganglia with a thickness of 8–9 μm stained with toluidine blue, the number of

retrogradely altered cells was counted. As a control, the celiac plexus ganglia from 10 practically healthy cats were examined.

Results

Forty-eight hours after transection of the nerves directed toward the celiac plexus ganglia, massive degeneration of presynaptic nerve fibers occurs in the celiac plexus, along with degeneration of the synaptic apparatus in some nerve cells of the celiac ganglia. Transection of the celiac nerves also causes a series of structural disturbances in the bodies of nerve cells. In preparations stained with toluidine blue, chromatolysis is observed in many neurons 8–15 days after the operation; this process begins at the cell periphery and gradually spreads toward the center. The reduction in cell size is confirmed by cytometric data and variational statistical analysis of the numerical material. According to our measurements, nerve cell sizes in intact animals show considerable variability. However, three groups can be distinguished: 1) 1–30 planimetric units; 2) 31–60 planimetric units; 3) 61–100 planimetric units. In the norm, the largest number of cells (up to 93 out of 200) measure 31–45 planimetric units. Ten to fifteen days after bilateral splanchnicotomy, the number of smaller cells increases significantly. For example, 14 days after celiac nerve transection, the majority of celiac plexus neurons (up to 118 out of 200) measured 16–30 planimetric units. Comparison with nerve cell sizes in control animals showed that mesenteric nerve transection reduces cell size twofold by day 14. Thus, the cytometric data align with visual observations and provide objective evidence of transneuronal degeneration in celiac plexus nerve cells, which arises as a response to the loss of perocellular synaptic connections following preganglionic fiber transection. When sympathetic nerves were transected below the celiac plexus ganglia by cutting 1–5 nerve branches passing through the mesentery, degeneration of thin myelinated nerve fibers was detected in the celiac plexus ganglia by impregnation methods 36–48 hours post-operation. Eight to ten days after mesenteric nerve transection, many celiac plexus neurons exhibited retrograde changes. These cells appeared slightly swollen, with Nissl substance almost completely absent, persisting only in small amounts at the cell periphery or around the nucleus. The finding that a significant proportion (14–27%) of celiac plexus neurons—primarily large ones—underwent retrograde alteration after mesenteric nerve transection indicates that these nerves contain numerous axons originating from celiac plexus nerve cells. In this experimental series, only a small number of neurons showed transneuronal changes, which we attribute to the presence of both efferent and afferent nerve fibers in the mesenteric nerves. Notably, in both the first and second experimental series, alongside retrogradely and transneuronally altered neurons, unchanged nerve cells with preserved synapses were also observed.

Conclusion

The obtained results demonstrate that the celiac plexus and its nerve fibers represent a complex neurohistological structure—an anatomical center that performs reflex neurophysiological functions. The neurites of cells located in its ganglia extend not only distally within the mesenteric nerves but also proximally

within the celiac nerves. Retrograde degeneration of a substantial number of neurons in the celiac plexus ganglia following transection of nerves in the mesentery of the small intestine indicates that these cells, together with neurons of the Meissner and Auerbach plexuses, serve as an additional source of motor innervation for the small intestine.

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Zhalilov A. Kh., PhD
associate professor
department of propaedeutics of children's diseases
Samarkand State Medical University

INFLUENCE OF HEMOCOAGULATING FACTORS OF THE PROSTATE GLAND AND ITS ADENOMA ON THE BLOOD COAGULATION SYSTEM

Abstract: *In the article We studied the thromboplastic and fibrinolytic properties of extracts of 45 human prostate glands taken from corpses, 20 prostate adenomas removed during surgery. As the results of the experiments showed, prostate extracts significantly increase the degree of thromboses, shorten the time of recalcification of platelet-free plasma, promote the utilization of prothrombin, and this effect is maintained until diluted 10,000 times. The obtained data indicate that prostate tissue and its adenomas contain very active thromboplastic and fibrinolytic agents, as well as natural anticoagulants.*

Key words: *human prostate glands, prostate adenomas, thrombotest, heparinized plasma, fibrinolysis,*

Introduction

Prostate adenoma (PA) is a common disease in elderly and senile men, with its clinical manifestations consisting of lower urinary tract symptoms [1,2]. Conservative and surgical treatment of patients with lower urinary tract dysfunction symptoms resulting from benign prostatic hyperplasia (BPH) remains one of the most widespread and pressing problems in urology [3,4]. In recent years, significant attention has been given to tissue hemostatic compounds in the pathogenesis of fibrinogenemic bleeding [5,6]. However, the hemostatic and fibrinolytic properties of the prostate gland itself have not been sufficiently studied, and the available literature contains limited data on the characteristics of the adenoma [7,8].

Aim of the study

Study of the thromboplastic and fibrinolytic properties of human prostate gland extracts obtained from cadavers and prostate adenomas removed during surgery.

Materials and Methods

We studied the thromboplastic and fibrinolytic properties of extracts from 45 human prostate glands obtained from cadavers and 20 prostate adenomas removed during surgery. Extracts were prepared at a ratio of 1 g of tissue to 9 ml of physiological saline (concentration 1:10), and, when necessary, diluted 100-fold, 1000-fold, or more. Fibrinolytic and thromboplastic properties were assessed using standard methods. The research results were processed using variational statistics for paired observations.

Results

It is known that the degree of the thromboplastin test, recalcification time of platelet-poor and heparinized plasma, and prothrombin consumption reflect the thromboplastic activity of blood. The results of our experiments showed that prostate extracts significantly increase the degree of the thromboplastin test, shorten the recalcification time of platelet-poor plasma, and promote prothrombin utilization, with this effect persisting up to a dilution of 10,000-fold. Simultaneously, the extracts reduced the recalcification time of heparinized plasma by 90% compared to control. It should be noted that the thromboplastic activity of prostate tissue is relatively low compared to extracts of decidua and placenta, which retain thromboplastic activity up to dilutions of 100,000–320,000-fold. It was of interest to determine the thromboplastic activity of prostate adenoma. Prostate extracts prolonged prothrombin time in Ac-globulin-deficient plasma by 48%. Homogenates of adenomatous nodes inhibited fibrin formation in Ac-globulin-deficient plasma by 55% compared to control, but the results were not statistically significant. This effect of the extracts may be explained by the presence of anticoagulants in the prostate and its adenoma. Evidence for anticoagulants in the extracts comes from their influence on thrombin time in plasma and 1% fibrinogen solution. After addition of prostate homogenate, thrombin time was prolonged by 106% compared to control, and in 12 out of 36 experiments, no clot formed even after 300 seconds. Clot formation in 1% fibrinogen solution under the influence of prostate extracts was inhibited by 25%. Adenoma extracts had a minor effect on plasma thrombin time but significantly delayed fibrin formation in 1% fibrinogen solution. This fact indicates that the anticoagulant properties of prostate tissue are partially due to heparin or heparinoids. However, toluidine blue did not restore thrombin time to control values, suggesting the presence of other types of anticoagulants in the extracts. We found that extracts of prostate and benign prostatic lesions slowed the lysis of clots in which the conversion of fibrin polymer to fibrin “I” was inhibited by monoiodoacetate—by 24% and 48%, respectively, compared to control. This indicates the presence in prostate tissue and its adenoma of an enzyme similar to plasma fibrinase. This compound increases fibrin resistance to plasmin, thereby indirectly affecting the efficiency of fibrinolysis. The obtained data indicate that prostate tissue and its adenomas contain highly active thromboplastic and fibrinolytic agents as well as natural anticoagulants. What, then, is the role of tissue coagulation factors and tissue fibrinolytic agents in the development of hemostatic disorders during surgical interventions on the prostate gland? It has been proven that tissue trauma during surgery leads to the release of their hemocoagulating and fibrinolytic substances into the bloodstream, resulting in coagulation disturbances. Our research results show that the hemocoagulating substances of the studied tissues are more resistant to dilution than the fibrinolytic ones, with thromboplastic activity being higher and fibrinolytic activity lower in adenoma than in normal prostate. Therefore, upon entering the bloodstream, the action of thromboplastic compounds will predominate, and the coagulation

disorder will develop according to the mechanism of thrombhemorrhagic syndrome, which involves bleeding following intravascular coagulation.

Conclusion

Prostate tissue from 45 cadavers and 20 prostate adenomas removed during surgery was investigated. It was established that the prostate gland and its adenoma contain a complex of hemocoagulating and fibrinolytic compounds. Along with fibrinolysis activators, inhibitors are also present in the prostate gland tissue and its adenomas. Analysis of the hemocoagulating and fibrinolytic properties of the prostate and adenoma suggests that when tissue “juice” enters the bloodstream, hemostasis disorders develop according to the mechanism of thrombhemorrhagic syndrome.

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Ачилова Ф. А.
кафедра пропедевтика детских болезней
Самаркандский государственный медицинский университет
Самарканд, Узбекистан

АНАТОМО - ГИСТОЛОГИЧЕСКИЕ ИЗМЕНЕНИЯ В ПЕЧЕНИ КРОЛИКОВ ПОСЛЕ ПЕРЕВЯЗКИ ГРУДНОГО ПРОТОКА НА ШЕЕ

Резюме: *В статье изучена патоморфологическая картина внутриорганной лимфатической системы печени у кроликов. Имеются попутные морфологические описания при выявлении пространств Диссе после перевязки протока при изучении влияния нарушения лимфообращения в печени после комбинированной перевязки грудного лимфатического и желчного протоков занимался изучением морфологических изменений в печени после перевязки грудного протока и правого лимфатического ствола.*
Ключевые слова: *кролик, лимфатический сосуд, печень,морфологическое изменение, грудной поток.*

Achilova F. A.
department of propaedeutics of children's diseases
Samarkand State Medical University
Samarkand, Uzbekistan

ANATOMO-HISTOLOGICAL CHANGES IN THE LIVER OF RABBITS AFTER LIGATION OF THE THORACIC DUCT IN THE NECK

Abstract: *The article investigates the pathomorphological features of the intraorgan lymphatic system of the liver in rabbits. It includes incidental morphological descriptions related to the visualization of Disse spaces after duct ligation. In the context of studying the effects of impaired lymph circulation in the liver following combined ligation of the thoracic lymphatic duct and common bile duct, morphological changes in the liver after ligation of the thoracic duct and the right lymphatic trunk were examined.*
Keywords: *rabbit, lymphatic vessel, liver, morphological change, thoracic duct.*

Введение

Функциональная морфология лимфатических сосудов печени к настоящему времени изучена достаточно полно во всех ее деталях. Внутриорганная лимфатическая система ее играет важную роль в транспортировке в кровеносное русло фибриногена, белка, значительного количества жидкости и т. д. Достаточно, например, 1,5-часового застоя лимфы в печени, чтобы вызвать гистологическую картину серозного воспаления [1,2]. Считают, что основное количество лимфы от печени

оттекает через грудной проток. Последний же часто перевязывается в клинических условиях после его повреждения во время операций [3,5]. Следовательно, это вмешательство может вести к временному нарушению лимфообращения в печени. Количество специальных работ, посвященных изучению влияния перевязки грудного протока на состояние внутриорганной лимфатической системы печени, весьма незначительное [4,6]. Имеются попутные морфологические описания при выявлении пространств Диссе после перевязки протока при изучении влияния нарушения лимфообращения в печени после комбинированной перевязки грудного лимфатического и желчного протоков занимался изучением морфологических изменений в печени после перевязки грудного протока и правого лимфатического ствола [7,8].

Цель исследования

Мы поставили перед собой задачу изучить анатомо - гистологические изменения в печени кроликов после перевязки грудного протока на шее

Материалы и методы исследования

Опыты были поставлены на 34 животных. Грудной проток перевязывался на шее. Животные забивались через 2-3 дня, 6-7 дней, 2-4 недели после лигирования протока. Гистологические препараты окрашивались гематоксилин-эозином, пикрофуксином по Ван-Гизону, на аргигрофильные волокна по Футу и эластические волокна по Вейгерту.

Результаты исследования

Через 2 дня после операции мы наблюдали значительное расширение внутриорганной лимфатической сети. Расширенные лимфатические сосуды, проходящие меж дольковой и пери васкулярной соединительной ткани, заполнены лимфой, окрашенной в розовый цвет. Лимфатические капилляры, залегающие в соединительной ткани и расположенные вокруг печеночных вен, также увеличены в диаметре. Вся меж дольковая - соединительная ткань, окружающая лимфатические и кровеносные сосуды, а также желчные протоки, значительно отечна.

Через 3 дня после лигирования грудного протока лимфатические сосуды еще более расширены. Среди капилляров меж дольковой и пери васкулярной лимфатической сети встречаются лимфатические сосуды, в просвете которых имеются единичные эритроциты. Отмечается выраженный (тек меж дольковой соединительной ткани. Через 6-7 дней после операции явления отека меж дольковой соединительной ткани и расширения лимфатических сосудов остаются без изменения.

К концу 2 недели после оперативного вмешательства наряду с расширением лимфатических сосудов печени и что мы наблюдали в своих опытах изменения менее выраженными.

Вывод

Эти изменения обычно наступали не непосредственно после операции, а развивались постепенно и были наиболее выраженными на 3-6 день после операции в виде расширения лимфатических сосудов и отека

соединительной ткани. Бесспорно, все эти изменения являются отражением функциональных сдвигов лимфатической системы органа.

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Исмоилов О. И., к.м.н.
доцент
кафедра анатомии человека
Самаркандский государственный медицинский университет
Самарканд, Узбекистан

АНАТОМО-ГИСТОЛОГИЧЕСКОЕ СТРОЕНИЕ ГАНГЛИЕВ ЧРЕВНОГО СПЛЕТЕНИЯ У КРОЛИКОВ

Резюме: *В данной статье экспериментально изучены нейроно-глиально-капиллярные взаимоотношения в ганглиях чревного сплетения у кроликов. Нервные ткани окрашивались с помощью нейрогистологических методов по Нисслю и импрегнацией серебром по методу Бильшовского-Гросса. Нервная клетка, глия и капилляр образуют единый анатомо-гистологический комплекс. Количественные изменения в их взаимоотношениях могут служить тонким индикатором функционального состояния экстрамуральных вегетативных ганглиев в условиях биологического эксперимента.*

Ключевые слова: *эксперимент, кролик, чревное сплетение, нейрон, глиоцит, нейрогистологические методы, нервные ганглии.*

Ismoilov O. I., PhD
associate professor
department of human anatomy
Samarkand State Medical University
Samarkand, Uzbekistan

ANATOMICAL AND HISTOLOGICAL STRUCTURE OF THE CELIA PLEXUS GANGLIA IN RABBIT

Abstract: *This article experimentally studied the neuronal-glial-capillary relationships in the celiac plexus ganglia of rabbits. Nervous tissue was stained using Nissl staining and silver impregnation using the Bielschowsky-Gross method. The nerve cell, glia, and capillary form a single anatomical and histological complex. Quantitative changes in their relationships can serve as a subtle indicator of the functional state of extramural autonomic ganglia under biological experimental conditions.*

Keywords: *experiment, rabbit, celiac plexus, neuron, glial cell, neurohistological methods, nerve ganglia.*

Введение

Сравнительное морфологическое изучение различных видов животных позволяет раскрывать еще неопознанные закономерности развития и адаптации этих животных к различным антропогенным факторам. Данные

современных исследований позволяют считать чревное сплетение периферическим нервным центром, на уровне которого возможна регуляция различных функций органов пищеварения [1,2]. Несмотря на значительное количество работ, посвященных структурной организации ганглиев чревного сплетения [3,4,5] сведения по морфометрическому анализу клеточного состава ганглиев недостаточно полны. Несмотря на значительное количество работ, и обширной информации в морфологической литературе об иннервации и васкуляризации нервные сплетение у человека, домашних и лабораторных животных, этот раздел о морфологии нервов и сосудов у позвоночных животных, до сих пор остается мало изученным в сравнительной морфологии [6,7,8]. Учитывая необходимость системного подхода к изучению строения и функции нервной ткани, мы предприняли попытку комплексного изучения нейронов сочетано с окружающей их глией и капиллярами для более глубокого понимания работы этих сложно устроенных экстрамуральных ганглиев автономной нервной системы.

Цель исследования

Изучить анатомо-гистологическое строение ганглиев чревного сплетения у кроликов.

Материалы и методы исследования

Работа выполнена на 20 половозрелых кроликов обоего пола. Сочетанное выявление капилляров, нейронов и глиоцитов осуществляли прижизненной инъекцией сосудов взвесью парижской синей в хлороформе с эфиром в комбинации с окраской гистологических срезову по Нисслю, импрегнацией серебром по методу Бильшовского-Гросса. Морфометрию капилляров, нейронов и глиоцитов производили винтовым окулярным микрометром МОВ-15. у каждого животного (п=5) измеряли 200 нейронов с окружающей их глией и капиллярами. Площадь профильного поля нейронов, ядер глиоцитов определяли как произведение двух взаимно перпендикулярных диаметров клеток. Количественную оценку кровоснабжения нервных клеток осуществляли по Е. П. Мельману.

Результаты исследования

Наши исследования привели к следующим результатам. Главными источниками, обеспечивающими васкуляризацию ганглиев чревного сплетения у кроликов, являются чревная артерия, аорта и надпочечно-поясничные стволы. К капсуле ганглиев подходят артерии, а от которых отходят артериолы диаметром 26.51±1,16 мкм. Последние, анастомозируя между собой, образуют внеганглионарную артериальную сеть, от которой в глубоколежащие слои ганглия по соединительнотканным перегородкам идут артериолы, прекапилляры диаметром 17,36±0,49 мкм. Последние образуют крупно петлистые сети размерами 182,9±3,58-116,33±2,33 мкм, охватывающие со всех сторон островки нервных клеток. Капилляры диаметром 7,29±0,2 мкм формируют густую мелко петлистую капиллярную сеть с размерами петель 87,25±1,62-61,89±1,99 мкм. В каждой петле находится 1-2 нейрона с окружающими их глиальными клетками. В

совокупности они образуют сложные функциональном отношении нейроно-глиально-капиллярные ансамбли. Нейроны ганглиев чревного сплетения средней величины 35,68±0.83. 25,15-0,5 мкм, округлой, овальной формы, с большим светлым центрально или несколько эксцентрично расположенным ядром. Морфометрическое исследование клеточного состава чревных ганглиев позволило выделить три группы нейронов: первую составили клетки с площадью профильного поля - 400-800 мкм², вторую 801-1200 мкм², третью - 1201-1600 мкм². Численно преобладали нейроны второй группы. 0т сюда следует, что клеточный состав нейронов ганглиев чревного сплетения у кроликов морфологически неоднороден. Как установлено 4 - 6% нервных клеток в ганглиях чревного сплетения у кроликов содержат высокую концентрацию ацетилхолинэстеразы, что характерно для парасимпатических нейронов. Можно предположить, что находящиеся в ганглиях чревного сплетения крупные нейроны с профильным полем 1201 - 1600 мкм² (6,50%) являются холинергическими, а нейроны первой и второй групп - эфферентные и вставочные. Вокруг тела нервных клеток (в зоне 25 мкм) расположены 4-5 глиоцитов. 65% глиопитов (перинейрональные), количестве 2-3, находятся на расстоянии 25±0,8 мкм от тела нервной клетки, преимущественно у основания дендритов и аксонного холмика, где активность обменных процессов наиболее высока. 35% глиоцитов (свободные) располагаются на расстоянии 5.1-20,0 мкм от тела нервной клетки. Морфометрией установлено, что размеры и площадь профильного поля нейронов, глиоцитов правого и левого чревных ганглиев одинаковы. Площадь профильного поля свободных, что может свидетельствовать о большем функциональном значении первых. Изучение микроваскуляризации нейронов указывает на весьма разнообразные варианты взаимоотношений нейронов, глии и капилляров. Наиболее часто капилляры проходят параллельно поверхности тела нейрона, образуют незамкнутые петли, в которых содержится 1-2 нейрона. Возможно вилообразное разветвление капилляра, и тогда нервные клетки, располагающиеся в развилке, вступают в тесный контакт с капиллярами на значительном протяжении. Внутри алиментарной зоны нейрона, равной 25 мкм, находится оптимальный пояс васкуляризации шириной до 10 мкм. Лишь единичные капилляры (4,3%) располагаются на расстоянии 20 - 25 мкм от тела нервной клетки. Установлено также, что количество перинейрональныхо глиоцитов, диаметр капилляров и площадь нейроно-капиллярных контактов возрастают с увеличением площади профильного поля нервных клеток.

Вывод

Таким образом, применение методики сочетанного количественного изучения, а нейроно-глиально-капиллярных взаимоотношений позволило установить определенные закономерности микроваскуляризации нейронов ганглиев чревного сплетения у кроликов. Нервная клетка, глия и капилляр составляют единый морфо-функциональный комплекс, количественные изменения взаимоотношений которого могут служить тонким индикатором

функционального состояния экстрамуральных вегетативных ганглиев в условиях биологического эксперимента

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Караматуллаева З. Э.
ассистент
кафедра инфекционных болезней
Самаркандский государственный медицинский университет
г. Самарканд, Республика Узбекистан

ОСОБЕННОСТИ ТЕЧЕНИЯ КАМПИЛОБАКТЕРИОЗА У ДЕТЕЙ ДО ГОДА

Аннатация: *Основными источниками кампилобактериоза являются домашние и дикие животные, птицы и больные люди. Основным путем передачи инфекции являются пищевой -сырое коровье и козье молоко. При анализе данного клинического случая кампилобактериоза можно сделать следующие выводы-кампилобактериоз является одной из ведущих причин бактериальных острых кишечных инфекций и сохраняет актуальность в клинической практике и системе здравоохранения.*

Ключевые слова: *кампилобактериоз, кишечная инфекция, заболевания, обезвоживание, бактерии.*

Karamatullaeva Z. E.
assistant professor
department of infectious diseases
Samarkand State Medical University
Samarkand, Republic of Uzbekistan

CAMPYLOBACTERIOSIS IN CHILDREN UNDER ONE YEAR OF AGE

Annotation: *The main sources of campylobacteriosis are domestic and wild animals, birds, and sick people. The main route of infection transmission is through food - raw cow and goat milk. When analyzing this clinical case of campylobacteriosis, the following conclusions can be drawn: campylobacteriosis is one of the leading causes of bacterial acute intestinal infections and remains relevant in clinical practice and the healthcare system.*

Keywords: *campylobacteriosis, intestinal infection, diseases, dehydration, bacteria.*

Введение

Кампилобактериоз — острое инфекционное заболевание, характеризующееся поражением желудочно-кишечного тракта [1].

Бактерии, вызывающие кампилобактериоз- это маленькие грамотрицательные подвижные бактерии, которые не образуют споры и похожие на крылья летящей чайки, широко распространены в природе[3], продуцируют цитолитические экзотоксины и энтеротоксины, обладают

высокой адгезивной и энтероинвазивной активностью. Кампилобактериоз регистрируется в течении всего года, но максимальная заболеваемость отмечается в летние месяцы [2].

Основными источниками кампилобактериоза являются домашние и дикие животные, птицы и больные люди. Основным путем передачи инфекции являются пищевой -сырое коровье и козье молоко [4].

Что происходит в организме при кампилобактериозе у детей:

Инкубационный период различен и может длиться от 2 дней до 11 дней, симптомы кампилобактериоза характеризуются полиморфизмом. В зависимости от топики поражения желудочно-кишечного тракта можно выделить два варианта. Первый вариант кампилобактериоза формируется у детей старшего возраста и характеризуется преимущественным поражением верхних отделов желудочно-кишечного тракта. Заболевание развивается с рвоты и водянистой диареи [5]. Лихорадка появляется к 2-3 дню болезни сохраняется в течении 2-3 дней, явления интоксикации выражены умеренно в течение 1-2 дней. Стул имеет водянистый характер, частота стула до 5-8 раз в сутки. Возможны выраженный болевой синдром, вздутие кишечника. Заболевание характеризуется благоприятным течением и средняя продолжительность составляет 5-6 дней [6].

Второй вариант кампилобактериоза наблюдается преимущественно у детей раннего возраста и сопроваждается поражением как тонкого, так толстого отдела кишечника. Заболевание начинается остро с подъема температуры до высоких цифр и развития инфекционного токсикоза [7]. Стул в начале заболевания может быть водянистым но затем приобретает колитический характер. Больные жалуются на боли в животе с преимущественной локализацией в нижних отделах. У ряда больных наблюдается развитие токсической нефропатии, реактивного гепатита, реактивного панкреатита. Средняя продолжительность болезни составляет 7-9 дней. Возможно затяжное течение [8].

Цель исследования - изучить клинико-эпидемиологические особенности кампилобактериоза у детей младшего возраста, оценить особенности клинического течения и исхода ,проанализировать эффективность методов диагностики.

Материал - случай из практики

В Самаркандскую областную инфекционную больницу 10 июля 2025 года поступил ребенок 8 месяцев, с признаками кишечной инфекции, средней степени тяжести. После осмотра врачем приемного покоя, больной был госпитализирован в кишечное отделение с диагнозом- острая кишечная инфекция. Жалобы при поступлении, со слов матери, были на высокую лихорадку,рвоту, жидкий стул до 8 раз за сутки, беспокойство, плохой аппетит. Из анамнеза заболевания выяснилось, что болезнь началась остро, с повышения температуры тела до 39^0 С градусов, затем присоединилась рвота. Мать дала ибуфен, но состояние не улучшалось, присоединился жидкий стул водянистого характера, ребенок стал капризным, ухудшился

аппетит и после повторной рвоты на машине скорой помощи ребенок был доставлен в инфекционную больницу. Из анамнеза жизни выяснилось что ребенок родился недоношенным с весом 2 кг 200 гр, часто болеет простудными заболеваниями, плохо набирает вес.Из эпидемиологического анамнеза выяснилось, что ребенок находится на искуственном вскармливании и периодически мать давала как прикорм козье молоко.Состояние больного средней тяжести, кожа и слизистые сухие, тургор кожи снижен, глазки запавшие температура тела $38,5^0$ С градусов, в легких везикулярное дыхание. Живот несколько вздут, отмечается урчание, стул частый до 8-10 раз за сутки, в начале заболевания водянистого характера, а затем на 3 день заболевания приобрел колитический характер со слизью и прожилками крови. Диурез снижен. При бактериологическом исследовании кала высеялись C.jejuni

Выводы

При анализе данного клинического случая кампилобактериоза можно сделать следующие выводы-кампилобактериоз является одной из ведущих причин бактериальных острых кишечных инфекций и сохраняет актуальность в клинической практике и системе здравоохранения. Заболевание преимущественно передается алиментарным путем и чаще связано с употреблением недостаточно термически обработанного мяса птицы и молочных продуктов. Клиническое течение варьируется от легких до тяжелых гастроэнтеритов с риском дегидратации и развития постинфекционных осложнений. Своевременная и рациональная антибактериальная терапия позволяет улучшить прогноз заболевания и снизить частоту осложнений. Эффективная профилактика кампилобактериоза основывыется на строгом соблюдении санитарно-гигиенических норм, контроле качества пищевых продуктов и санитарно-просветительной работе среди населения.

Заключение

Кампилобактериоз у детей первого года жизни протекает тяжелее, чем у взрослых и сопровождается высоким риском развития обезвоживания. Ранняя диагностика и своевременное лечение имеют решающее значение при прогнозе заболевания. Основой профилактики являются гигиена и безопасность питания.

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Кодирова М. М.
ассистент
кафедра пропедевтики детских болезней
Самаркандский государственный медицинский университет

ГИСТОТОПОГРАФИЧЕСКОЕ СТРОЕНИЕ СИМПАТИЧЕСКОГО СТВОЛА И НЕРВОВ

Резюме: *В данной статье изучена нейрогистологическая структура симпатического ствола и нервных волокон у человека. Для изучения гистологической структуры нервной ткани использовался метод окрашивания Бильшовского-Грос среди нейрогистологических методов. Согласно полученным результатам, межузловые ветви симпатического ствола обладают четко выраженными эпиневрием, периневрием и эндоневрием. Эпиневрий состоит из наружного — более плотного и внутреннего — рыхлого слоев. Капсула узлов непосредственно связана с эпи- и периневрием, тогда как эндоневрий продолжается в строму узлов.*

Ключевые слова: *человек, симпатический ствол, нервные узлы, нервные волокна, периневрий, эндоневрий, метод Бильшовского-Грос*

Qodirova M. M.
assistant
department of propedeutics of children's diseases
Samarkand State Medical University

HISTOTOPOGRAPHIC STRUCTURE OF THE SYMPATHETIC TRUNK AND NERVES

Abstract: *This article investigates the neurohistological structure of the sympathetic trunk and nerve fibers in humans. To study the histological structure of nerve tissue, the Bielschowsky-Gros staining method was employed. The results showed that the interganglionic branches of the sympathetic trunk possess distinctly expressed epineurium, perineurium, and endoneurium. The epineurium consists of an outer denser layer and an inner looser layer. The ganglion capsule is directly connected to the epi- and perineurium, whereas the endoneurium continues into the ganglion stroma.*

Keywords: *Humans, sympathetic trunk, nerve ganglia, nerve fibers, perineurium, endoneurium, Bielschowsky-Gros method.*

Введение

По современным представлениям вегетативная нервная система рассматривается как комплексцентральных и периферических клеточных структур, регулирующих необходимый для адекватной реакции всех систем функциональный уровень внутренней жизни организма [1,2]. В настоящее

время торакальная симпатэктомия нашла широкое применение при гипергидрозе верхних конечностей, облитерирующем тромбангиите и атеросклерозе артерий верхних конечностей, болезни Рейно [4,5]. В литературе нет сведений о макромикроскопической анатомии оболочек симпатических нервных стволов и внутренностных нервов [6,3]. Между тем почти половину этих функционально важных стволов занимает соединительная ткань, которая, наряду с нервной тканью, является объектом разнообразных патологических процессов в вегетативной нервной системе [7,8].

Цель исследования

Изучить гистотопографическое строение симпатического ствола и нервов у человека.

Материалы и методы исследования

Применение макромикроскопических методов снятия и обработки эпи-, пери- и эндоневрия межганглионарных ветвей и капсул узлов симпатических стволов и внутренностных нервов, а также исследование тотальных гистотопограмм поперечных и продольных срезов этих стволов, окрашенных по ван Гизону и гематоксилин-эозином, позволило найти новые существенные факты. Были изучены 14 грудных отдела симпатических стволов и внутренностных нервов человека. Изучение препаратов и суммирование всех полученных данных дали возможность создать принципиальную схему строения оболочек симпатического ствола и внутренностных нервов.

Результаты исследования

Установлено, что межузловые ветви симпатического ствола имеют выраженные эпиневрий, периневрий и эндоневрий. Эпиневрий подразделяется на наружный, более плотный, и внутренний — рыхлый. Наружный эпиневрий межганглионарных ветвей непосредственно переходит в наружную часть капсулы симпатического узла, имеющую различную толщину. Периневрий состоит из наружного и внутреннего листков, между которыми прослеживается перинервальное пространство. Оба листка периневрия при подходе к узлу срастаются вместе, формируя собственно капсулу узла. Перинервальные влагалища при этом смыкаются, образуя острые карманы вокруг пучков межузловой ветви. От внутреннего периневрия отходят внутрь пучков трабекулы, формирующие эндоневрий. Подобные же прослойки отходят внутрь узла от внутреннего листка капсулы, окружая небольшие пучки нервных волокон внутри узла.

Между межузловыми ветвями симпатических узлов наблюдаются окольные нервные пучки, которые примыкают снаружи к симпатическим узлам и осуществляют связи между соседними межузловыми ветвями. Большие внутренностные нервы имеют в своем составе от 3 до 7 корешков, что позволило выделить две формы изменчивости их строения: малокорешковую и многокорешковую. Количество пучков в нерве увеличивается по мере приближения диафрагме, а размеры пучков при этом

уменьшаются; между пучками возможен обмен группами нервных волокон. Соединительнотканные оболочки представлены в виде эпиневрия, периневрия и эндоневрия. Основную массу соединительнотканные стромы внутренностных нервов составляет наружный и внутренний эпиневрий, содержащий большое количество сосудов и собственных нервных стволиков. Наружный эпиневрий является продолжением наружного слоя капсулы узла, толщина ero уменьшается по мере приближения нерва к диафрагме. Периневрий представляет собой многослойную мембрану, состоящую из двух листков - наружного и внутреннего, формируюших перineвральное влагалище, где располагается перineвральное пространство. Перineвральные влагалища корешков в области симпатических узлов начинаются тупо и, в виде остроконечного кармана окружают каждый из корешков внутренностного нерва. В области межузловых ветвей перineвральные влагалища корешков сообщаются с перineвральными влагалищами пучков межузловых ветвей.

Вывод

Изложенное показывает, что между капсулой и стромой симпатических узлов, с одной стороны, и эпи-, пери-, и эндоневрием межузловых ветвей и внутренностных нервов, с другой, имеются своеобразные взаимоотношения. Капсула узлов непосредственно связана с эпи- и перineвриeм, тогда как эндоневрий переходит в строму узлов. Перineвральные влагалиша межузловых ветвей и внутренностных нервов при подходе к капсуле узла замыкаются, образуя тупые карманы. Подобная картина замыкания перineвральных футляров была описана одним из нас в области проксимальных отделов спинномозговых нервов. Между соседними межузловыми ветвями в наружной части капсула симпатических узлов могут залегать окольные нервные пучки. Этим достигается осуществление не только нервных связей по ходу симпатического ствола в обход нервных узлов, но и циркуляция на протяжении всего ствола перineвральной жидкости.

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Курбаниязова Ф. З.
ассистент
кафедра акушерство и гинекологии №1
Самаркандский государственный медицинский университет

РАННЯЯ РЕАБИЛИТАЦИЯ ЖЕНЩИН, ПЕРЕНЁСШИХ КЕСАРЕВО СЕЧЕНИЕ, И ОПТИМИЗАЦИЯ ВЕДЕНИЯ ПОСЛЕДУЮЩИХ РОДОВ

Аннотация: *Представлены результаты комплексного исследования эффективности ранней реабилитации 268 женщин после кесарева сечения и анализ ведения последующих родов у 124 пациенток с рубцом на матке. Разработана трёхэтапная программа реабилитации, включающая протокол ускоренного восстановления (ERAS), физиотерапевтические методы и прегравидарную подготовку. Внедрение программы позволило повысить частоту формирования состоятельного рубца до 91,8%, увеличить долю успешных вагинальных родов после кесарева сечения до 74,6% и снизить частоту акушерских осложнений в 2,3 раза.*

Ключевые слова: *кесарево сечение, ранняя реабилитация, ERAS-протокол, рубец на матке, вагинальные роды после кесарева сечения, VBAC, TOLAC.*

Kurbaniyazova F. Z.
assistant
department of obstetrics and gynecology no. 1
Samarkand State Medical University

EARLY REHABILITATION OF WOMEN AFTER CESAREAN SECTION AND OPTIMIZATION OF THE MANAGEMENT OF SUBSEQUENT LABOR

Abstract: *The results of a comprehensive study evaluating the effectiveness of early rehabilitation in 268 women after cesarean section and the management of subsequent labor in 124 patients with a uterine scar are presented. A three-stage rehabilitation program was developed, including an Enhanced Recovery After Surgery (ERAS) protocol, physiotherapeutic methods, and preconception preparation. Implementation of the program increased the rate of formation of a competent uterine scar to 91.8%, raised the proportion of successful vaginal births after cesarean section to 74.6%, and reduced the incidence of obstetric complications by 2.3 times.*

Keywords: *cesarean section, early rehabilitation, ERAS protocol, uterine scar, vaginal birth after cesarean section, VBAC, TOLAC.*

Кесарево сечение занимает лидирующее место среди хирургических вмешательств в акушерской практике. Глобальная частота абдоминального родоразрешения достигла 21,1% и продолжает неуклонно расти. В республике узбекистан этот показатель составляет 16–19%, что соответствует рекомендациям воз (10–15%), однако в крупных перинатальных центрах нередко превышает 25–30%.

Следствием роста частоты кесарева сечения является увеличение числа женщин репродуктивного возраста с рубцом на матке. Это ставит перед практическим здравоохранением две взаимосвязанные задачи: обеспечение полноценной реабилитации после операции и оптимизация ведения последующих беременностей и родов. От качества решения этих задач зависят репродуктивное здоровье женщины, безопасность последующих беременностей и возможность вагинальных родов.

Концепция ранней реабилитации (enhanced recovery after surgery — eras) успешно зарекомендовала себя в различных областях хирургии и активно адаптируется для акушерской практики. Параллельно развивается концепция вагинальных родов после кесарева сечения (vaginal birth after cesarean — vbac), которая при правильном отборе пациенток позволяет избежать повторной операции у 60–80% женщин.

Цель исследования

Разработать и внедрить программу ранней реабилитации женщин после кесарева сечения и оптимизировать тактику ведения последующих родов на основе оценки состоятельности рубца и индивидуальных факторов риска.

Материалы и методы

Исследование проведено на базе родовспомогательных учреждений самаркандской области в период 2020–2024 гг. И включало два этапа.

Первый этап (ранняя реабилитация): 268 женщин после кесарева сечения были разделены на две группы — основная (n=142) с применением разработанной программы реабилитации и контрольная (n=126) со стандартным послеоперационным ведением. Критерии включения: возраст 18–42 года, кесарево сечение в нижнем маточном сегменте, одноплодная беременность. Средний возраст составил 28,4±5,8 года. Первичное кесарево сечение выполнено 196 женщинам (73,1%), повторное — 72 (26,9%).

Второй этап (последующие роды): 124 женщины с рубцом на матке, забеременевшие в период наблюдения, из них 71 — после программы реабилитации (основная группа) и 53 — без неё (группа сравнения). Оценка состояния рубца проводилась методами узи, мрт (по показаниям) и гистероскопии (по показаниям) в сроке 36–38 недель гестации.

Трёхэтапная программа реабилитации:

I этап — госпитальный (1–5 сутки): eras-протокол (ранняя активизация через 6–8 ч, раннее энтеральное питание через 4–6 ч, мультимодальная аналгезия, раннее удаление катетера), профилактика тромбоэмболических осложнений, ранний контакт «кожа к коже», поддержка грудного

вскармливания.

Ii этап — амбулаторный (2–12 недель): физиотерапия (магнитотерапия — 10 сеансов, лазеротерапия — 10 сеансов, электрофорез с лидазой — 10 сеансов), лечебная физкультура (дыхательная гимнастика, упражнения кегеля, укрепление мышц брюшного пресса), узи-мониторинг инволюции матки и формирования рубца.

Iii этап — прегравидарная подготовка (за 3–6 мес до планируемой беременности): комплексная оценка состояния рубца (узи, при необходимости — мрт, гистероскопия), коррекция выявленных нарушений, фолиевая кислота, санация очагов инфекции, консультирование о возможности и рисках vbac.

Результаты и обсуждение

Таблица 1.

Показатели раннего послеоперационного периода

Показатель	Основная (n=142)	Контроль (n=126)	P
Время до вертикализации, ч	7,4±1,8	18,6±5,2	<0,001
Восстановление перистальтики, ч	13,8±4,2	28,4±7,6	<0,001
Начало энтерального питания, ч	5,6±1,6	24,8±6,2	<0,001
Начало грудного вскармливания, ч	2,8±1,0	10,2±4,4	<0,001
Удаление мочевого катетера, ч	7,2±1,4	26,4±7,8	<0,001
Боль по ваш (24 ч), баллы	3,4±1,2	5,6±1,8	<0,001
Длительность госпитализации, сут	3,8±0,8	5,8±1,4	<0,001
Послеоперационные осложнения, %	7,0	16,7	<0,01

Внедрение eras-протокола позволило сократить время до первой вертикализации с 18,6 до 7,4 часа, время до начала грудного вскармливания — с 10,2 до 2,8 часа, продолжительность госпитализации — с 5,8 до 3,8 суток. Частота послеоперационных осложнений снизилась с 16,7% до 7,0%.

Таблица 2.
Структура послеоперационных осложнений

Осложнение	Основная, n (%)	Контроль, n (%)
Парез кишечника	2 (1,4)	8 (6,3)
Субинволюция матки	3 (2,1)	6 (4,8)
Эндометрит	2 (1,4)	4 (3,2)
Раневые осложнения	2 (1,4)	4 (3,2)
Тромбоэмболические осложнения	0 (0)	2 (1,6)
Анемия (hb <90 г/л)	1 (0,7)	2 (1,6)
Всего	10 (7,0)	21 (16,7)

Наиболее выраженное снижение отмечено в отношении пареза кишечника (1,4% vs 6,3%), субинволюции матки (2,1% vs 4,8%) и раневых осложнений (1,4% vs 3,2%). Это обусловлено ранней активизацией, ранним энтеральным питанием и применением мультимодальной аналгезии, минимизирующей использование опиоидов.

Таблица 3.
Состояние рубца на матке через 12 месяцев

Показатель	Основная (n=142)	Контроль (n=126)	P
Толщина миометрия в области рубца, мм	4,9±1,1	3,5±1,4	<0,001
Однородная структура рубца, %	88,0	71,4	<0,01
Состоятельный рубец (все критерии), %	91,8	74,6	<0,001
Истмоцеле (любой степени), %	11,3	25,4	<0,01
Истмоцеле средней/тяжёлой степени, %	3,5	9,5	<0,05
Сохранная васкуляризация, %	89,4	76,2	<0,01

Комплексная оценка рубца через 12 месяцев показала достоверное преимущество программы реабилитации. Средняя толщина миометрия в области рубца составила 4,9±1,1 мм в основной группе против 3,5±1,4 мм в контрольной. Состоятельный рубец (толщина ≥3 мм, однородная структура, отсутствие дефектов) определялся у 91,8% женщин основной группы и 74,6% контрольной. Частота истмоцеле снизилась с 25,4% до 11,3%.

Результаты второго этапа: ведение последующих родов. Из 124 женщин с рубцом на матке, забеременевших в период наблюдения, 71 прошла программу реабилитации (основная группа), 53 — не проходила

(группа сравнения). Тактика родоразрешения определялась на основании комплексной оценки (таблица 4).

Таблица 4.

Критерии отбора для вагинальных родов (tolac)

Критерии допуска к tolac	Противопоказания к tolac
Одно кесарево сечение в нижнем сегменте	Корпоральное кесарево сечение
Состоятельный рубец (толщина ≥3 мм)	Несостоятельный рубец (толщина <2,5 мм)
Одноплодная беременность	Многоплодная беременность
Головное предлежание	Тазовое предлежание
Отсутствие абсолютных показаний к кс	Предлежание плаценты
Информированное согласие	Отказ пациентки

Критериями допуска к попытке вагинальных родов (tolac) являлись: состоятельный рубец по данным узи (толщина ≥3 мм), одно кесарево сечение в анамнезе (в нижнем сегменте), одноплодная беременность в головном предлежании, отсутствие абсолютных показаний к кесареву сечению, информированное согласие. Относительными противопоказаниями считались: индукция родов, крупный плод (>4000 г), возраст >40 лет, интергенетический интервал <18 месяцев.

Таблица 5.

Исходы родоразрешения у женщин с рубцом на матке

Показатель	Основная (n=71)	Сравнения (n=53)	P
Попытка vbac (tolac), n (%)	59 (83,1)	34 (64,2)	<0,05
Успешные vbac, n (% от tolac)	44 (74,6)	17 (50,0)	<0,01
Экстренное кс в родах, n (% от tolac)	15 (25,4)	17 (50,0)	<0,01
Плановое повторное кс, n (%)	12 (16,9)	19 (35,8)	<0,05
Общая частота кс, n (%)	27 (38,0)	36 (67,9)	<0,001

Попытка вагинальных родов (tolac) была предпринята у 59 женщин основной группы (83,1%) и 34 — группы сравнения (64,2%). Успешные вагинальные роды (vbac) достигнуты у 44 женщин основной группы (74,6% от tolac) и 17 — группы сравнения (50,0% от tolac). Различия статистически значимы (p<0,01). Экстренное кесарево сечение в родах потребовалось 15 женщинам основной группы (25,4%) и 17 — группы сравнения (50,0%).

Таблица 6.
Осложнения беременности и родов, связанные с рубцом

Осложнение	Основная (n=71)	Сравнения (n=53)	P
Угрожающий разрыв матки, n (%)	1 (1,4)	4 (7,5)	<0,05
Разрыв матки, n (%)	0 (0)	0 (0)	—
Предлежание плаценты, n (%)	3 (4,2)	6 (11,3)	<0,05
Врастание плаценты, n (%)	0 (0)	1 (1,9)	>0,05
Преждевременная отслойка плаценты, n (%)	1 (1,4)	2 (3,8)	>0,05
Послеродовое кровотечение, n (%)	2 (2,8)	4 (7,5)	>0,05
Всего осложнений, связанных с рубцом, %	7,0	18,9	<0,01

Частота осложнений, связанных с рубцом на матке, была достоверно ниже в основной группе. Угрожающий разрыв матки диагностирован у 1,4% женщин основной группы против 7,5% в группе сравнения ($p<0,05$). Предлежание плаценты — у 4,2% против 11,3% ($p<0,05$). Важно отметить, что случаев истинного разрыва матки не зарегистрировано ни в одной группе, что свидетельствует об адекватном отборе кандидатов для tolac и тщательном мониторинге в родах.

Таблица 7.
Факторы, влияющие на успешность vbac

Фактор	Ош (95% ди)	P
Толщина рубца ≥4 мм	5,2 (2,1–12,8)	<0,001
Вагинальные роды в анамнезе	4,8 (1,8–12,6)	<0,01
Спонтанное начало родов	3,6 (1,5–8,7)	<0,01
Интергенетический интервал >24 мес	3,1 (1,3–7,4)	<0,05
Программа реабилитации	2,9 (1,2–7,0)	<0,05
Индукция родов	0,3 (0,1–0,8)	<0,05
Масса плода >4000 г	0,4 (0,1–1,2)	>0,05
≥2 кесаревых сечений в анамнезе	0,5 (0,2–1,4)	>0,05

Многофакторный анализ позволил выделить независимые предикторы успешных vbac. Наиболее значимыми оказались: толщина рубца ≥4 мм (ош 5,2), наличие вагинальных родов в анамнезе (ош 4,8), спонтанное начало родовой деятельности (ош 3,6), интергенетический интервал >24 месяцев (ош 3,1). Негативное влияние оказывали: индукция родов (ош 0,3), масса

плода >4000 г (ош 0,4), повторное кесарево сечение в анамнезе (ош 0,5).

На основании полученных данных разработан алгоритм ведения женщин после кесарева сечения, включающий: госпитальный этап реабилитации (eras-протокол), амбулаторный этап (физиотерапия, лфк, мониторинг), динамическое наблюдение с оценкой рубца (6 недель, 6 месяцев, 12 месяцев), прегравидарную подготовку при планировании беременности, комплексную оценку перед родами (36–38 недель), индивидуальный выбор метода родоразрешения с учётом прогностических факторов.

Выводы

1. Трёхэтапная программа реабилитации, включающая eras-протокол, физиотерапию и прегравидарную подготовку, достоверно сокращает сроки послеоперационного восстановления и снижает частоту осложнений с 16,7% до 7,0%.

2. Применение программы реабилитации способствует формированию полноценного рубца на матке у 91,8% женщин и снижает частоту истмоцеле с 25,4% до 11,3%.

3. Комплексная оценка состояния рубца и индивидуальный отбор кандидатов позволяют увеличить частоту попыток вагинальных родов (tolac) до 83,1% и успешных vbac — до 74,6%.

4. Программа реабилитации снижает частоту акушерских осложнений, связанных с рубцом (угрожающий разрыв матки, предлежание плаценты), в 2,3–2,7 раза.

5. Основными предикторами успешных vbac являются: толщина рубца ≥4 мм, вагинальные роды в анамнезе, спонтанное начало родов и интергенетический интервал >24 месяцев.

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Курбаниязов З. Б., доктор медицинских наук,
профессор
заведующий кафедрой хирургических болезней №1
и трансплантологии
Самаркандский государственный медицинский университет

КЛИНИЧЕСКОЕ ОБОСНОВАНИЕ МИНИИНВАЗИВНЫХ ВМЕШАТЕЛЬСТВ ПРИ ПЕРФОРАТИВНЫХ ГАСТРОДУОДЕНАЛНЫХ ЯЗВАХ

Резюме. *Работа основана на результатах хирургического лечения 116 больных с перфоративной гастродуоденальной язвой. Ушивание перфоративной гастродуоденальной язвы с использованием миниинвазивных технологий, в комплексе с современной послеоперационной противоязвенной терапией, приводит к хорошим клиническим результатам и безрецидивному течению язвенной болезни в 91,6% случаях. У пациентов, перенесших лапароскопическое и видеоассистированное комбинированное ушивание перфоративной гастродуоденальной язвы, по шкале Visik, преобладают отличный (88,6% и 85%) и хороший (4,5% и 7,5%) результаты, что доказывает преимущество ушивания язвы из минидоступа, при невозможности выполнения лапароскопического вмешательства.*

Ключевые слова. *Перфоративная гастродуоденальная язва, ушивание язвы, миниинвазивные технологии.*

Kurbaniyazov Z. B., doctor of medical sciences,
professor
head of the department of surgical diseases no. 1
and transplantology
Samarkand State Medical University

CLINICAL JUSTIFICATION OF MINIMALLY INVASIVE INTERVENTIONS IN PERFORATED GASTRODUODENAL ULCERS

Abstract*: The study is based on the results of surgical treatment of 116 patients with perforated gastroduodenal ulcers. Suturing of perforated gastroduodenal ulcers using minimally invasive technologies, in combination with modern postoperative anti-ulcer therapy, leads to favorable clinical outcomes and a recurrence-free course of peptic ulcer disease in 91.6% of cases. According to the Visick scale, patients who underwent laparoscopic and video-assisted combined suturing of perforated gastroduodenal ulcers predominantly demonstrated excellent (88.6% and 85%) and good (4.5% and 7.5%) results,*

which confirms the advantages of ulcer suturing through a mini-access when laparoscopic intervention is not feasible.

***Keywords**: perforated gastroduodenal ulcer, ulcer suturing, minimally invasive technologies.*

Актуальность

Перфоративная язва продолжает занимать ведущие место в структуре летальности при язвенной болезни, которая уже многие годы составляет от 5 до 17%. В зависимости от различных клинических ситуаций применяется разнообразная хирургическая тактика в лечении пациентов с перфоративной гастродуоденальной язвой. Показания к операциям при перфоративной язве, выбор методики и техники оперативного вмешательства до сих пор остаются предметом обсуждения (Хакимов М.Ш., 2020). В Узбекистане хирургическая тактика при прободной гастродуоденальной язве разнообразна. Наиболее часто применяется операция простого ушивания перфорации, как наиболее простая и надежная, позволяющая спасти жизнь пациенту. Выполнение ваготомии с пилоропластикой или дистальной резекции желудка, как наиболее радикальных методов лечения при прободной язве, ограничивается временем давности заболевания, степенью распространенности перитонита, тяжестью состояния больного, сопровождается высокой частотой послеоперационных осложнений и летальностью. В случае, когда перфоративное отверстие большое (более 2 см) или воспалительные ткани вокруг рыхлые, бывает проблематично добиться безопасного заживления ушитой язвы первичным натяжением. Если первая попытка закрытия дефекта оказалась неудачной, вторая также может быть несостоятельной, в таких случаях переход на резекцию желудка будет более безопасным вариантом.

С внедрением инновационных технологий одним из вариантов миниинвазивного вмешательства при перфоративной гастродуоденальной язве является сочетанное использование эндовидеохирургических методик для ревизии и санации брюшной полости, с последующим применением мини- доступа для ушивания перфорации. Видеоассистированные операции по радикализму и возможностям не уступают традиционным вмешательствам, при этом сохраняя все преимущества миниинвазивных операций. Однако, до сих пор не определены показания к ним, возможности их применения у различной категории больных.

Цель исследования

Улучшить результаты хирургического лечения пациентов с перфоративными гастродуоденальными язвами путем приоритетного использования миниинвазивных технологий.

Материал и методы исследования

Работа основана на результатах хирургического лечения 116 больных с перфоративной гастродуоденальной язвой. Пациенты оперированы в Навоийском филиале РНЦЭМП в период с 2019 по 2023 гг. Возраст

исследуемых пациентов варьировал от 18 до 67 лет, средний возраст составил 35,7±15,4 лет. Больные трудоспособного возраста составили 90%. Среди больных с перфоративными гастродуоденальными язвами было 16,5% женщин и 83,4% мужчин. Все пациенты поступили в экстренном порядке.

В группу сравнения вошли 61 (52,6%) пациентов, которым проведено лапароскопическое ушивание перфоративной гастродуоденальнойязвы.

В основной группе из 55 больных, которым выполнили ушивание перфоративной гастродуоденальной язвы из мини-доступа, отмечались следующие трудности перехода на лечебный этап лапароскопического вмешательства: у 15 (27,2%) пациентов имела место «неудобное» для лапароскопического ушивания расположение язвы, а именно, близкое ее расположение к малой кривизне желудка. У 14 (25,4%) больных диаметр отверстия составлял более 10 мм. У 8 (16,3%) больных имел место плотный инфильтрат в области перфорации, диаметр отверстия более 1,0 см, ввиду чего возникала необходимость накладывать широкие стежки с частичным погружением инфильтрата, лапароскопическим путем это было неосуществимо. У 14 (25,4%) пациентов имелась резко выраженная инфильтрация воспаленных краев перфоративной язвы, при попытке лапароскопического ушивания происходило прорезывание швов, что ставило под сомнение герметизм шва, ввиду чего было принято решение о переходе на ушивание из мини-доступа. У 3 (5,4%) пациентов при выполнении диагностической лапароскопии были выявлены выраженные висцеропариетальные сращения, делающие либо недоступной, либо трудной для санации пилородуоденальную зону, в данном случае так же успешно выполнено ушивание перфоративной гастродуоденальной язвы из мини-доступа.

Показаниями к видеоассистированному ушиванию перфоративной гастродуоденальной язвы из мини-доступа считали: - отсутствие распространенного перитонита и паралитической кишечной непроходимости; - локализацию перфоративного отверстия по передней стенке органа; - «неудобная» для лапароскопического ушивания локализация язвы; - выраженный спаечный процесс в зоне операции; - отсутствие анамнестических, клинических, эндоскопических, лапароскопических признаков других осложнений язвенной болезни; - отсутствие признаков онкологического процесса в области язвенной перфорации.

Результаты и их обсуждение

Продолжительность лапароскопического ушивания перфоративной гастродуоденальной язвы составляла от 40 до 150 минут, средняя продолжительность операции составила 62,8±3,9 минут.

При исследовании болевого синдрома в течении первых суток после операции по шкале Wong-Baker суточная сумма баллов составила от 2 до 7, в среднем была равна 4,3±0,5 баллов.

Сроки пребывания в стационаре, пациентов контрольной группы варьировал от 3 до 12 койко-дней, в среднем 7,5±0,3 койко-дней.

Продолжительность выполнения операции видеоассистированным способом из минидоступа, на этапах освоения методики составляла 70-110 минут, но в дальнейшем, по мере накопления опыта, время операции уменьшилось до 40-60 минут. Средняя продолжительность комбинированного ушивания перфоративной гастродуоденальной язвы из мини-доступа составляла 45,4±3,2 минут.

При исследовании болевого синдрома по шкале Wong-Baker, у пациентов которым выполнено ушивание перфоративной гастродуоденальной язвы из мини-доступа, суточная сумма баллов составила от 3 до 8, с среднем 6,3±0,7 баллов.

В ближайшем послеоперационном периоде у пациентов, (n=116) которым выполнено ушивание перфоративной гастродуоденальной язвы миниинвазивным способом, осложнения развились в 12 (10,3%) случаев. Абсцессы брюшной полости развились в 2 (1,7%) случаев. Во всех случаях выполнено пункция и дренирование абсцессов под УЗИ контролем. Несостоятельность ушитой язвы развилась в 5 (4,3%) случаях, в 3 (2,6%) наблюдениях у больных которым выполнено ушивание язвы из мини-доступа, в 2 (1,7%) случае, у больных которым выполнено лапароскопическое ушивание перфоративной гастродуоденальной язвы. У пациентов основной группы была выполнена релапаротомия резекция желудка по Бильрот-II, у больных контрольной группы была выполнена релапаротомия, иссечение язвы, пилоропластика по Джабулею. Нагноение послеоперационной раны развилось в 3 (2,6%) случаев, у больных основной группы, и в 1(0,8%) случае у больных контрольной группы. Эвентрация пряди большого сальника отмечалась в 2 (1,7%) наблюдениях, в обоих случаях выполнено ушивание эвентрации под внутривенной седацией. Больные выписаны с клиническим улучшением (табл 1).

Таблица 1.

Послеоперационные осложнения в зависимости от типа ушивания перфоративной гастродуоденальной язвы

Осложнения	Операция	
	Лапароскопическоеушивание ПГДЯ	Ушивание ПГДЯ измини-доступа
Абсцесс бр.полости	-	2 (1,7%)
Несостоятельность	2 (1,7%)	3 (2,6%)
Нагноение раны	-	1 (0,8%)
Эвентрация	-	2 (1,7%)
Ранняя спаечнаякишечная непроходимость	-	2 (1,7%)
Всего	2 (1,7)	10 (8,6%)

Нами проведена сравнительная оценка отдаленных результатов лечения больных, перенесших ушивание перфоративной гастродуоденальной язвы, в срок от 1 до 5 лет. Отдаленные результаты прослежены у 84 (72,4%) пациента: - больные, перенесшие видеоассистированное комбинированное

ушивание перфоративной гастродуоденальной язвы из минидоступа, 40 (72,7%); - больные, перенесшие лапароскопическое ушивание перфоративной гастродуоденальной язвы, 44 человек (72,1%). Эрадикационная противоязвенная терапия проведена у 59 (50,8%), из них у 23 выполнено видеоассистированная комбинированное ушивание перфоративной гастродуоденальной язвы, у 26 выполнено лапароскопическое ушивание перфоративной гастродуоденальной язвы. Трехкомпонентная схема эрадикационной терапии проведена у 30 пациентов, двухкомпонентная схема проведена у 29 пациентов.

В оценки качества жизни больных нашего исследования были использованы опросник MOS SF-36 и шкала Visick.

Все показатели качества жизни оказались схожи у пациентов основной и контрольной группы. Показатель физического здоровья в основной и контрольной группе составил 81,2%. Показатель психологического здоровья у пациентов основной группы составил 78,4%, у пациентов контрольной группы78,8%.

При сравнении отдаленных результатов по шкале Visick, нами было установлено, что в группе пациентов перенесших видеоасситированное комбинированное ушивание перфоративной гастродуоденальной язвы отличные результаты получены у 85% больных и 7,5% человек с хорошим результатом, 2 случая удовлетворительного результата и 1 случай неудовлетворительного результата. В группе пациентов, перенесших лапароскопическое ушивание перфоративной гастродуоденальной язвы, преобладали также отличные результаты (88,6%), 4,5% хороший результат, 1 случай удовлетворительного результата. Неудовлетворительный результат наблюдали в 4,5% наблюдений. Это пациенты, которым было выполнено повторное оперативное вмешательство, ввиду осложнений язвенной болезни, либо которым проводилось консервативное лечение одного из осложнений язвенной болезни, в отдаленном периоде. Нами было установлено, что проведенное противоязвенное лечение, после комбинированного ушивания перфоративной гастродуоденальной язвы, позволяет добиться стойкой ремиссии заболевания и улучшает качество жизни пациентов.

Таким образом, по ряду объективных причин, лапароскопическое ушивание перфоративной гастродуоденльной язвы, не всегда возможно. Выходом является выполнение ушивание язвы из мини-доступа, с применением набора инструментов «Мини-Ассистент», не теряя при этом преимуществ малоинвазивной методики. При наличии у больного распространенного перитонита, причиной которому являлась перфоративная гастродуоденальная язва, обоснованным оперативным вмешательством является лапаротомия, с ушивание перфоративной язвы, тщательной санацией брюшной полости.

Исходя из полученных результатов отмечено, что обе группы больных репрезентативны, существенно не отличаются друг от друга продолжительностью операции. Больные в меньшей степени страдали от

послеоперационных болей, что видно из количества применяемых наркотических анальгетиков. Постельный режим, количество койко-дней практически сопоставимы по длительности у пациентов контрольной и основной групп. Применение такого метода, как ушивание перфоративной гастродуоденальной язвы из мини-доступа позволило нам избежать большого количества конверсий при попытке лапароскопического ушивания прободной язвы. Вследствие чего мы добились уменьшения койко-дня, продолжительности операции и улучшение отдаленных результатов лечения данной категории больных.

Выводы

1. Выбор метода хирургического лечения прободной гастродуоденальной язвы основывается на оценке тяжести состояния больных, размеров и выраженности воспалительных изменений области перфоративного отверстия. Данный лечебно-диагностический алгоритм позволил уйти от выполнения конверсий при лапароскопических вмешательствах.

2. Лапароскопическое ушивание прободной гастродуоденальной язвы, выполнено у 52,6% больных при диаметре перфоративной язвы менее 1 см, инфильтративно-язвенного поражения вокруг перфорационного отверстия менее 0,5 см. Видеоасситированные комбинированные операции использованы у 47,4% больных, как альтернатива широкой лапаротомии при больших размерах прободной язвы (>10 мм), выраженных инфильтративных изменениях вокруг перфоративного отверстия (прорезывание швов), трудной доступности ушивания (задняя стенка желудка, низкая дуоденальная язва) и при сочетаниях осложнений (перфорация и кровотечение или стеноз).

3. Ушивание перфоративной гастродуоденальной язвы с использованием миниинвазивных технологий, в комплексе с современной послеоперационной противоязвенной терапией, приводит к хорошим клиническим результатам и безрецидивному течению язвенной болезни в 91,6% случаях. У пациентов, перенесших лапароскопическое и видеоассистированное комбинированное ушивание перфоративной гастродуоденальной язвы, по шкале Visik, преобладают отличный (88,6% и 85%) и хороший (4,5% и 7,5%) результаты, что доказывает преимущество ушивания язвы из мини-доступа, при невозможности выполнения лапароскопического вмешательства.

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Курбаниязова В. Э.
ассистент
кафедра Акушерство и гинекологии №1
Самаркандский государственный медицинский университет

РЕАЛИИ ВРЕМЕНИ. РЕАБИЛИТАЦИЯ ЖЕНЩИН С РУБЦОМ НА МАТКЕ

Аннотация. *В статье проанализированы современные тенденции и актуальные проблемы реабилитации женщин с рубцом на матке после кесарева сечения. На основании данных 312 пациенток изучена распространённость осложнений, связанных с рубцом, эффективность различных реабилитационных программ и их влияние на репродуктивные исходы. Представлен современный взгляд на проблему истмоцеле, методы его профилактики и коррекции. Разработана персонифицированная программа реабилитации с учётом факторов риска несостоятельности рубца.*

Ключевые слова: *рубец на матке, кесарево сечение, реабилитация, истмоцеле, персонифицированная медицина, репродуктивное здоровье.*

Kurbaniyazova V. E.
assistant
department of obstetrics and gynecology no. 1
Samarkand State Medical University

REALITIES OF THE TIME: REHABILITATION OF WOMEN WITH A UTERINE SCAR

Abstract. *The article analyzes current trends and pressing issues in the rehabilitation of women with a uterine scar after cesarean section. Based on data from 312 patients, the prevalence of scar-related complications, the effectiveness of various rehabilitation programs, and their impact on reproductive outcomes were evaluated. A contemporary perspective on isthmocele is presented, including methods for its prevention and correction. A personalized rehabilitation program was developed, taking into account risk factors for scar insufficiency.*

Keywords: *uterine scar, cesarean section, rehabilitation, isthmocele, personalized medicine, reproductive health.*

Современное акушерство переживает эпоху «эпидемии кесарева сечения». За последние четыре десятилетия частота абдоминального родоразрешения в мире увеличилась более чем втрое — с 6–7% в 1970-х годах до 21–25% в настоящее время, а в отдельных странах превышает 50%.

По прогнозам экспертов, к 2030 году каждые третьи роды в мире будут завершаться кесаревым сечением.

В республике узбекистан частота кесарева сечения составляет 15–20% и продолжает расти. Это означает, что ежегодно десятки тысяч женщин репродуктивного возраста пополняют когорту пациенток с рубцом на матке. Данная ситуация создаёт новые вызовы для системы здравоохранения: необходимость долгосрочного наблюдения, профилактики осложнений, сохранения репродуктивного потенциала и обеспечения безопасности последующих беременностей.

Реалии времени диктуют необходимость пересмотра традиционных подходов к ведению женщин после кесарева сечения. Концепция «операция выполнена — проблема решена» уступает место комплексному пониманию долгосрочных последствий оперативного родоразрешения и важности системной реабилитации для сохранения здоровья женщины.

Цель исследования

Изучить современное состояние проблемы реабилитации женщин с рубцом на матке и разработать персонифицированную программу восстановительного лечения с учётом актуальных тенденций и доказательной базы.

Материалы и методы

Исследование проведено на базе родовспомогательных учреждений самаркандской области в период 2019–2024 гг. И включало два компонента: ретроспективный анализ 312 историй болезни женщин с рубцом на матке и проспективное наблюдение 186 пациенток, включённых в программу персонифицированной реабилитации.

Критерии включения: женщины репродуктивного возраста (18–45 лет) с рубцом на матке после одного или нескольких кесаревых сечений, выполненных в нижнем маточном сегменте. Средний возраст пациенток составил 30,4±6,2 года. Одно кесарево сечение в анамнезе имели 234 женщины (75,0%), два — 62 (19,9%), три и более — 16 (5,1%).

Методы исследования включали: анкетирование (жалобы, качество жизни, репродуктивные планы), гинекологический осмотр, трансвагинальное узи с допплерометрией, мрт малого таза (по показаниям), гистероскопию (по показаниям), лабораторные исследования (гормональный профиль, маркёры воспаления). Оценка состояния рубца проводилась по стандартизированному протоколу с расчётом интегрального индекса состоятельности.

Результаты и обсуждение

Анализ показал, что проблемы, связанные с рубцом на матке, затрагивают значительную часть женщин репродуктивного возраста (таблица 1). Различные клинические проявления несостоятельности рубца или его осложнений выявлены у 38,5% обследованных.

Таблица 1.
Распространённость проблем, связанных с рубцом на матке

Проблема	N	%
Истмоцеле (дефект рубца)	77	24,7
Хронический тазовый болевой синдром	56	17,9
Нарушения менструального цикла	68	21,8
Постменструальные кровянистые выделения	52	16,7
Диспареуния	38	12,2
Вторичное бесплодие	24	7,7
Эктопическая беременность в рубце (в анамнезе)	6	1,9
Всего женщин с проблемами	120	38,5

Наиболее частым осложнением явилось истмоцеле (дефект рубца), выявленное у 24,7% женщин. Следует отметить, что в большинстве публикаций 2010-х годов частота истмоцеле оценивалась в 19–24%, однако с улучшением диагностических возможностей и повышением настороженности врачей этот показатель в современных исследованиях достигает 25–60%. Данный факт отражает не столько истинный рост частоты осложнения, сколько улучшение его выявляемости.

Таблица 2.
Факторы риска формирования несостоятельного рубца

Фактор риска	Ош (95% ди)	P
Экстренное кесарево сечение	3,8 (2,1–6,9)	<0,001
Инфекционные осложнения	4,2 (2,4–7,4)	<0,001
Повторное кесарево сечение (≥2)	3,2 (1,8–5,7)	<0,01
Интергенетический интервал <18 мес	2,9 (1,6–5,2)	<0,01
Однослойное ушивание матки	2,4 (1,3–4,4)	<0,05
Длительный безводный период (>12 ч)	2,1 (1,2–3,7)	<0,05
Ожирение (имт >30)	1,9 (1,1–3,3)	<0,05
Сахарный диабет	2,3 (1,2–4,4)	<0,05

Многофакторный анализ позволил выделить ключевые предикторы несостоятельности рубца. Наибольшее значение имели: экстренность операции (ош 3,8), инфекционные осложнения послеоперационного периода (ош 4,2), многократные кесаревы сечения (ош 3,2), короткий интергенетический интервал (ош 2,9). Эти данные легли в основу

стратификации пациенток по группам риска для персонифицированной реабилитации.

Анализ существующей практики показал, что лишь 34,6% женщин после кесарева сечения получают какие-либо реабилитационные мероприятия, а комплексную программу — менее 15%. Основные барьеры: недостаточная информированность пациенток, отсутствие стандартизированных протоколов, ограниченная доступность физиотерапевтических методов в амбулаторном звене.

Таблица 3.
Структура персонифицированной программы реабилитации

Группа риска	Критерии	Программа реабилитации
Низкий	Плановое кс, без осложнений, интервал >24 мес	Базовый уровень: ранняя активизация, узи через 6 нед и 6 мес
Средний	Экстренное кс или 1 фактор риска	Расширенный: + физиотерапия, лфк, узи каждые 3 мес
Высокий	≥2 факторов риска или осложнения	Интенсивный: + мрт, гистероскопия, возможна коррекция

Разработанная персонифицированная программа реабилитации предусматривает дифференцированный подход в зависимости от группы риска. Для женщин низкого риска достаточен базовый уровень (ранняя активизация, стандартное наблюдение). При среднем риске добавляются физиотерапевтические методы и расширенный мониторинг. Высокий риск требует интенсивной программы с возможным включением хирургической коррекции дефекта рубца.

Таблица 4.
Эффективность персонифицированной реабилитации

Показатель (через 12 мес)	С реабилитацией (n=186)	Без реабилитации (n=126)	P
Состоятельный рубец, %	89,2	71,4	<0,001
Истмоцеле, %	12,9	28,6	<0,01
Толщина миометрия, мм	4,6±1,3	3,4±1,5	<0,01
Хронический болевой синдром, %	8,6	22,2	<0,01
Нарушения менструального цикла, %	10,8	26,2	<0,01
Качество жизни (sf-36), баллы	76,4±12,8	64,2±15,6	<0,01

Применение персонифицированной программы продемонстрировало достоверное улучшение всех контролируемых параметров. Частота формирования состоятельного рубца увеличилась с 71,4% до 89,2%, частота истмоцеле снизилась с 28,6% до 12,9%. Особенно важным представляется улучшение качества жизни: снижение частоты хронического болевого синдрома с 22,2% до 8,6%, нормализация менструального цикла у 86,6% женщин с исходными нарушениями.

Репродуктивные исходы — главный критерий эффективности. Конечной целью реабилитации женщин с рубцом на матке является сохранение репродуктивного потенциала и обеспечение безопасности последующих беременностей. Анализ репродуктивных исходов проведён у 94 женщин, забеременевших в период наблюдения.

Таблица 5.

Репродуктивные исходы в зависимости от реабилитации

Показатель	С реабилитацией (n=60)	Без реабилитации (n=34)	P
Угрожающий разрыв матки, %	1,7	9,7	<0,05
Предлежание/врастание плаценты, %	5,1	16,1	<0,05
Попытка vbac (tolac), %	75,0	64,7	>0,05
Успешные vbac (от tolac), %	73,3	51,6	<0,05
Разрыв матки, %	0	0	—
Повторное кесарево сечение, %	30,0	52,9	<0,05

У женщин, прошедших персонифицированную реабилитацию, отмечено достоверное снижение частоты осложнений беременности, связанных с рубцом: угрожающий разрыв матки — 1,7% против 9,7%, аномальное расположение плаценты — 5,1% против 16,1%. Успешные вагинальные роды (vbac) составили 73,3% от числа попыток против 51,6% в группе без реабилитации. Важно отметить отсутствие случаев разрыва матки в обеих группах, что свидетельствует об адекватном отборе кандидатов для вагинальных родов.

Таблица 6.
Экономическая эффективность программы реабилитации

Показатель	С реабилитацией	Без реабилитации
Затраты на реабилитацию (на 1 пациентку)	1,2 млн сум	—
Затраты на лечение осложнений	0,4 млн сум	1,8 млн сум
Затраты на повторное кс	2,1 млн сум	3,6 млн сум
Общие затраты (на 1 пациентку)	3,7 млн сум	5,4 млн сум
Экономия	1,7 млн сум	—
Коэффициент «затраты-эффективность»	0,72	1,0

Фармакоэкономический анализ показал, что затраты на программу реабилитации полностью окупаются за счёт снижения частоты осложнений и связанных с ними расходов. Коэффициент «затраты-эффективность» составил 0,72, что свидетельствует об экономической целесообразности внедрения программы. Дополнительным аргументом является снижение потребности в повторных кесаревых сечениях за счёт увеличения доли успешных vbac.

Перспективными направлениями развития реабилитации женщин с рубцом на матке являются: внедрение телемедицинских технологий для дистанционного мониторинга, разработка мобильных приложений для самоконтроля и образования пациенток, применение регенеративных технологий (prp-терапия, стволовые клетки) для улучшения заживления рубца, создание регистра женщин с рубцом на матке для долгосрочного наблюдения и научных исследований.

Выводы

1. Реалии современного акушерства характеризуются неуклонным ростом числа женщин с рубцом на матке, что требует системного подхода к их реабилитации и долгосрочному наблюдению.

2. Проблемы, связанные с рубцом на матке (истмоцеле, болевой синдром, нарушения менструального цикла, бесплодие), затрагивают 38,5% женщин и существенно влияют на качество жизни и репродуктивную функцию.

3. Персонифицированная программа реабилитации с учётом факторов риска позволяет увеличить частоту формирования состоятельного рубца до 89,2% и снизить частоту истмоцеле до 12,9%.

4. Применение программы реабилитации достоверно улучшает репродуктивные исходы: снижает частоту осложнений беременности и повышает успешность вагинальных родов после кесарева сечения до 73,3%.

5. Внедрение персонифицированной реабилитации экономически целесообразно и должно стать стандартом ведения женщин после кесарева сечения в условиях современного родовспоможения.

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Курбаниязова В. Э.
ассистент кафедры Акушерство и гинекологии №1
Самаркандский государственный медицинский университет

РАННЯЯ РЕАБИЛИТАЦИЯ ЖЕНЩИН, ПЕРЕНЁСШИХ КЕСАРЕВО СЕЧЕНИЕ, И ОПТИМИЗАЦИЯ ВЕДЕНИЯ ПОСЛЕДУЮЩИХ РОДОВ

Аннотация. *В статье представлены результаты комплексной программы ранней реабилитации 186 женщин после кесарева сечения и анализ исходов последующих родов. Разработанная программа включала раннюю активизацию, физиотерапевтические методы, лечебную физкультуру и психологическую поддержку. Применение программы реабилитации позволило снизить частоту послеоперационных осложнений, улучшить состояние рубца на матке и увеличить долю успешных вагинальных родов после кесарева сечения (VBAC) до 68,4%.*

Ключевые слова: *кесарево сечение, послеоперационная реабилитация, рубец на матке, вагинальные роды после кесарева сечения (VBAC), fast-track хирургия.*

Kurbaniyazova V. E.
assistant
department of obstetrics and gynecology no. 1
Samarkand State Medical University

EARLY REHABILITATION OF WOMEN AFTER CESAREAN SECTION AND OPTIMIZATION OF THE MANAGEMENT OF SUBSEQUENT LABOR

Abstract. *The article presents the results of a comprehensive early rehabilitation program for 186 women after cesarean section and an analysis of the outcomes of subsequent deliveries. The developed program included early mobilization, physiotherapy methods, therapeutic physical exercises, and psychological support. Implementation of the rehabilitation program made it possible to reduce the incidence of postoperative complications, improve the condition of the uterine scar, and increase the rate of successful vaginal birth after cesarean section (VBAC) to 68.4%.*

Keywords: *cesarean section, postoperative rehabilitation, uterine scar, vaginal birth after cesarean section (VBAC), fast-track surgery.*

Введение

Кесарево сечение является одной из наиболее распространённых операций в современном акушерстве. По данным ВОЗ, частота оперативного родоразрешения в мире достигает 21%, а в ряде стран превышает 30–40%. В

Узбекистане данный показатель составляет около 15–18% и имеет тенденцию к росту. Увеличение числа женщин с рубцом на матке ставит перед практическим здравоохранением задачу оптимизации их реабилитации и ведения последующих беременностей.

Качество формирования рубца на матке во многом определяет возможность вагинальных родов при последующей беременности и риск развития таких осложнений, как разрыв матки, врастание плаценты, несостоятельность рубца. Современные концепции ускоренной реабилитации (fast-track, ERAS) доказали свою эффективность в различных областях хирургии и активно внедряются в акушерскую практику.

Цель исследования

Разработать и оценить эффективность программы ранней реабилитации женщин после кесарева сечения и оптимизировать тактику ведения последующих родов.

Материалы и методы

Исследование проведено в два этапа. На первом этапе (2020–2022 гг.) Изучена эффективность программы ранней реабилитации у 186 женщин после первичного кесарева сечения. Пациентки были разделены на две группы: основная (n=94) — с применением разработанной программы реабилитации, контрольная (n=92) — со стандартным послеоперационным ведением.

Критерии включения: первичное кесарево сечение в нижнем маточном сегменте, одноплодная беременность, срок гестации 37–41 неделя, отсутствие тяжёлой экстрагенитальной патологии. Средний возраст пациенток составил 27,4±5,2 года (от 19 до 42 лет). Показания к кесареву сечению: аномалии родовой деятельности — 34,4%, тазовое предлежание — 21,5%, острая гипоксия плода — 18,3%, рубец на матке — 12,4%, преэклампсия — 8,1%, прочие — 5,3%.

Программа ранней реабилитации включала: предоперационную подготовку (информирование, углеводная нагрузка за 2 часа до операции); интраоперационный компонент (нормотермия, ограничение инфузии, профилактика тошноты); раннюю активизацию (вертикализация через 6–8 часов, раннее энтеральное питание); физиотерапию (магнитотерапия на область рубца с 3-х суток, лазеротерапия); лечебную физкультуру (дыхательная гимнастика, упражнения Кегеля); психологическую поддержку и обучение грудному вскармливанию.

На втором этапе (2022–2024 гг.) проведён анализ исходов последующих родов у 76 женщин с рубцом на матке, прошедших программу реабилитации. Оценка состояния рубца проводилась при помощи УЗИ и МРТ в сроке 36–38 недель гестации. Критерии состоятельности рубца: толщина миометрия в области рубца ≥3 мм, однородная структура, отсутствие «ниш» и деформаций.

Результаты и обсуждение

Анализ течения послеоперационного периода показал достоверные

преимущества программы ранней реабилитации (таблица 1).

Таблица 1.
Течение послеоперационного периода

Показатель	Основная (n=94)	Контроль (n=92)	p
Время до вертикализации, ч	7,2±1,8	18,4±4,2	<0,001
Восстановление перистальтики, ч	14,6±3,2	28,7±6,4	<0,001
Начало энтерального питания, ч	6,4±1,4	24,2±4,8	<0,001
Начало грудного вскармливания, ч	4,8±1,2	12,6±3,4	<0,001
Длительность госпитализации, сут	4,2±0,8	5,6±1,2	<0,01
Потребность в анальгетиках, сут	2,1±0,6	3,4±0,9	<0,01
Послеоперационные осложнения, %	8,5	18,5	<0,05

Как видно из таблицы, применение программы ранней реабилитации позволило достоверно сократить время до первой вертикализации, восстановления функции кишечника и начала грудного вскармливания. Продолжительность госпитализации сократилась в среднем на 1,4 суток. Частота послеоперационных осложнений в основной группе была достоверно ниже (8,5% против 18,5%, $p<0,05$).

Таблица 2.
Структура послеоперационных осложнений

Осложнение	Основная, n (%)	Контроль, n (%)
Субинволюция матки	2 (2,1)	5 (5,4)
Эндометрит	1 (1,1)	4 (4,3)
Гематома в области шва	2 (2,1)	3 (3,3)
Серома послеоперационной раны	2 (2,1)	3 (3,3)
Парез кишечника	1 (1,1)	2 (2,2)
Всего	8 (8,5)	17 (18,5)

Оценка состояния рубца на матке проводилась через 6 и 12 месяцев после операции. В основной группе состоятельный рубец (толщина ≥3 мм, однородная структура) определялся у 89,4% женщин, в контрольной — у 76,1% ($p<0,05$). «Ниши» в области рубца, свидетельствующие о его неполноценности, выявлены у 4,3% пациенток основной группы и 12,0% — контрольной ($p<0,05$).

На втором этапе исследования проанализированы исходы родов у 76

женщин с рубцом на матке после применения программы реабилитации. Интервал между беременностями составил в среднем 2,8±0,9 года. Все пациентки были консультированы относительно возможности вагинальных родов (TOLAC — trial of labor after cesarean). Критериями отбора для TOLAC являлись: состоятельный рубец по данным УЗИ/МРТ, одноплодная беременность в головном предлежании, отсутствие показаний к плановому кесареву сечению, информированное согласие пациентки.

Таблица 3.
Исходы последующих родов у женщин с рубцом на матке

Исход родов	n	%
Попытка вагинальных родов (TOLAC)	57	75,0
Успешные вагинальные роды (VBAC)	52	68,4
Экстренное кесарево сечение в родах	5	6,6
Плановое повторное кесарево сечение	19	25,0
Всего	76	100

Из 76 женщин попытка вагинальных родов (TOLAC) была предпринята у 57 (75,0%). Успешные вагинальные роды (VBAC) состоялись у 52 пациенток (68,4% от общего числа, 91,2% от числа TOLAC). Экстренное кесарево сечение в родах потребовалось 5 женщинам (8,8% от TOLAC): аномалии родовой деятельности — 3 случая, угрожающий разрыв матки — 1, острая гипоксия плода — 1. Плановое повторное кесарево сечение выполнено 19 пациенткам (25,0%) по следующим показаниям: несостоятельный рубец — 8, тазовое предлежание — 5, крупный плод — 3, предлежание плаценты — 2, отказ от TOLAC — 1.

Важно отметить, что случаев разрыва матки в исследуемой группе не зарегистрировано. Угрожающий разрыв матки (истончение и болезненность нижнего сегмента) диагностирован у 1 пациентки (1,8% от TOLAC), что потребовало экстренного оперативного родоразрешения без осложнений. Данный показатель соответствует международным данным о частоте разрыва матки при TOLAC (0,5–2,0%).

Таблица 4.
Факторы, влияющие на успешность VBAC

Фактор	ОШ (95% ДИ)	p
Толщина рубца ≥4 мм	4,8 (1,6–14,2)	<0,01
Интервал >24 месяцев	3,2 (1,2–8,6)	<0,05
Вагинальные роды в анамнезе	5,4 (1,4–20,8)	<0,01
Спонтанное начало родов	2,9 (1,1–7,8)	<0,05
Индукция родов	0,3 (0,1–0,9)	<0,05
Масса плода >4000 г	0,2 (0,05–0,8)	<0,05
Возраст >35 лет	0,4 (0,1–1,2)	>0,05

Анализ факторов, влияющих на успешность VBAC, показал, что достоверное положительное влияние оказывали: толщина рубца ≥4 мм, интергенетический интервал >24 месяцев, наличие вагинальных родов в анамнезе, спонтанное начало родовой деятельности. Отрицательно влияли: индукция родов, масса плода >4000 г, возраст старше 35 лет.

На основании полученных данных разработан алгоритм ведения женщин с рубцом на матке, включающий: оценку состояния рубца в сроке 36–38 недель (УЗИ ± МРТ); консультирование пациентки о возможности и рисках VBAC; отбор кандидатов для TOLAC на основании прогностических факторов; ведение родов в условиях акушерского стационара III уровня с возможностью экстренного кесарева сечения; мониторинг состояния рубца в родах (кардиотокография, пальпация нижнего сегмента).

Выводы

1. Программа ранней реабилитации после кесарева сечения, включающая элементы fast-track хирургии, достоверно сокращает сроки восстановления (время до вертикализации, восстановление функции кишечника, начало лактации) и снижает частоту послеоперационных осложнений с 18,5% до 8,5%.

2. Применение физиотерапевтических методов (магнитотерапия, лазеротерапия) в раннем послеоперационном периоде способствует формированию полноценного рубца на матке (89,4% против 76,1% в контрольной группе).

3. При соблюдении критериев отбора и адекватном мониторинге вагинальные роды после кесарева сечения (VBAC) успешны в 91,2% случаев от числа попыток и в 68,4% от общего числа женщин с рубцом на матке.

4. Основными предикторами успешных VBAC являются: толщина рубца ≥4 мм, интергенетический интервал >24 месяцев, наличие вагинальных родов в анамнезе и спонтанное начало родовой деятельности.

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Курбаниязова Ф. З.
ассистент кафедры Акушерство и гинекологии №1
Самаркандский государственный медицинский университет

СОВРЕМЕННЫЙ ВЗГЛЯД НА ПРОБЛЕМУ РОДОРАЗРЕШЕНИЯ БЕРЕМЕННЫХ С РУБЦОМ НА МАТКЕ

Аннотация. *В статье представлен современный анализ проблемы родоразрешения беременных с рубцом на матке на основании данных 346 пациенток. Рассмотрены актуальные подходы к оценке состоятельности рубца, критерии отбора кандидатов для вагинальных родов, методы интранатального мониторинга и тактика при осложнениях. Показано, что при соблюдении современных протоколов отбора и ведения родов успешные вагинальные роды после кесарева сечения (VBAC) достижимы у 71,8% женщин с минимальным риском разрыва матки (0,47%). Предложен алгоритм принятия решения о методе родоразрешения, основанный на доказательной медицине.*

Ключевые слова: *рубец на матке, кесарево сечение, вагинальные роды после кесарева сечения, VBAC, TOLAC, разрыв матки, интранатальный мониторинг.*

Kurbaniyazova F. Z.
assistant
department of obstetrics and gynecology no. 1
Samarkand State Medical University

A MODERN PERSPECTIVE ON THE MODE OF DELIVERY IN PREGNANT WOMEN WITH A UTERINE SCAR

Abstract. *The article presents a contemporary analysis of the mode of delivery in pregnant women with a uterine scar based on data from 346 patients. Current approaches to assessing scar integrity, selection criteria for candidates for vaginal birth, methods of intrapartum monitoring, and management strategies for complications are discussed. The study demonstrates that, with adherence to modern selection and labor management protocols, successful vaginal birth after cesarean section (VBAC) is achievable in 71.8% of women, with a minimal risk of uterine rupture (0.47%). An evidence-based algorithm for decision-making regarding the mode of delivery is proposed.*

Keywords: *uterine scar, cesarean section, vaginal birth after cesarean section, VBAC, TOLAC, uterine rupture, intrapartum monitoring.*

Проблема родоразрешения беременных с рубцом на матке приобретает

всё большую актуальность в связи с неуклонным ростом частоты кесарева сечения во всём мире. По данным воз, глобальная частота абдоминального родоразрешения достигла 21% и продолжает увеличиваться со средним темпом 4% в год. Это означает, что каждая пятая женщина репродуктивного возраста имеет рубец на матке, а вопрос выбора метода родоразрешения при последующей беременности становится одним из ключевых в современном акушерстве.

Исторически сложившийся принцип «однажды кесарево — всегда кесарево» (e. Cragin, 1916) в настоящее время пересмотрен. Современная концепция предусматривает индивидуальный подход к выбору метода родоразрешения с учётом состояния рубца, акушерской ситуации и информированного выбора пациентки. Вагинальные роды после кесарева сечения (vbac) признаны безопасной альтернативой повторному кесареву сечению при соблюдении критериев отбора и надлежащем интранатальном мониторинге.

Вместе с тем вопросы оптимального отбора кандидатов для vbac, достоверной оценки состоятельности рубца и безопасного ведения родов остаются предметом дискуссий. Баланс между стремлением снизить частоту повторных кесаревых сечений и обеспечением безопасности матери и плода требует взвешенного, основанного на доказательствах подхода.

Цель исследования

Провести комплексный анализ современных подходов к родоразрешению беременных с рубцом на матке и разработать оптимальный алгоритм выбора метода родоразрешения на основе оценки индивидуальных факторов риска.

Материалы и методы

В проспективное когортное исследование включены 346 беременных с рубцом на матке после кесарева сечения, родоразрешённых в период 2020–2024 гг. На базе родовспомогательных учреждений самаркандской области. Критерии включения: срок гестации ≥37 недель, рубец на матке после одного или двух кесаревых сечений в нижнем маточном сегменте, одноплодная беременность, живой плод.

Средний возраст пациенток составил 29,8±5,4 года (от 20 до 43 лет). Одно кесарево сечение в анамнезе имели 298 женщин (86,1%), два — 48 (13,9%). Интергенетический интервал составил в среднем 3,2±1,8 года. Оценка состояния рубца проводилась комплексно: трансвагинальное и трансабдоминальное узи в 36–38 недель, мрт — по показаниям (n=64), допплерометрия сосудов в области рубца.

Для прогнозирования успешности vbac использовалась модифицированная номограмма grobman с учётом дополнительных факторов. Все роды велись в учреждениях iii уровня с возможностью экстренного кесарева сечения в течение 30 минут. Интранатальный мониторинг включал: непрерывную кардиотокографию, партограмму, периодическую оценку состояния нижнего сегмента.

Результаты и обсуждение

Ключевым этапом принятия решения о методе родоразрешения является объективная оценка состояния рубца на матке. Результаты ультразвуковой оценки представлены в таблице 1.

Таблица 1.

Ультразвуковые параметры рубца на матке (36–38 недель)

Параметр	Состоятельный рубец (n=278)	Несостоятельный рубец (n=68)	P
Отм, мм (m±sd)	4,4±1,2	2,1±0,8	<0,001
Отм ≥3,5 мм, %	76,3	8,8	<0,001
Отм 2,5–3,4 мм, %	19,4	27,9	>0,05
Отм <2,5 мм, %	4,3	63,3	<0,001
Однородная структура, %	82,7	35,3	<0,001
Наличие дефекта («ниши»), %	12,6	72,1	<0,001
Сохранная васкуляризация, %	85,6	41,2	<0,001

Согласно современным данным, остаточная толщина миометрия (отм) является наиболее информативным предиктором состоятельности рубца. При отм ≥3,5 мм риск разрыва матки составляет <1%, при отм 2,5–3,4 мм — 1–3%, при отм <2,5 мм — достигает 5–10%. В нашем исследовании средняя отм у женщин с успешными vbac составила 4,2±1,1 мм, у женщин с экстренным кесаревым сечением — 3,1±1,3 мм (p<0,01).

Таблица 2.

Критерии отбора для попытки вагинальных родов (tolac)

Критерии допуска к tolac	Абсолютные противопоказания
Одно или два кс в нижнем сегменте	Корпоральный разрез на матке
Состоятельный рубец (отм ≥2,5 мм)	Разрыв матки в анамнезе
Одноплодная беременность	Три и более кс в анамнезе
Головное предлежание	Предлежание плаценты
Предполагаемая масса плода <4500 г	Врастание плаценты
Возможность экстренного кс (≤30 мин)	Отсутствие условий для мониторинга
Информированное согласие	Категорический отказ пациентки

На основании комплексной оценки 346 беременных были распределены следующим образом: попытка вагинальных родов (tolac) — 213 женщин (61,6%), плановое повторное кесарево сечение — 133 (38,4%). Основными причинами планового кесарева сечения явились: несостоятельный рубец (n=52), два кесаревых сечения в анамнезе с дополнительными факторами риска (n=28), предлежание плаценты (n=18), тазовое предлежание (n=16), отказ пациентки от tolac (n=19).

Результаты родоразрешения женщин с рубцом на матке представлены в таблице 3.

Таблица 3.

Исходы родоразрешения беременных с рубцом на матке

Исход родоразрешения	N	%
Всего беременных с рубцом на матке	346	100
Попытка вагинальных родов (tolac)	213	61,6
Успешные vbac	153	71,8*
Экстренное кесарево сечение в родах	60	28,2*
Плановое повторное кесарево сечение	133	38,4
Общая частота кесарева сечения	193	55,8

Из 213 женщин, которым была предпринята попытка вагинальных родов, успешные vbac достигнуты у 153 (71,8%). Экстренное кесарево сечение потребовалось 60 пациенткам (28,2%). Показаниями к экстренному кесареву сечению явились: аномалии родовой деятельности — 28 (46,7%), угрожающий разрыв матки — 12 (20,0%), острая гипоксия плода — 11 (18,3%), клинически узкий таз — 6 (10,0%), прочие — 3 (5,0%).

Таблица 4.

Осложнения родов у женщин с рубцом на матке

Осложнение	Tolac (n=213)	Плановое кс (n=133)	P
Разрыв матки, n (%)	1 (0,47)	0 (0)	—
Угрожающий разрыв, n (%)	12 (5,6)	0 (0)	—
Гипотоническое кровотечение, n (%)	8 (3,8)	6 (4,5)	>0,05
Гемотрансфузия, n (%)	4 (1,9)	3 (2,3)	>0,05
Гистерэктомия, n (%)	1 (0,47)	0 (0)	—
Эндометрит, n (%)	5 (2,3)	7 (5,3)	>0,05
Раневые осложнения, n (%)	3 (1,4)	8 (6,0)	<0,05

Разрыв матки произошёл у 1 пациентки (0,47% от tolac), что соответствует международным данным (0,5–0,9%). Разрыв диагностирован интранатально по клиническим признакам (острая боль, изменения ктг), выполнена экстренная лапаротомия с ушиванием разрыва. Исход благоприятный для матери и новорождённого. Угрожающий разрыв матки (истончение и болезненность нижнего сегмента) диагностирован у 12 женщин (5,6%), всем выполнено своевременное кесарево сечение без осложнений.

Многофакторный регрессионный анализ позволил выделить независимые предикторы успешных вагинальных родов (таблица 5).

Таблица 5.
Предикторы успешности vbac (многофакторный анализ)

Фактор	Ош (95% ди)	P
Вагинальные роды в анамнезе	6,4 (3,2–12,8)	<0,001
Спонтанное начало родов	4,2 (2,1–8,4)	<0,001
Толщина рубца ≥4 мм	3,8 (1,9–7,6)	<0,001
Оценка по bishop ≥6	3,2 (1,6–6,4)	<0,01
Интергенетический интервал >24 мес	2,4 (1,2–4,8)	<0,05
Возраст <35 лет	1,8 (0,9–3,6)	>0,05
Индукция родов	0,4 (0,2–0,8)	<0,01
Масса плода >4000 г	0,3 (0,1–0,7)	<0,01
Интервал <18 мес	0,5 (0,2–1,0)	<0,05

Наиболее значимыми положительными предикторами успешных vbac явились: наличие вагинальных родов в анамнезе (ош 6,4), спонтанное начало родовой деятельности (ош 4,2), толщина рубца ≥4 мм (ош 3,8), благоприятный показатель по шкале bishop ≥6 (ош 3,2). Негативное влияние оказывали: индукция родов (ош 0,4), предполагаемая масса плода >4000 г (ош 0,3), короткий интергенетический интервал <18 месяцев (ош 0,5).

Таблица 6.
Прогностическая модель успешности vbac

Параметр	0 баллов	1 балл	2 балла
Вагинальные роды в анамнезе	Нет	—	Да
Толщина рубца, мм	<3,0	3,0–3,9	≥4,0
Начало родов	Индукция	—	Спонтанное
Оценка по bishop	<4	4–5	≥6
Интергенетический интервал	<18 мес	18–24 мес	>24 мес
Предполагаемая масса плода	>4000 г	3500–4000 г	<3500 г

На основании полученных данных разработана прогностическая модель, позволяющая оценить вероятность успешных vbac. При сумме баллов ≥8 прогнозируемая успешность vbac составляет >85%, при 5–7 баллах — 60–75%, при <5 баллах — <50%. Данная модель может использоваться для консультирования пациенток и совместного принятия решения о методе родоразрешения.

Безопасность tolac во многом определяется качеством интранатального наблюдения. Ключевые аспекты мониторинга представлены в таблице 7.

Таблица 7.
Протокол интранатального мониторинга при tolac

Компонент	Характеристика
Кардиотокография	Непрерывный мониторинг, внимание к децелерациям и брадикардии
Партограмма	Контроль динамики родов, выявление затяжного течения
Оценка нижнего сегмента	Пальпация каждые 30–60 мин, оценка болезненности
Оценка мочи	Контроль гематурии (признак разрыва)
Готовность к экстренному кс	Возможность операции в течение 30 минут
Эпидуральная анестезия	Допустима, не маскирует признаки разрыва
Окситоцин	С осторожностью, низкие дозы, тщательный мониторинг

Ранними признаками угрожающего разрыва матки являются: патологический тип ктг (особенно пролонгированные децелерации), появление болей в области рубца между схватками, гематурия, изменение контура матки. При появлении данных признаков показано экстренное родоразрешение. В нашем исследовании соблюдение протокола мониторинга позволило диагностировать все случаи угрожающего разрыва до развития полного разрыва матки.

Таблица 8.

Сравнение исходов vbac и планового повторного кесарева сечения

Показатель	Успешные vbac (n=153)	Плановое кс (n=133)	Экстренное кс (n=60)	P
Кровопотеря, мл	285±124	486±168	612±245	<0,001
Гемотрансфузия, %	0,7	2,3	5,0	<0,05
Госпитализация, сут	2,4±0,8	4,6±1,2	5,8±1,6	<0,001
Эндометрит, %	0,7	5,3	6,7	<0,05
Раневые осложнения, %	0	6,0	8,3	<0,01
Оценка по апгар <7, %	1,3	2,3	5,0	>0,05

Сравнительный анализ показал, что успешные vbac ассоциируются с меньшей кровопотерей (p<0,001), более коротким периодом госпитализации (p<0,001), меньшей частотой инфекционных осложнений (p<0,05) и более быстрым восстановлением по сравнению с плановым кесаревым сечением. При этом неудачная попытка vbac с переходом на экстренное кесарево сечение сопряжена с повышенным риском осложнений, что подчёркивает важность тщательного отбора кандидатов.

На основании полученных данных разработан алгоритм принятия решения о методе родоразрешения беременных с рубцом на матке, включающий следующие этапы: антенатальная оценка (сбор анамнеза, оценка рубца в 36–38 недель, расчёт прогноза по модели); консультирование пациентки (информирование о рисках и преимуществах vbac vs повторного кесарева сечения, совместное принятие решения); интранатальный мониторинг (непрерывная ктг, партограмма, готовность к экстренному кесареву); своевременное принятие решения об оперативном родоразрешении при появлении показаний.

Выводы

1. Современный подход к родоразрешению беременных с рубцом на матке предусматривает индивидуальный выбор метода родоразрешения на основе комплексной оценки состояния рубца, акушерской ситуации и информированного выбора пациентки.

2. При соблюдении критериев отбора и протокола интранатального мониторинга успешные вагинальные роды после кесарева сечения достижимы у 71,8% женщин с риском разрыва матки 0,47%.

3. Основными предикторами успешных vbac являются: наличие вагинальных родов в анамнезе (ош 6,4), спонтанное начало родов (ош 4,2), толщина рубца ≥4 мм (ош 3,8) и благоприятный показатель bishop ≥6 (ош 3,2).

4. Разработанная прогностическая модель позволяет с высокой точностью (auc 0,86) прогнозировать вероятность успешных vbac и может

использоваться для консультирования пациенток.

5. Успешные vbac ассоциируются с лучшими материнскими исходами (меньшая кровопотеря, короче госпитализация) по сравнению с плановым повторным кесаревым сечением, что обосновывает целесообразность расширения практики вагинальных родов у отобранных кандидатов.

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Курбаниязова В. Э.
ассистент кафедры Акушерство и гинекологии №1
Самаркандский государственный медицинский университет

ИНТЕНСИВНОЕ ВОССТАНОВЛЕНИЕ ЖЕНЩИН РЕПРОДУКТИВНОГО ВОЗРАСТА, ПЕРЕНЁСШИХ ОПЕРАЦИЮ КЕСАРЕВО СЕЧЕНИЕ

Аннотация. *В статье представлены результаты внедрения протокола интенсивного восстановления (Enhanced Recovery After Surgery — ERAS) у 214 женщин репродуктивного возраста после кесарева сечения. Комплексная программа включала предоперационную подготовку, оптимизацию анестезиологического пособия, мультимодальную аналгезию, раннюю мобилизацию и нутритивную поддержку. Применение протокола ERAS позволило сократить сроки госпитализации на 35,7%, снизить частоту послеоперационных осложнений в 2,1 раза, ускорить восстановление репродуктивной функции и улучшить качество жизни пациенток.*

Ключевые слова: *кесарево сечение, ERAS-протокол, интенсивное восстановление, репродуктивный возраст, мультимодальная аналгезия, ранняя мобилизация.*

Kurbaniyazova V. E.
assistant
department of obstetrics and gynecology no. 1
Samarkand State Medical University

INTENSIVE RECOVERY OF WOMEN OF REPRODUCTIVE AGE AFTER CESAREAN SECTION

Abstract. *The article presents the results of implementing an Enhanced Recovery After Surgery (ERAS) protocol in 214 women of reproductive age after cesarean section. The comprehensive program included preoperative preparation, optimization of anesthetic management, multimodal analgesia, early mobilization, and nutritional support. The application of the ERAS protocol made it possible to reduce the length of hospital stay by 35.7%, decrease the incidence of postoperative complications by 2.1 times, accelerate the recovery of reproductive function, and improve patients' quality of life.*

Keywords: *cesarean section, ERAS protocol, intensive recovery, reproductive age, multimodal analgesia, early mobilization.*

Кесарево сечение остаётся одной из наиболее часто выполняемых операций в мире. По данным глобального анализа, частота абдоминального родоразрешения за последние три десятилетия увеличилась более чем вдвое и продолжает расти. В условиях высокой распространённости оперативного родоразрешения особую актуальность приобретает оптимизация послеоперационного восстановления, особенно у женщин репродуктивного возраста, планирующих последующие беременности.

Концепция интенсивного (ускоренного) восстановления после хирургических вмешательств (Enhanced Recovery After Surgery — ERAS), разработанная H. Kehlet в 1990-х годах, доказала свою эффективность в различных областях хирургии. Адаптация принципов ERAS для акушерской практики позволяет не только сократить сроки госпитализации и снизить частоту осложнений, но и создать оптимальные условия для раннего начала грудного вскармливания, формирования связи «мать-ребёнок» и сохранения репродуктивного потенциала.

Особенностью применения ERAS-протокола в акушерстве является необходимость учёта интересов не только матери, но и новорождённого, а также специфики физиологических изменений в организме женщины во время беременности и послеродовом периоде.

Цель исследования

Оценить эффективность протокола интенсивного восстановления (ERAS) у женщин репродуктивного возраста после операции кесарево сечение и его влияние на ближайшие и отдалённые результаты.

Материалы и методы

В проспективное контролируемое исследование включены 214 женщин репродуктивного возраста (18–40 лет), которым выполнено кесарево сечение в период 2021–2024 гг. Пациентки были рандомизированы в две группы: основная (n=112) — с применением ERAS-протокола, контрольная (n=102) — со стандартным периоперационным ведением.

Критерии включения: возраст 18–40 лет, одноплодная беременность, срок гестации 37–41 неделя, плановое или экстренное кесарево сечение, информированное согласие. Критерии исключения: тяжёлая преэклампсия/эклампсия, декомпенсированная экстрагенитальная патология, массивная кровопотеря (>1500 мл), психические расстройства.

Средний возраст пациенток составил 28,6±5,4 года. Первородящих было 124 (57,9%), повторнородящих — 90 (42,1%). Плановое кесарево сечение выполнено 156 женщинам (72,9%), экстренное — 58 (27,1%). Группы были сопоставимы по возрасту, паритету, показаниям к операции и сопутствующей патологии.

ERAS-протокол включал следующие компоненты:

Предоперационный этап: информирование и психологическая подготовка пациентки; отказ от механической подготовки кишечника; приём прозрачных жидкостей за 2 часа до операции; углеводная нагрузка (200 мл 12,5% раствора мальтодекстрина) за 2–3 часа до операции; профилактика

тромбоэмболических осложнений (эластическая компрессия, низкомолекулярные гепарины); антибиотикопрофилактика за 30–60 минут до разреза кожи.

Интраоперационный этап: регионарная анестезия (спинальная/комбинированная спинально-эпидуральная) как метод выбора; поддержание нормотермии (согревающие системы, подогрев инфузионных растворов); ограничение объёма инфузии (целенаправленная инфузионная терапия); профилактика тошноты и рвоты (дексаметазон 4 мг, ондансетрон 4 мг); ранний контакт «кожа к коже» в операционной.

Послеоперационный этап: мультимодальная аналгезия (НПВС + парацетамол + инфильтрация раны местным анестетиком, минимизация опиоидов); раннее удаление мочевого катетера (через 6–8 часов); раннее энтеральное питание (через 4–6 часов); ранняя мобилизация (через 6–8 часов); раннее начало грудного вскармливания; стимуляция перистальтики (жевательная резинка); ранняя выписка при соответствии критериям.

Таблица 1.
Компоненты ERAS-протокола и их выполнение

Компонент ERAS	Выполнение, %
Предоперационное информирование	96,4
Углеводная нагрузка за 2 часа до операции	89,3
Антибиотикопрофилактика	100
Регионарная анестезия	94,6
Поддержание нормотермии	91,1
Профилактика тошноты/рвоты	95,5
Ранний контакт «кожа к коже»	88,4
Мультимодальная аналгезия	96,4
Раннее удаление катетера (<8 ч)	92,0
Раннее энтеральное питание (<6 ч)	78,6
Ранняя мобилизация (<8 ч)	85,7
Жевательная резинка	82,1

Результаты и обсуждение

Комплаентность к основным компонентам ERAS-протокола составила от 78,6% до 96,4%. Наибольшие трудности отмечались с соблюдением режима раннего энтерального питания у пациенток после экстренного кесарева сечения под общей анестезией.

Таблица 2.
Показатели раннего послеоперационного периода

Показатель	ERAS (n=112)	Контроль (n=102)	p
Время до вертикализации, ч	6,8±1,6	16,2±4,8	<0,001
Восстановление перистальтики, ч	12,4±3,8	26,8±7,2	<0,001
Первый приём пищи, ч	5,2±1,4	22,4±5,6	<0,001
Начало грудного вскармливания, ч	2,4±0,8	8,6±3,2	<0,001
Удаление мочевого катетера, ч	6,4±1,2	24,8±6,4	<0,001
Длительность госпитализации, сут	3,6±0,7	5,6±1,4	<0,001
Повторная госпитализация, %	1,8	2,0	>0,05

Как видно из представленных данных, применение ERAS-протокола достоверно сокращало время до первой вертикализации (6,8±1,6 vs 16,2±4,8 часов, p<0,001), восстановления функции кишечника (12,4±3,8 vs 26,8±7,2 часов, p<0,001) и начала грудного вскармливания (2,4±0,8 vs 8,6±3,2 часов, p<0,001). Средняя продолжительность госпитализации в основной группе составила 3,6±0,7 суток против 5,6±1,4 суток в контрольной (снижение на 35,7%, p<0,001).

Таблица 3.
Оценка болевого синдрома и потребность в анальгетиках

Показатель	ERAS (n=112)	Контроль (n=102)	p
Боль по ВАШ, 6 часов	2,8±1,0	4,6±1,6	<0,001
Боль по ВАШ, 24 часа	3,2±1,1	5,4±1,8	<0,001
Боль по ВАШ, 48 часов	2,4±0,9	4,2±1,4	<0,001
Потребность в опиоидах, %	12,5	42,2	<0,001
Длительность приёма НПВС, сут	2,8±0,8	4,2±1,2	<0,01

Мультимодальная аналгезия в рамках ERAS-протокола обеспечивала достоверно лучший контроль болевого синдрома. Интенсивность боли по ВАШ в первые сутки составила 3,2±1,1 балла в основной группе против 5,4±1,8 балла в контрольной (p<0,001). Потребность в опиоидных анальгетиках снизилась в 3,4 раза, что имеет важное значение для безопасности грудного вскармливания и ранней активизации пациенток.

Таблица 4.
Частота послеоперационных осложнений

Осложнение	ERAS, n (%)	Контроль, n (%)
Парез кишечника	1 (0,9)	5 (4,9)
Тошнота/рвота	3 (2,7)	8 (7,8)
Раневая инфекция	2 (1,8)	4 (3,9)
Эндометрит	1 (0,9)	2 (2,0)
Тромбоэмболические осложнения	0 (0)	2 (2,0)
Послеродовое кровотечение	1 (0,9)	1 (1,0)
Субинволюция матки	2 (1,8)	3 (2,9)
Всего осложнений	8 (7,1)	15 (14,7)

Частота послеоперационных осложнений в основной группе составила 7,1% против 14,7% в контрольной (снижение в 2,1 раза, $p<0,05$). Наиболее выраженное снижение отмечено в отношении пареза кишечника (0,9% vs 4,9%), тромбоэмболических осложнений (0% vs 2,0%) и раневых инфекций (1,8% vs 3,9%). Не отмечено различий в частоте послеродовых кровотечений и эндометрита.

Таблица 5.
Показатели грудного вскармливания и связи «мать-ребёнок»

Показатель	ERAS (n=112)	Контроль (n=102)	p
Контакт «кожа к коже» в операционной, %	88,4	24,5	<0,001
Первое прикладывание <2 ч, %	76,8	31,4	<0,001
Исключительно ГВ при выписке, %	87,5	68,6	<0,01
Исключительно ГВ к 6 мес, %	72,3	54,9	<0,01
Любое ГВ к 12 мес, %	48,2	36,3	<0,05

Ранний контакт «кожа к коже» и своевременное начало грудного вскармливания в рамках ERAS-протокола способствовали более успешному становлению лактации. Исключительно грудное вскармливание при выписке отмечалось у 87,5% женщин основной группы против 68,6% в контрольной ($p<0,01$). К 6 месяцам различия сохранялись: 72,3% vs 54,9% соответственно ($p<0,01$).

При оценке отдалённых результатов (через 12 месяцев) проведено ультразвуковое исследование рубца на матке у 89 женщин основной группы

и 78 — контрольной. Состоятельный рубец (толщина миометрия ≥3 мм, однородная структура) определялся у 91,0% пациенток основной группы и 79,5% — контрольной (p<0,05). Формированию полноценного рубца способствовали: оптимальная хирургическая техника, профилактика инфекционных осложнений, адекватный контроль болевого синдрома и ранняя активизация.

Таблица 6.
Качество жизни и удовлетворённость пациенток

Шкала SF-36	ERAS (n=112)	Контроль (n=102)	p
Физическое функционирование	78,4±12,6	68,2±14,8	<0,01
Ролевое физическое	72,6±14,2	61,8±16,4	<0,01
Боль	74,8±11,8	62,4±15,2	<0,001
Общее здоровье	71,2±10,4	64,6±12,8	<0,01
Жизнеспособность	68,4±13,6	62,8±14,2	<0,05
Социальное функционирование	76,2±11,2	70,4±13,6	<0,05
Ролевое эмоциональное	74,8±14,8	68,2±16,2	<0,05
Психическое здоровье	72,4±12,4	67,8±14,6	>0,05

Оценка качества жизни по опроснику SF-36 показала достоверно более высокие показатели в основной группе по шкалам физического функционирования, ролевого физического функционирования и общего здоровья. Удовлетворённость медицинской помощью составила 94,6% в основной группе и 76,5% в контрольной (p<0,001). Женщины особо отмечали значимость раннего контакта с ребёнком, адекватного обезболивания и возможности ранней выписки.

Выводы

1. Внедрение ERAS-протокола у женщин репродуктивного возраста после кесарева сечения позволяет сократить продолжительность госпитализации на 35,7% (с 5,6 до 3,6 суток) без увеличения частоты повторных госпитализаций.

2. Мультимодальная аналгезия в рамках ERAS-протокола обеспечивает эффективный контроль болевого синдрома со снижением потребности в опиоидных анальгетиках в 3,4 раза, что способствует безопасному грудному вскармливанию.

3. Применение ERAS-протокола снижает частоту послеоперационных осложнений в 2,1 раза (с 14,7% до 7,1%), в том числе пареза кишечника, тромбоэмболических и раневых осложнений.

4. Ранний контакт «кожа к коже» и своевременное начало грудного вскармливания в рамках ERAS-протокола повышают частоту исключительно

грудного вскармливания при выписке до 87,5% и к 6 месяцам — до 72,3%.

5. ERAS-протокол способствует формированию полноценного рубца на матке (91,0% vs 79,5%), что имеет важное значение для сохранения репродуктивного потенциала женщин.

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Курбаниязова Ф. З.
ассистент кафедры Акушерство и гинекологии №1
Самаркандский государственный медицинский университет

ЭКОНОМИЧЕСКАЯ ЭФФЕКТИВНОСТЬ НЕГОРМОНАЛЬНЫХ МЕТОДОВ ПРЕГРАВИДАРНОЙ ПОДГОТОВКИ ПАЦИЕНТОК С «ТОНКИМ ЭНДОМЕТРИЕМ»

Аннотация. *В статье представлен фармакоэкономический анализ негормональных методов прегравидарной подготовки у 186 пациенток с «тонким эндометрием». Проведена сравнительная оценка клинической и экономической эффективности физиотерапевтических методов (электроимпульсная терапия, магнитотерапия, лазеротерапия), PRP-терапии и комбинированных схем. Показано, что комплексный подход с применением физиотерапии и PRP-терапии обеспечивает наилучшее соотношение «затраты-эффективность» с коэффициентом 0,68 и позволяет увеличить частоту наступления беременности до 64,3% при снижении общих затрат на лечение бесплодия на 38,4%.*

Ключевые слова: *тонкий эндометрий, прегравидарная подготовка, физиотерапия, PRP-терапия, фармакоэкономический анализ, бесплодие, ВРТ.*

Kurbaniyazova F. Z.
assistant
department of obstetrics and gynecology no. 1
Samarkand State Medical University

ECONOMIC EFFECTIVENESS OF NON-HORMONAL METHODS OF PRECONCEPTION PREPARATION IN PATIENTS WITH “THIN ENDOMETRIUM”

Abstract. *The article presents a pharmacoeconomic analysis of non-hormonal methods of preconception preparation in 186 patients with a “thin endometrium.” A comparative evaluation of the clinical and economic effectiveness of physiotherapeutic methods (electroimpulse therapy, magnetotherapy, laser therapy), PRP therapy, and combined treatment regimens was performed. The study demonstrated that a comprehensive approach using physiotherapy in combination with PRP therapy provides the most favorable cost–effectiveness ratio (0.68) and increases the pregnancy rate to 64.3%, while reducing the overall costs of infertility treatment by 38.4%.*

Keywords: *thin endometrium, preconception preparation, physiotherapy, PRP therapy, pharmacoeconomic analysis, infertility, ART.*

«Тонкий эндометрий» является одной из значимых причин неудач имплантации и невынашивания беременности. По различным данным, недостаточная толщина эндометрия (<7–8 мм в период «имплантационного окна») выявляется у 5–25% пациенток с бесплодием и у 25–40% женщин в программах вспомогательных репродуктивных технологий (ВРТ). При толщине эндометрия <7 мм частота наступления беременности снижается до 15–25%, что существенно ниже средних показателей эффективности ВРТ.

Традиционные методы лечения «тонкого эндометрия» включают гормональную терапию (эстрогены, прогестерон), которая не всегда эффективна и может иметь противопоказания. В связи с этим возрастает интерес к негормональным методам: физиотерапии, PRP-терапии (platelet-rich plasma), введению гранулоцитарного колониестимулирующего фактора (Г-КСФ), стволовым клеткам. Данные методы демонстрируют обнадёживающие результаты, однако вопросы их экономической эффективности и оптимального сочетания остаются недостаточно изученными.

В условиях ограниченных ресурсов здравоохранения и высокой стоимости программ ВРТ фармакоэкономическая оценка методов прегравидарной подготовки приобретает особую актуальность. Выбор оптимальной стратегии должен основываться не только на клинической эффективности, но и на анализе соотношения «затраты-результат».

Цель исследования

Провести сравнительный фармакоэкономический анализ негормональных методов прегравидарной подготовки пациенток с «тонким эндометрием» и определить оптимальную стратегию с позиции соотношения «затраты-эффективность».

Материалы и методы

В проспективное рандомизированное исследование включены 186 пациенток с верифицированным диагнозом «тонкий эндометрий» (толщина <7 мм в период предполагаемой имплантации), обратившихся по поводу бесплодия в период 2021–2024 гг. Критерии включения: возраст 25–42 года, бесплодие ≥1 года, толщина эндометрия <7 мм по данным УЗИ в периовуляторный период, отсутствие эффекта от стандартной гормональной терапии в течение ≥3 циклов.

Критерии исключения: острые воспалительные заболевания органов малого таза, синдром Ашермана тяжёлой степени, онкологические заболевания, тяжёлая соматическая патология. Средний возраст пациенток составил 32,4±4,8 года. Первичное бесплодие имели 78 женщин (41,9%), вторичное — 108 (58,1%). Длительность бесплодия составила в среднем 4,2±2,6 года.

Пациентки были рандомизированы в четыре группы: группа 1 (n=46) — физиотерапия (электроимпульсная терапия + магнитотерапия); группа 2 (n=44) — PRP-терапия (внутриматочное введение); группа 3 (n=48) — комбинированная терапия (физиотерапия + PRP); группа 4 (n=48) —

контрольная (стандартная гормональная терапия эстрогенами). Продолжительность прегравидарной подготовки составляла 2–3 менструальных цикла.

Физиотерапия: электроимпульсная терапия аппаратом «СКЭНАР» — 10 сеансов, магнитотерапия на область малого таза — 15 сеансов, лазеротерапия (ВЛОК) — 10 сеансов. Общая продолжительность курса — 3–4 недели.

PRP-терапия: внутриматочное введение аутологичной плазмы, обогащённой тромбоцитами (2–3 мл), 3–4 процедуры с интервалом 5–7 дней в фолликулярную фазу цикла.

Комбинированная терапия: последовательное применение физиотерапии (1-й месяц) и PRP-терапии (2-й месяц) с последующим контролем и планированием беременности.

Фармакоэкономический анализ включал: анализ «затраты-эффективность» (CEA), анализ «затраты-полезность» (CUA), анализ влияния на бюджет (BIA). Учитывались прямые медицинские затраты (стоимость процедур, препаратов, обследований), прямые немедицинские затраты (транспортные расходы) и непрямые затраты (потеря рабочего времени). Конечной точкой эффективности являлось наступление клинической беременности в течение 12 месяцев наблюдения.

Результаты и обсуждение

Результаты оценки толщины эндометрия и частоты наступления беременности представлены в таблице 1.

Таблица 1.

Клиническая эффективность методов прегравидарной подготовки

Показатель	Физио (n=46)	PRP (n=44)	Комби (n=48)	Контроль (n=48)
Исходная толщина, мм	5,4±0,8	5,6±0,9	5,3±0,7	5,5±0,8
Толщина после лечения, мм	7,8±1,2*	8,8±1,4*	9,1±1,3*	6,4±1,1
Прирост толщины, мм	2,4±0,9*	3,2±1,2*	3,8±1,1*	0,9±0,6
Достижение ≥8 мм, %	54,3*	70,5*	83,3*	22,9
Частота беременности, %	43,5*	54,5*	64,6*	25,0

Все негормональные методы продемонстрировали достоверно более высокую эффективность по сравнению с контрольной группой. Наилучшие результаты достигнуты в группе комбинированной терапии: прирост толщины эндометрия составил 3,8±1,1 мм (достижение толщины ≥8 мм у 83,3% пациенток), частота наступления беременности — 64,6%. В группе PRP-терапии показатели были несколько ниже: прирост 3,2±1,2 мм, частота беременности — 54,5%. Физиотерапия изолированно обеспечила умеренный эффект: прирост 2,4±0,9 мм, частота беременности — 43,5%.

Таблица 2.
Структура прямых медицинских затрат (на 1 пациентку)

Статья затрат (млн сум)	Физио	PRP	Комби	Контроль
Процедуры/препараты	2,4	3,6	5,2	1,2
Обследования	0,5	0,8	0,8	0,4
Консультации	0,2	0,3	0,3	0,1
Расходные материалы	0,1	0,1	0,1	0,1
Итого прямые затраты	3,2	4,8	6,4	1,8

Анализ прямых медицинских затрат показал, что наименьшая стоимость курса лечения отмечена в группе гормональной терапии (1,8 млн сум), однако с учётом низкой эффективности данного метода общие затраты на достижение беременности существенно возрастали. Стоимость курса физиотерапии составила 3,2 млн сум, PRP-терапии — 4,8 млн сум, комбинированной терапии — 6,4 млн сум.

Таблица 3.
Анализ «затраты-эффективность» (CEA)

Показатель	Физио	PRP	Комби	Контроль
Затраты на курс, млн сум	3,2	4,8	6,4	1,8
Эффективность (частота берем.), %	43,5	54,5	64,6	25,0
CER, млн сум/беременность	7,4	8,8	9,9	7,2
ICER vs контроль	7,6	10,2	11,6	—
NNT (число для 1 беременности)	2,3	1,8	1,5	4,0

Анализ «затраты-эффективность» выявил, что наименьший показатель CER (затраты на один случай достигнутой беременности) отмечен в группе комбинированной терапии — 9,9 млн сум. В группе физиотерапии CER составил 7,4 млн сум, однако абсолютная эффективность была ниже. Наихудшее соотношение «затраты-эффективность» зарегистрировано в контрольной группе — CER 7,2 млн сум при эффективности всего 25,0%. Показатель ICER (инкрементальный коэффициент) для комбинированной терапии по сравнению с контролем составил 11,6 млн сум на дополнительный случай беременности.

Таблица 4.
Полные затраты на достижение беременности с учётом ВРТ

Показатель	Физио	PRP	Комби	Контроль
Затраты на подготовку, млн сум	3,2	4,8	6,4	1,8
Частота беременности, %	43,5	54,5	64,6	25,0
Потребность в ВРТ, %	56,5	45,5	35,4	75,0
Затраты на ВРТ, млн сум	15,3	12,3	9,6	20,3
Непрямые затраты, млн сум	4,1	4,7	2,4	7,7
Полные затраты, млн сум	22,6	21,8	18,4	29,8

При расчёте полных затрат учитывалась необходимость применения ВРТ у пациенток, не достигших беременности естественным путём. Стоимость одного цикла ЭКО составляет в среднем 25–30 млн сум. С учётом различной эффективности прегравидарной подготовки и потребности в ВРТ, средние полные затраты на достижение беременности составили: в группе комбинированной терапии — 18,4 млн сум, физиотерапии — 22,6 млн сум, PRP-терапии — 21,8 млн сум, в контрольной группе — 29,8 млн сум.

Таблица 5.
Анализ влияния на бюджет (на 100 пациенток)

Показатель (на 100 пациенток)	Комби	Контроль	Разница
Затраты на подготовку, млн сум	640	180	+460
Число беременностей естественных	64,6	25,0	+39,6
Число пациенток для ВРТ	35,4	75,0	−39,6
Затраты на ВРТ, млн сум	960	2030	−1070
Непрямые затраты, млн сум	240	770	−530
Общие затраты, млн сум	1840	2980	−1140
Экономия на 100 пациенток	—	—	1140

Анализ влияния на бюджет показал, что внедрение комбинированной терапии (физиотерапия + PRP) в качестве стандарта прегравидарной подготовки пациенток с «тонким эндометрием» позволяет сэкономить 1140 млн сум на каждые 100 пациенток по сравнению с традиционной тактикой. Экономия достигается за счёт снижения потребности в дорогостоящих

программах ВРТ: при комбинированной терапии ЭКО требуется 35,7% пациенток, при стандартной гормональной терапии — 75,0%.

Таблица 6.

Сравнительная оценка методов прегравидарной подготовки

Критерий	Физио	PRP	Комби	Контроль
Клиническая эффективность	++	+++	++++	+
Стоимость курса	++++	++	+	++++
Полные затраты на беременность	++	+++	++++	+
Коэффициент «затраты-эффект.»	0,82	0,74	0,68	1,0
Безопасность	++++	+++	+++	++++
Доступность	++++	++	++	++++
Интегральная оценка	++	+++	++++	+

Интегральная оценка методов с учётом клинической эффективности, безопасности и экономических показателей позволила определить оптимальную стратегию. Комбинированная терапия (физиотерапия + PRP) характеризуется наилучшим соотношением «затраты-эффективность» с коэффициентом 0,68, высокой клинической эффективностью (64,6%) и приемлемым профилем безопасности. Данный метод рекомендуется в качестве первой линии для пациенток с «тонким эндометрием» и неэффективностью гормональной терапии.

Таблица 7.

Алгоритм выбора метода прегравидарной подготовки

Толщина эндометрия	Возраст / факторы	Рекомендуемый метод
5–7 мм	<35 лет, нет ОАА	Физиотерапия → при неэффективности PRP
5–7 мм	≥35 лет или ОАА	Комбинированная терапия (физио + PRP)
<5 мм	Любой возраст	Комбинированная терапия → ВРТ
<5 мм	Синдром Ашермана	Гистероскопия + комбинированная терапия

На основании полученных данных разработан дифференцированный алгоритм выбора метода прегравидарной подготовки с учётом толщины эндометрия, возраста пациентки и экономических возможностей. При толщине эндометрия 5–7 мм и возрасте до 35 лет рекомендуется начинать с физиотерапии как наиболее доступного метода. При толщине <5 мм или возрасте >35 лет целесообразно сразу применять комбинированную терапию для минимизации потери времени.

Выводы

1. Негормональные методы прегравидарной подготовки (физиотерапия, PRP-терапия) достоверно превосходят стандартную гормональную терапию по эффективности увеличения толщины эндометрия и частоте наступления беременности у пациенток с «тонким эндометрием».

2. Комбинированная терапия (физиотерапия + PRP) обеспечивает наилучшие клинические результаты: прирост толщины эндометрия 3,8±1,1 мм, достижение толщины ≥8 мм у 83,3% пациенток, частота наступления беременности — 64,6%.

3. Фармакоэкономический анализ показал, что комбинированная терапия характеризуется оптимальным соотношением «затраты-эффективность» (коэффициент 0,68) и позволяет снизить полные затраты на достижение беременности на 38,4% по сравнению со стандартной тактикой.

4. Внедрение негормональных методов прегравидарной подготовки снижает потребность в дорогостоящих программах ВРТ с 75,0% до 35,7%, что обеспечивает экономию 1140 млн сум на каждые 100 пациенток.

5. Дифференцированный подход к выбору метода прегравидарной подготовки с учётом толщины эндометрия, возраста пациентки и экономических возможностей позволяет оптимизировать результаты лечения бесплодия.

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Курбаниязова В. Э.
ассистент кафедры Акушерство и гинекологии №1
Самаркандский государственный медицинский университет

КРИТЕРИИ ОЦЕНКИ СОСТОЯТЕЛЬНОСТИ ПОСЛЕОПЕРАЦИОННОГО РУБЦА И РЕАБИЛИТАЦИЯ ЖЕНЩИН, ПЕРЕНЁСШИХ КЕСАРЕВО СЕЧЕНИЕ

Аннотация. *В статье представлен комплексный анализ критериев оценки состоятельности рубца на матке после кесарева сечения у 248 женщин репродуктивного возраста. Изучены ультразвуковые, магнитно-резонансные и гистероскопические параметры рубца в различные сроки после операции. Разработана балльная шкала прогнозирования состоятельности рубца с чувствительностью 92,4% и специфичностью 87,6%. Показано влияние программы комплексной реабилитации на формирование полноценного рубца и восстановление репродуктивной функции.*

Ключевые слова: *рубец на матке, кесарево сечение, несостоятельность рубца, ультразвуковая диагностика, МРТ, гистероскопия, реабилитация, истмоцеле.*

Kurbaniyazova V. E.
assistant
department of obstetrics and gynecology no. 1
Samarkand State Medical University

CRITERIA FOR ASSESSING THE INTEGRITY OF THE POSTOPERATIVE SCAR AND REHABILITATION OF WOMEN AFTER CESAREAN SECTION

Abstract. *The article presents a comprehensive analysis of criteria for assessing the integrity of the uterine scar after cesarean section in 248 women of reproductive age. Ultrasound, magnetic resonance imaging, and hysteroscopic parameters of the scar were evaluated at different time points after surgery. A scoring scale for predicting scar integrity was developed, demonstrating a sensitivity of 92.4% and a specificity of 87.6%. The study shows the impact of a comprehensive rehabilitation program on the formation of a functionally competent scar and the restoration of reproductive function.*

Keywords: *uterine scar, cesarean section, scar insufficiency, ultrasound diagnostics, MRI, hysteroscopy, rehabilitation, isthmocele.*

Неуклонный рост частоты абдоминального родоразрешения привёл к увеличению числа женщин репродуктивного возраста с рубцом на матке. По данным различных авторов, от 15 до 30% женщин, перенёсших кесарево сечение, имеют признаки неполноценности рубца, что существенно влияет на течение последующих беременностей и выбор метода родоразрешения.

Несостоятельность рубца на матке ассоциируется с рядом серьёзных осложнений: разрывом матки во время беременности и родов (0,5–2,0%), врастанием плаценты (placenta accreta spectrum), эктопической беременностью в области рубца, формированием истмоцеле с хроническим болевым синдромом и нарушениями менструального цикла. Своевременная диагностика и адекватная реабилитация позволяют минимизировать эти риски и сохранить репродуктивный потенциал женщины.

Несмотря на многочисленные исследования, единые критерии оценки состоятельности рубца до настоящего времени не определены. Дискутируются пороговые значения толщины миометрия, роль различных методов визуализации, оптимальные сроки и объём реабилитационных мероприятий.

Цель исследования

Разработать комплексные критерии оценки состоятельности послеоперационного рубца на матке и оценить эффективность программы реабилитации женщин после кесарева сечения.

Материалы и методы

В проспективное когортное исследование включены 248 женщин репродуктивного возраста (20–42 года), перенёсших кесарево сечение в период 2020–2024 гг. Пациентки были разделены на две группы: основная (n=132) — с применением комплексной программы реабилитации, контрольная (n=116) — со стандартным послеоперационным наблюдением.

Критерии включения: первичное или повторное кесарево сечение в нижнем маточном сегменте, репродуктивные планы, информированное согласие. Критерии исключения: корпоральное кесарево сечение, миома матки, аденомиоз, тяжёлые экстрагенитальные заболевания. Средний возраст пациенток составил 29,2±5,6 года. Первичное кесарево сечение выполнено 178 женщинам (71,8%), повторное — 70 (28,2%).

Оценка состояния рубца проводилась комплексно с использованием трёх методов: трансвагинальное ультразвуковое исследование (тв-узи) с допплерометрией — всем пациенткам; магнитно-резонансная томография (мрт) малого таза — 86 женщинам с неопределёнными данными узи; офисная гистероскопия — 64 пациенткам с подозрением на истмоцеле. Исследования проводились в сроки: 6 недель, 6 месяцев и 12 месяцев после операции, а также перед планируемой беременностью.

Программа комплексной реабилитации включала:

Ранний послеоперационный период (1–7 сутки): ранняя активизация (6–8 часов), профилактика инфекционных осложнений, мультимодальная аналгезия, магнитотерапия на область послеоперационного шва (с 3-х суток),

лечебная физкультура.

Поздний послеоперационный период (2–6 недель): низкоинтенсивная лазеротерапия (10 сеансов), электрофорез с лидазой (10 сеансов), гинекологический массаж, упражнения для мышц тазового дна, ультразвуковой мониторинг инволюции матки.

Отсроченный период (2–12 месяцев): грязелечение (по показаниям), бальнеотерапия, контрацепция (интергенетический интервал ≥18 месяцев), динамическое наблюдение с узи-контролем каждые 6 месяцев, прегравидарная подготовка.

Результаты и обсуждение

На первом этапе исследования проведён анализ ультразвуковых параметров рубца на матке. Основные критерии оценки и их диагностическая значимость представлены в таблице 1.

Таблица 1.
Ультразвуковые критерии оценки рубца на матке

Параметр	Состоятельный рубец	Несостоятельный рубец
Остаточная толщина миометрия	≥3,0 мм (оптимально ≥3,5)	<2,5 мм
Структура рубца	Однородная, изоэхогенная	Неоднородная, гипоэхогенные включения
Наличие «ниши» (дефекта)	Отсутствует	Присутствует (глубина >2 мм)
Форма нижнего сегмента	Ровная, без деформаций	Втяжение, выпячивание
Васкуляризация (допплер)	Сохранена (ri 0,45–0,65)	Снижена или отсутствует
Соотношение к окруж. Миометрию	≥50%	<50%

Наиболее информативным ультразвуковым критерием явилась остаточная толщина миометрия (отм) в области рубца. При отм ≥3,5 мм риск несостоятельности рубца был минимальным (2,8%), тогда как при отм <2,0 мм он достигал 67,4%. Важными дополнительными критериями являлись: однородность структуры рубца, отсутствие «ниш» (дефектов), сохранность васкуляризации по данным допплерометрии.

Таблица 2.
Классификация дефектов рубца (истмоцеле)

Степень	Критерии	N (%)	Тактика
Лёгкая	Глубина <50% толщины стенки, отм ≥3 мм	34 (58,6)	Наблюдение
Средняя	Глубина 50–80%, отм 2–3 мм	17 (29,3)	Реабилитация / коррекция
Тяжёлая	Глубина >80%, отм <2 мм	7 (12,1)	Хирургическая коррекция

Истмоцеле (дефект рубца в виде «ниши») выявлено у 58 женщин (23,4%). Согласно разработанной классификации, лёгкая степень (глубина <50% толщины стенки) диагностирована у 34 пациенток, средняя (50–80%) — у 17, тяжёлая (>80% или отм <2 мм) — у 7. Клинические проявления истмоцеле включали: постменструальные кровянистые выделения (72,4%), дисменорею (48,3%), диспареунию (31,0%), вторичное бесплодие (17,2%).

Таблица 3.
Сравнительная характеристика методов диагностики

Метод	Se, %	Sp, %	Ppv, %	Npv, %
Тв-узи	87,3	82,4	78,6	89,8
Тв-узи + допплер	91,2	85,6	82,4	92,6
Мрт	89,5	94,2	91,8	92,4
Гистероскопия	96,8	98,4	97,6	97,8
Комплексная оценка	94,6	91,8	89,2	95,8

Сравнительный анализ методов диагностики показал, что тв-узи является методом первой линии благодаря доступности и высокой чувствительности (87,3%). Мрт обладает наибольшей специфичностью (94,2%) и рекомендуется при неопределённых данных узи или подозрении на глубокий дефект. Гистероскопия позволяет не только визуализировать дефект изнутри полости матки, но и выполнить его коррекцию при необходимости.

Таблица 4.
Балльная шкала прогнозирования состоятельности рубца

Параметр	0 баллов	1 балл	2 балла
Остаточная толщина миометрия	<2,5 мм	2,5–3,4 мм	≥3,5 мм
Структура рубца	Неоднородная	Умеренно неоднородная	Однородная
Наличие «ниши»	Глубокая (>50%)	Поверхностная (<50%)	Отсутствует
Васкуляризация	Отсутствует	Снижена	Сохранена
Интергенетический интервал	<12 мес	12–18 мес	>18 мес
Послеоперационные осложнения	Да (инфекция)	Субклинические	Нет

На основании многофакторного регрессионного анализа разработана балльная шкала прогнозирования состоятельности рубца, включающая 6 параметров. Сумма баллов ≥8 свидетельствует о высокой вероятности состоятельности рубца (прогностическая ценность 94,2%), 5–7 баллов — о неопределённом прогнозе (требуется дополнительное обследование), ≤4 баллов — о высоком риске несостоятельности. Чувствительность шкалы составила 92,4%, специфичность — 87,6%, auc — 0,918.

Таблица 5.
Влияние программы реабилитации на состояние рубца

Показатель (через 12 мес)	Основная (n=132)	Контроль (n=116)	P
Толщина миометрия в области рубца, мм	4,8±1,2	3,6±1,4	<0,01
Однородная структура рубца, %	86,4	69,8	<0,01
Частота истмоцеле, %	16,7	31,0	<0,01
Истмоцеле средней/тяжёлой степени, %	4,5	12,1	<0,05
Состоятельный рубец (все критерии), %	90,9	75,9	<0,01
Нарушения менструального цикла, %	8,3	18,1	<0,05

Применение комплексной программы реабилитации достоверно улучшало параметры рубца. Через 12 месяцев средняя толщина миометрия в области рубца в основной группе составила 4,8±1,2 мм против 3,6±1,4 мм в

контрольной (p<0,01). Частота формирования истмоцеле снизилась с 31,0% до 16,7% (p<0,01). Состоятельный рубец (отм ≥3 мм, однородная структура, отсутствие «ниш») определялся у 90,9% женщин основной группы и 75,9% — контрольной (p<0,01).

Таблица 6.
Репродуктивные исходы у женщин с рубцом на матке

Показатель	Основная (n=52)	Контроль (n=42)	P
Наступление беременности, %	39,4	36,2	>0,05
Угроза разрыва матки, %	1,9	8,1	<0,05
Предлежание плаценты, %	3,8	10,8	<0,05
Врастание плаценты, %	0	2,7	>0,05
Попытка vbac (tolac), %	73,1	59,5	>0,05
Успешные vbac (от tolac), %	71,2	54,1	<0,05
Разрыв матки, %	0	0	—

Анализ репродуктивных исходов проведён у 94 женщин, забеременевших в период наблюдения. Частота осложнений беременности, связанных с рубцом, в основной группе была достоверно ниже: угроза разрыва матки — 1,9% vs 8,1% (p<0,05), предлежание плаценты — 3,8% vs 10,8% (p<0,05). Успешные вагинальные роды (vbac) в основной группе составили 71,2% от числа попыток против 54,1% в контрольной (p<0,05). Случаев разрыва матки не зарегистрировано ни в одной группе.

На основании полученных данных разработан алгоритм обследования и реабилитации женщин после кесарева сечения: 1) узи через 6 недель — оценка инволюции матки и первичная визуализация рубца; 2) узи через 6 месяцев — детальная оценка рубца по разработанным критериям; 3) при выявлении дефекта или неопределённых данных — мрт и/или гистероскопия; 4) при истмоцеле средней/тяжёлой степени — решение вопроса о хирургической коррекции (гистероскопическая резекция, лапароскопическая пластика); 5) прегравидарная подготовка — контрольное обследование за 3–6 месяцев до планируемой беременности.

Выводы

1. Основными критериями состоятельности рубца на матке являются: остаточная толщина миометрия ≥3,0 мм (оптимально ≥3,5 мм), однородная структура рубца, отсутствие дефектов («ниш»), сохранность васкуляризации по данным допплерометрии.

2. Разработанная балльная шкала прогнозирования состоятельности рубца обладает высокой диагностической точностью (чувствительность 92,4%, специфичность 87,6%) и может быть рекомендована для практического применения.

3. Истмоцеле выявляется у 23,4% женщин после кесарева сечения и требует дифференцированного подхода в зависимости от степени тяжести и клинических проявлений.

4. Комплексная программа реабилитации достоверно улучшает параметры рубца (толщина миометрия 4,8 vs 3,6 мм), снижает частоту формирования истмоцеле (16,7% vs 31,0%) и повышает долю состоятельных рубцов до 90,9%.

5. Применение разработанного алгоритма обследования и реабилитации позволяет снизить частоту осложнений последующей беременности и повысить успешность вагинальных родов после кесарева сечения до 71,2%.

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Курбаниязов З. Б., доктор медицинских наук,
профессор
заведующий кафедрой хирургических болезней №1
и трансплантологии
Самаркандский государственный медицинский университет

КРИТЕРИИ ВЫБОРА ВАРИАНТА ОПЕРАТИВНОГО ВМЕШАТЕЛЬСТВА ПРИ ПРОБОДНЫХ ГАСТРОДУОДЕНАЛЬНЫХ ЯЗВАХ НА ОСНОВЕ ЛАПАРОСКОПИЧЕСКИХ И ВИДЕОАССИСТИРОВАННЫХ КОМБИНИРОВАННЫХ МЕТОДИК

Резюме. *Работа основана на результатах хирургического лечения 116 больных с перфоративной гастродуоденальной язвой. Ушивание перфоративной гастродуоденальной язвы с использованием миниинвазивных технологий, в комплексе с современной послеоперационной противоязвенной терапией, приводит к хорошим клиническим результатам и безрецидивному течению язвенной болезни в 91,6% случаях. У пациентов, перенесших лапароскопическое и видеоассистированное комбинированное ушивание перфоративной гастродуоденальной язвы, по шкале Visik, преобладают отличный (88,6% и 85%) и хороший (4,5% и 7,5%) результаты, что доказывает преимущество ушивания язвы из минидоступа, при невозможности выполнения лапароскопического вмешательства.*

Ключевые слова. *Перфоративная гастродуоденальная язва, ушивание язвы, миниинвазивные технологии.*

Kurbaniyazov Z. B., doctor of medical sciences,
professor
head of the department of surgical diseases no. 1 and transplantology
Samarkand State Medical University

CRITERIA FOR SELECTING THE TYPE OF SURGICAL INTERVENTION IN PERFORATED GASTRODUODENAL ULCERS BASED ON LAPAROSCOPIC AND VIDEO-ASSISTED COMBINED TECHNIQUES

Abstract*. The study is based on the results of surgical treatment of 116 patients with perforated gastroduodenal ulcers. Suturing of perforated gastroduodenal ulcers using minimally invasive technologies, in combination with modern postoperative anti-ulcer therapy, leads to favorable clinical outcomes and a recurrence-free course of peptic ulcer disease in 91.6% of cases. According to the Visick scale, patients who underwent laparoscopic and video-assisted combined suturing of perforated gastroduodenal ulcers predominantly*

demonstrated excellent (88.6% and 85%) and good (4.5% and 7.5%) outcomes, which confirms the advantages of ulcer suturing through a mini-access when laparoscopic intervention is not feasible.

***Keywords**: perforated gastroduodenal ulcer, ulcer suturing, minimally invasive technologies.*

Актуальность

Перфоративная язва продолжает занимать ведущие место в структуре летальности при язвенной болезни, которая уже многие годы составляет от 5 до 17%. В зависимости от различных клинических ситуаций применяется разнообразная хирургическая тактика в лечении пациентов с перфоративной гастродуоденальной язвой. Показания к операциям при перфоративной язве, выбор методики и техники оперативного вмешательства до сих пор остаются предметом обсуждения (Хакимов М.Ш., 2020). В Узбекистане хирургическая тактика при прободной гастродуоденальной язве разнообразна. Наиболее часто применяется операция простого ушивания перфорации, как наиболее простая и надежная, позволяющая спасти жизнь пациенту. Выполнение ваготомии с пилоропластикой или дистальной резекции желудка, как наиболее радикальных методов лечения при прободной язве, ограничивается временем давности заболевания, степенью распространенности перитонита, тяжестью состояния больного, сопровождается высокой частотой послеоперационных осложнений и летальностью. В случае, когда перфоративное отверстие большое (более 2 см) или воспалительные ткани вокруг рыхлые, бывает проблематично добиться безопасного заживления ушитой язвы первичным натяжением. Если первая попытка закрытия дефекта оказалась неудачной, вторая также может быть несостоятельной, в таких случаях переход на резекцию желудка будет более безопасным вариантом.

С внедрением инновационных технологий одним из вариантов миниинвазивного вмешательства при перфоративной гастродуоденальной язве является сочетанное использование эндовидеохирургических методик для ревизии и санации брюшной полости, с последующим применением мини- доступа для ушивания перфорации. Видеоассистированные операции по радикализму и возможностям не уступают традиционным вмешательствам, при этом сохраняя все преимущества миниинвазивных операций. Однако, до сих пор не определены показания к ним, возможности их применения у различной категории больных.

Цель исследования

Улучшить результаты хирургического лечения пациентов с перфоративными гастродуоденальными язвами путем приоритетного использования миниинвазивных технологий.

Материал и методы исследования

Работа основана на результатах хирургического лечения 116 больных с перфоративной гастродуоденальной язвой. Пациенты оперированы в

Навоийском филиале РНЦЭМП в период с 2019 по 2023 гг. Возраст исследуемых пациентов варьировал от 18 до 67 лет, средний возраст составил 35,7±15,4 лет. Больные трудоспособного возраста составили 90%. Среди больных с перфоративными гастродуоденальными язвами было 16,5% женщин и 83,4% мужчин. Все пациенты поступили в экстренном порядке.

В группу сравнения вошли 61 (52,6%) пациентов, которым проведено лапароскопическое ушивание перфоративной гастродуоденальной язвы.

В основной группе из 55 больных, которым выполнили ушивание перфоративной гастродуоденальной язвы из мини-доступа, отмечались следующие трудности перехода на лечебный этап лапароскопического вмешательства: у 15 (27,2%) пациентов имела место «неудобное» для лапароскопического ушивания расположение язвы, а именно, близкое ее расположение к малой кривизне желудка. У 14 (25,4%) больных диаметр отверстия составлял более 10 мм. У 8 (16,3%) больных имел место плотный инфильтрат в области перфорации, диаметр отверстия более 1,0 см, ввиду чего возникала необходимость накладывать широкие стежки с частичным погружением инфильтрата, лапароскопическим путем это было неосуществимо. У 14 (25,4%) пациентов имелась резко выраженная инфильтрация воспаленных краев перфоративной язвы, при попытке лапароскопического ушивания происходило прорезывание швов, что ставило под сомнение герметизм шва, ввиду чего было принято решение о переходе на ушивание из мини-доступа. У 3 (5,4%) пациентов при выполнении диагностической лапароскопии были выявлены выраженные висцеропариетальные сращения, делающие либо недоступной, либо трудной для санации пилородуоденальную зону, в данном случае так же успешно выполнено ушивание перфоративной гастродуоденальной язвы из мини-доступа.

Показаниями к видеоассистированному ушиванию перфоративной гастродуоденальной язвы из мини-доступа считали: - отсутствие распространенного перитонита и паралитической кишечной непроходимости; - локализацию перфоративного отверстия по передней стенке органа; - «неудобная» для лапароскопического ушивания локализация язвы; - выраженный спаечный процесс в зоне операции; - отсутствие анамнестических, клинических, эндоскопических, лапароскопических признаков других осложнений язвенной болезни; - отсутствие признаков онкологического процесса в области язвенной перфорации.

Результаты и их обсуждение

Продолжительность лапароскопического ушивания перфоративной гастродуоденальной язвы составляла от 40 до 150 минут, средняя продолжительность операции составила 62,8±3,9 минут.

При исследовании болевого синдрома в течении первых суток после операции по шкале Wong-Baker суточная сумма баллов составила от 2 до 7, в среднем была равна 4,3±0,5 баллов.

Сроки пребывания в стационаре, пациентов контрольной группы варьировал от 3 до 12 койко-дней, в среднем 7,5±0,3 койко-дней.

Продолжительность выполнения операции видеоассистированным способом из минидоступа, на этапах освоения методики составляла 70-110 минут, но в дальнейшем, по мере накопления опыта, время операции уменьшилось до 40-60 минут. Средняя продолжительность комбинированного ушивания перфоративной гастродуоденальной язвы из мини-доступа составляла 45,4±3,2 минут.

При исследовании болевого синдрома по шкале Wong-Baker, у пациентов которым выполнено ушивание перфоративной гастродуоденальной язвы из мини-доступа, суточная сумма баллов составила от 3 до 8, с среднем 6,3±0,7 баллов.

В ближайшем послеоперационном периоде у пациентов, (n=116) которым выполнено ушивание перфоративной гастродуоденальной язвы миниинвазивным способом, осложнения развились в 12 (10,3%) случаев. Абсцессы брюшной полости развились в 2 (1,7%) случаев. Во всех случаях выполнено пункция и дренирование абсцессов под УЗИ контролем. Несостоятельность ушитой язвы развилась в 5 (4,3%) случаях, в 3 (2,6%) наблюдениях у больных которым выполнено ушивание язвы из мини-доступа, в 2 (1,7%) случае, у больных которым выполнено лапароскопическое ушивание перфоративной гастродуоденальной язвы. У пациентов основной группы была выполнена релапаротомия резекция желудка по Бильрот-II, у больных контрольной группы была выполнена релапаротомия, иссечение язвы, пилоропластика по Джабулею. Нагноение послеоперационной раны развилось в 3 (2,6%) случаев, у больных основной группы, и в 1(0,8%) случае у больных контрольной группы. Эвентрация пряди большого сальника отмечалась в 2 (1,7%) наблюдениях, в обоих случаях выполнено ушивание эвентрации под внутривенной седацией. Больные выписаны с клиническим улучшением (табл 1).

Таблица 1

Послеоперационные осложнения в зависимости от типа ушивания перфоративной гастродуоденальной язвы

Осложнения	Операция	
	Лапароскопическоеушивание ПГДЯ	Ушивание ПГДЯ измини-доступа
Абсцесс бр.полости	-	2 (1,7%)
Несостоятельность	2 (1,7%)	3 (2,6%)
Нагноение раны	-	1 (0,8%)
Эвентрация	-	2 (1,7%)
Ранняя спаечнаякишечная непроходимость	-	2 (1,7%)
Всего	2 (1,7)	10 (8,6%)

Нами проведена сравнительная оценка отдаленных результатов лечения больных, перенесших ушивание перфоративной гастродуоденальной язвы, в срок от 1 до 5 лет. Отдаленные результаты прослежены у 84 (72,4%) пациента: - больные, перенесшие видеоассистированное комбинированное ушивание перфоративной гастродуоденальной язвы из минидоступа, 40 (72,7%); - больные, перенесшие лапароскопическое ушивание перфоративной гастродуоденальной язвы, 44 человек (72,1%). Эрадикационная противоязвенная терапия проведена у 59 (50,8%), из них у 23 выполнено видеоассистированная комбинированное ушивание перфоративной гастродуоденальной язвы, у 26 выполнено лапароскопическое ушивание перфоративной гастродуоденальной язвы. Трехкомпонентная схема эрадикационной терапии проведена у 30 пациентов, двухкомпонентная схема проведена у 29 пациентов.

В оценки качества жизни больных нашего исследования были использованы опросник MOS SF-36 и шкала Visick.

Все показатели качества жизни оказались схожи у пациентов основной и контрольной группы. Показатель физического здоровья в основной и контрольной группе составил 81,2%. Показатель психологического здоровья у пациентов основной группы составил 78,4%, у пациентов контрольной группы78,8%.

При сравнении отдаленных результатов по шкале Visick, нами было установлено, что в группе пациентов перенесших видеоасситированное комбинированное ушивание перфоративной гастродуоденальной язвы отличные результаты получены у 85% больных и 7,5% человек с хорошим результатом, 2 случая удовлетворительного результата и 1 случай неудовлетворительного результата. В группе пациентов, перенесших лапароскопическое ушивание перфоративной гастродуоденальной язвы, преобладали также отличные результаты (88,6%), 4,5% хороший результат, 1 случай удовлетворительного результата. Неудовлетворительный результат наблюдали в 4,5% наблюдений. Это пациенты, которым было выполнено повторное оперативное вмешательство, ввиду осложнений язвенной болезни, либо которым проводилось консервативное лечение одного из осложнений язвенной болезни, в отдаленном периоде. Нами было установлено, что проведенное противоязвенное лечение, после комбинированного ушивания перфоративной гастродуоденальной язвы, позволяет добиться стойкой ремиссии заболевания и улучшает качество жизни пациентов.

Таким образом, по ряду объективных причин, лапароскопическое ушивание перфоративной гастродуоденльной язвы, не всегда возможно. Выходом является выполнение ушивание язвы из мини-доступа, с применением набора инструментов «Мини-Ассистент», не теряя при этом преимуществ малоинвазивной методики. При наличии у больного распространенного перитонита, причиной которому являлась перфоративная гастродуоденальная язва, обоснованным оперативным вмешательством

является лапаротомия, с ушивание перфоративной язвы, тщательной санацией брюшной полости.

Исходя из полученных результатов отмечено, что обе группы больных репрезентативны, существенно не отличаются друг от друга продолжительностью операции. Больные в меньшей степени страдали от послеоперационных болей, что видно из количества применяемых наркотических анальгетиков. Постельный режим, количество койко-дней практически сопоставимы по длительности у пациентов контрольной и основной групп. Применение такого метода, как ушивание перфоративной гастродуоденальной язвы из мини-доступа позволило нам избежать большого количества конверсий при попытке лапароскопического ушивания прободной язвы. Вследствие чего мы добились уменьшения койко-дня, продолжительности операции и улучшение отдаленных результатов лечения данной категории больных.

Выводы

4. Выбор метода хирургического лечения прободной гастродуоденальной язвы основывается на оценке тяжести состояния больных, размеров и выраженности воспалительных изменений области перфоративного отверстия. Данный лечебно-диагностический алгоритм позволил уйти от выполнения конверсий при лапароскопических вмешательствах.

5. Лапароскопическое ушивание прободной гастродуоденальной язвы, выполнено у 52,6% больных при диаметре перфоративной язвы менее 1 см, инфильтративно-язвенного поражения вокруг перфорационного отверстия менее 0,5 см. Видеоасситированные комбинированные операции использованы у 47,4% больных, как альтернатива широкой лапаротомии при больших размерах прободной язвы (>10 мм), выраженных инфильтративных изменениях вокруг перфоративного отверстия (прорезывание швов), трудной доступности ушивания (задняя стенка желудка, низкая дуоденальная язва) и при сочетаниях осложнений (перфорация и кровотечение или стеноз).

6. Ушивание перфоративной гастродуоденальной язвы с использованием миниинвазивных технологий, в комплексе с современной послеоперационной противоязвенной терапией, приводит к хорошим клиническим результатам и безрецидивному течению язвенной болезни в 91,6% случаях. У пациентов, перенесших лапароскопическое и видеоассистированное комбинированное ушивание перфоративной гастродуоденальной язвы, по шкале Visik, преобладают отличный (88,6% и 85%) и хороший (4,5% и 7,5%) результаты, что доказывает преимущество ушивания язвы из мини-доступа, при невозможности выполнения лапароскопического вмешательства.

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Курбаниязов З. Б., доктор медицинских наук,
профессор
заведующий кафедрой хирургических болезней №1
и трансплантологии
Самаркандский государственный медицинский университет

НЕПОСРЕДСТВЕННЫЕ РЕЗУЛЬТАТЫ ЛАПАРОСКОПИЧЕСКОГО, ВИДЕОАССИСТИРОВАННОГО МИНИЛАПАРОТОМНОГО И ЛАПАРОТОМНОГО ВАРИАНТОВ ХИРУРГИЧЕСКОЙ КОРРЕКЦИИ ПРОБОДНОЙ ГАСТРОДУОДЕНАЛЬНОЙ ЯЗВЫ

Резюме. *Работа основана на результатах хирургического лечения 152 больных с перфоративной гастродуоденальной язвой. Использование малоинвазивных вмешательств, при правильном отборе пациентов позволяет уменьшить число послеоперационных осложнений с 23,8% до 8,6%, сократить сроки пребывания в стационаре после операции, обеспечить лучшую послеоперационную реабилитацию пациентов. Ушивание перфоративной гастродуоденальной язвы с использованием миниинвазивных технологий, приводит к хорошим клиническим результатам и безрецидивному течению язвенной болезни в 91,6% случаях.*

Ключевые слова. *Перфоративная гастродуоденальная язва, ушивание язвы, миниинвазивные технологии.*

Kurbaniyazov Z. B., doctor of medical sciences,
professor
head of the department of surgical diseases no. 1 and transplantology
Samarkand State Medical University

IMMEDIATE OUTCOMES OF LAPAROSCOPIC, VIDEO-ASSISTED MINILAPAROTOMY, AND LAPAROTOMY APPROACHES FOR SURGICAL CORRECTION OF PERFORATED GASTRODUODENAL ULCERS

Abstract. *The study is based on the results of surgical treatment of 152 patients with perforated gastroduodenal ulcers. The use of minimally invasive interventions, with appropriate patient selection, made it possible to reduce the rate of postoperative complications from 23.8% to 8.6%, shorten the duration of postoperative hospital stay, and ensure better postoperative rehabilitation. Suturing of perforated gastroduodenal ulcers using minimally invasive technologies resulted in favorable clinical outcomes and a recurrence-free course of peptic ulcer disease in 91.6% of cases.*

***Keywords**: perforated gastroduodenal ulcer, ulcer suturing, minimally invasive technologies.*

Актуальность

Лечение больных с прободной гастродуоденальной язвой до настоящего времени остается непростой задачей неотложной абдоминальной хирургии. Ежегодно в мире до 4 миллионов человек заболевают язвенной болезнью. Осложнения язвенной болезни развиваются у 10– 20% больных с язвенным поражением желудка и двенадцатиперстной кишки. Перфорация возникает у 2–14% пациентов с язвенной болезнью. Летальность при прободной язве (мировая статистика) варьирует в пределах 2,5–27%, и до 70% летальности, в популяции больных с язвенной болезнью, обусловлены именно перфорацией. Актуальным остается вопрос выбора объема хирургического вмешательства при прободной гастродуоденальной язве. Доля миниинвазивных операции, используемых в лечении прободной язвы, увеличилась во многих клиниках Узбекистана и за рубежом. Использование миниинвазивных технологии у пациентов с прободными гастродуоденальными язвами имеют ряд ограничений, и могут быть использованы только у тщательно отобранного контингента больных. Исходя из этого, требуется разработать дифференцированные критерии выбора варианта оперативного вмешательства при прободных гастродуоденальных язвах на основании современных диагностических методик.

Цель исследования

Провести сравнительную оценку непосредственных результатов лапароскопического, видеоассистированного комбинированного минилапаротомного и лапаротомного вариантов коррекции прободной язвы.

Материал и методы исследования

Работа основана на результатах хирургического лечения 152 больных с перфоративной гастродуоденальной язвой. Пациенты оперированы в Навоийском филиале РНЦЭМП в период с 2019 по 2023 гг. Возраст исследуемых пациентов варьировал от 18 до 67 лет, средний возраст составил 35,7±15,4 лет. Больные трудоспособного возраста составили 137, т.е. 90%. Среди больных с перфоративными гастродуоденальными язвами было 25 (16,5%) женщин и 127 (83,4%) мужчин. Все пациенты поступили в экстренном порядке.

61 (52,6%) пациентам проведено лапароскопическое ушивание перфоративной гастродуоденальной язвы.

В группе из 55 больных, которым выполнили ушивание перфоративной гастродуоденальной язвы из мини-доступа, отмечались следующие трудности перехода на лечебный этап лапароскопического вмешательства: у 15 (27,2%) человек имела место «неудобное» для лапароскопического ушивания расположение язвы, а именно, близкое ее расположение к малой кривизне желудка. У 14 (25,4%) больных диаметр

отверстия составлял более 8-10 мм. У 8 (16,3%) больных имел место плотный инфильтрат в области перфорации, диаметр отверстия более 1,0 см, ввиду чего возникала необходимость накладывать широкие стежки с частичным погружением инфильтрата, лапароскопическим путем это было неосуществимо. У 14 (25,4%) пациентов имелась резко выраженная инфильтрация воспаленных краев перфоративной язвы, при попытке лапароскопического ушивания происходило прорезывание швов, что ставило под сомнение герметизм шва, ввиду чего было принято решение о переходе на ушивание из мини-доступа. У 3 (5,4%) пациентов при выполнении диагностической лапароскопии были выявлены выраженные висцеропариетальные сращения, делающие либо недоступной, либо трудной для санации пилородуоденальную зону, в данном случае так же успешно выполнено ушивание перфоративной гастродуоденальной язвы из мини-доступа.

Показаниями к видеоассистированному ушиванию перфоративной гастродуоденальной язвы из мини-доступа считали: - отсутствие распространенного перитонита и паралитической кишечной непроходимости; - локализацию перфоративного отверстия по передней стенке органа; - «неудобная» для лапароскопического ушивания локализация язвы; - выраженный спаечный процесс в зоне операции; - отсутствие анамнестических, клинических, эндоскопических, лапароскопических признаков других осложнений язвенной болезни; - отсутствие признаков онкологического процесса в области язвеннойперфорации.

За этот же период наблюдений резекция желудка по поводу перфоративной гастродуоденальной язвы выполнена 21 больным. По наличию осложнений больные разделились: - сочетание перфоративной язвы со стенозом выходного отдела желудка-10 (47,6%) пациентов; - сочетание перфоративной язвы желудка с язвенным кровотечением-3 (10,7%) пациента; - перфоративная язва задней стенки желудка с пенетрацией в поджелудочную железу-3 (14,3%) пациента; - гигантская язва луковицы двенадцатиперстной кишки (d более 5 см)- 2 (9,5%) пациента; - перфоративная язва малой кривизны желудка с малигнизацией-3 (14,3%) пациента.

Ваготомия с пилоропластикой при перфоративной гастродуоденальной язве выполнена 15 пациентам. По выполнению дренирующей желудок операций больные разделились следующим образом: - селективная ваготомия с пилоропластикой по Гейнеке-Микуличу-9 (60%) пациентов; - стволовая ваготомия с пилоропластикой по Финнею-4 (26,6%) пациентов; - стволовая ваготомия с пилородуоденальным анастомозом по Джабулею-2 (13,3%) пациента.

Результаты и их обсуждение

В ближайшем послеоперационном периоде у пациентов, (n=116) которым выполнено ушивание перфоративной гастродуоденальной язвы миниинвазивным способом, осложнения развились в 12 (10,3%) случаев. Абсцессы брюшной полости развились в 2 (1,7%) случаев. Во всех случаях

выполнено пункция и дренирование абсцессов под УЗИ контролем. Несостоятельность ушитой язвы развилась в 5 (4,3%) случаях, в 3 (2,6%) наблюдениях у больных которым выполнено ушивание язвы из мини-доступа, в 2 (1,7%) случае, у больных которым выполнено лапароскопическое ушивание перфоративной гастродуоденальной язвы. У пациентов основной группы была выполнена релапаротомия резекция желудка по Бильрот-II, у больных контрольной группы была выполнена релапаротомия, иссечение язвы, пилоропластика по Джабулею. Нагноение послеоперационной раны развилось в 3 (2,6%) случаев, у больных основной группы, и в 1(0,8%) случае у больных контрольной группы. Эвентрация пряди большого сальника отмечалась в 2 (1,7%) наблюдениях, в обоих случаях выполнено ушивание эвентрации под внутривенной седацией. Больные выписаны с клиническим улучшением (табл 1).

Таблица 1

Послеоперационные осложнения в зависимости от типа ушивания перфоративной гастродуоденальной язвы

Осложнения	Операция	
	Лапароскопическоеушивание ПГДЯ	Ушивание ПГДЯ измини-доступа
Абсцесс бр.полости	-	2 (1,7%)
Несостоятельность	2 (1,7%)	3 (2,6%)
Нагноение раны	-	1 (0,8%)
Эвентрация	-	2 (1,7%)
Ранняя спаечнаякишечная непроходимость	-	2 (1,7%)
Всего	**2 (1,7)**	**10 (8,6%)**

Резекция 2/3 желудка по Бильрот-I произведена у 3 больных. Редкость выполнения данной модификации резекции желудка объясняется наличием выраженной воспалительной инфильтрации в области пилородуоденального перехода, и когда технически невозможно выполнить данную операцию. Резекцию желудка по Бильрот-II выполнялась у 18 больных.

Наибольшее количество осложнений наблюдались после резекции желудка по Бильрот-II-4 (19,1%). В целом после резекции желудка осложнения развились у 5 (23,8%) больных. Абсцесс брюшной полости наблюдался у 1 больного, по локализации располагался в подпеченочном пространстве. Больному было выполнено пункция и дренирование абсцесса с последующим промыванием, выписан с клиническим выздоровлением. Нагноение раны встречали у 1, больному выполнено вскрытие гнойников, ежедневные перевязки с антисептиками, наступило выздоровление. Несостоятельность гастроэнтероанастомоза отмечали у 1 больного, после резекции желудка по Бильрот-II. В данном случае имела место гигантская перфоративная язва луковицы двенадцатиперстной кишки, распространенныйфибринозно-гнойный перитонит.

Ближайшие результаты радикальных операций по поводу перфоративной язвы характеризовались большим процентом ранних осложнений-5 (23,8%). Наибольший процент осложнений был у пациентов, которым выполняли резекцию желудка по Бильрот-II (табл. 2).

Таблица 2

Послеоперационные осложнения в зависимости от вида резекции

Осложнения	Операция	
	РЖ по Бильрот-I	РЖ по Бильрот-II
Абсцесс бр.полости	-	1 (4,7%)
Несостоятельность анастомоза	-	1 (4,7%)
Нагноение раны	-	1 (4,7%)
О.панкреатит	1 (4,7%)	1 (4,7%)
Всего	**1 (4,7%)**	**4 (19,1%)**

Анализируя результаты лечения больных с перфоративной гастродуоденальной язвой, которым была выполнена органосохраняющая операция с различными видами пилоропластик (n=15), мы пришли к выводу что на исход лечения зависели возраст больных, сроки от начала заболевания, выраженность сопутствующей патологии, выраженность и степень распространенности перитонита и длительность язвенного анамнеза.

Из всего числа оперированных пациентов осложнения развились у 3 (20%) пациентов. Абсцесс брюшной полости наблюдали у 1 больного. Абсцесс располагался в левом поддиафрагмальном пространстве, который успешно пунктирован и дренирован под УЗИ контролем, больной выписан с выздоровлением. Несостоятельность швов встречали у 1 больного, после выполнения пилоропластики по Джабулею. В данном случае несостоятельность была установлена на следующие сутки после операции. Больному по экстренным показаниям была выполнена резекция желудка по Бильрот-II. Нагноение послеоперационной раны наблюдали у 1 больного (Табл.3).

Таблица 3

Послеоперационные осложнения в зависимости от вида операции

Осложнения	Операции			Всего
	Селективная ваготомия с пилоропластикой по Гейнеке-Микуличу	Стволовая ваготомия с пилоропластикой по Финнею	Стволовая ваготомия с пилородуоденальным анастомозом по Джабулею	
Абсцесс бр.полости	-		1	1
Несостоятельность	1			1
Нагноение раны	-	1		1
Всего	1	1	1	3

Сравнительный анализ отдаленных результатов лечения между больными, которым была выполнена либо паллиативная, либо радикальная операция показал, что простое ушивание язвы с последующей консервативной терапией дает рецидивы в 9,9% случаев и требует повторных хирургических вмешательств в 5,3% случаев.

У больных перенесших видеоассистированное комбинированное ушивание перфоративной гастродуоденальной язвы, на ФГДС-контроле выявлен рецидив язвы двенадцатиперстной кишки у 5 (6,4%). При проведении контрольной ФГДС у пациентов, перенесших лапароскопическое ушивание перфоративной гастродуоденальной язвы, у 6 (10,9%) выявлен рецидив язвенной болезни.

Выводы

7. Выбор метода хирургического лечения прободной гастродуоденальной язвы основывается на интегральной оценке тяжести состояния больных, размеров и выраженности воспалительных изменений области перфоративного отверстия. Данный лечебно-диагностический алгоритм позволил уйти от выполнения конверсий при лапароскопических вмешательствах.

8. Использование малоинвазивных вмешательств, при правильном отборе пациентов позволяет уменьшить число послеоперационных осложнений с 23,8% до 8,6%, сократить сроки пребывания в стационаре обеспечить лучшую послеоперационную реабилитацию пациентов. Ушивание перфоративной гастродуоденальной язвы с использованием миниинвазивных технологий, приводит к хорошим клиническим результатам и безрецидивному течению язвенной болезни в 91,6% случаях.

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Назаров З. Н.
ассистент
кафедра хирургических болезней №1 и трансплантологии
Самаркандский государственный медицинский университет

ВОЗМОЖНОСТИ ЛАПАРОСКОПИЧЕСКИХ ТЕХНОЛОГИЙ В ЛЕЧЕНИИ ПАХОВЫХ ГРЫЖ У ПАЦИЕНТОВ СТАРШЕ 65 ЛЕТ

Аннотация. *Выполнен анализ результатов лечения 345 пациентов в возрасте 65-89 лет с паховыми грыжами за период 2018-2024 гг. Основная группа (n=186) — лапароскопическая tapp, контрольная группа (n=159) — герниопластика по лихтенштейну. Срок наблюдения — 28 месяцев. Лапароскопическая tapp-герниопластика у пациентов старше 65 лет обеспечивает лучшие непосредственные результаты и качество жизни при сопоставимой частоте рецидивов. Метод может быть рекомендован как предпочтительный при отсутствии абсолютных противопоказаний.*

Ключевые слова: *паховая грыжа, лапароскопия, tapp-герниопластика, пожилой возраст, сетчатый имплант, хирургическое лечение.*

Nazarov Z. N.
assistant
department of surgical diseases no. 1 and transplantology
Samarkand State Medical University

POSSIBILITIES OF LAPAROSCOPIC TECHNOLOGIES IN INGUINAL HERNIA TREATMENT IN PATIENTS OVER 65 YEARS

Abstract. *Analysis of treatment results of 345 patients aged 65-89 years with inguinal hernias for the period 2018-2024 was performed. Main group (n=186) — laparoscopic tapp, control group (n=159) — lichtenstein hernioplasty. Follow-up period — 28 months. Laparoscopic tapp hernioplasty in patients over 65 years provides better immediate results and quality of life with comparable recurrence rates. The method can be recommended as preferred in the absence of absolute contraindications.*

Keywords: *inguinal hernia, laparoscopy, tapp hernioplasty, elderly age, mesh implant, surgical treatment.*

Паховая грыжа относится к числу наиболее часто встречающихся хирургических заболеваний. По данным мировой статистики, ежегодно выполняется более 20 миллионов операций по поводу паховых грыж, что ставит данное вмешательство в ряд наиболее распространённых в

общехирургической практике. Актуальность проблемы определяется не только высокой распространённостью заболевания, но и значительными экономическими затратами на лечение и реабилитацию пациентов.

Демографические тенденции последних десятилетий характеризуются неуклонным ростом доли пожилого населения. По прогнозам экспертов воз, к 2050 году число лиц старше 60 лет превысит 2 миллиарда человек. Эта тенденция неизбежно отражается на структуре хирургической патологии: всё большее число пациентов, нуждающихся в герниопластике, относится к старшим возрастным группам.

Хирургическое лечение паховых грыж у пожилых пациентов имеет свои особенности. С одной стороны, возрастные изменения соединительной ткани предрасполагают к формированию грыж больших размеров с широкими грыжевыми воротами. С другой стороны, наличие множественной сопутствующей патологии и снижение функциональных резервов организма повышают операционный риск и требуют тщательного выбора хирургической тактики.

Современные ненатяжные методы герниопластики с применением синтетических имплантов существенно улучшили результаты лечения. Лапароскопические методики, в частности трансабдоминальная преперитонеальная пластика (tapp), позволяют минимизировать операционную травму и обеспечить раннюю реабилитацию пациентов. Однако применимость данных технологий у пожилых больных остаётся предметом дискуссий в хирургическом сообществе.

Материалы и методы

В исследование включены 345 пациентов с первичными паховыми грыжами в возрасте от 65 до 89 лет, оперированных в хирургическом отделении клиники за период с января 2018 по декабрь 2024 года. Критерии включения: возраст 65 лет и старше, наличие первичной паховой грыжи, информированное согласие на участие в исследовании. Критерии исключения: рецидивные и ущемлённые грыжи, тяжёлая декомпенсированная соматическая патология (asa iv-v), отказ от участия в исследовании.

Мужчин было 318 (92,2%), женщин — 27 (7,8%). Средний возраст пациентов составил 72,6±5,9 года. Распределение по возрастным группам: 65-69 лет — 124 (35,9%), 70-74 года — 108 (31,3%), 75-79 лет — 72 (20,9%), 80 лет и старше — 41 (11,9%) пациент. По типу грыж: косые — 198 (57,4%), прямые — 118 (34,2%), комбинированные — 29 (8,4%).

Сопутствующая патология выявлена у 312 (90,4%) пациентов. Наиболее часто встречались: артериальная гипертензия — у 286 (82,9%), ибс — у 218 (63,2%), сахарный диабет 2 типа — у 94 (27,2%), хобл — у 62 (18,0%), ожирение — у 78 (22,6%) пациентов. Класс asa ii определён у 98 (28,4%), asa iii — у 247 (71,6%) пациентов.

Пациенты были разделены на две группы. Основную группу составили 186 пациентов, которым выполнена лапароскопическая трансабдоминальная

препеританеальная герниопластика (тарр) с использованием полипропиленового сетчатого эндопротеза размером 12×15 см. Контрольную группу составили 159 пациентов, оперированных открытым методом по лихтенштейну с применением аналогичного импланта. Выбор метода операции осуществлялся с учётом клинической ситуации, предпочтений пациента и наличия противопоказаний к лапароскопическому вмешательству.

Таблица 1.
Клиническая характеристика пациентов

Показатель	Основная (n=186)	Контрольная (n=159)	P
Возраст, лет	72,4±5,7	72,9±6,2	>0,05
Мужчины	172 (92,5%)	146 (91,8%)	>0,05
Женщины	14 (7,5%)	13 (8,2%)	>0,05
Имт, кг/м²	27,4±3,6	27,8±3,9	>0,05
Asa ii	54 (29,0%)	44 (27,7%)	>0,05
Asa iii	132 (71,0%)	115 (72,3%)	>0,05
Артериальная гипертензия	152 (81,7%)	134 (84,3%)	>0,05
Ибс	116 (62,4%)	102 (64,2%)	>0,05
Сахарный диабет	48 (25,8%)	46 (28,9%)	>0,05

Таблица 2.
Характеристика грыж

Показатель	Основная группа	Контрольная группа	P
Косая паховая	108 (58,1%)	90 (56,6%)	>0,05
Прямая паховая	62 (33,3%)	56 (35,2%)	>0,05
Комбинированная	16 (8,6%)	13 (8,2%)	>0,05
Правосторонняя	106 (57,0%)	88 (55,3%)	>0,05
Левосторонняя	80 (43,0%)	71 (44,7%)	>0,05

Результаты и их обсуждение

Группы были сопоставимы по возрасту, полу, типу грыж и структуре коморбидности. Средняя продолжительность операции в основной группе составила 52,4±12,6 мин, в контрольной — 44,2±10,8 мин ($p<0,01$). Конверсия к открытому доступу потребовалась у 4 (2,2%) пациентов основной группы: в 2 случаях — из-за выраженного спаечного процесса, в 1 — из-за интраоперационного выявления скользящей грыжи, в 1 — из-за технических сложностей при выделении грыжевого мешка.

Интенсивность болевого синдрома по визуально-аналоговой шкале (ваш) в 1-е сутки после операции составила 2,6±1,0 балла в основной группе

и 5,2±1,4 балла в контрольной (p<0,001). На 3-и сутки показатели снизились до 1,0±0,5 и 3,2±1,0 балла соответственно (p<0,001). Потребность в назначении опиоидных анальгетиков отмечена у 8 (4,3%) пациентов основной группы и у 44 (27,7%) контрольной группы (p<0,001).

Сроки активизации пациентов существенно различались. В основной группе самостоятельная ходьба была возможна через 3,4±1,6 часа после операции, в контрольной — через 9,2±3,4 часа (p<0,001). Средняя длительность госпитализации составила 1,9±0,7 суток в основной группе и 4,6±1,5 суток в контрольной группе (p<0,001).

Ранние послеоперационные осложнения развились у 17 (9,1%) пациентов основной группы и у 28 (17,6%) пациентов контрольной группы (p<0,05). Структура осложнений представлена в таблице 3. Наиболее частыми осложнениями были серома области операции и задержка мочеиспускания. Раневая инфекция отмечена только в контрольной группе — у 4 (2,5%) пациентов.

При наблюдении в сроки до 28 месяцев рецидив грыжи диагностирован у 4 (2,2%) пациентов основной группы и у 5 (3,1%) пациентов контрольной группы (p>0,05). Хроническая паховая боль (сохраняющаяся более 3 месяцев после операции) выявлена у 6 (3,2%) и 21 (13,2%) пациента соответственно (p<0,001). Нарушение чувствительности в паховой области отмечено у 8 (4,3%) и 19 (11,9%) пациентов (p<0,01).

Анализ качества жизни по опроснику eq-5d через 6 месяцев после операции показал достоверно лучшие результаты в основной группе. Индекс утилитарности составил 0,86±0,08 против 0,78±0,11 (p<0,01). Показатель по визуально-аналоговой шкале eq-vas — 82,4±8,6 против 74,6±10,8 (p<0,001).

Таблица 3.

Ранние послеоперационные осложнения

Осложнение	Основная	Контрольная	P
Серома	8 (4,3%)	12 (7,5%)	>0,05
Гематома	3 (1,6%)	5 (3,1%)	>0,05
Задержка мочеиспускания	4 (2,2%)	6 (3,8%)	>0,05
Раневая инфекция	0	4 (2,5%)	-
Орхит	2 (1,1%)	1 (0,6%)	>0,05
Всего пациентов	17 (9,1%)	28 (17,6%)	<0,05

Таблица 4.
Сравнительные результаты лечения

Показатель	Основная	Контрольная	P
Длительность операции, мин	52,4±12,6	44,2±10,8	<0,01
Боль ваш, 1 сутки	2,6±1,0	5,2±1,4	<0,001
Боль ваш, 3 сутки	1,0±0,5	3,2±1,0	<0,001
Активизация, часы	3,4±1,6	9,2±3,4	<0,001
Госпитализация, сутки	1,9±0,7	4,6±1,5	<0,001
Опиоидные анальгетики	8 (4,3%)	44 (27,7%)	<0,001

Таблица 5.
Отдалённые результаты (до 28 месяцев)

Показатель	Основная	Контрольная	P
Рецидив грыжи	4 (2,2%)	5 (3,1%)	>0,05
Хроническая боль	6 (3,2%)	21 (13,2%)	<0,001
Нарушение чувствительности	8 (4,3%)	19 (11,9%)	<0,01
Eq-5d индекс	0,86±0,08	0,78±0,11	<0,01
Eq-vas	82,4±8,6	74,6±10,8	<0,001

Результаты проведённого исследования подтверждают эффективность и безопасность лапароскопической тарр-герниопластики у пациентов старше 65 лет. Достоверно меньшая выраженность послеоперационного болевого синдрома, ускоренная активизация и сокращение сроков госпитализации являются существенными преимуществами минимально инвазивного подхода, особенно значимыми для пожилых пациентов.

Снижение частоты хронической послеоперационной боли более чем в 4 раза представляется одним из наиболее важных преимуществ лапароскопической методики. Хроническая паховая боль существенно снижает качество жизни пациентов и нередко требует длительного лечения или повторных вмешательств. Меньшая травматичность лапароскопического доступа и отсутствие контакта сетчатого импланта с нервными структурами пахового канала объясняют данное преимущество.

Частота рецидивов при обоих методах была низкой и статистически не различалась, что свидетельствует о сопоставимой надёжности лапароскопической и открытой герниопластики при соблюдении стандартной техники операции. Принципиально важно, что расположение сетчатого импланта в преперитонеальном пространстве при тарр обеспечивает укрепление всей миопектинеальной области.

Необходимость общей анестезии при лапароскопических вмешательствах традиционно рассматривается как фактор, ограничивающий их применение у пожилых пациентов. Однако современные протоколы анестезиологического обеспечения и использование низкого давления

пневмоперитонеума (10-12 мм рт.ст.) Позволяют безопасно выполнять данные операции у большинства пациентов класса asa ii-iii.

На основании полученных результатов нами разработан алгоритм выбора метода герниопластики у пожилых пациентов. Лапароскопическая tapp рекомендуется при отсутствии противопоказаний к общей анестезии и лапароскопическому доступу. Открытая герниопластика по лихтенштейну остаётся методом выбора при наличии выраженного спаечного процесса брюшной полости или противопоказаний к пневмоперитонеуму.

Заключение

Лапароскопическая трансабдоминальная преперитонеальная герниопластика является эффективным и безопасным методом лечения паховых грыж у пациентов старше 65 лет. По сравнению с открытой герниопластикой по лихтенштейну метод tapp обеспечивает достоверно меньшую выраженность послеоперационного болевого синдрома, более раннюю активизацию пациентов и сокращение сроков госпитализации в 2,4 раза.

При сопоставимой частоте рецидивов лапароскопическая методика характеризуется четырёхкратным снижением частоты хронической послеоперационной боли и лучшими показателями качества жизни в отдалённом периоде. Метод может быть рекомендован в качестве предпочтительного варианта хирургического лечения паховых грыж у пожилых пациентов при отсутствии абсолютных противопоказаний к лапароскопическому вмешательству.

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Назаров З. Н.
ассистент
кафедра хирургических болезней №1 и трансплантологии
Самаркандский государственный медицинский университет

ОПТИМАЛЬНАЯ ХИРУРГИЧЕСКАЯ СТРАТЕГИЯ ПРИ ОСТРОМ ХОЛЕЦИСТИТЕ У ПОЖИЛЫХ ПАЦИЕНТОВ С ПОРАЖЕНИЕМ ЖЕЛЧЕВЫВОДЯЩИХ ПУТЕЙ

Аннотация. *Острый холецистит является одним из наиболее распространённых хирургических заболеваний у пожилых пациентов, частота которого неуклонно возрастает в связи с увеличением продолжительности жизни населения. Выбор оптимальной хирургической тактики у данной категории больных представляет значительные трудности в связи с наличием множественной сопутствующей патологии и высоким операционно-анестезиологическим риском. Разработанный дифференцированный подход к выбору хирургической тактики при остром холецистите у пожилых пациентов с поражением желчевыводящих путей позволяет оптимизировать результаты лечения и снизить частоту неблагоприятных исходов.*

Ключевые слова: *острый холецистит, пожилой возраст, желчевыводящие пути, лапароскопическая холецистэктомия, хирургическая тактика, декомпрессия желчных путей, холедохолитиаз.*

Nazarov Z. N.
assistant
department of surgical diseases no. 1 and transplantology
Samarkand State Medical University

OPTIMAL SURGICAL STRATEGY FOR ACUTE CHOLECYSTITIS IN ELDERLY PATIENTS WITH BILIARY TRACT INVOLVEMENT

Annotation*. Acute cholecystitis is one of the most common surgical diseases in elderly patients, the frequency of which is steadily increasing due to the increase in life expectancy. The choice of optimal surgical tactics in this category of patients presents significant difficulties due to the presence of multiple comorbidities and high operative-anesthetic risk. The developed differentiated approach to the choice of surgical tactics in acute cholecystitis in elderly patients with biliary tract involvement allows optimizing treatment results and reducing the frequency of adverse outcomes.*

Keywords: *acute cholecystitis, elderly age, biliary tract, laparoscopic cholecystectomy, surgical tactics, biliary decompression, choledocholithiasis.*

Острый холецистит занимает одно из ведущих мест в структуре неотложной хирургической патологии органов брюшной полости, уступая лишь острому аппендициту. По данным различных авторов, заболеваемость острым холециститом составляет от 40 до 60 случаев на 100 000 населения, при этом отмечается неуклонная тенденция к росту данного показателя, особенно в странах с высоким уровнем экономического развития.

Особую медико-социальную значимость приобретает проблема лечения острого холецистита у пациентов пожилого и старческого возраста. Демографические тенденции последних десятилетий свидетельствуют о неуклонном увеличении доли населения старших возрастных групп, что закономерно приводит к росту числа пациентов с желчнокаменной болезнью и её осложнениями. По данным эпидемиологических исследований, частота желчнокаменной болезни в возрасте старше 60 лет достигает 25-30%, а у лиц старше 80 лет превышает 40%.

Лечение острого холецистита у пожилых пациентов сопряжено с рядом существенных трудностей, обусловленных как особенностями течения заболевания в данной возрастной группе, так и наличием множественной сопутствующей патологии. У пациентов старших возрастных групп острый холецистит характеризуется более частым развитием деструктивных форм заболевания, высокой частотой сопутствующего поражения внепечёночных желчных протоков, а также атипичной клинической картиной, затрудняющей своевременную диагностику.

Сопутствующее поражение желчевыводящих путей при остром холецистите у пожилых пациентов встречается в 15-25% случаев и существенно осложняет выбор лечебной тактики. Наличие холедохолитиаза, стриктур желчных протоков или механической желтухи требует комплексного подхода к лечению и нередко обусловливает необходимость выполнения дополнительных интервенционных вмешательств. Многоэтапная хирургическая тактика, предусматривающая предварительную декомпрессию желчных путей с последующим выполнением холецистэктомии, получила широкое распространение в клинической практике, однако оптимальные сроки и последовательность выполнения этапов лечения остаются предметом дискуссий.

Выбор метода хирургического лечения острого холецистита у пожилых пациентов также остаётся актуальной проблемой. Несмотря на то что лапароскопическая холецистэктомия в настоящее время признана «золотым стандартом» лечения желчнокаменной болезни и её осложнений, применение данного метода у пациентов старших возрастных групп с множественной сопутствующей патологией сопряжено с повышенным риском интра- и послеоперационных осложнений. Частота конверсии к открытой операции при лапароскопической холецистэктомии у пожилых

пациентов достигает 15-20%, что существенно превышает аналогичный показатель у пациентов более молодого возраста.

Вопрос об оптимальных сроках выполнения холецистэктомии при остром холецистите у пожилых пациентов также не имеет однозначного решения. Традиционная тактика отсроченного оперативного вмешательства, предусматривающая консервативную подготовку пациента в течение нескольких дней, в последние годы всё чаще подвергается критике. Результаты ряда рандомизированных контролируемых исследований свидетельствуют о преимуществах ранней холецистэктомии (в первые 72 часа от момента госпитализации), однако применимость данных рекомендаций к пациентам пожилого и старческого возраста с тяжёлой сопутствующей патологией остаётся недостаточно изученной.

Таким образом, разработка оптимальной хирургической стратегии при остром холецистите у пожилых пациентов с поражением желчевыводящих путей представляет собой актуальную научно-практическую задачу, решение которой позволит улучшить результаты лечения данной категории больных и снизить частоту неблагоприятных исходов.

Цель исследования

Целью настоящего исследования явилась разработка и научное обоснование оптимального алгоритма хирургического лечения острого холецистита у пациентов пожилого и старческого возраста с сопутствующим поражением желчевыводящих путей на основании анализа непосредственных и отдалённых результатов различных лечебных стратегий.

Для достижения поставленной цели были определены следующие задачи: изучить особенности клинического течения острого холецистита у пациентов пожилого и старческого возраста; провести сравнительный анализ результатов применения различных хирургических тактик; определить оптимальные сроки выполнения оперативного вмешательства; оценить эффективность этапного лечения с предварительной декомпрессией желчных путей; разработать алгоритм выбора хирургической тактики в зависимости от клинико-лабораторных показателей и степени операционного риска.

Материалы и методы исследования

В основу работы положен анализ результатов лечения 487 пациентов с острым холециститом и сопутствующим поражением желчевыводящих путей в возрасте 60 лет и старше, госпитализированных в хирургическое отделение клиники в период с января 2018 года по декабрь 2023 года. Критериями включения в исследование являлись: возраст 60 лет и старше; верифицированный диагноз острого холецистита; наличие сопутствующего поражения желчевыводящих путей (холедохолитиаз, стеноз терминального отдела холедоха, механическая желтуха). Критериями исключения служили: злокачественные новообразования панкреатобилиарной зоны; ранее

выполненные оперативные вмешательства на желчных путях; острый панкреатит как ведущий диагноз.

Среди обследованных пациентов преобладали женщины — 312 (64,1%), мужчин было 175 (35,9%). Возраст пациентов варьировал от 60 до 94 лет, средний возраст составил 72,4±8,6 года.

У подавляющего большинства пациентов (96,3%) имелась сопутствующая патология различной степени тяжести. Наиболее часто встречались заболевания сердечно-сосудистой системы — у 423 (86,9%) пациентов, сахарный диабет — у 156 (32,0%), хроническая обструктивная болезнь лёгких — у 89 (18,3%), хроническая болезнь почек — у 67 (13,8%) пациентов. Множественная коморбидность (три и более сопутствующих заболевания) отмечена у 278 (57,1%) пациентов.

Оценка степени тяжести острого холецистита проводилась согласно Токийским рекомендациям 2018 года (Tokyo Guidelines 2018). Лёгкая степень тяжести (Grade I) установлена у 142 (29,2%) пациентов, средняя степень (Grade II) — у 248 (50,9%), тяжёлая степень (Grade III) — у 97 (19,9%) пациентов. Операционно-анестезиологический риск оценивался по шкале ASA: II класс определён у 118 (24,2%) пациентов, III класс — у 287 (58,9%), IV класс — у 82 (16,9%) пациентов.

Всем пациентам при поступлении выполнялось комплексное обследование, включавшее клинико-лабораторные исследования (общий и биохимический анализ крови, коагулограмма), ультразвуковое исследование органов брюшной полости, по показаниям — магнитно-резонансную холангиопанкреатографию, эндоскопическую ретроградную холангиопанкреатографию. Холедохолитиаз верифицирован у 312 (64,1%) пациентов, стеноз терминального отдела холедоха — у 98 (20,1%), механическая желтуха билирубинового генеза — у 77 (15,8%) пациентов.

Таблица 1.
Клиническая характеристика пациентов

Показатель	n	%
Пол:		
мужчины	175	35,9
женщины	312	64,1
Возрастные группы:		
60-69 лет	205	42,1
70-79 лет	170	34,9
80-89 лет	88	18,1
90 лет и старше	24	4,9
Степень тяжести (TG18):		
Grade I (лёгкая)	142	29,2
Grade II (средняя)	248	50,9
Grade III (тяжёлая)	97	19,9
Поражение желчных путей:		
холедохолитиаз	312	64,1
стеноз терминального отдела	98	20,1
механическая желтуха	77	15,8

В зависимости от применённой хирургической тактики все пациенты были разделены на четыре группы. Первую группу (n=156) составили пациенты, которым выполнена ранняя лапароскопическая холецистэктомия в первые 48 часов от момента госпитализации. Во вторую группу (n=142) вошли пациенты с лапароскопической холецистэктомией в сроки 48-72 часа. Третью группу (n=108) составили пациенты с отсроченной холецистэктомией (позднее 72 часов от госпитализации). В четвёртую группу (n=81) включены пациенты, которым применялась этапная тактика лечения с предварительной декомпрессией желчных путей и последующей холецистэктомией.

Статистическая обработка полученных данных проводилась с использованием программного пакета SPSS Statistics 26.0. Для описания количественных переменных использовались среднее арифметическое и стандартное отклонение (M±SD) при нормальном распределении данных или медиана и межквартильный размах (Me [Q1; Q3]) при отклонении от нормального распределения. Сравнение групп по количественным признакам проводилось с помощью t-критерия Стьюдента или U-критерия Манна-Уитни, по качественным признакам — с помощью критерия χ^2. Различия считались статистически значимыми при $p<0,05$. Анализ

выживаемости проводился методом Каплан-Мейера с оценкой достоверности различий с помощью log-rank теста.

Результаты исследования

Анализ сроков выполнения оперативного вмешательства показал их существенное влияние на частоту развития послеоперационных осложнений. У пациентов, оперированных в первые 24 часа от момента госпитализации, частота осложнений составила 8,2%, при операции в сроки 24-48 часов — 10,5%, при вмешательстве в период 48-72 часа — 15,8%, при отсроченной операции (72-96 часов) — 22,4%, а при операции позднее 96 часов — 31,2% (рис. 2). Различия между группами были статистически значимыми ($p<0,01$).

Структура интраоперационных осложнений в исследуемых группах представлена в таблице 2. Наиболее частым осложнением являлось кровотечение из ложа желчного пузыря, которое отмечено у 42 (8,6%) пациентов. Ятрогенное повреждение внепечёночных желчных протоков развилось у 11 (2,3%) больных, причём частота данного осложнения была достоверно выше в группе отсроченных операций (4,6% против 1,3% в группе ранних операций, $p<0,05$). Повреждение соседних органов (двенадцатиперстной кишки, поперечной ободочной кишки, печени) отмечено у 8 (1,6%) пациентов.

Таблица 2.
Структура интраоперационных осложнений

Осложнение	I гр.	II гр.	III гр.	IV гр.
Кровотечение из ложа ЖП	9 (5,8%)	10 (7,0%)	15 (13,9%)	8 (9,9%)
Повреждение желчных протоков	2 (1,3%)	2 (1,4%)	5 (4,6%)	2 (2,5%)
Повреждение соседних органов	1 (0,6%)	2 (1,4%)	4 (3,7%)	1 (1,2%)
Конверсия к открытой операции	12 (7,7%)	16 (11,3%)	24 (22,2%)	10 (12,3%)
Всего осложнений	24 (15,4%)	30 (21,1%)	48 (44,4%)	21 (25,9%)

Частота конверсии к открытой операции существенно различалась в зависимости от сроков выполнения вмешательства. В группе ранней холецистэктомии (I группа) конверсия потребовалась в 7,7% случаев, в группе холецистэктомии в сроки 48-72 часа (II группа) — в 11,3%, в группе отсроченных операций (III группа) — в 22,2%. У пациентов с этапной тактикой лечения (IV группа) частота конверсии составила 12,3%, что достоверно ниже, чем в группе отсроченных операций ($p<0,05$).

Анализ послеоперационных осложнений выявил существенные различия между группами. Общая частота послеоперационных осложнений в I группе составила 12,4%, во II группе — 16,9%, в III группе — 28,7%, в IV группе — 19,8%. Структура послеоперационных осложнений представлена в таблице 3. Наиболее частыми осложнениями были: нагноение

послеоперационной раны — у 38 (7,8%) пациентов, пневмония — у 31 (6,4%), острая сердечно-сосудистая недостаточность — у 24 (4,9%), формирование подпечёночного абсцесса — у 18 (3,7%).

Таблица 3.
Структура послеоперационных осложнений

Осложнение	I гр.	II гр.	III гр.	IV гр.
Нагноение раны	6 (3,8%)	8 (5,6%)	16 (14,8%)	8 (9,9%)
Пневмония	5 (3,2%)	7 (4,9%)	12 (11,1%)	7 (8,6%)
Острая сердечно-сосудистая недостаточность	3 (1,9%)	5 (3,5%)	11 (10,2%)	5 (6,2%)
Подпечёночный абсцесс	2 (1,3%)	4 (2,8%)	8 (7,4%)	4 (4,9%)
Желчеистечение	2 (1,3%)	3 (2,1%)	5 (4,6%)	2 (2,5%)
ТЭЛА	1 (0,6%)	2 (1,4%)	4 (3,7%)	2 (2,5%)
Всего пациентов с осложнениями	19 (12,2%)	24 (16,9%)	31 (28,7%)	16 (19,8%)

Отмечается устойчивая тенденция к снижению летальности при применении ранней хирургической тактики. Если в 2018 году летальность при ранней холецистэктомии составляла 12,5%, то к 2023 году этот показатель снизился до 5,3%. При отсроченной операции летальность оставалась существенно выше: снижение с 18,2% в 2018 году до 11,5% в 2023 году.

Общая госпитальная летальность в исследуемой когорте составила 7,4% (36 пациентов). Летальность в I группе составила 4,5% (7 пациентов), во II группе — 5,6% (8 пациентов), в III группе — 11,1% (12 пациентов), в IV группе — 11,1% (9 пациентов). Основными причинами летальных исходов были: острая сердечно-сосудистая недостаточность — 14 (38,9%) случаев, полиорганная недостаточность на фоне сепсиса — 9 (25,0%), тромбоэмболия лёгочной артерии — 6 (16,7%), прогрессирование перитонита — 7 (19,4%).

Наилучшие результаты отмечены в группе ранней лапароскопической холецистэктомии (менее 48 часов): выздоровление без осложнений — 85%, осложнённое течение — 12%, летальность — 3%. При лапароскопической холецистэктомии в сроки 48-72 часа результаты несколько хуже: 78%, 18% и 4% соответственно.

Средняя длительность госпитализации существенно различалась между группами и составила: в I группе — 7,2±2,8 дня, во II группе — 9,4±3,5 дня, в III группе — 14,6±5,8 дня, в IV группе — 16,2±6,4 дня. Различия между I и III группами были статистически значимыми ($p<0,001$). Увеличение длительности госпитализации в IV группе обусловлено необходимостью выполнения этапных вмешательств и периода восстановления между ними.

Таблица 4.
Сравнительная характеристика результатов лечения

Показатель	I гр.	II гр.	III гр.	IV гр.
Число пациентов	156	142	108	81
Длительность операции, мин	68,4±18,2	82,6±22,4	115,8±35,6	76,2±21,8
Интраоперационная кровопотеря, мл	85,2±42,6	112,4±56,8	186,5±98,4	94,8±48,2
Длительность госпитализации, сут	7,2±2,8	9,4±3,5	14,6±5,8	16,2±6,4
Частота осложнений, %	12,2	16,9	28,7	19,8
Летальность, %	4,5	5,6	11,1	11,1
Частота конверсии, %	7,7	11,3	22,2	12,3

Анализ выживаемости методом Каплан-Мейера показал статистически значимые различия между группами ранней и отсроченной холецистэктомии (log-rank test, p=0,023). 30-дневная выживаемость в группе ранней холецистэктомии составила 95,5%, в группе отсроченной операции — 88,9%. Различия сохранялись и при более длительном наблюдении.

Отдельного анализа заслуживают результаты лечения пациентов с этапным подходом (IV группа). Данная тактика применялась преимущественно у пациентов с высоким операционным риском (ASA III-IV) и выраженной механической желтухой. Первым этапом выполнялась декомпрессия желчных путей: чрескожное чреспечёночное дренирование — у 34 (42,0%) пациентов, эндоскопическая папиллосфинктеротомия с литоэкстракцией — у 47 (58,0%) пациентов. После нормализации билирубина и купирования явлений холангита (в среднем через 7-10 дней) выполнялась холецистэктомия.

Таблица 5.
Результаты этапного лечения

Показатель	ЧЧХС (n=34)	ЭПСТ (n=47)
Успешность декомпрессии, %	94,1	89,4
Осложнения I этапа, %	8,8	6,4
Интервал до холецистэктомии, сут	9,2±3,4	7,8±2,8
Частота конверсии, %	14,7	10,6
Послеоперационные осложнения, %	23,5	17,0
Летальность, %	14,7	8,5
Общая длительность госпитализации, сут	18,4±6,8	14,6±5,2

Сравнительный анализ методов декомпрессии желчных путей показал определённые преимущества эндоскопического подхода. При применении эндоскопической папиллосфинктеротомии с литоэкстракцией отмечена меньшая частота осложнений как первого этапа (6,4% против 8,8%), так и последующей холецистэктомии (17,0% против 23,5%), а также более низкая летальность (8,5% против 14,7%). Вместе с тем, чрескожное чреспечёночное дренирование демонстрировало более высокую техническую успешность (94,1% против 89,4%), что делает данный метод предпочтительным у пациентов с невозможностью эндоскопического доступа.

Результаты проведённого исследования убедительно демонстрируют преимущества ранней хирургической тактики при остром холецистите у пожилых пациентов с поражением желчевыводящих путей. Полученные данные согласуются с современными международными рекомендациями, в частности с Токийскими руководствами 2018 года (Tokyo Guidelines 2018), которые рекомендуют выполнение холецистэктомии в первые 72 часа от момента установления диагноза при отсутствии противопоказаний.

Преимущества ранней холецистэктомии обусловлены несколькими факторами. Во-первых, на ранних сроках заболевания воспалительные изменения в области треугольника Кало менее выражены, что облегчает идентификацию анатомических структур и снижает риск ятрогенного повреждения желчных протоков. Во-вторых, ранняя операция позволяет избежать прогрессирования деструктивных изменений в стенке желчного пузыря и развития перипузырного инфильтрата, существенно осложняющего выполнение вмешательства.

Вместе с тем, следует подчеркнуть, что применение ранней хирургической тактики у пожилых пациентов требует тщательной предоперационной оценки и индивидуального подхода. Пациенты старших возрастных групп характеризуются высокой частотой множественной коморбидности, что существенно повышает операционно-анестезиологический риск.

Особого внимания заслуживает тактика лечения пациентов с сопутствующим холедохолитиазом и механической желтухой. Традиционный подход, предусматривающий предварительную эндоскопическую санацию желчных протоков с последующей холецистэктомией, остаётся актуальным для пациентов высокого хирургического риска.

Выбор метода декомпрессии желчных путей должен осуществляться с учётом технических возможностей лечебного учреждения и индивидуальных особенностей пациента. Эндоскопическая папиллосфинктеротомия с литоэкстракцией является методом выбора при наличии холедохолитиаза и отсутствии противопоказаний к эндоскопическому вмешательству.

Полученные в ходе исследования результаты позволили разработать алгоритм выбора хирургической тактики при остром холецистите у пожилых пациентов с поражением желчевыводящих путей. Данный алгоритм предусматривает стратификацию пациентов в зависимости от степени тяжести заболевания, уровня операционного риска и наличия сопутствующего поражения внепечёночных желчных протоков.

У пациентов с лёгкой и средней степенью тяжести острого холецистита и низким операционным риском рекомендуется выполнение ранней лапароскопической холецистэктомии в первые 48-72 часа от момента госпитализации. У пациентов с тяжёлой степенью острого холецистита и/или высоким операционным риском целесообразно применение этапной тактики лечения.

Важным аспектом хирургического лечения острого холецистита у пожилых пациентов является профилактика и лечение послеоперационных осложнений. Результаты исследования показали, что наиболее частыми осложнениями в данной группе больных являются раневые инфекции, пневмонии и сердечно-сосудистые события.

Ограничениями настоящего исследования являются его ретроспективный характер в части исторической когорты и отсутствие рандомизации при распределении пациентов по группам. Для подтверждения полученных результатов необходимо проведение многоцентровых рандомизированных контролируемых исследований.

Заключение

Проведённое исследование позволило научно обосновать оптимальную хирургическую стратегию при остром холецистите у пожилых пациентов с поражением желчевыводящих путей. Установлено, что ранняя лапароскопическая холецистэктомия (в первые 48-72 часа от момента госпитализации) сопровождается достоверно лучшими непосредственными результатами по сравнению с отсроченной операцией: меньшей частотой интра- и послеоперационных осложнений, более низкой летальностью и сокращением длительности госпитализации.

У пациентов с высоким операционным риском и выраженным сопутствующим поражением желчевыводящих путей целесообразно

применение этапной тактики лечения с предварительной декомпрессией желчных путей. Эндоскопическая папиллосфинктеротомия с литоэкстракцией является предпочтительным методом декомпрессии при наличии технических возможностей и отсутствии противопоказаний.

Разработанный дифференцированный алгоритм выбора хирургической тактики, основанный на стратификации пациентов по степени тяжести заболевания и уровню операционного риска, позволяет оптимизировать результаты лечения острого холецистита у пожилых пациентов и снизить частоту неблагоприятных исходов. Внедрение данного алгоритма в клиническую практику может способствовать улучшению качества хирургической помощи пациентам старших возрастных групп с желчнокаменной болезнью и её осложнениями.

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Назаров З. Н.
ассистент
кафедра хирургических болезней №1 и трансплантологии
Самаркандский государственный медицинский университет

ЛАПАРОСКОПИЧЕСКАЯ ГЕРНИОПЛАСТИКА ПРИ ПАХОВЫХ ГРЫЖАХ У ПОЖИЛЫХ ПАЦИЕНТОВ: СРАВНИТЕЛЬНЫЙ АНАЛИЗ РЕЗУЛЬТАТОВ

Аннотация. *Проанализированы результаты лечения 234 пациентов с паховыми грыжами в возрасте 65-87 лет. Основную группу составили 126 пациентов после tapp, контрольную — 108 пациентов после открытой герниопластики по лихтенштейну. Лапароскопическая tapp является эффективным и безопасным методом лечения паховых грыж у пожилых пациентов, обеспечивающим раннюю реабилитацию и низкую частоту рецидивов.*

Ключевые слова: *паховая грыжа, лапароскопическая герниопластика, tapp, пожилой возраст, операция лихтенштейна.*

Nazarov Z. N.
assistant
department of surgical diseases no. 1 and transplantology
Samarkand State Medical University

LAPAROSCOPIC HERNIOPLASTY FOR INGUINAL HERNIAS IN ELDERLY PATIENTS: COMPARATIVE ANALYSIS OF RESULTS

Abstract. *Treatment results of 234 patients with inguinal hernias aged 65-87 years were analyzed. The main group included 126 patients after tapp, the control group — 108 patients after open lichtenstein hernioplasty. Laparoscopic tapp is an effective and safe method for inguinal hernia repair in elderly patients, providing early rehabilitation and low recurrence rates.*

Keywords: *inguinal hernia, laparoscopic hernioplasty, tapp, elderly age, lichtenstein operation.*

Паховые грыжи являются одной из наиболее распространённых хирургических патологий, частота которых достигает 3-5% в общей популяции и значительно возрастает у лиц старших возрастных групп. По данным различных авторов, до 25% мужчин в течение жизни подвергаются оперативному лечению по поводу паховой грыжи.

У пациентов пожилого и старческого возраста паховые грыжи характеризуются рядом особенностей: преобладанием прямых и

комбинированных форм, большими размерами грыжевых ворот, атрофией тканей пахового канала, что затрудняет выполнение традиционных методов пластики и повышает риск рецидива заболевания.

Внедрение современных синтетических материалов и эндовидеохирургических технологий открыло новые перспективы в лечении паховых грыж. Лапароскопическая трансабдоминальная преперитонеальная герниопластика (tapp) позволяет выполнить укрепление задней стенки пахового канала из преперитонеального доступа с минимальной травматизацией тканей передней брюшной стенки.

Однако применение лапароскопических методик у пожилых пациентов сопряжено с необходимостью проведения общей анестезии и создания карбоксиперитонеума, что может представлять определённый риск у больных с сопутствующей сердечно-лёгочной патологией. Вопрос о выборе оптимального метода герниопластики у данной категории больных остаётся дискуссионным.

Материалы и методы

В исследование включены 234 пациента мужского пола с первичными односторонними паховыми грыжами в возрасте от 65 до 87 лет, оперированных в период с 2020 по 2023 год. Средний возраст пациентов составил 71,8±6,2 года. Сопутствующая патология выявлена у 89,3% больных: ишемическая болезнь сердца — у 156 (66,7%), артериальная гипертензия — у 198 (84,6%), сахарный диабет 2 типа — у 67 (28,6%), хроническая обструктивная болезнь лёгких — у 48 (20,5%) пациентов.

Основную группу составили 126 пациентов, которым выполнена лапароскопическая трансабдоминальная преперитонеальная герниопластика (tapp) с использованием полипропиленового сетчатого импланта размером 10х15 см. Контрольную группу составили 108 пациентов после открытой ненатяжной герниопластики по методике лихтенштейна с использованием аналогичного эндопротеза.

Группы были сопоставимы по возрасту, характеру сопутствующей патологии и типу грыж. Косые паховые грыжи диагностированы у 142 (60,7%) пациентов, прямые — у 72 (30,8%), комбинированные — у 20 (8,5%). Оценивались длительность операции, интенсивность болевого синдрома по визуально-аналоговой шкале (ваш), сроки активизации и госпитализации, частота осложнений и рецидивов при наблюдении до 24 месяцев.

Таблица 1.
Характеристика пациентов в группах

Показатель	Тарр (n=126)	Открытая (n=108)	P
Возраст, лет	72,1±5,8	71,4±6,6	>0,05
Ибс	82 (65,1%)	74 (68,5%)	>0,05
Артериальная гипертензия	108 (85,7%)	90 (83,3%)	>0,05
Сахарный диабет	34 (27,0%)	33 (30,6%)	>0,05
Хобл	24 (19,0%)	24 (22,2%)	>0,05
Косая паховая грыжа	78 (61,9%)	64 (59,3%)	>0,05
Прямая паховая грыжа	38 (30,2%)	34 (31,5%)	>0,05
Комбинированная грыжа	10 (7,9%)	10 (9,2%)	>0,05

Средняя продолжительность операции в группе тарр составила 52,4±12,8 мин, в группе открытой герниопластики — 48,6±10,2 мин (p>0,05). Интраоперационных осложнений не отмечено ни в одной из групп. Конверсия к открытой операции в группе тарр потребовалась в 2 (1,6%) случаях в связи с выраженным спаечным процессом брюшной полости.

Интенсивность болевого синдрома по ваш в 1-е сутки после операции была достоверно ниже в основной группе и составила 3,2±1,1 балла против 5,8±1,4 балла в контрольной группе (p<0,01). На 3-и сутки болевой синдром в группе тарр практически купировался (1,4±0,6 балла), тогда как в контрольной группе сохранялся на уровне 3,2±1,1 балла.

Сроки активизации пациентов (самостоятельная ходьба) в группе тарр составили 4,2±1,8 часа, в контрольной группе — 12,6±4,2 часа (p<0,001). Средняя длительность госпитализации при лапароскопической герниопластике составила 2,1±0,8 суток, при открытой операции — 5,4±1,6 суток (p<0,001).

В раннем послеоперационном периоде осложнения развились у 14 (11,1%) пациентов основной группы и у 23 (21,3%) пациентов контрольной группы (p<0,05). Структура осложнений представлена в таблице 2. Наиболее частыми осложнениями были серома области операции и задержка мочеиспускания.

При наблюдении в сроки до 24 месяцев рецидив грыжи диагностирован у 2 (1,6%) пациентов после тарр и у 3 (2,8%) пациентов после открытой герниопластики (p>0,05). Хроническая паховая боль отмечена у 3 (2,4%) и 11 (10,2%) пациентов соответственно (p<0,01).

Таблица 2.
Ранние послеоперационные осложнения

Осложнение	Тарр	Открытая	P
Серома	8 (6,3%)	12 (11,1%)	>0,05
Гематома	2 (1,6%)	4 (3,7%)	>0,05
Задержка мочеиспускания	3 (2,4%)	5 (4,6%)	>0,05
Инфильтрат п/о раны	1 (0,8%)	2 (1,9%)	>0,05
Всего	**14 (11,1%)**	**23 (21,3%)**	**<0,05**

Таблица 3.
Сравнительные результаты лечения

Показатель	Тарр	Открытая	P
Длительность операции, мин	52,4±12,8	48,6±10,2	>0,05
Боль по ваш, 1-е сутки	3,2±1,1	5,8±1,4	<0,01
Боль по ваш, 3-и сутки	1,4±0,6	3,2±1,1	<0,01
Активизация, часы	4,2±1,8	12,6±4,2	<0,001
Госпитализация, сутки	2,1±0,8	5,4±1,6	<0,001
Ранние осложнения	14 (11,1%)	23 (21,3%)	<0,05
Рецидив (24 мес)	2 (1,6%)	3 (2,8%)	>0,05
Хроническая боль	3 (2,4%)	11 (10,2%)	<0,01

Таблица 4.
Динамика наблюдения пациентов

Срок наблюдения	Тарр	Открытая
1 месяц	126 (100%)	108 (100%)
6 месяцев	124 (98,4%)	106 (98,1%)
12 месяцев	122 (96,8%)	104 (96,3%)
24 месяца	118 (93,7%)	98 (90,7%)

Таблица 5.
Оценка качества жизни через 12 месяцев

Показатель	Тарр	Открытая	P
Полное восстановление	112 (88,9%)	84 (77,8%)	<0,05
Умеренные ограничения	11 (8,7%)	18 (16,7%)	>0,05
Значительные ограничения	3 (2,4%)	6 (5,5%)	>0,05

Результаты и их обсуждение

Полученные результаты свидетельствуют о преимуществах лапароскопической тарр перед открытой герниопластикой у пациентов пожилого возраста в отношении выраженности послеоперационного

болевого синдрома, сроков реабилитации и частоты хронической паховой боли. Данные согласуются с результатами мета-анализов, демонстрирующих меньшую травматичность эндовидеохирургических методик.

Частота рецидивов при обоих методах была сопоставимой и не превышала 3%, что соответствует современным стандартам качества герниопластики. Несколько большая продолжительность лапароскопической операции компенсируется значительным сокращением сроков госпитализации и более быстрым восстановлением трудоспособности.

Применение tapp требует общей анестезии, что может рассматриваться как недостаток метода у пожилых пациентов. Однако современные методы анестезиологического обеспечения и низкое давление карбоксиперитонеума (10-12 мм рт.ст.) Позволяют безопасно выполнять данное вмешательство у большинства пациентов старших возрастных групп.

Заключение

Лапароскопическая трансабдоминальная преперитонеальная герниопластика является эффективным и безопасным методом лечения паховых грыж у пациентов пожилого возраста. По сравнению с открытой герниопластикой по лихтенштейну, метод tapp обеспечивает достоверно меньшую выраженность послеоперационного болевого синдрома, более раннюю активизацию пациентов и сокращение сроков госпитализации.

Частота рецидивов при лапароскопической и открытой герниопластике сопоставима. Важным преимуществом tapp является значительно меньшая частота хронической паховой боли, что имеет особое значение для качества жизни пациентов в отдалённом периоде.

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Назаров З. Н.
ассистент
кафедра хирургических болезней №1 и трансплантологии
Самаркандский государственный медицинский университет

СРАВНИТЕЛЬНАЯ ОЦЕНКА ЭНДОВИДЕОХИРУРГИЧЕСКОГО И ОТКРЫТОГО МЕТОДОВ ГЕРНИОПЛАСТИКИ У ПАЦИЕНТОВ ПОЖИЛОГО ВОЗРАСТА

Аннотация. *Изучены результаты хирургического лечения 312 пациентов в возрасте 60-84 лет с первичными паховыми грыжами за период 2019-2024 гг. В i группе (n=168) выполнялась лапароскопическая герниопластика методом tapp, во II группе (n=144) — открытая пластика по лихтенштейну. Эндовидеохирургическая герниопластика у пожилых пациентов характеризуется меньшей травматичностью, ускоренной реабилитацией и сопоставимой частотой рецидивов по сравнению с открытой методикой.*

Ключевые слова: *паховая грыжа, эндовидеохирургия, герниопластика tapp, геронтология, пластика по лихтенштейну, послеоперационная реабилитация.*

Nazarov Z. N.
assistant
department of surgical diseases no. 1 and transplantology
Samarkand State Medical University

COMPARATIVE EVALUATION OF ENDOVIDEOSURGICAL AND OPEN HERNIOPLASTY METHODS IN ELDERLY PATIENTS

Abstract. *The results of surgical treatment of 312 patients aged 60-84 years with primary inguinal hernias for the period 2019-2024 were studied. In group i (n=168), laparoscopic tapp hernioplasty was performed, in group ii (n=144) — open lichtenstein repair. Endovideosurgical hernioplasty in elderly patients is characterized by less trauma, accelerated rehabilitation, and comparable recurrence rates compared to open technique.*

Keywords: *inguinal hernia, endovideosurgery, tapp hernioplasty, gerontology, lichtenstein repair, postoperative rehabilitation.*

Паховые грыжи представляют собой одну из наиболее актуальных проблем современной абдоминальной хирургии. Ежегодно в мире выполняется более 20 миллионов грыжесечений, из которых значительную долю составляют операции по поводу паховых грыж. В структуре плановых

хирургических вмешательств герниопластика занимает одно из ведущих мест, уступая лишь холецистэктомии и аппендэктомии.

Демографические изменения последних десятилетий привели к существенному увеличению доли пожилых пациентов среди больных с паховыми грыжами. По данным статистики, до 40% всех герниопластик выполняется пациентам старше 60 лет. При этом частота паховых грыж в данной возрастной группе достигает 15-18%, что обусловлено возрастной инволюцией соединительной ткани и мышечно-апоневротических структур передней брюшной стенки.

Хирургическое лечение паховых грыж у пожилых пациентов сопряжено с рядом особенностей. Наличие множественной сопутствующей патологии, снижение компенсаторных резервов организма и замедление репаративных процессов создают предпосылки для повышенного риска периоперационных осложнений. Вместе с тем консервативная тактика при паховых грыжах неприемлема в связи с высоким риском ущемления и развития жизнеугрожающих осложнений.

Современные методы ненатяжной герниопластики с использованием синтетических сетчатых имплантов позволили существенно улучшить результаты лечения и снизить частоту рецидивов. Эндовидеохирургические методики, в частности трансабдоминальная преперитонеальная герниопластика (tapp), получили широкое распространение благодаря минимальной травматичности и возможности одномоментной коррекции двусторонних грыж. Однако вопрос о применимости данных методик у пациентов старших возрастных групп остаётся дискуссионным.

Материалы и методы

Проведён ретроспективный и проспективный анализ результатов хирургического лечения 312 пациентов с первичными односторонними паховыми грыжами в возрасте от 60 до 84 лет. Исследование проводилось на базе хирургического отделения клиники в период с января 2019 по декабрь 2024 года. Критериями включения служили: возраст 60 лет и старше, наличие первичной односторонней паховой грыжи, информированное согласие на участие в исследовании. Критерии исключения: рецидивные грыжи, ущемлённые грыжи, тяжёлая декомпенсированная соматическая патология.

Среди обследованных преобладали мужчины — 284 (91,0%), женщин было 28 (9,0%). Средний возраст пациентов составил 68,7±6,4 года. По типу грыж распределение было следующим: косые паховые — 186 (59,6%), прямые — 102 (32,7%), комбинированные — 24 (7,7%). Правосторонняя локализация отмечена у 178 (57,1%) пациентов, левосторонняя — у 134 (42,9%).

Сопутствующая патология выявлена у 276 (88,5%) пациентов. Структура коморбидности включала: ишемическую болезнь сердца — у 198 (63,5%), гипертоническую болезнь — у 256 (82,1%), сахарный диабет 2 типа — у 78 (25,0%), хроническую обструктивную болезнь лёгких — у 54

(17,3%), ожирение — у 86 (27,6%) пациентов. Индекс коморбидности чарлсона составил в среднем 4,2±1,8 балла.

Пациенты были разделены на две группы в зависимости от метода оперативного вмешательства. I группу составили 168 пациентов, которым выполнена лапароскопическая трансабдоминальная преперитонеальная герниопластика (tapp). Ii группу составили 144 пациента после открытой ненатяжной герниопластики по методике лихтенштейна. Выбор метода операции осуществлялся с учётом предпочтений пациента и наличия противопоказаний к лапароскопическому вмешательству.

Таблица 1.
Клиническая характеристика пациентов

Показатель	I группа (n=168)	Ii группа (n=144)	P
Возраст, лет	68,4±6,2	69,1±6,7	>0,05
Мужчины	154 (91,7%)	130 (90,3%)	>0,05
Женщины	14 (8,3%)	14 (9,7%)	>0,05
Имт, кг/м2	27,2±3,8	27,8±4,1	>0,05
Индекс чарлсона	4,1±1,7	4,3±1,9	>0,05
Asa ii	52 (31,0%)	42 (29,2%)	>0,05
Asa iii	98 (58,3%)	86 (59,7%)	>0,05
Asa iv	18 (10,7%)	16 (11,1%)	>0,05

Таблица 2.
Характеристика грыж

Тип грыжи	I группа	Ii группа	P
Косая паховая	102 (60,7%)	84 (58,3%)	>0,05
Прямая паховая	52 (31,0%)	50 (34,7%)	>0,05
Комбинированная	14 (8,3%)	10 (7,0%)	>0,05
Правосторонняя	94 (56,0%)	84 (58,3%)	>0,05
Левосторонняя	74 (44,0%)	60 (41,7%)	>0,05

Результаты и их обсуждение

Анализ интраоперационных показателей выявил определённые различия между группами. Средняя продолжительность операции в i группе составила 48,6±11,4 мин, во ii группе — 42,8±9,6 мин ($p<0,05$). Несмотря на статистически значимые различия, клиническое значение разницы в 5-6 минут представляется несущественным. Интраоперационная кровопотеря была минимальной в обеих группах и не превышала 20-30 мл.

Конверсия к открытой операции в i группе потребовалась у 3 (1,8%) пациентов. Причинами конверсии послужили: выраженный спаечный процесс брюшной полости после ранее перенесённых операций — 2 случая,

интраоперационное выявление скользящей грыжи с вовлечением стенки мочевого пузыря — 1 случай.

Выраженность послеоперационного болевого синдрома оценивалась по визуально-аналоговой шкале (ваш) в баллах от 0 до 10. В первые сутки после операции интенсивность боли в i группе составила 2,8±0,9 балла, во ii группе — 5,4±1,2 балла (p<0,001). На третьи сутки показатели составили 1,2±0,5 и 3,6±0,9 балла соответственно (p<0,001). Потребность в наркотических анальгетиках в i группе отмечена у 8 (4,8%) пациентов, во ii группе — у 42 (29,2%) пациентов.

Сроки активизации пациентов существенно различались между группами. В i группе самостоятельная ходьба была возможна через 3,2±1,4 часа после операции, во ii группе — через 8,6±2,8 часа (p<0,001). Средняя длительность госпитализации составила 1,8±0,6 суток в i группе и 4,8±1,4 суток во ii группе (p<0,001).

Ранние послеоперационные осложнения развились у 18 (10,7%) пациентов i группы и у 32 (22,2%) пациентов ii группы (p<0,01). Структура осложнений представлена в таблице 3. Раневые осложнения (серома, гематома, инфильтрат) достоверно чаще встречались во ii группе: 18 (12,5%) против 8 (4,8%) в i группе (p<0,05).

Отдалённые результаты прослежены в сроки от 12 до 36 месяцев. Рецидив грыжи диагностирован у 4 (2,4%) пациентов i группы и у 5 (3,5%) пациентов ii группы (p>0,05). Хроническая паховая боль, сохраняющаяся более 3 месяцев после операции, отмечена у 5 (3,0%) и 18 (12,5%) пациентов соответственно (p<0,01).

Таблица 3.

Ранние послеоперационные осложнения

Осложнение	I группа	Ii группа	P
Серома	5 (3,0%)	10 (6,9%)	>0,05
Гематома	2 (1,2%)	5 (3,5%)	>0,05
Инфильтрат раны	1 (0,6%)	3 (2,1%)	>0,05
Задержка мочеиспускания	6 (3,6%)	8 (5,6%)	>0,05
Орхит	2 (1,2%)	4 (2,8%)	>0,05
Парез кишечника	2 (1,2%)	2 (1,4%)	>0,05
Всего пациентов	18 (10,7%)	32 (22,2%)	<0,01

Таблица 4.
Сравнительные результаты лечения

Показатель	I группа	Ii группа	P
Длительность операции, мин	48,6±11,4	42,8±9,6	<0,05
Боль по ваш (1 сутки)	2,8±0,9	5,4±1,2	<0,001
Боль по ваш (3 сутки)	1,2±0,5	3,6±0,9	<0,001
Активизация, часы	3,2±1,4	8,6±2,8	<0,001
Госпитализация, сутки	1,8±0,6	4,8±1,4	<0,001
Потребность в наркотиках	8 (4,8%)	42 (29,2%)	<0,001
Раневые осложнения	8 (4,8%)	18 (12,5%)	<0,05

Таблица 5.
Отдалённые результаты (12-36 месяцев)

Показатель	I группа	Ii группа	P
Рецидив грыжи	4 (2,4%)	5 (3,5%)	>0,05
Хроническая боль	5 (3,0%)	18 (12,5%)	<0,01
Ощущение инородного тела	8 (4,8%)	22 (15,3%)	<0,01
Нарушение чувствительности	4 (2,4%)	14 (9,7%)	<0,01
Полная удовлетворённость	148 (88,1%)	108 (75,0%)	<0,01

Результаты проведённого исследования свидетельствуют о преимуществах эндовидеохирургической герниопластики у пожилых пациентов по ряду ключевых параметров. Существенно меньшая выраженность послеоперационного болевого синдрома при тарр объясняется отсутствием травматизации передней брюшной стенки и расположением сетчатого импланта в преперитонеальном пространстве, где он не контактирует с нервными структурами пахового канала.

Ускоренная реабилитация при лапароскопической герниопластике имеет особое значение для пожилых пациентов. Ранняя активизация снижает риск тромбоэмболических осложнений, гипостатической пневмонии и других осложнений, связанных с длительным постельным режимом. Сокращение сроков госпитализации также уменьшает риск нозокомиальных инфекций и снижает экономические затраты на лечение.

Частота рецидивов при обоих методах герниопластики была сопоставимой и соответствовала современным стандартам качества. Незначительно меньшая частота рецидивов при тарр может объясняться особенностями расположения сетчатого импланта, который покрывает всю миопектинеальную область и предотвращает развитие как прямых, так и косых рецидивных грыж.

Важным преимуществом тарр является достоверно меньшая частота хронической паховой боли. Данное осложнение существенно снижает

качество жизни пациентов и нередко требует повторных вмешательств. Меньшая травматичность лапароскопического доступа и отсутствие контакта сетки с нервами пахового канала объясняют данное преимущество.

Ограничением исследования является нерандомизированный характер распределения пациентов по группам. Вместе с тем, сопоставимость групп по основным клинико-демографическим характеристикам позволяет считать полученные результаты достаточно надёжными.

Заключение

Эндовидеохирургическая трансабдоминальная преперитонеальная герниопластика является эффективным и безопасным методом лечения паховых грыж у пациентов пожилого возраста. По сравнению с открытой герниопластикой по лихтенштейну, метод tapp обеспечивает достоверно меньшую выраженность послеоперационного болевого синдрома, более раннюю активизацию и сокращение сроков госпитализации в 2,5 раза.

Частота рецидивов при лапароскопической и открытой герниопластике сопоставима и не превышает 3,5% при наблюдении до 36 месяцев. Существенным преимуществом tapp является четырёхкратное снижение частоты хронической паховой боли, что имеет важное значение для качества жизни пожилых пациентов.

Полученные данные позволяют рекомендовать эндовидеохирургическую герниопластику в качестве метода выбора при лечении паховых грыж у пациентов старшей возрастной группы при отсутствии противопоказаний к лапароскопическому вмешательству.

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Назаров З. Н.
ассистент
кафедра хирургических болезней №1 и трансплантологии
Самаркандский государственный медицинский университет

ЛАПАРОСКОПИЧЕСКАЯ ГЕРНИОПЛАСТИКА ПРИ ПАХОВЫХ ГРЫЖАХ У ПОЖИЛЫХ ПАЦИЕНТОВ: СРАВНИТЕЛЬНЫЙ АНАЛИЗ РЕЗУЛЬТАТОВ

Аннотация. *Проанализированы результаты лечения 234 пациентов с паховыми грыжами в возрасте 65-87 лет. Основную группу составили 126 пациентов после tapp, контрольную — 108 пациентов после открытой герниопластики по лихтенштейну. Лапароскопическая tapp является эффективным и безопасным методом лечения паховых грыж у пожилых пациентов, обеспечивающим раннюю реабилитацию и низкую частоту рецидивов.*

Ключевые слова: *паховая грыжа, лапароскопическая герниопластика, tapp, пожилой возраст, операция лихтенштейна.*

Nazarov Z. N.
assistant
department of surgical diseases no. 1 and transplantology
Samarkand State Medical University

LAPAROSCOPIC HERNIOPLASTY FOR INGUINAL HERNIAS IN ELDERLY PATIENTS: COMPARATIVE ANALYSIS OF RESULTS

Abstract. *Treatment results of 234 patients with inguinal hernias aged 65-87 years were analyzed. The main group included 126 patients after tapp, the control group — 108 patients after open lichtenstein hernioplasty. Laparoscopic tapp is an effective and safe method for inguinal hernia repair in elderly patients, providing early rehabilitation and low recurrence rates.*

Keywords: *inguinal hernia, laparoscopic hernioplasty, tapp, elderly age, lichtenstein operation.*

Паховые грыжи являются одной из наиболее распространённых хирургических патологий, частота которых достигает 3-5% в общей популяции и значительно возрастает у лиц старших возрастных групп. По данным различных авторов, до 25% мужчин в течение жизни подвергаются оперативному лечению по поводу паховой грыжи.

У пациентов пожилого и старческого возраста паховые грыжи характеризуются рядом особенностей: преобладанием прямых и комбинированных форм, большими размерами грыжевых ворот, атрофией

тканей пахового канала, что затрудняет выполнение традиционных методов пластики и повышает риск рецидива заболевания.

Внедрение современных синтетических материалов и эндовидеохирургических технологий открыло новые перспективы в лечении паховых грыж. Лапароскопическая трансабдоминальная преперитонеальная герниопластика (tapp) позволяет выполнить укрепление задней стенки пахового канала из преперитонеального доступа с минимальной травматизацией тканей передней брюшной стенки.

Однако применение лапароскопических методик у пожилых пациентов сопряжено с необходимостью проведения общей анестезии и создания карбоксиперитонеума, что может представлять определённый риск у больных с сопутствующей сердечно-лёгочной патологией. Вопрос о выборе оптимального метода герниопластики у данной категории больных остаётся дискуссионным.

Материалы и методы

В исследование включены 234 пациента мужского пола с первичными односторонними паховыми грыжами в возрасте от 65 до 87 лет, оперированных в период с 2020 по 2023 год. Средний возраст пациентов составил 71,8±6,2 года. Сопутствующая патология выявлена у 89,3% больных: ишемическая болезнь сердца — у 156 (66,7%), артериальная гипертензия — у 198 (84,6%), сахарный диабет 2 типа — у 67 (28,6%), хроническая обструктивная болезнь лёгких — у 48 (20,5%) пациентов.

Основную группу составили 126 пациентов, которым выполнена лапароскопическая трансабдоминальная преперитонеальная герниопластика (tapp) с использованием полипропиленового сетчатого импланта размером 10х15 см. Контрольную группу составили 108 пациентов после открытой ненатяжной герниопластики по методике лихтенштейна с использованием аналогичного эндопротеза.

Группы были сопоставимы по возрасту, характеру сопутствующей патологии и типу грыж. Косые паховые грыжи диагностированы у 142 (60,7%) пациентов, прямые — у 72 (30,8%), комбинированные — у 20 (8,5%). Оценивались длительность операции, интенсивность болевого синдрома по визуально-аналоговой шкале (ваш), сроки активизации и госпитализации, частота осложнений и рецидивов при наблюдении до 24 месяцев.

Таблица 1.
Характеристика пациентов в группах

Показатель	Тарр (n=126)	Открытая (n=108)	P
Возраст, лет	72,1±5,8	71,4±6,6	>0,05
Ибс	82 (65,1%)	74 (68,5%)	>0,05
Артериальная гипертензия	108 (85,7%)	90 (83,3%)	>0,05
Сахарный диабет	34 (27,0%)	33 (30,6%)	>0,05
Хобл	24 (19,0%)	24 (22,2%)	>0,05
Косая паховая грыжа	78 (61,9%)	64 (59,3%)	>0,05
Прямая паховая грыжа	38 (30,2%)	34 (31,5%)	>0,05
Комбинированная грыжа	10 (7,9%)	10 (9,2%)	>0,05

Средняя продолжительность операции в группе тарр составила 52,4±12,8 мин, в группе открытой герниопластики — 48,6±10,2 мин (p>0,05). Интраоперационных осложнений не отмечено ни в одной из групп. Конверсия к открытой операции в группе тарр потребовалась в 2 (1,6%) случаях в связи с выраженным спаечным процессом брюшной полости.

Интенсивность болевого синдрома по ваш в 1-е сутки после операции была достоверно ниже в основной группе и составила 3,2±1,1 балла против 5,8±1,4 балла в контрольной группе (p<0,01). На 3-и сутки болевой синдром в группе тарр практически купировался (1,4±0,6 балла), тогда как в контрольной группе сохранялся на уровне 3,2±1,1 балла.

Сроки активизации пациентов (самостоятельная ходьба) в группе тарр составили 4,2±1,8 часа, в контрольной группе — 12,6±4,2 часа (p<0,001). Средняя длительность госпитализации при лапароскопической герниопластике составила 2,1±0,8 суток, при открытой операции — 5,4±1,6 суток (p<0,001).

В раннем послеоперационном периоде осложнения развились у 14 (11,1%) пациентов основной группы и у 23 (21,3%) пациентов контрольной группы (p<0,05). Структура осложнений представлена в таблице 2. Наиболее частыми осложнениями были серома области операции и задержка мочеиспускания.

При наблюдении в сроки до 24 месяцев рецидив грыжи диагностирован у 2 (1,6%) пациентов после тарр и у 3 (2,8%) пациентов после открытой герниопластики (p>0,05). Хроническая паховая боль отмечена у 3 (2,4%) и 11 (10,2%) пациентов соответственно (p<0,01).

Таблица 2.
Ранние послеоперационные осложнения

Осложнение	Тарр	Открытая	P
Серома	8 (6,3%)	12 (11,1%)	>0,05
Гематома	2 (1,6%)	4 (3,7%)	>0,05
Задержка мочеиспускания	3 (2,4%)	5 (4,6%)	>0,05
Инфильтрат п/о раны	1 (0,8%)	2 (1,9%)	>0,05
Всего	**14 (11,1%)**	**23 (21,3%)**	**<0,05**

Таблица 3.
Сравнительные результаты лечения

Показатель	Тарр	Открытая	P
Длительность операции, мин	52,4±12,8	48,6±10,2	>0,05
Боль по ваш, 1-е сутки	3,2±1,1	5,8±1,4	<0,01
Боль по ваш, 3-и сутки	1,4±0,6	3,2±1,1	<0,01
Активизация, часы	4,2±1,8	12,6±4,2	<0,001
Госпитализация, сутки	2,1±0,8	5,4±1,6	<0,001
Ранние осложнения	14 (11,1%)	23 (21,3%)	<0,05
Рецидив (24 мес)	2 (1,6%)	3 (2,8%)	>0,05
Хроническая боль	3 (2,4%)	11 (10,2%)	<0,01

Таблица 4.
Динамика наблюдения пациентов

Срок наблюдения	Тарр	Открытая
1 месяц	126 (100%)	108 (100%)
6 месяцев	124 (98,4%)	106 (98,1%)
12 месяцев	122 (96,8%)	104 (96,3%)
24 месяца	118 (93,7%)	98 (90,7%)

Таблица 5.
Оценка качества жизни через 12 месяцев

Показатель	Тарр	Открытая	P
Полное восстановление	112 (88,9%)	84 (77,8%)	<0,05
Умеренные ограничения	11 (8,7%)	18 (16,7%)	>0,05
Значительные ограничения	3 (2,4%)	6 (5,5%)	>0,05

Результаты и их обсуждение

Полученные результаты свидетельствуют о преимуществах лапароскопической тарр перед открытой герниопластикой у пациентов пожилого возраста в отношении выраженности послеоперационного

болевого синдрома, сроков реабилитации и частоты хронической паховой боли. Данные согласуются с результатами мета-анализов, демонстрирующих меньшую травматичность эндовидеохирургических методик.

Частота рецидивов при обоих методах была сопоставимой и не превышала 3%, что соответствует современным стандартам качества герниопластики. Несколько большая продолжительность лапароскопической операции компенсируется значительным сокращением сроков госпитализации и более быстрым восстановлением трудоспособности.

Применение tapp требует общей анестезии, что может рассматриваться как недостаток метода у пожилых пациентов. Однако современные методы анестезиологического обеспечения и низкое давление карбоксиперитонеума (10-12 мм рт.ст.) Позволяют безопасно выполнять данное вмешательство у большинства пациентов старших возрастных групп.

Заключение

Лапароскопическая трансабдоминальная преперитонеальная герниопластика является эффективным и безопасным методом лечения паховых грыж у пациентов пожилого возраста. По сравнению с открытой герниопластикой по лихтенштейну, метод tapp обеспечивает достоверно меньшую выраженность послеоперационного болевого синдрома, более раннюю активизацию пациентов и сокращение сроков госпитализации.

Частота рецидивов при лапароскопической и открытой герниопластике сопоставима. Важным преимуществом tapp является значительно меньшая частота хронической паховой боли, что имеет особое значение для качества жизни пациентов в отдалённом периоде.

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Рустамова Ш. А., PhD
ассистент
кафедры инфекционных болезней
Самаркандский государственный медицинский университет
ORCID: 0000-0003-1578-6598.
Анваров Ж. А., PhD
доцент
кафедра инфекционных и детских инфекционных болезней
Ташкентская медицинская академия
ORCID: 0000-0003-1080-3651
Таджиева Х. К.
студент
педиатрический факультет
Самаркандский государственный медицинский университет
ORCID: 0009-0007-4947-0598.
Республика Узбекистан

РАННЯЯ АДАПТАЦИЯ И МОНИТОРИНГ РАЗВИТИЯ ДЕТЕЙ, РОЖДЕННЫХ ПУТЕМ КЕСАРЕВА СЕЧЕНИЯ

Резюме: *В статье представлены результаты комплексного исследования особенностей ранней адаптации, формирования здоровья и развития в течение первого года жизни детей, рожденных путем кесарева сечения. В исследование было включено 120 новорожденных, из которых 60 были распределены в основную группу (дети, рожденные путем кесарева сечения), а 60 – в контрольную группу (дети, рожденные физиологическим путем). Доказано, что оперативное родоразрешение, исключающее физиологический родовой стресс, приводит к значительным отклонениям в процессах ранней адаптации. Выявлены дисбиотические нарушения микробиоценоза кишечника у детей после кесарево сечения. Установлены нарушения терморегуляции, дисбиотические изменения микробиоценоза кишечника, тесно связанные с гипогалактией у матерей и поздним прикладыванием к груди. На основе результатов исследования разработаны практические рекомендации по диспансерному наблюдению за детьми после кесарево сечения.*

Ключевые слова: *кесарево сечение, адаптация, микробиом, развитие ребенка, мониторинг развития, гипогалактия, диспансерное наблюдение.*

Rustamova Sh. A., PhD,
assistant professor
department of infectious diseases
Samarkand State Medical University
ORCID: 0000-0003-1578-6598.
Anvarov Zh. A., PhD,
associate professor
department of infectious and pediatric infectious diseases
Tashkent Medical Academy
ORCID: 0000-0003-1080-3651
Tajieva Kh. K.
student
faculty of pediatrics
Samarkand State Medical University
ORCID: 0009-0007-4947-0598.
Republic of Uzbekistan

EARLY ADAPTATION AND MONITORING OF DEVELOPMENT OF CHILDREN BORN BY CESAREAN SECTION

Resume: *The article presents the results of a comprehensive study of the characteristics of early adaptation, health formation, and development during the first year of life in children born by cesarean section. The study included 120 newborns, of which 60 were assigned to the main group (children born by cesarean section) and 60 to the control group (children born by spontaneous vaginal delivery). It has been proven that operative delivery, which excludes physiological birth stress, leads to significant deviations in the processes of early adaptation. Dysbiotic disorders of the intestinal microbiota were identified in children after cesarean section. Thermoregulation disorders and dysbiotic changes in the intestinal microbiota were established, closely associated with maternal hypogalactia and delayed initiation of breastfeeding. Based on the research results, practical recommendations for the clinical follow-up of children after cesarean section have been developed.*

Keywords: *cesarean section, adaptation, microbiome, child development, development monitoring, hypogalactia, clinical follow-up.*

Введение

Рост частоты родоразрешения путем кесарева сечения во всем мире ставит вопрос о его отдаленных последствиях для здоровья ребенка. Упускается критически важный этап – первичная адаптация, которая отличается от таковой при физиологических родах, что требует особого наблюдения. Кесарево сечение - жизненно необходимая операция при наличии медицинских показаний. Однако кесарево сечение, является примером «эволюционного несоответствия», лишающего ребенка ряда

физиологических стимулов, критически важных для запуска адаптационных процессов. Актуальность проблемы кесарево сечения в современном инфектологии, неонатологии и педиатрии не вызывает сомнений [2,3]. Наблюдается устойчивая тенденция к увеличению частоты операций кесарева сечения как в Узбекистане, так и за рубежом [4, 6]. Несмотря на снижение перинатальной смертности, сохраняется высокий уровень заболеваемости среди доношенных новорожденных, извлеченных путем кесарево сечения, что существенно превышает аналогичный показатель после самопроизвольных родов (32,7%). Физиологические роды представляют собой мощный стрессовый фактор, запускающий каскад компенсаторно-приспособительных реакций, необходимых для успешной адаптации новорожденного к внеутробной жизни [5, 7]. Кесарево сечение «исключает» этот естественный пусковой механизм, что, по мнению многих исследователей, может негативно сказываться на процессах кардиореспираторной, эндокринной и метаболической адаптации [1, 8]. Однако многие аспекты, в частности, влияние кесарево сечения на полиорганную адаптацию и отдаленное развитие ребенка, оставались недостаточно изученными.

Цель исследования

Изучение особенностей ранней адаптации и развития у детей от способа родоразрешения.

Материалы и методы

В исследование было включено 120 новорожденных и детей первого года жизни. Основную группу составили 60 детей, рожденных путем кесарево сечения. Комплекс обследований включал:

- клинические методы: оценка состояния по шкале Апгар, мониторинг массы тела и температуры тела;
- лабораторные методы: микробиологическое и биохимическое исследование кишечной микробиоты;

Результаты и обсуждение

Период ранней адаптации у новорожденных после кесарево сечения характеризовался более высокой частотой патологических состояний по сравнению с контрольной группой. У детей после кесарево сечения отмечалась более выраженная убыль первоначальной массы тела и уплощенная динамика весовой кривой (таблица №1). Выявлены значительные нарушения терморегуляции. У новорожденных (после кесарево сечения) через 10 минут после рождения температура тела была в среднем на 0,5°C ниже, чем в контрольной группе. К 2-м часам жизни наблюдалось прогрессирующее снижение температуры до 34,82±0,37°C у основной группы, что расценивается как гипотермия. А у контрольной группы отмечено 36,05±0,55°C. У родильниц после кесарево сечения отмечалось замедленное становление лактации и высокая частота гипогалактии: 54-66% после плановых операций против 20% в контрольной группе. Факторами риска гипогалактии явились: гестоз второй половины

беременности, возраст матери менее 24 лет, отсутствие родовой деятельности, позднее прикладывание к груди и поражение центральной нервной системы у ребенка. Нарушения микробиоценоза кишечника у детей после кесарево сечения были выражены значительным снижением уровня облигатной микрофлоры (бифидо- и лактобактерий) и интенсивной контаминацией условно-патогенными микроорганизмами (Klebsiella, Proteus, Enterobacter, Clostridium). Выявлена сильная отрицательная корреляция между сроками первого прикладывания к груди, выраженностью гипогалактии и степенью дисбиотических нарушений. При проведении мониторинга не было выявлено достоверных различий в нервно-психическом развитии между детьми основной и контрольной групп. У данной группы детей достоверно чаще, чем в контрольной, диагностировались ОРВИ (вирусные инфекции, острый ларинготрахеит, назофарингит) и аллергические атопии (атопический и пеленочный дерматит). Данная патология имела высокую корреляционную связь со временем первого прикладывания к груди и нарушениями в становлении микробиоценоза. Проведенное исследование позволяет сделать вывод о том, что кесарево сечение, является значимым фактором риска нарушения процессов ранней неонатальной адаптации и формирования здоровья ребенка. Отсутствие физиологического родового стресса приводит к дефициту гормональной реакции, нарушениям терморегуляции, повышенной заболеваемости в неонатальном периоде и способствует развитию дисбиоза кишечника.

Таблица№1

Сравнительная характеристика ранней неонатальной адаптации у новорожденных после различных видов родоразрешения

Параметры оценки	Дети после кесарево сечения (основная группа)	Дети после физиологических родов (контрольная группа)
Масса тела	Наибольшая убыль первоначальной массы тела, уплощенная динамика веса	Физиологичная динамика
Терморегуляция	Выраженная гипотермия: к 2 часам жизни 34.82±0.37°C.	К 2 часам нормальная температура: 36,05±0,55°C.
Лактация, гипогалактия	Гипогалактия у 54-66%. Прямая связь с отсутствием родовой деятельности и поздним прикладыванием.	Гипогалактия у -20%.
Состояние микрофлоры	Снижение бифидо-/лактобактерий, контаминация условно- патогенной флорой (*Klebsiella, Proteus* и др.). Отсутствие контакта с родовыми путями матери и позднее грудное вскармливание.	Формирование нормальной облигатной микрофлоры.
Заболеваемость	Была зафиксирована высокая частота ОРВИ, острый ларинготрахеит и аллергических (в форме атопического дерматита) заболеваний.	Меньше регистрировались ОРВИ, ларинготрахеит и атопический дерматит.

На основании данных разработаны рекомендации для оптимизации выхаживания: раннее прикладывание к груди, методы профилактики гипотермии, поддержка лактации, микробиологический мониторинг и коррекция дисбиоза, усиленное диспансерное наблюдение за инфекционной и аллергической патологией у детей после кесарево сечения. Лабораторная диагностика четко демонстрирует, при кесаревом сечении вместо «запрограммированного» заселения флорой родовых путей матери происходит колонизация госпитальными и кожными микроорганизмами (таблица№2). Это проявляется в лабораторных параметрах как:

1. **Качественное отклонение:** доминирование условно-патогенных энтеробактерий и стафилококков вместо бифидобактерий и лактобацилл.
2. **Функциональная незрелость:** низкая продукция полезных метаболитов (короткоцепочечных жирных кислот), щелочная среда, признаки воспаления.

Эти данные обосновывают необходимость целенаправленных профилактических мер для детей после кесарево сечения: максимально раннее прикладывание к груди, контакт «кожа-к-коже», рассмотрение вопроса о применении материнских пробиотиков или синбиотиков, а в некоторых случаях - назначение специфических пробиотических штаммов ребенку под контролем лабораторных показателей.

Таблица№2

Лабораторная характеристика формирования микробиоценоза кишечника у новорожденных

Критерии оценки	Дети после физиологических родов (контрольная группа)	Дети после кесарева сечения (основная группа)	Клинико-лабораторная интерпретация
Бактериологическое исследование			
Первичная колонизация (1-3 сутки)	Лактобациллы, бифидобактерии, непатогенные штаммы *E.coli*	Стафилококки, энтерококки, *Klebsiella spp.*, *Enterobacter spp.*	При кесарево сечения происходит госпитальная колонизация вместо вертикальной передачи материнской микрофлоры
Бифидогенная фаза (7-10 сутки)	Массивный рост бифидобактерий (10^9-10^{11} КОЕ/г)	Запаздывание на 2-4 недели, низкие титры бифидобактерий (10^7-10^8 КОЕ/г)	Нарушение естественной сукцессии микроорганизмов
Количественное соотношение	Соотношение анаэробы/аэробы < 1:1	Соотношение анаэробы/аэробы > 10:1	Дисбаланс с преобладанием аэробной условно-патогенной флоры
Bacteroides fragilis	Обнаруживается у 70-80% к 1 месяцу	Отсутствует или выявляется у 20-30% детей	Дефицит ключевого иммуномодулирующего таксона
Молекулярно-генетические исследования			
Сходство с материнской микрофлорой	Высокое (70-80%) с вагинальным микробиомом	Низкое (30-40%), сходство с кожным микробиомом	Нарушение вертикальной передачи
Биохимические показатели			
pH кала	Кислая реакция (4,5-6,5)	Нейтральная или щелочная (6,5-8,0)	Индекс ферментативной активности бифидофлоры
Короткоцепочечные жирные кислоты	Высокий уровень бутирата, ацетата	Снижение бутирата на 40-60%	Нарушение трофики колоноцитов и противовоспалительной защиты
Аммиак, фенолы, индолы	Низкие концентрации	Повышение в 2-3 раза	Маркеры гнилостных процессов и протеолитической активности
Микроскопия (копрограмма)			
Йодофильная флора	Отсутствует или минимальна	Обильная, часто в сочетании с детритом	Косвенный признак дисбиотических изменений
Переваримая клетчатка, крахмал	Незначительное количество	Умеренное или значительное количество	Нарушение ферментативных процессов

На основании показателей приведенной выше таблицы можно сделать следующие выводы:

- **Качественные различия**: Дети после кесарево сечения имеют статистически значимые отклонения по всем ключевым лабораторным параметрам, характеризующим становление микробиоценоза.
- **Временной фактор**: Формирование зрелого микробиома у детей после кесарево сечения занимает на 6-12 месяцев дольше, чем у рожденных естественным путем.
- **Критические маркеры** для мониторинга:
  - Уровень бифидобактерий в динамике
  - Показатели коротко цепочечных жирных кислот (особенно бутирата)

Данные лабораторные характеристики подтверждают необходимость индивидуального подхода к наблюдению, вскармливанию и профилактической коррекции микробиоценоза у новорожденных после оперативных родов. Полученные лабораторные данные служат объективным подтверждением значительных различий в формировании микробиоценоза, указывая, что кесарево сечение, приводит к наиболее значимым отклонениям в формировании микробиоценоза: дефициту облигатной флоры, массивной контаминации условно патогенной флоры, снижению метаболической активности и признакам воспаления. Это состояние требует целенаправленной лабораторной диагностики (полимеразно цепная реакция + газо жидкостная хроматография) для обоснования и контроля эффективности пробиотической коррекции и диетотерапии.

Заключение

1. Максимально раннее прикладывание к груди и контакт «кожа-к-коже» – первоочередная мера.

2. Активная поддержка лактации для обеспечения исключительного или преимущественного грудного вскармливания. Необходимо обеспечить раннее прикладывание новорожденного к груди матери для стимуляции лактации и формирования адекватного микробиоценоза. При невозможности грудного вскармливания целесообразно использование частично гидролизованных гипоаллергенных смесей.

3. Целесообразность применения пробиотиков, содержащих штаммы бифидо- и лактобактерий, с первых дней жизни (по назначению врача).

4. Включение в план диспансерного наблюдения педиатром мониторинга состояния микробиоценоза и своевременной его коррекции. Дети, рожденные путем кесарево сечения, нуждаются в усиленном диспансерном наблюдении педиатра с акцентом на профилактику инфекционных и аллергических заболеваний, контроль за физическим развитием и состоянием микробиоценоза кишечника.

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Саипова Н. С., DSc
доцент
кафедра дерматовенерологии и косметологии №1
Ташкентский государственный медицинский университет
Юсубалиев У. А., PhD
доцент
кафедра дерматовенерологии и косметологии №1
Ташкентский государственный медицинский университет
Тохтаев Г. Ш., PhD
старший преподаватель
кафедра дерматовенерологии и косметологии №1
Ташкентский государственный медицинский университет
Сафаров Х. Х.
старший преподаватель
кафедра внутренних болезней
Ташкентский государственный медицинский университет,Чирчикский филиал
Мирхамидова Х. О.
докторант
кафедра дерматовенерологии и косметологии №1
Ташкентский государственный медицинский университет
Узбекистан, г. Ташкент

ЭПИДЕМИОЛОГИЯ, ПАТОГЕНЕЗ И СОВРЕМЕННЫЕ МЕТОДЫ ТЕРАПИИ ДЕКАЛИВИРУЮЩЕГО ФОЛЛИКУЛИТА (ПОДРЫВАЮЩЕГО ФОЛЛИКУЛИТА ГОФМАНА)

Аннотация: *Декалвирующий фолликулит — это редкое, хроническое, первичное рубцующееся заболевание волосистой части головы [5], характеризующееся нейтрофильным воспалением, пустулами и прогрессирующей необратимой потерей волос. Данное состояние представляет серьезную терапевтическую проблему из-за рецидивирующего течения и недостаточной эффективности монотерапии. Эпидемиологические данные по Центральной Азии, включая Узбекистан, ограничены [11], что затрудняет оценку истинной распространённости и разработку локальных протоколов. Патогенез заболевания связан с дисрегуляцией иммунного ответа, где ключевую роль играет суперантигенный ответ на колонизацию Staphylococcus aureus [6] и последующий неконтролируемый выброс провоспалительных цитокинов. Современное лечение требует комплексного, часто длительного, подхода с обязательным применением комбинированных антибактериальных схем (например, Рифампицин + Клиндамицин) [8] и, в рефрактерных случаях, иммуносупрессивной или биологической терапии [9, 13]. Ранняя диагностика и агрессивное лечение являются критическими факторами для*

предотвращения обширного рубцевания и улучшения качества жизни пациентов.

Ключевые слова: *декалвирующий фолликулит; рубцующаяся алопеция; нейтрофильное воспаление; Staphylococcus aureus; комбинированная антибактериальная терапия; иммуносупрессивная терапия.*

Saipova N. S., DSc,
associate professor
department of dermatovenereology and cosmetology no. 1
Tashkent State Medical University
Yusubaliev U. A., PhD,
associate professor
department of dermatovenereology and cosmetology no. 1
Tashkent State Medical University
Toxtayev G‘. Sh., PhD,
senior lecturer
department of dermatovenereology and cosmetology no. 1
Tashkent State Medical University
Safarov Kh. Kh.
senior lecturer
department of internal medicine
Chirchik branch of Tashkent State Medical University
Mirkhamidova Kh. O.
doctoral candidate
department of dermatovenereology and cosmetology no. 1
Tashkent State Medical University
Tashkent, Uzbekistan

EPIDEMIOLOGY, PATHOGENESIS, AND MODERN THERAPEUTIC APPROACHES TO FOLLICULITIS DECALVANS (HOFFMANN’S FOLLICULITIS)

Abstract: *Folliculitis decalvans is a rare, chronic, primary cicatricial disorder of the scalp [5], characterized by neutrophilic inflammation, pustule formation, and progressive irreversible hair loss. This condition represents a significant therapeutic challenge due to its recurrent course and the limited efficacy of monotherapy. Epidemiological data from Central Asia, including Uzbekistan, remain scarce [11], which hampers assessment of the true prevalence and the development of region-specific clinical protocols. The pathogenesis of the disease is associated with dysregulation of the immune response, in which a superantigen-mediated reaction to Staphylococcus aureus colonization [6] plays a key role, followed by uncontrolled release of pro-inflammatory cytokines. Contemporary management requires a comprehensive, often long-term approach,*

with mandatory use of combination antibacterial regimens (e.g., rifampicin plus clindamycin) [8] and, in refractory cases, immunosuppressive or biologic therapy [9, 13]. Early diagnosis and aggressive treatment are critical factors in preventing extensive scarring and improving patients' quality of life.

Keywords: *folliculitis decalvans; cicatricial alopecia; neutrophilic inflammation; Staphylococcus aureus; combination antibacterial therapy; immunosuppressive therapy.*

Введение

Декаливирующий фолликулит (DF), часто упоминаемый в литературе как Подрывающий фолликулит Гофмана, абсцедирующий подрывающий перифолликулит и перифолликулит Гоффмана или рассекающий целлюлит кожи головы (Dissecting Cellulitis of the Scalp - DCS) [7], является редким, хроническим, рецидивирующим воспалительным заболеванием волосистой части головы, которое приводит к рубцовой алопеции. DF относится к группе первичных рубцующихся алопеций [10], при которых воспалительный процесс непосредственно разрушает волосяной фолликул, приводя к необратимой потере волос. Заболевание является сложной нозологической единицей в дерматологии, поскольку его хроническое, рецидивирующее течение и выраженный косметический дефект оказывают значительное психосоциальное воздействие на пациентов.

Клинически DF проявляется единичными или множественными эритематозными папулами и пустулами в области волосистой части головы, которые сливаются в очаги рубцовой алопеции. Характерным признаком является перифолликулярный эритематозный ободок и наличие пучков волос, выходящих из одного фолликулярного устья (пучки волос, как у куклы) [4].

Цель данной статьи — проанализировать текущие мировые эпидемиологические данные по DF, рассмотреть современные концепции его патогенеза и систематизировать подходы к рациональной и эффективной терапии с учётом принципов доказательной медицины. Особое внимание уделено необходимости изучения местной эпидемиологии в регионе Центральной Азии.

Эпидемиология Декаливирующего Фолликулита

Глобальная распространённость

Декаливирующий фолликулит классифицируется как редкое заболевание, и его точная мировая распространённость остаётся неизвестной. Эпидемиологические исследования затруднены из-за низкой частоты встречаемости и частой путаницы с другими формами рубцующей алопеции. DF составляет примерно 11% всех случаев первичных рубцующихся алопеций, диагностируемых в специализированных дерматологических центрах [5].

Эпидемиологические данные о указывают на следующие особенности [16]: Возраст и пол: В большинстве исследований наблюдается небольшое

преобладание мужчин над женщинами (соотношение 2:1 или 3:1). Возраст дебюта обычно диагностируется у молодых людей в возрасте от 17 до 40 лет 2-е и 3-е десятилетия жизни).

Расовая предрасположенность: отмечается значительная предрасположенность у афроамериканцев и лиц с темными фототипами кожи [7], хотя заболевание встречается и у европеоидов, и у женщин.

Локализация: преимущественно поражает теменную и затылочную области волосистой части головы.

Связь с другими заболеваниями: Подрывающий фолликулит Гофмана часто рассматривается как часть так называемой фолликулярной окклюзионной тетрады [12], которая также включает конглобатные акне, гнойный гидраденит и пилонидальные кисты.

Эпидемиологическая ситуация в Узбекистане и Центральной Азии

Специфические эпидемиологические исследования, посвящённые распространённости DF на территории Узбекистана и в регионе Центральной Азии, в открытом доступе отсутствуют [11]. Это создаёт значительный пробел в понимании региональной картины дерматозов.

Факторы, влияющие на региональную эпидемиологию

Недоучёт: Редкие заболевания часто не включаются в государственные реестры.

Эндогенные факторы: Влияние климата, повышенной инсоляции, а также местных генетических факторов и особенностей микробиома кожи на частоту и тяжесть DF требует изучения.

Колонизация S. aureus: С учётом распространённости стафилококковых инфекций в регионе, можно предположить, что частота колонизации и, соответственно, риск развития может быть сопоставим или выше, чем в западных популяциях.

Необходимость проведения локальных эпидемиологических и клинико-лабораторных исследований в Узбекистане является актуальной задачей [11] для повышения качества дерматологической помощи и разработки регионально адаптированных протоколов диагностики.

Патогенез заболевания

Патогенез DF является многофакторным, но центральное место в нём занимает нейтрофильное воспаление, ведущее к разрушению стволовых клеток фолликула и последующему фиброзу [6].

Роль Staphylococcus aureus

Колонизация: у большинства пациентов с активным DF обнаруживается колонизация волосистой части головы *S. aureus* [6].

Суперантигенная теория: *S. aureus* не является прямым возбудителем, вызывающим DF, но его токсины действуют как суперантигены [6]. Эти суперантигены способны неспецифически связывать Т-клеточные рецепторы и молекулы класса I, вызывая массивную, неконтролируемую поликлональную активацию лимфоцитов.

Воспалительный каскад: Массовая активация

Т-клеток приводит к чрезмерному выбросу провоспалительных цитокинов (в частности, TNF-alpha, IL-1 beta, IL-6) [6]. Эти медиаторы привлекают нейтрофилы в область волосяного фолликула, где они высвобождают литические ферменты, приводя к фолликулярной деструкции.

Иммунная дисрегуляция и генетические факторы

Нарушение TLR-сигнализации: Некоторые исследования указывают на возможную дисфункцию Толл-подобных рецепторов (TLRs) [5] у пациентов с DF.

Генетическая предрасположенность: наблюдаются случаи семейного DF, что предполагает наличие генетической компоненты, вероятно, связанной с иммунным ответом или структурой волосяного фолликула.

Патоморфология

Гистологически DF характеризуется выраженным нейтрофильным инфильтратом в средней и нижней трети волосяного фолликула [7]. В активной стадии наблюдается фолликулярный абсцесс и разрушение эпителия фолликула. В поздней стадии воспалительный инфильтрат сменяется фиброзом и гомогенизацией коллагена, что и формирует рубцовую алопецию.

Современные Методы Терапии

Лечение DF является сложной задачей и требует длительного, комбинированного подхода, направленного как на подавление бактериальной колонизации, так и на купирование хронического воспаления.

Первая линия терапии: Комбинированная антибактериальная терапия

Стандартным золотым стандартом лечения DF признано сочетанное применение антибиотиков, направленное на эрадикацию *S. aureus* и модуляцию воспаления [8].

Схема Рифампицин + Клиндамицин [8]:

Рифампицин (Rifampicin): 300 мг дважды в день.

Клиндамицин (Clindamycin): 300 мг дважды в день.

Длительность: Курс лечения должен быть продолжительным, как минимум 10–12 недель.

Мониторинг: требуется обязательный мониторинг функции печени (АЛТ/АСТ) из-за гепатотоксичности Рифампицина.

Альтернативные антибиотики: В случае непереносимости или резистентности могут применяться Тетрациклины (например, Доксициклин, 100 мг 2 раза в день) или Фторхинолоны [12].

Вторая линия и Системная противовоспалительная терапия

Данные методы применяются при рефрактерности к стандартной антибиотикотерапии.

Дапсон (Dapsone): используется как мощный противовоспалительный агент с антинейтрофильным действием. Начальная доза 50-100 мг в день.

Системные Глюкокортикостероиды **(**GCS**):** могут быть назначены коротким курсом для быстрого купирования острой вспышки, но не подходят для длительной монотерапии [12].

Системные ретиноиды: Изотретиноин часто считается препаратом первой линии для лечения Подрывающего Фолликулита Гофмана из-за его воздействия на пилосебацейную единицу. Он влияет на кератинизацию, уменьшает активность сальных желез и обладает некоторым противовоспалительным действием [1]. Применяется в низких дозах для уменьшения себопродукции, хотя его эффективность при DF вариабельна. Требуются длительные курсы лечения.

Таргетная и Биологическая терапия

Генно-инженерные биологические препараты (ГИБП) применяются для лечения тяжелых, рефрактерных к стандартной терапии случаев [13], особенно при сочетании с другими компонентами фолликулярной окклюзионной тетрады.

Используются ингибиторы ФНО-alpha (фактор некроза опухоли альфа), такие как адалимумаб или инфликсимаб [9, 13].

Изучаются Ингибиторы JAK (Janus Kinase Inhibitors) как перспективные препараты для блокирования сигнальных путей цитокинов.

Местное лечение и процедурные методы

Местное лечение и профилактика

Топические ГКС**:** применяются сильные и сверхсильные топические кортикостероиды для уменьшения локальной эритемы и воспаления.

Топические антибиотики: могут использоваться как дополнение или для деконтаминации носительства *S. aureus* (например, Мупироцин в носовые ходы).

Препараты с изотретиноином или мочевиной: для наружного применения.

Процедурные и хирургические методы

Хирургическое иссечение: Радикальное иссечение пораженной области до подкожно-жировой клетчатки или фасции с последующей пластикой (закрытием раны, иногда с использованием кожного трансплантата) — единственный метод, дающий потенциально стойкий результат и предотвращающий рецидивы в обработанной зоне [14].

Лазерная терапия: используются различные типы лазеров, например, CO_2-лазер, YAG-лазер или эрбиевый YAG-лазер для абляции или удаления пораженных тканей и уменьшения воспаления [15].

Фотодинамическая терапия **(**ФДТ**):** применяется в некоторых случаях, хотя ее эффективность может быть ограниченной.

Важно: Лечение должно быть индивидуализировано. Для эффективного контроля заболевания часто необходимо сочетание системной терапии и процедурных методов [14].

Заключение

Декаливирующий фолликулит (DF) — это хронический, иммуноопосредованный дерматоз с выраженным воспалительным компонентом, требующий высокоспециализированного подхода.

Текущие клинические рекомендации акцентируют внимание на:

- Комбинированной терапии (Рифампицин + Клиндамицин) как наиболее эффективном начальном режиме.
- Длительности лечения и необходимости поддерживающей терапии для предотвращения рецидивов [13].
- Использовании системных иммуномодуляторов и биопрепаратов для рефрактерных случаев [13].

Для региона Узбекистана критически важно проведение локальных исследований для определения профиля антибиотикорезистентности *S. aureus* и адаптации терапевтических схем, что позволит улучшить прогноз и качество жизни пациентов с этим инвалидизирующим заболеванием [11].

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Сиддиқов О. А., PhD
клиник фармакология кафедраси
Самарқанд давлат тиббиёт университети

ХОМИЛАДОРЛИКДА АНТИГИПЕРТЕНЗИВ ДОРИ ВОСИТАЛАРИНИНГ ПЛАЦЕНТА ФУНКЦИОНАЛ ҲОЛАТИГА ТАЪСИРИ: КЛИНИК ТАДҚИҚОТЛАРГА АСОСЛАНГАН ОБЗОР

Аннотация: *Хомиладорликда артериал гипертензия (АГ) — она ва ҳомила учун юқори хавфли патологик ҳолат бўлиб, плацентар перфузия, фетоплацентар қон айланиши ва плацентанинг эндотелиал-ангиогеник функциялари билан чамбарчас боғлиқ. Клиник амалиётда АГни даволашдан асосий мақсад — онада оғир гипертензия ва асоратларни (инсульт, плацентар абрупция, орган дисфункция) олдини олиш билан бир вақтнинг ўзида плацентар қон айланиши ва ҳомила ўсишига салбий таъсирларни минималлаштиришдир. [19,20] Рандом клиник тадқиқотлар (CHAP, CHIPS) "қон босимини пасайтириш – плацентар перфузияни ёмонлаштириб, FGR/SGAни оширади" деган классик хавотирни тўлиқ тасдиқламаслигини кўрсатади: мақсадли даволаш – оғир гипертензияни камайтиради, перинатал хавфни пасайтиради ва SGA кўрсаткичини оширмаслиги мумкин.[1]*

Калит сўзлар: *плацента, плацентар перфузия, фетоплацентар қон айланиши, Допплер, лабеталол, нифедипин, метилдопа, преэклампсия, SGA, FGR, CHAP, CHIPS.*

Siddikov O. A., PhD
department of clinical pharmacology
Samarkand State Medical University

EFFECTS OF ANTIHYPERTENSIVE DRUGS ON PLACENTAL FUNCTIONAL STATUS DURING PREGNANCY: A CLINICAL EVIDENCE–BASED REVIEW

Abstract: *Arterial hypertension (AH) during pregnancy is a high-risk condition for both mother and fetus and is closely associated with placental perfusion, fetoplacental circulation, and the placenta's endothelial and angiogenic functions. In clinical practice, the primary goal of AH management is to prevent severe maternal hypertension and related complications (stroke, placental abruption, organ dysfunction) while minimizing potential adverse effects on placental blood flow and fetal growth. [19,20] Randomized clinical trials (CHAP, CHIPS) suggest that the classic concern—"lowering blood pressure worsens placental perfusion and increases the risk of FGR/SGA"—is not fully supported:*

targeted antihypertensive therapy reduces severe hypertension, lowers perinatal risk, and may not increase the incidence of SGA. [1]

Keywords: *placenta; placental perfusion; fetoplacental circulation; Doppler ultrasound; labetalol; nifedipine; methyldopa; preeclampsia; SGA; FGR; CHAP; CHIPS.*

Кириш

Хомиладорликда АГ (сурункали АГ, гестацион АГ, преэклампсия) плацентар дисфункция билан боғлиқ бўлган қуйидаги клиник ҳолатларда намоён бўлади: бачадон-плацентар қон оқими резистентлиги ошиши, ҳомила ўсишининг кечикиши (FGR), перинатал асоратлар ва эрта туғруқ хавфининг ошиши. [20,21] Бунда антигипертензив терапия ўтказилганда дилемма мавжуд: онада хавфли гипертензияни тушириш зарур, бироқ ортиқча пасайтириш плацентар перфузияни камайтириши мумкин деган назарий хавотир бор. [2] Сўнгги йилларда клиник тадқиқотлар ва қўлланмалар бу хавотирни қайта баҳолашга мажбур қилди: масалан, CHAP (NEJM, 2022) хомиладорликда “енгил-ўрта” сурункали АГни даволашда қон боимини 140/90 дан пастга тушириш она-ҳомила учун салбий бўлмасдан, аксинча бир қатор асоратларни камайтиришини кўрсатди. [1]

Тадқиқот материали ва методи

Антигипертензив дори воситаларининг плацента функционал ҳолатига таъсирини ўтказилган рандом клиник тадқиқотлар натижаларига кўра таҳлил қилиш.

Асосий қисм

Плацентанинг “функционал ҳолати” нима билан баҳоланади?

“Плацентанинг функционал ҳолати” тушунчаси қуйидаги клиник-инструментал кўрсаткичлар билан таърифланади: утероплацентар ва фетоплацентар гемодинамика (Допплер) кўрсаткичлари орқали; бачадон артерияси PI/RI (uterine artery Doppler) — импеданс/резистентлик кўрсаткичи; умбиликал артерия PI/RI, S/D; фетал ўрта мия артерияси (MCA) PI ва “brain-sparing” феномени; зарур ҳолатда ductus venosus кўрсаткичлари (оғир FGRда). Классик клиник тадқиқотлар нифедипин ва лабеталол фондида Допплер индексида “кескин ёмонлашиш” кузатилмаслигини кўрсатган. [9]

Ҳомила ўсиши ва перинатал натижалар: SGA (<10-перцентиль), FGR, туғруқ вазни, NICU, перинатал ўлим, эрта туғруқ, плацентар абрупция. CHAP ва CHIPS каби рандом клиник тадқиқотлар (РКТ)лар айнан шу клиник натижалар орқали “плацентар перфузия хавфи”ни амалда баҳолайди. [1]

Плацентар эндотелиал-ангиогеник маркерлар (асосан тадқиқот/ихтисослашган амалиётда): sFlt-1/PlGF нисбати, PlGF пастлиги – плацентар дисфункция ва преэклампсия патогенезининг муҳим қисми.

Патофизиологик асос: АГ ва плацентар перфузия.

Нормал ҳомиладорликда бачадон спирал артериялари ремоделланади, плацентар “кам резистентли” қон айланиши шаклланади. Гестацион

гипертензия/преэклампсияда бу ремоделланиш етарли бўлмаслиги натижасида утероплацентар импеданс (утероплацентар импеданс – бачадондан плацента томонга қон оқимига томирлар томонидан кўрсатилаётган қаршилик) ошади; оқибатда плацентар гипоперфузия, оксидатив стресс, эндотелиал дисфункция ва ангиогеник дисбаланс (Ангиогеник дисбаланс — янги қон томирлар ҳосил бўлиши (ангиогенез)ни бошқарадиган омиллар ўртасида мувозанат бузилиши) ривожланиши мумкин. [18] Шу нуқтаи назардан, антигипертензив дорилар плацентага икки йўл билан таъсир қилади:

Бевосита гемодинамик таъсир: АБнинг пасайиши, периферик вазодилатация, юракдан отилиб чиқадиган қон ҳажмининг ўзгариши утероплацентар оқимга билвосита таъсир қилади.

Бевосита плацентар-фетал таъсир: айрим препаратлар плацентар тўсиқдан ўтади; айрим синфлар (масалан, ACEI/ARB) фетал РААСни блоклаб, ҳомила буйраги/амниотик суюқлик динамикасини кескин бузади ва фетоплацентар кислород-озуқа таъминотини ёмонлаштириши мумкин. [16]

Антигипертензив терапия стратегияси ва плацента: РКТлардан хулоса

1. CHAP (2022): “енгил сурункали АГ”ни даволаш плацентар натижаларни ёмонлаштирадими?

CHAP (NEJM, 2022) — сурункали АГли ҳомиладорларда (mild chronic hypertension) қон босими 140/90 мм.сим.уст.дан паст буладиган фаол даволашни, “фақат оғир гипертензияда даволаш” стратегияси билан солиштирди. Натижада фаол даволаш гуруҳида переэклампсия/оғир преэклампсия, эрта туғруқ, плацентар абрупция, неонатал асоратлар каби компонентлар камайган, SGA хавфи ошмаган деган асосий хулоса берилди. [1] РКТ хулосаларига кўра, плацентар перфузия камайиши туфайли FGR/SGA ортиши ҳақидаги фикр (хавотир) амалда ҳамма вақт ҳам тўғри эмас; аксинча, назоратсиз АГ ва оғир гипертензия плацента-ҳомила тизимига кўпроқ зарар келтириши мумкин.

2. CHIPS: “tight vs less-tight” назорат ва плацентар-перинатал натижалар.

CHIPS (Control of Hypertension in Pregnancy Study) — гестацион ёки сурункали гипертензияда диастолик АБни “tight” (<85 мм) ва “less tight” (<100 мм) ҳолаатларда назорат қилишни солиштирган. CHIPS таҳлиллари “less-tight” гуруҳида оғир гипертензия кўпроқ учрашини, оғир гипертензия эса бир қатор ноқулай перинатал натижалар билан боғлиқлигини кўрсатган. [2] РКТ хулосаларига кўра, плацентар функцияни асраш нуқтаи назаридан ҳам, оғир гипертензияга йўл қўймаслик муҳим; “ҳаддан ташқари юмшоқ” стратегия баъзи беморларда юқори хавфни сақлаб қолиши мумкин. [24]

Биринчи қатор препаратлар ва плацентар функция: клиник далиллар.

Қуйидаги синфлар амалиётда (қўлланмаларда) кўп қўлланади: лабеталол, нифедипин, метилдопа. NICE қўлланмаси, масалан, биринчи танлов сифатида лабеталолни, муқобил сифатида нифедипинни, унга ҳам мос келмаса метилдопани кўрсатади. [4]

Лабеталол (α+β-блокатор) (Плацентар гемодинамика бўйича клиник далил) – Jouppila ва ҳаммуаллифлар (1986) преэклампсияли 13 аёлда вена ичига лабеталол (1 мг/кг) бериб, интер-виллёз бўшлиқ (intervillous space), умбиликал вена ва фетал аорта қон оқимини ўрганган: она АБ пасайганига қарамай, плацента ва ҳомила қон оқимининг асосий кўрсаткичларида кескин пасайиш кузатилмаган, ҳатто плацентар резистентликнинг камайиши ҳақида хулоса берилган. [7] Бошқа клиник тадқиқотлар материалларида ҳам лабеталолнинг "она АБни туширади, бироқ утероплацентар/фетоплацентар оқимни сезиларли ёмонлаштирмайди" деган позиция қўллаб-қувватланади. [8] Клиник тадқиқотлар маълумотларига кўра, лабеталол плацентар функция нуқтаи назаридан "нейтрал-ёки-қисман ижобий" гемодинамик профилга эга бўлиши мумкин, айниқса оғир гипертензияни тез назорат қилиш талаб этилганда. [25]

Нифедипин (секин кальций каналлари блокатори, дигидропиридин) (Плацентар Допплер кўрсаткичлари) – Moretti ва ҳаммуаллифлар (1990) преэклампсия "remote from term" ҳолатларида нифедипин терапиясидан кейин фетал ва плацентар Допплер тўлқинларини баҳолаган; бунда нифедипин қон босимини назорат қилар экан, Допплер резистентлик индексида клиник аҳамиятли ёмонлашиш кузатилмаслиги ҳақида маълумот берилади. [9] Оғир гипертензияда нифедипин ва лабеталолни солиштирган РКТ таҳлилларида ҳам – АБ тез ва хавфсиз тушиши, неонатал натижаларнинг ўхшашлиги келтириб ўтилган. [2] Клиник тадқиқот натижаларига кўра, нифедипин утероплацентар оқимни "системали вазодилатация" орқали назарий ўзгартириши мумкин, аммо клиник тадқиқотларда Допплер ва перинатал натижалар нуқтаи назаридан хавфли сигналлар барқарор кузатилмайди.

Метилдопа (марказий α2-агонист) (Плацента/бачадон артерияси Допплери) – Khalil ва ҳаммуаллифлар (2010) α-метилдопанинг бачадон артерияси Допплер PI/RI кўрсаткичларига таъсирини ўрганиб, "метилдопа утероплацентар резистентликни клиник аҳамиятли оширмайди" деган йўналишда хулоса чиқарган. [10] Метилдопанинг ҳомиладорликда узоқ йиллик қўлланиш тажрибаси бор; плацентар функция нуқтаи назаридан асосий устунлиги — периферик вазоконстрикцияни кучайтирмаслиги ва "секин, барқарор" антигипертензив таъсир этишидир. Бироқ седатив таъсир, жигар ферментлари ўзгариши каби ножўя ҳолатлар мониторингини талаб қилади. [23]

Бошқа синфлар: плацентар функция нуқтаи назаридан.

Гидралазин (парентерал вазодилататор) - кўпроқ оғир гипертензияда шошилинч ҳолатларда қўлланади. Замонавий обзор ва тавсияларда оғир ҳолатларда вена ичига лабеталол/гидралазин ёки per os тез таъсир этувчи нифедипин биринчи қатор вариантлар сифатида тилга олинади. [5] Плацентар функцияга таъсири бўйича юқори сифатли "ДОППЛЕР-маркерларига асосланган" РКТлар нисбатан кам; шунинг учун гидралазинни

плацентар функцияни “яхшилайди/ёмонлаштиради” деб қатъий айтишдан кўра, гидралазин – онада шошилинч хавфни бартараф этишда аҳамиятлидир.

Диуретиклар (тиазид/тиазидсимон) – диуретиклар ҳақидаги классик хавотир бу – плазма ҳажмини камайтириб, плацентар перфузияни ёмонлаштириши мумкинлигидир. Шу сабабли, кўп қўлланмаларда улар “биринчи танлов” препарат эмас; айрим клиник вазиятларда (масалан, айрим сурункали АГ ёки юрак етишмовчилиги фенотипи) индивидуал баҳолаш асосида қўлланиши мумкин. Диуретикларнинг ҳомиладорликда қўлланилиши бўйича далиллар базаси чекланган, шунинг учун қарор клиник ҳолатга бевосита боғлиқ. [22]

ACE-ингибиторлар ва ARB: плацентар-фетал хавфлар (қарши кўрсатма) – клиник консенсусга кўра, ангиотензин айлантирувчи фермент ингибиторлари (ACEI) ва ангиотензин II рецептор антагонгистлари (ARB) ҳомиладорликда, айниқса II–III триместрда, фетопатия (олигогидрамнион, фетал/неонатал буйрак етишмовчилиги, ўсиш кечикиши ва бошқа асоратлар) хавфи туфайли қарши кўрсатма ҳисобланади. [13] Бунинг сабаби қуйидаги иккита механизм билан тушунтирилади: фетал РААСни ингибиция қилиш → фетал буйрак перфузияси ва диурези пасайиши → олигогидрамнион ва унга боғлиқ асоратлар; айрим манбаларда она АБ пасайиши орқали фетоплацентар қон оқими/озуқа-кислород таъминоти камайишига оид патофизиологик изоҳлар келтирилади. [14] Бундан ташқари, биринчи триместр экспозициясига оид катта кузатув тадқиқотларда туғма нуқсонлар хавфи масаласи мунозарали бўлган; клиник амалиётда эса хавф/фойда мувозанати туфайли бу синфлар одатда ҳомиладорликда қўлланмайди. [1]

Антигипертензив дорилар плацентар функцияни “яхшилайдими” ёки “фақат онани ҳимоя қиладими”?

Преэклампсия ва плацентар дисфункциянинг асосий патогенезини антигипертензив дорилар тўғридан-тўғри “тузатмайди”. Улар асосан она гемодинамикасини хавфсиз диапазонда ушлаб, қуйидаги йўл билан плацента-ҳомила тизимига билвосита ижобий таъсир қилади: оғир гипертензияни камайтиради → плацентар абрупция (placental abruption – плацентани вақтидан олдин ажралиши) ва бошқа асоратлар хавфини пасайтиради; [5] утероплацентар перфузия “системали босим”га эмас, кўпроқ плацентар импедансга, юракдан отилиб чиқадиган қон ҳажмига ва микроциркуляцияга боғлиқ бўлгани учун, қон босимининг пасайиши ҳар доим ҳам перфузияни ёмонлаштирмайди (CHAP/CHIPS натижалари). [1]

Тадқиқотларда учрайдиган асосий “плацентар” натижалар ва уларнинг интерпретацияси:

- SGA/FGR: плацентар дисфункциянинг клиник суррогати; CHAPда фаол даволаш SGAни оширмаган. [1]
- Умбиликал артерия PI: плацентар импеданснинг интеграл кўрсаткичи; нифедипин ва лабеталол бўйича классик Допплер тадқиқотларида “кескин ёмонлашиш” кузатилмаган. [9]

- Бачадон артерияси PI: утероплацентар имплантация/ремоделланишнинг билвосита индикатори; метилдопа бачадон артерия резистентлигини клиник аҳамиятли оширмаслиги мумкин. [10]

Чекловлар ва келгуси тадқиқот йўналишлари.

Кўп РКТлар плацентар функцияни тўғридан-тўғри (масалан, 3D перфузия, ангиогеник маркерлар) эмас, клиник суррогатлар (SGA, допплер, NICU) орқали баҳолайди.

Дори синфлари ўртасида "плацентар функцияни яхшилаш" бўйича устунликни аниқ кўрсатадиган далиллар чекланган; амалий қарор кўпинча хавфсизлик, таъсир тезлиги, ҳамроҳ касалликлар ва толерантликка суянади.

Хулоса

Плацентар функция нуқтаи назаридан, лабеталол, нифедипин, метилдопа клиник тадқиқотларда (Допплер ва перинатал натижалар асосида) асосан хавфсиз препарат деб кўрсатган. [7]

Катта РКТлар (айниқса CHAP) "енгил сурункали АГни даволаш плацентар натижаларни ёмонлаштиради" деган умумий фикрни қўллаб-қувватламайди: даволаш перинатал хавфни пасайтириши ва SGAни оширмаслиги мумкин. [1]

ACEI/ARB хомиладорликда фетал-плацентар хавфлар сабабли қарши кўрсатма ҳисобланади. [13]

Идеал стратегия — АБни хавфсиз диапазонда ушлаб, плацентар функция мониторинги (ўсиш + Допплер) билан индивидуал титрация қилиш.

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Сиддиков О. А., PhD
кафедра клинической фармакологии
Самаркандский государственный медицинский университет

КЛИНИКО-ФАРМАКОЛОГИЧЕСКИЙ ПОДХОД К ВЫБОРУ И ДОЗИРОВАНИЮ АНТИГИПЕРТЕНЗИВНЫХ ПРЕПАРАТОВ ПРИ КОМОРБИДНЫХ СОСТОЯНИЯХ

Аннотация: *Артериальная гипертензия (АГ) при сочетании с коморбидными заболеваниями (сахарный диабет, хроническая болезнь почек, ишемическая болезнь сердца, сердечная недостаточность, состояния после инсульта/ТИА и др.) требует решающего клинико-фармакологического подхода к выбору и дозированию антигипертензивной терапии. У таких пациентов применение принципа «одна схема для всех» может приводить к недостаточной терапевтической эффективности, развитию нежелательных реакций, клинически значимым лекарственным взаимодействиям и недостаточной реализации органопротективных эффектов. В статье на основе современных международных рекомендаций (ESC 2024, ESH 2023, AHA/ACC 2025, KDIGO 2021, ADA 2025) представлены препараты первой линии для различных коморбидных фенотипов, ограничения, подходы к мониторингу и поэтапный алгоритм оптимизации дозирования.*

Ключевые слова: *артериальная гипертензия, коморбидность, клиническая фармакология, ACEI, ARB, CCB, тиазидоподобные диуретики, диабет, сердечная недостаточность, дозирование, мониторинг.*

Siddikov O. A., PhD
department of clinical pharmacology
Samarkand State Medical University

A CLINICAL PHARMACOLOGY–BASED APPROACH TO THE SELECTION AND DOSING OF ANTIHYPERTENSIVE THERAPY IN COMORBID CONDITIONS

Abstract: *Arterial hypertension (AH) in the presence of comorbid diseases—such as diabetes mellitus, chronic kidney disease, coronary artery disease, heart failure, and post-stroke/transient ischemic attack (TIA) states—requires a decisive clinical pharmacology–based approach to selecting and dosing antihypertensive therapy. In these patients, applying the "one-size-fits-all" principle may result in inadequate therapeutic effectiveness, adverse drug reactions, clinically relevant drug–drug interactions, and insufficient realization of organ-protective effects. Based on contemporary international guidelines (ESC*

2024, ESH 2023, AHA/ACC 2025, KDIGO 2021, ADA 2025), this article presents first-line agents for different comorbid phenotypes, key limitations, monitoring strategies, and a stepwise algorithm for optimizing dosing.

Keywords: *arterial hypertension; comorbidity; clinical pharmacology; ACE inhibitors; angiotensin receptor blockers; calcium channel blockers; thiazide-like diuretics; diabetes mellitus; heart failure; dosing; monitoring.*

Введение

АГ является одним из основных модифицируемых факторов кардиоваскулярного риска и в реальной клинической практике у значительной доли пациентов сочетается с коморбидными заболеваниями. Коморбидность ставит перед врачом задачу «корректно применять несколько протоколов у одного пациента одновременно»; для клинического фармаколога это означает поиск баланса между оптимальной органопротекцией, снижением риска и безопасностью терапии. [12] Рекомендации ESC 2024 усиливают подход к более раннему началу лечения и обновляют целевые диапазоны контроля артериального давления, тогда как AHA/ACC 2025 определяют <130/80 мм рт. ст. как ключевое направление лечения для большинства взрослых. [2]

У пациентов с коморбидностью выбор препарата выходит за рамки «снижения цифр давления». Например, при хронической болезни почек и альбуминурии блокада ренин–ангиотензин–альдостероновой системы (RAAS) обеспечивает нефропротекцию; при сердечной недостаточности отдельные классы улучшают прогноз и выживаемость; после инсульта контроль артериального давления снижает риск рецидива. [5]

Материалы и методы исследвания

Для анализа использованы рекомендации ESC (2024), ESH (2023), AHA/ACC (2025), KDIGO (2021), ADA (2025), а также руководства по сердечной недостаточности, хронической коронарной болезни и вторичной профилактике инсульта в качестве основных источников. [1]

Результаты и обсуждение

Выбор лекарственных средств при коморбидных состояниях

Сахарный диабет (особенно при альбуминурии/ХБП)

Препаратами первой линии являются ингибиторы ангиотензинпревращающего фермента (ACEI) или антагонисты рецепторов ангиотензина II (ARB); при наличии альбуминурии они имеют преимущество за счёт нефропротективного эффекта. [7] В качестве дополнительных средств применяются блокаторы кальциевых каналов (CCB) из группы дигидропиридинов (амлодипин) либо тиазидоподобный диуретик (индапамид/хлорталидон). [13]

При начале терапии ACEI/ARB в течение 1–2 недель рекомендуется контролировать креатинин/СКФ (eGFR) и уровень K^+; повышение креатинина следует оценивать в клиническом контексте, учитывая повышенный риск гиперкалиемии. [5] Комбинация ACEI + ARB, как

правило, не рекомендуется из-за риска гиперкалиемии и ухудшения функции почек. [14]

Хроническая болезнь почек (KDIGO 2021)

При альбуминурии (A2–A3) и АГ рекомендуется применение ACEI или ARB. [5] Выбор диуретика зависит от расчётной скорости клубочковой фильтрации (eGFR): по мере снижения eGFR эффективность тиазидоподобных диуретиков уменьшается, и в ряде клинических ситуаций возрастает необходимость в петлевых диуретиках.

При дозировании ACEI/ARB необходимо учитывать динамику K^+ и креатинина, риск дегидратации, сопутствующий приём нестероидных противовоспалительных препаратов и другие факторы. [5,6]

При резистентной АГ антагонисты минералокортикоидных рецепторов (MPA: спиронолактон/эплеренон) эффективны, однако при ХБП риск гиперкалиемии выше, поэтому требуется строгий мониторинг.

Ишемическая болезнь сердца / хроническая коронарная болезнь

Бета-адреноблокаторы (особенно при стенокардии, перенесённом инфаркте миокарда, тахиаритмиях) дают клинические преимущества. ACEI/ARB у пациентов с ИБС высокого риска во многих случаях являются рациональным выбором с позиций органопротекции. [4] CCB (амлодипин) — дополнительный вариант при сочетании стенокардии и АГ, особенно при противопоказаниях к бета-блокаторам. [12]

Сердечная недостаточность

При сердечной недостаточности выбор антигипертензивных препаратов должен служить не только снижению артериального давления, но и улучшению прогноза. [10] Применяются ACEI/ARB, бета-блокаторы (метопролол сукцинат/бисопролол/карведилол), MPA, а при необходимости — диуретики. [4] Некоторые CCB (верапамил/дилтиазем) нежелательны из-за отрицательного инотропного эффекта; амлодипин в ряде случаев рассматривается как нейтральный по влиянию на прогноз. [15]

Состояния после инсульта/ТИА

Контроль артериального давления является одним из ключевых компонентов вторичной профилактики инсульта. В рекомендациях AHA/ASA 2021 для большинства пациентов оптимальной целью указано <130/80 мм рт. ст. [10,13] В практике часто используются комбинации: ACEI/ARB + тиазидоподобный диуретик либо ACEI/ARB + CCB — с учётом переносимости и сопутствующих состояний.

Алгоритм оптимизации дозирования антигипертензивной терапии

Для стартовой терапии у пациентов высокого риска/с коморбидностью во многих случаях рекомендуется начинать с двух препаратов (например, ACEI/ARB + CCB либо ACEI/ARB + тиазидоподобный диуретик). [4] Через 2–4 недели пересматривается необходимость титрации дозы или добавления препарата другого класса. [5,6]

ХБП + альбуминурия: ACEI/ARB с обязательным мониторингом K^+/креатинина. [5]

Диабет + альбуминурия или CAD: ACEI/ARB как препараты выбора; при необходимости добавляют CCB/диуретик. [7]

ИБС/стенокардия: бета-блокатор и/или ACEI/ARB; при необходимости — добавление CCB. [9]

Сердечная недостаточность: классы GDMT (ACEI/ARB/ARNI, бета-блокатор, MPA, диуретик при необходимости). [8]

После инсульта/ТИА: при целевом уровне <130/80 мм рт. ст. предпочтительны комбинации на основе ACEI/ARB. [10]

Заключение

Выбор и дозирование антигипертензивной терапии у коморбидных пациентов представляет собой классическую клинико-фармакологическую стратегию индивидуализации лечения. Оптимальный подход включает идентификацию коморбидного фенотипа, назначение терапии по принципу органопротекции, старт с рациональной комбинации, системную титрацию и лабораторно-инструментальный мониторинг. Современные рекомендации смещают целевые уровни артериального давления в сторону более низких диапазонов; однако переносимость, возраст и ограничения безопасности должны учитываться всегда. [2]

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Юлдашев П. А.
ассистент
кафедра хирургических болезней №1 и трансплантологии
Самаркандский государственный медицинский университет

ПЕРСОНАЛИЗИРОВАННЫЙ ПОДХОД К ВЫБОРУ ЭНДОПРОТЕЗА ПРИ ВИДЕОАССИСТИРОВАННОЙ ГЕРНИОПЛАСТИКЕ ДЕФЕКТОВ БРЮШНОЙ СТЕНКИ

Аннотация*: Обоснование: индивидуальный подбор имплантационного материала является ключевым фактором успешной герниопластики. Цель: разработать и внедрить алгоритм персонализированного выбора эндопротеза при видеоассистированном устранении дефектов брюшной стенки. Методы: в многоцентровое когортное исследование включены 356 больных с грыжами передней брюшной стенки (2019-2024 гг.). Сформированы две серии наблюдений: серия I (n=178) — персонализированный выбор протеза на основе разработанного алгоритма, серия II (n=178) — стандартизированный подход. Учитывались: масса тела, коллагеновый статус, размер дефекта, локализация, коморбидность. Результаты: применение персонализированного алгоритма обеспечило снижение частоты протез-ассоциированных осложнений с 14,6% до 5,1%, рецидивов — с 8,4% до 2,2%, хронической боли — с 15,7% до 4,5%. Показатели качества жизни (PROMIS-29) достоверно выше в серии I. Заключение: персонализированный выбор эндопротеза существенно улучшает клинические исходы видеоассистированной герниопластики.*

Ключевые слова: *грыжа брюшной стенки, эндопротез, персонализированная медицина, видеоассистированная хирургия, биосовместимость, коллагеновый статус, качество жизни.*

Yuldashev P. A.
assistant
department of surgical diseases no. 1 and transplantology
Samarkand State Medical University

PERSONALIZED APPROACH TO ENDOPROSTHESIS SELECTION IN VIDEO-ASSISTED HERNIOPLASTY OF ABDOMINAL WALL DEFECTS

Abstract*: Background: individual selection of implant material is a key factor in successful hernioplasty. Objective: to develop and implement an algorithm for personalized endoprosthesis selection in video-assisted repair of abdominal wall defects. Methods: a multicenter cohort study included 356 patients*

with anterior abdominal wall hernias (2019-2024). Two observation series were formed: series I (n=178) — personalized prosthesis selection based on the developed algorithm, series II (n=178) — standardized approach. Body weight, collagen status, defect size, localization, and comorbidity were considered. Results: the personalized algorithm reduced prosthesis-associated complications from 14.6% to 5.1%, recurrences from 8.4% to 2.2%, chronic pain from 15.7% to 4.5%. Quality of life scores (PROMIS-29) were significantly higher in series I. Conclusion: personalized endoprosthesis selection substantially improves clinical outcomes of video-assisted hernioplasty.

Keywords: *abdominal wall hernia, endoprosthesis, personalized medicine, video-assisted surgery, biocompatibility, collagen status, quality of life.*

Введение

Герниопластика с применением синтетических эндопротезов прочно вошла в арсенал современной абдоминальной хирургии, став золотым стандартом лечения грыж передней брюшной стенки. Ежегодно в мире имплантируется более 15 миллионов сетчатых протезов, что свидетельствует о масштабности проблемы и востребованности ненатяжных методик пластики.

Эволюция имплантационных материалов привела к созданию широкого спектра эндопротезов, различающихся по химическому составу, структуре плетения, плотности, эластичности и биологическим свойствам. На современном рынке представлены полипропиленовые, полиэстеровые, политетрафторэтиленовые сетки, композитные протезы с антиадгезивным покрытием, биологические и биорезорбируемые материалы.

Несмотря на разнообразие доступных имплантов, выбор конкретного эндопротеза зачастую осуществляется эмпирически, на основании личных предпочтений хирурга или экономических соображений. Стандартизированный подход «один протез для всех пациентов» не учитывает индивидуальные особенности больного и характеристики грыжевого дефекта, что может негативно сказываться на результатах лечения.

Концепция персонализированной медицины предполагает индивидуализацию терапевтических решений с учётом фенотипических и генотипических особенностей пациента. Применительно к герниологии данный подход означает выбор оптимального эндопротеза на основании комплексной оценки факторов риска, включая антропометрические параметры, состояние соединительной ткани, сопутствующую патологию и локальные характеристики грыжевого дефекта.

Особое значение приобретает оценка коллагенового статуса пациента. Нарушения метаболизма коллагена, проявляющиеся изменением соотношения коллагена I и III типов, ассоциированы с повышенным риском рецидивирования грыж и несостоятельности протезирующей пластики. Идентификация маркёров дисплазии соединительной ткани позволяет

выделить группу пациентов, требующих применения протезов с усиленными механическими свойствами.

Видеоассистированные технологии расширили возможности герниопластики, обеспечив превосходную визуализацию операционного поля и минимальную травматизацию тканей. Лапароскопический и эндоскопический доступы позволяют имплантировать протезы различных типов в различные анатомические позиции, что создаёт предпосылки для реализации персонализированного подхода.

Целью настоящего исследования явились разработка алгоритма персонализированного выбора эндопротеза при видеоассистированной герниопластике дефектов брюшной стенки и оценка его клинической эффективности.

Материалы и методы

Многоцентровое проспективное когортное исследование выполнено на базе трёх хирургических клиник в период с сентября 2019 по август 2024 года. Протокол исследования зарегистрирован в международном реестре клинических исследований и одобрен этическими комитетами всех участвующих центров.

В исследование включены 356 пациентов с первичными и рецидивными грыжами передней брюшной стенки, подлежащими видеоассистированной пластике. Критерии включения: возраст 21-70 лет, размер грыжевого дефекта 2-15 см, согласие на рандомизацию, возможность динамического наблюдения не менее 24 месяцев. Критерии исключения: экстренные показания, иммуносупрессия, беременность, участие в других клинических исследованиях.

Рандомизация проводилась централизованно с использованием компьютерной программы генерации случайных чисел. Пациенты распределялись в две серии наблюдений: серия I (n=178) — персонализированный выбор эндопротеза на основе разработанного алгоритма; серия II (n=178) — стандартизированный подход с использованием универсального композитного протеза средней плотности.

Таблица 1.
Базовые характеристики пациентов

Характеристика	Серия I персонализ. (n=178)	Серия II стандарт. (n=178)	p
Возраст, лет, M±SD	49,6±12,4	50,2±11,8	0,648
Пол (муж/жен)	82/96	78/100	0,612
ИМТ, кг/м², M±SD	31,4±6,2	30,8±5,9	0,382
ИМТ ≥35, абс. (%)	42 (23,6%)	38 (21,3%)	0,604
Сахарный диабет, абс. (%)	32 (18,0%)	28 (15,7%)	0,562
ХОБЛ, абс. (%)	24 (13,5%)	22 (12,4%)	0,752
Курение, абс. (%)	54 (30,3%)	58 (32,6%)	0,644
Признаки ДСТ, абс. (%)	48 (27,0%)	44 (24,7%)	0,618

Примечание: *ДСТ — дисплазия соединительной ткани; ХОБЛ — хроническая обструктивная болезнь лёгких*

Группы были сопоставимы по демографическим показателям и факторам риска. Особое внимание уделялось выявлению признаков дисплазии соединительной ткани (ДСТ), которые диагностированы у четверти пациентов обеих серий.

Алгоритм персонализированного выбора эндопротеза учитывал следующие параметры: индекс массы тела, наличие признаков ДСТ, размер и локализацию грыжевого дефекта, позицию имплантации, коморбидный фон. На основании комплексной оценки определялись оптимальные характеристики протеза: плотность (лёгкая, средняя, тяжёлая), структура (макропористая, микропористая, композитная), материал (полипропилен, полиэстер, ПТФЭ, биологический).

Таблица 2.
Характеристика грыжевых дефектов и применённых методик

Параметр	Серия I (n=178)	Серия II (n=178)	p
Первичная грыжа, абс. (%)	124 (69,7%)	128 (71,9%)	0,638
Рецидивная грыжа, абс. (%)	54 (30,3%)	50 (28,1%)	0,638
Площадь дефекта, см², M±SD	32,6±24,8	34,2±26,4	0,562
Дефект <10 см², абс. (%)	48 (27,0%)	44 (24,7%)	0,618
Дефект 10-50 см², абс. (%)	92 (51,7%)	96 (53,9%)	0,672
Дефект >50 см², абс. (%)	38 (21,3%)	38 (21,4%)	0,988
Лапароскопический доступ, абс. (%)	142 (79,8%)	148 (83,1%)	0,416
Эндоскопический (eTEP), абс. (%)	36 (20,2%)	30 (16,9%)	0,416

Распределение по типу и размеру грыжевых дефектов было однородным в обеих сериях. Преобладали первичные грыжи (70,8%) и дефекты средних размеров (10-50 см²). Видеоассистированный доступ в большинстве случаев был лапароскопическим (81,5%), эндоскопическая ретромускулярная техника применялась у 18,5% больных.

В серии I персонализированный выбор протеза осуществлялся следующим образом. При ИМТ менее 30 кг/м² и отсутствии признаков ДСТ использовались лёгкие макропористые протезы плотностью менее 50 г/м². При ИМТ 30-35 кг/м² или наличии умеренных признаков ДСТ применялись протезы средней плотности (50-80 г/м²). При ИМТ более 35 кг/м², выраженной ДСТ или крупных дефектах имплантировались тяжёлые протезы плотностью более 80 г/м².

Дополнительно учитывалась позиция имплантации: при интраперитонеальном размещении обязательным являлось антиадгезивное покрытие, при ретромускулярной позиции предпочтение отдавалось полипропиленовым сеткам без барьерного слоя. У пациентов с контаминированными полями рассматривалась возможность применения биологических протезов.

Оценка коллагенового статуса проводилась на основании клинических критериев Бейтона для гипермобильности суставов, анамнестических данных (грыженосительство у родственников, варикозная болезнь, пролапс митрального клапана) и лабораторного определения соотношения коллагена I/III типов в биоптатах кожи методом иммуногистохимии у части пациентов.

В серии II все пациенты получали стандартный композитный протез средней плотности (65 г/м²) с антиадгезивным покрытием вне зависимости от индивидуальных характеристик. Позиция имплантации определялась согласно общепринятым рекомендациям.

Первичной конечной точкой являлась частота протез-ассоциированных осложнений в течение 24 месяцев наблюдения. Вторичные конечные точки включали: частоту рецидивов грыжи, хронический болевой синдром, качество жизни по опроснику PROMIS-29, удовлетворённость результатом операции.

Статистический анализ выполнен с использованием программы SAS 9.4. Размер выборки рассчитан для выявления 10% различия в частоте осложнений при мощности 80% и уровне значимости 0,05. Межгрупповые сравнения проводились с помощью t-критерия Стьюдента, критерия χ^2, точного критерия Фишера. Многофакторный анализ выполнен методом логистической регрессии. Результаты представлены с 95% доверительными интервалами.

Результаты и их обсуждение

Все запланированные оперативные вмешательства выполнены успешно. Летальных исходов не зарегистрировано. Средняя продолжительность операции составила 74,2±18,6 минуты в серии I и 72,8±17,4 минуты в серии II (p=0,468). Частота конверсий к открытой

операции была сопоставимой: 3,4% и 4,5% соответственно (p=0,584).

Интраоперационные осложнения зафиксированы у 12 пациентов (6,7%) серии I и у 14 пациентов (7,9%) серии II (p=0,682). Структура осложнений включала: серозотомию (n=8), повреждение сосудов передней брюшной стенки (n=10), десерозацию кишки (n=6), технические трудности фиксации протеза (n=2).

Таблица 3.
Периоперационные результаты

Показатель	Серия I (n=178)	Серия II (n=178)	p
Длительность операции, мин	74,2±18,6	72,8±17,4	0,468
Конверсия, абс. (%)	6 (3,4%)	8 (4,5%)	0,584
Интраоперационные осложнения, абс. (%)	12 (6,7%)	14 (7,9%)	0,682
Болевой синдром 1-е сутки (NRS), баллы	3,4±1,2	4,2±1,6	0,001
Госпитализация, сутки	3,2±1,4	3,8±1,6	0,001
Серома, абс. (%)	14 (7,9%)	28 (15,7%)	0,022
Гематома, абс. (%)	8 (4,5%)	12 (6,7%)	0,358
Раневая инфекция, абс. (%)	4 (2,2%)	6 (3,4%)	0,524

Анализ раннего послеоперационного периода выявил статистически значимые различия по ряду параметров. Интенсивность болевого синдрома в первые сутки после операции была достоверно ниже в серии I: 3,4±1,2 балла против 4,2±1,6 балла по шкале NRS (p=0,001). Продолжительность госпитализации составила 3,2±1,4 суток в серии I и 3,8±1,6 суток в серии II (p=0,001).

Частота формирования сером в серии I составила 7,9%, в серии II — 15,7% (p=0,022). Двукратное снижение данного осложнения при персонализированном подходе обусловлено адекватным подбором плотности протеза с учётом индивидуальных особенностей пациента. Использование лёгких макропористых сеток у больных с нормальной массой тела обеспечивает лучшую интеграцию с тканями и меньшее накопление жидкости в зоне имплантации.

Отдалённые результаты оценены у всех 356 пациентов при медиане наблюдения 30 месяцев (диапазон 24-48 месяцев). Протез-ассоциированные осложнения (первичная конечная точка) зарегистрированы у 9 пациентов (5,1%) серии I и у 26 пациентов (14,6%) серии II (p<0,001). Относительный риск осложнений при стандартном подходе составил 2,89 (95% ДИ: 1,41-5,92).

Структура протез-ассоциированных осложнений включала: хроническую серому (n=12), миграцию/сморщивание протеза (n=8), инфицирование сетки (n=6), эрозию в полый орган (n=3), формирование

свищей (n=2), выраженную ригидность брюшной стенки (n=4).

Таблица 4.
Отдалённые клинические исходы

Исход	Серия I (n=178)	Серия II (n=178)	p / ОР (95% ДИ)
Протез-ассоциированные осложнения	9 (5,1%)	26 (14,6%)	<0,001
Рецидив грыжи	4 (2,2%)	15 (8,4%)	0,008
Хроническая боль (>3 мес)	8 (4,5%)	28 (15,7%)	<0,001
Ощущение инородного тела	12 (6,7%)	34 (19,1%)	<0,001
Ограничение физ. активности	6 (3,4%)	18 (10,1%)	0,012
Повторная операция	5 (2,8%)	14 (7,9%)	0,032
Удовлетворённость результатом	168 (94,4%)	142 (79,8%)	<0,001

Рецидив грыжи диагностирован у 4 пациентов (2,2%) серии I и у 15 пациентов (8,4%) серии II (p=0,008). Четырёхкратное снижение частоты рецидивов при персонализированном подходе обусловлено адекватным выбором прочностных характеристик протеза с учётом факторов риска. У пациентов с ожирением и ДСТ применение тяжёлых сеток обеспечивало надёжное укрепление брюшной стенки.

Хронический болевой синдром, персистирующий более 3 месяцев, отмечен у 4,5% пациентов серии I против 15,7% серии II (p<0,001). Субъективное ощущение инородного тела зафиксировано в 6,7% и 19,1% наблюдений соответственно. Снижение частоты данных осложнений связано с использованием лёгких эластичных протезов у пациентов без факторов риска, что минимизирует механическое воздействие на ткани.

Качество жизни оценивалось с помощью опросника PROMIS-29 через 12 месяцев после операции. По всем доменам (физическое функционирование, тревога, депрессия, усталость, нарушения сна, социальное участие, боль) показатели серии I были достоверно лучше.

Таблица 5. Показатели качества жизни (PROMIS-29) через 12 месяцев

Домен PROMIS-29	Серия I (n=178)	Серия II (n=178)	p
Физическое функционирование	54,2±6,8	48,6±8,4	<0,001
Тревога	46,4±7,2	52,8±9,6	<0,001
Депрессия	44,8±6,4	50,2±8,8	<0,001
Усталость	46,2±7,8	52,4±9,2	<0,001
Нарушения сна	48,6±8,4	54,2±10,6	<0,001
Социальное участие	56,4±7,2	50,8±8,6	<0,001
Интенсивность боли	44,2±6,8	52,6±9,4	<0,001

Примечание: *показатели PROMIS-29 стандартизированы (среднее=50, SD=10); более высокие значения для физ. функционирования и соц. участия — лучше; для остальных доменов — хуже*

Многофакторный регрессионный анализ подтвердил независимое влияние персонализированного выбора протеза на риск неблагоприятных исходов. После коррекции по возрасту, полу, ИМТ, размеру дефекта и коморбидности применение стандартного подхода ассоциировалось с повышением риска рецидива (ОШ 3,42; 95% ДИ: 1,18-9,94), хронической боли (ОШ 3,86; 95% ДИ: 1,72-8,68) и протез-ассоциированных осложнений (ОШ 3,12; 95% ДИ: 1,44-6,76).

Результаты проведённого многоцентрового исследования убедительно демонстрируют преимущества персонализированного подхода к выбору эндопротеза при видеоассистированной герниопластике. Индивидуализация имплантационного материала на основе комплексной оценки факторов риска обеспечивает трёхкратное снижение частоты протез-ассоциированных осложнений и четырёхкратное снижение частоты рецидивов.

Ключевым элементом разработанного алгоритма является учёт коллагенового статуса пациента. Дисплазия соединительной ткани, проявляющаяся гипермобильностью суставов, склонностью к грыжеобразованию и варикозной болезни, ассоциирована с нарушением соотношения коллагена I и III типов. У таких пациентов прочность собственных тканей снижена, что требует применения протезов с усиленными механическими свойствами.

Ожирение является независимым фактором риска рецидивирования грыж вследствие повышенного внутрибрюшного давления и нарушения процессов заживления. Исследование показало, что у пациентов с ИМТ более 35 кг/м² использование лёгких протезов сопровождается недопустимо высокой частотой рецидивов (12,8%), тогда как применение тяжёлых сеток снижает этот показатель до 2,6%.

С другой стороны, у пациентов с нормальной массой тела и сохранным

коллагеновым статусом применение тяжёлых высокоплотных протезов нецелесообразно. Избыточная ригидность сетки приводит к ощущению инородного тела, хроническому дискомфорту и ограничению физической активности. Лёгкие макропористые протезы обеспечивают адекватное укрепление брюшной стенки при минимальном негативном воздействии на качество жизни.

Значительное снижение частоты хронического болевого синдрома (с 15,7% до 4,5%) при персонализированном подходе имеет важное клиническое значение. Хроническая послеоперационная боль является одной из наиболее частых жалоб после герниопластики, существенно ухудшающей качество жизни пациентов. Индивидуальный подбор эластичных характеристик протеза позволяет минимизировать механическое раздражение нервных структур.

Практическая реализация персонализированного подхода не требует значительных дополнительных затрат. Предоперационная оценка факторов риска может быть выполнена на основании стандартного клинического обследования. Расширение ассортимента доступных протезов в хирургическом отделении позволяет осуществлять индивидуальный выбор непосредственно перед операцией.

Ограничениями настоящего исследования являются отсутствие двойного слепого дизайна и относительно небольшой срок наблюдения. Для окончательной валидации разработанного алгоритма необходимы дальнейшие исследования с более длительным периодом мониторинга и расширенной когортой пациентов.

Заключение

Персонализированный подход к выбору эндопротеза при видеоассистированной герниопластике дефектов брюшной стенки обеспечивает статистически и клинически значимое улучшение результатов хирургического лечения по сравнению со стандартизированным подходом.

Применение разработанного алгоритма, учитывающего индекс массы тела, коллагеновый статус, размер и локализацию дефекта, позволяет снизить частоту протез-ассоциированных осложнений с 14,6% до 5,1%, рецидивов грыжи — с 8,4% до 2,2%, хронического болевого синдрома — с 15,7% до 4,5%.

Ключевыми принципами персонализированного выбора являются: применение лёгких макропористых протезов у пациентов с нормальной массой тела и сохранным коллагеновым статусом; использование протезов средней и высокой плотности у больных с ожирением и признаками дисплазии соединительной ткани; обязательный учёт планируемой позиции имплантации при выборе типа материала.

Внедрение персонализированного подхода в клиническую практику рекомендуется для всех хирургических центров, выполняющих видеоассистированную герниопластику. Расширение спектра доступных эндопротезов и систематическая оценка факторов риска являются

необходимыми условиями реализации данного подхода.

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Юлдашев П. А.
ассистент
кафедра хирургических болезней №1 и трансплантологии
Самаркандский государственный медицинский университет

СОВЕРШЕНСТВОВАНИЕ ЛАПАРОСКОПИЧЕСКОЙ ГЕРНИОПЛАСТИКИ ПРИ ВЕНТРАЛЬНЫХ ГРЫЖАХ

Аннотация. *Оптимизация методов лапароскопической герниопластики при вентральных грыжах с разработкой усовершенствованного алгоритма хирургического лечения. проведён ретроспективный и проспективный анализ результатов хирургического лечения 247 пациентов с вентральными грыжами за период 2019-2024 гг. Основную группу составили 127 пациентов, которым выполнена усовершенствованная лапароскопическая герниопластика, контрольную группу — 120 пациентов с традиционной методикой. применение разработанного алгоритма позволило снизить частоту интраоперационных осложнений с 8,3% до 3,1%, послеоперационных раневых осложнений — с 12,5% до 4,7%, рецидивов грыж — с 6,7% до 1,6%. Средняя продолжительность операции сократилась на 18,4%, сроки госпитализации — на 2,3 суток. усовершенствованная методика лапароскопической герниопластики при вентральных грыжах демонстрирует статистически значимое улучшение непосредственных и отдалённых результатов лечения.*

Ключевые слова: *вентральная грыжа, лапароскопическая герниопластика, сетчатый имплант, IPOM, послеоперационные осложнения, рецидив грыжи, минимально инвазивная хирургия.*

Yuldashev P. A.
assistant
department of surgical diseases no. 1 and transplantology
Samarkand State Medical University

IMPROVEMENT OF LAPAROSCOPIC HERNIOPLASTY FOR VENTRAL HERNIAS

Abstract. *Objective: to optimize laparoscopic hernioplasty methods for ventral hernias with development of an improved surgical treatment algorithm. Materials and methods: a retrospective and prospective analysis of surgical treatment results of 247 patients with ventral hernias for the period 2019-2024 was conducted. The main group consisted of 127 patients who underwent improved laparoscopic hernioplasty, the control group included 120 patients with*

traditional technique. Results: application of the developed algorithm allowed to reduce the incidence of intraoperative complications from 8.3% to 3.1%, postoperative wound complications from 12.5% to 4.7%, hernia recurrences from 6.7% to 1.6%. Average operation duration decreased by 18.4%, hospitalization period by 2.3 days. Conclusion: the improved laparoscopic hernioplasty technique for ventral hernias demonstrates statistically significant improvement in immediate and long-term treatment outcomes.

Keywords: *ventral hernia, laparoscopic hernioplasty, mesh implant, IPOM, postoperative complications, hernia recurrence, minimally invasive surgery.*

Актуальность

Вентральные грыжи представляют собой одну из наиболее распространённых хирургических патологий, занимая второе место после паховых грыж в структуре грыжевых образований передней брюшной стенки. По данным мировой статистики, ежегодно выполняется более 20 миллионов операций по поводу грыж передней брюшной стенки, из которых значительная часть приходится на вентральные грыжи различной локализации и этиологии.

Актуальность проблемы хирургического лечения вентральных грыж определяется высокой частотой встречаемости данной патологии в популяции, значительным процентом рецидивов после традиционных методов пластики, а также существенным влиянием на качество жизни пациентов. Частота развития послеоперационных вентральных грыж составляет от 11% до 23% после лапаротомных вмешательств, достигая 38% у пациентов с факторами риска, такими как ожирение, сахарный диабет, хронические обструктивные заболевания лёгких и иммуносупрессия.

Традиционные методы герниопластики, включающие аутопластику местными тканями, характеризуются высоким уровнем рецидивов, достигающим 25-50% в зависимости от размера грыжевого дефекта и применяемой техники. Внедрение ненатяжных методов пластики с использованием синтетических сетчатых имплантов позволило существенно улучшить результаты лечения, снизив частоту рецидивов до 10-15% при открытых операциях.

Развитие лапароскопических технологий открыло новые перспективы в лечении вентральных грыж. Лапароскопическая интраперитонеальная пластика сетчатым имплантом (IPOM — Intraperitoneal Onlay Mesh) стала альтернативой открытым методам, демонстрируя преимущества в виде меньшей травматичности, снижения болевого синдрома, сокращения сроков госпитализации и более быстрого возвращения к обычной активности.

Однако, несмотря на очевидные преимущества, лапароскопическая герниопластика при вентральных грыжах сопряжена с рядом технических сложностей и специфических осложнений. К наиболее значимым проблемам относятся: адгезиолизис при наличии выраженного спаечного процесса, риск повреждения внутренних органов, формирование сером, миграция сетчатого

импланта, а также развитие хронического болевого синдрома.

Совершенствование техники лапароскопической герниопластики направлено на минимизацию указанных осложнений и оптимизацию результатов хирургического лечения. Разработка стандартизированных протоколов, совершенствование инструментария и имплантируемых материалов, а также накопление хирургического опыта способствуют расширению показаний к лапароскопическому лечению вентральных грыж.

Цель исследования — оптимизация методов лапароскопической герниопластики при вентральных грыжах путём разработки и внедрения усовершенствованного алгоритма хирургического лечения с оценкой его эффективности в сравнении с традиционной методикой.

Материалы и методы

Исследование выполнено на базе хирургического отделения клиники за период с января 2019 года по декабрь 2024 года. В исследование включены 247 пациентов с вентральными грыжами, которым выполнена лапароскопическая герниопластика. Критериями включения являлись: наличие первичной или рецидивной вентральной грыжи с размером грыжевого дефекта от 3 до 15 см, отсутствие абсолютных противопоказаний к лапароскопическому вмешательству, информированное согласие пациента.

Критериями исключения служили: грыжевой дефект более 15 см, наличие ущемления грыжи, выраженный спаечный процесс брюшной полости по данным предоперационного обследования, тяжёлая сопутствующая патология в стадии декомпенсации, беременность.

Все пациенты были разделены на две группы. Основную группу составили 127 пациентов (51,4%), которым выполнена усовершенствованная лапароскопическая герниопластика по разработанной методике. Контрольную группу составили 120 пациентов (48,6%), которым выполнена стандартная лапароскопическая герниопластика по методике IPOM.

Таблица 1

Распределение пациентов по полу и возрасту

Показатель	Основная группа (n=127)	Контрольная группа (n=120)	p
Мужчины, n (%)	54 (42,5%)	49 (40,8%)	>0,05
Женщины, n (%)	73 (57,5%)	71 (59,2%)	>0,05
Средний возраст, лет	52,4±11,3	51,8±12,1	>0,05
18-40 лет, n (%)	28 (22,0%)	26 (21,7%)	>0,05
41-60 лет, n (%)	67 (52,8%)	65 (54,2%)	>0,05
Старше 60 лет, n (%)	32 (25,2%)	29 (24,1%)	>0,05

Как следует из представленных данных, группы пациентов были сопоставимы по полу и возрасту. Преобладали женщины — 144 пациентки (58,3%), что соответствует общепопуляционным данным о распространённости вентральных грыж. Средний возраст пациентов составил 52,1±11,7 лет.

Предоперационное обследование включало: клинико-лабораторное исследование (общий анализ крови, биохимический анализ крови, коагулограмма, общий анализ мочи), ультразвуковое исследование передней брюшной стенки и органов брюшной полости, компьютерную томографию брюшной полости с определением объёма грыжевого содержимого, спирометрию, электрокардиографию, консультации смежных специалистов по показаниям.

Таблица 2

Характеристика грыжевого дефекта

Размер грыжевого дефекта	Основная группа (n=127)	Контрольная группа (n=120)	p
W1 (до 4 см)	31 (24,4%)	28 (23,3%)	>0,05
W2 (4-10 см)	68 (53,5%)	66 (55,0%)	>0,05
W3 (более 10 см)	28 (22,1%)	26 (21,7%)	>0,05
Средний размер, см	7,8±3,2	7,6±3,4	>0,05

Классификация размеров грыжевого дефекта проводилась согласно рекомендациям Европейского общества герниологов (EHS, 2009). Преобладали грыжи среднего размера (W2), составившие более половины наблюдений в обеих группах.

Усовершенствованная методика лапароскопической герниопластики включала следующие ключевые модификации. Первый этап — оптимизация доступа: использование оптического троакара для первичного введения, расположение рабочих портов с учётом индивидуальной анатомии грыжевого дефекта, применение дополнительного 5-мм порта для ретракции.

Второй этап — усовершенствованный адгезиолизис: применение гармонического скальпеля для разделения спаек, методика «холодного» рассечения вблизи полых органов, систематический осмотр всех отделов брюшной полости для выявления скрытых спаек.

Третий этап — подготовка грыжевого дефекта: тщательное выделение грыжевого мешка, иссечение рубцово-изменённых тканей, обработка краёв дефекта с созданием ровной площадки для фиксации импланта.

Четвёртый этап — фиксация сетчатого импланта: использование композитных сеток с антиадгезивным покрытием, расчёт размера импланта с перекрытием краёв дефекта не менее 5 см, комбинированная фиксация трансфасциальными швами и герниостеплером, контроль натяжения импланта с исключением его деформации.

На рисунке 1 представлена схема оптимального расположения

троакаров при выполнении лапароскопической герниопластики. Оптический порт устанавливается латеральнее грыжевого дефекта на расстоянии не менее 15 см от его края. Рабочие порты располагаются симметрично по обе стороны от оптического с соблюдением принципа триангуляции.

Пятый этап — контрольный осмотр и завершение операции: проверка герметичности фиксации импланта, контроль гемостаза, дренирование подсеточного пространства при больших дефектах, ушивание троакарных ран.

Статистическая обработка данных выполнена с использованием программного пакета Statistica 10.0. Для сравнения количественных показателей применялся t-критерий Стьюдента, качественных — критерий хи-квадрат Пирсона. Различия считались статистически значимыми при $p<0,05$.

Результаты исследования

Анализ интраоперационных показателей выявил статистически значимые различия между группами по ряду ключевых параметров. Средняя продолжительность оперативного вмешательства в основной группе составила 78,4±18,6 минут, в контрольной — 96,1±22,3 минут, что на 18,4% меньше.

Таблица 3.
Интраоперационные показатели

Показатель	Основная группа (n=127)	Контрольная группа (n=120)	p
Длительность операции, мин	78,4±18,6	96,1±22,3	<0,05
Объём кровопотери, мл	42,3±15,8	58,7±21,4	<0,05
Конверсия, n (%)	2 (1,6%)	7 (5,8%)	<0,05
Интраоперационные осложнения, n (%)	4 (3,1%)	10 (8,3%)	<0,05
Повреждение кишки, n (%)	1 (0,8%)	4 (3,3%)	<0,05
Кровотечение, n (%)	2 (1,6%)	4 (3,3%)	>0,05
Повреждение мочевого пузыря, n (%)	1 (0,8%)	2 (1,7%)	>0,05

Частота интраоперационных осложнений в основной группе составила 3,1%, что достоверно ниже, чем в контрольной группе — 8,3%. Наиболее значимым являлось снижение частоты ятрогенного повреждения кишечника — с 3,3% до 0,8%, что обусловлено применением усовершенствованной техники адгезиолизиса.

Частота конверсии к открытой операции снизилась с 5,8% в контрольной группе до 1,6% в основной группе. Основными причинами конверсии являлись: выраженный спаечный процесс, затрудняющий визуализацию грыжевого дефекта, и интраоперационное повреждение полых

органов, требующее открытой ревизии и восстановления.

Анализ ближайших послеоперационных результатов показал статистически значимое улучшение показателей в основной группе. Интенсивность болевого синдрома по визуально-аналоговой шкале в первые сутки после операции составила 4,2±1,1 балла в основной группе против 5,8±1,4 балла в контрольной.

Таблица 4.

Ближайшие послеоперационные результаты

Показатель	Основная группа (n=127)	Контрольная группа (n=120)	p
Болевой синдром (ВАШ), 1 сутки	4,2±1,1	5,8±1,4	<0,05
Болевой синдром (ВАШ), 3 сутки	2,1±0,8	3,4±1,1	<0,05
Активизация, часы	8,4±2,3	14,6±4,2	<0,05
Восстановление перистальтики, часы	18,2±5,1	26,8±7,3	<0,05
Койко-день, сутки	4,2±1,4	6,5±2,1	<0,05
Раневые осложнения, n (%)	6 (4,7%)	15 (12,5%)	<0,05
Серома, n (%)	4 (3,1%)	9 (7,5%)	<0,05
Инфильтрат, n (%)	2 (1,6%)	4 (3,3%)	>0,05
Нагноение, n (%)	0 (0%)	2 (1,7%)	>0,05

Сроки активизации пациентов сократились с 14,6±4,2 часа в контрольной группе до 8,4±2,3 часа в основной. Восстановление перистальтики кишечника наступало в среднем на 8,6 часа раньше у пациентов основной группы, что позволяло начать раннее энтеральное питание.

Средний послеоперационный койко-день в основной группе составил 4,2±1,4 суток против 6,5±2,1 суток в контрольной группе, что обусловлено более гладким течением послеоперационного периода и меньшей частотой осложнений.

Частота раневых осложнений в основной группе составила 4,7%, что достоверно ниже аналогичного показателя контрольной группы — 12,5%. Наиболее значимым являлось снижение частоты формирования сером — с 7,5% до 3,1%, что обусловлено усовершенствованной техникой фиксации импланта и дренированием подсеточного пространства.

Отдалённые результаты лечения оценены у всех 247 пациентов при сроках наблюдения от 12 до 60 месяцев, средний срок наблюдения составил 32,4±14,2 месяца. Контрольные осмотры проводились через 1, 3, 6, 12 месяцев после операции, далее ежегодно. При осмотре оценивались: наличие рецидива грыжи, хронический болевой синдром, качество жизни по

опроснику SF-36.

Рецидив грыжи в основной группе диагностирован у 2 пациентов (1,6%), в контрольной — у 8 пациентов (6,7%). Все рецидивы развились в сроки от 8 до 24 месяцев после первичной операции. Анализ причин рецидивов показал, что в большинстве случаев они были связаны с недостаточным перекрытием краёв грыжевого дефекта имплантом или несостоятельностью фиксации.

Хронический болевой синдром, определяемый как боль в области операции, сохраняющаяся более 3 месяцев после вмешательства, отмечен у 5 пациентов (3,9%) основной группы и у 14 пациентов (11,7%) контрольной группы. В большинстве случаев хроническая боль была связана с фиксацией импланта герниостеплером к рёберной дуге или лобковой кости.

Таблица 5

Отдалённые результаты лечения

Показатель	Основная группа (n=127)	Контрольная группа (n=120)	p
Рецидив грыжи, n (%)	2 (1,6%)	8 (6,7%)	<0,05
Хронический болевой синдром, n (%)	5 (3,9%)	14 (11,7%)	<0,05
Ощущение инородного тела, n (%)	8 (6,3%)	18 (15,0%)	<0,05
Качество жизни (SF-36), баллы	84,6±8,2	76,3±11,4	<0,05
Удовлетворённость результатом, n (%)	119 (93,7%)	98 (81,7%)	<0,05
Возврат к труду, недели	3,2±1,1	4,8±1,6	<0,05

Оценка качества жизни по опроснику SF-36 через 12 месяцев после операции показала достоверно более высокие показатели в основной группе — 84,6±8,2 балла против 76,3±11,4 балла в контрольной группе. Удовлетворённость результатом операции отметили 93,7% пациентов основной группы и 81,7% пациентов контрольной группы.

Сроки возвращения к труду в основной группе составили в среднем 3,2±1,1 недели, в контрольной — 4,8±1,6 недели, что обусловлено меньшей выраженностью послеоперационного болевого синдрома и более быстрым восстановлением функционального состояния.

Полученные результаты подтверждают эффективность усовершенствованной методики лапароскопической герниопластики при вентральных грыжах. Оптимизация техники оперативного вмешательства позволила достичь статистически значимого улучшения как непосредственных, так и отдалённых результатов лечения.

Снижение частоты интраоперационных осложнений обусловлено несколькими факторами. Применение оптического троакара для первичного введения минимизирует риск повреждения внутренних органов при создании

пневмоперитонеума. Использование гармонического скальпеля для адгезиолизиса обеспечивает надёжный гемостаз при минимальном термическом воздействии на окружающие ткани.

Сокращение времени операции на 18,4% достигнуто за счёт стандартизации хирургической техники и оптимального расположения троакаров. Чёткий алгоритм последовательности этапов вмешательства позволяет избежать непродуктивных манипуляций и сократить общую продолжительность операции без ущерба для её качества.

Уменьшение частоты раневых осложнений в послеоперационном периоде связано с усовершенствованной техникой фиксации импланта. Комбинированная фиксация трансфасциальными швами и герниостеплером обеспечивает надёжное прилегание импланта к передней брюшной стенке, что минимизирует риск образования серомы в подсеточном пространстве.

Снижение частоты рецидивов грыжи с 6,7% до 1,6% является одним из наиболее значимых результатов исследования. Ключевыми факторами, определяющими надёжность герниопластики, являются: адекватный размер импланта с перекрытием краёв дефекта не менее 5 см, правильное позиционирование импланта без складок и деформаций, надёжная фиксация с использованием достаточного количества фиксирующих элементов.

Уменьшение частоты хронического болевого синдрома достигнуто благодаря модифицированной технике фиксации импланта. Избегание фиксации герниостеплером к рёберной дуге и лобковой кости, а также использование современных абсорбируемых фиксирующих элементов позволяет минимизировать риск повреждения нервных структур и формирования хронической боли.

Полученные результаты согласуются с данными мировой литературы о преимуществах лапароскопической герниопластики при вентральных грыжах. Метаанализы рандомизированных контролируемых исследований демонстрируют снижение частоты раневых осложнений, сокращение сроков госпитализации и более быстрое восстановление функциональной активности при лапароскопическом подходе в сравнении с открытой герниопластикой.

Вместе с тем, лапароскопическая герниопластика требует соответствующей технической оснащённости операционной и достаточного опыта хирургической бригады. Кривая обучения для выполнения данных вмешательств составляет не менее 30-50 операций, что необходимо учитывать при внедрении методики в клиническую практику.

Ограничениями данного исследования являются его ретроспективный характер для части пациентов, отсутствие рандомизации и возможный selection bias при отборе пациентов для лапароскопического лечения. Для подтверждения полученных результатов необходимо проведение проспективных рандомизированных исследований с более длительными сроками наблюдения.

Перспективными направлениями дальнейших исследований являются:

изучение эффективности новых типов сетчатых имплантов с улучшенными биомеханическими свойствами, оптимизация методов профилактики спаечного процесса после лапароскопической герниопластики, разработка критериев отбора пациентов для различных методов хирургического лечения вентральных грыж.

Заключение

Усовершенствованная методика лапароскопической герниопластики при вентральных грыжах демонстрирует статистически значимое улучшение результатов хирургического лечения по сравнению со стандартной техникой. Применение разработанного алгоритма позволяет снизить частоту интраоперационных осложнений с 8,3% до 3,1%, послеоперационных раневых осложнений — с 12,5% до 4,7%, рецидивов грыж — с 6,7% до 1,6%.

Ключевыми компонентами усовершенствованной методики являются: оптимизация расположения троакаров с учётом индивидуальной анатомии грыжевого дефекта, применение гармонического скальпеля для адгезиолизиса, использование композитных сетчатых имплантов с антиадгезивным покрытием, комбинированная фиксация импланта с соблюдением принципов безопасной фиксации.

Внедрение усовершенствованной методики в клиническую практику способствует улучшению непосредственных и отдалённых результатов лечения пациентов с вентральными грыжами, сокращению сроков госпитализации и периода нетрудоспособности, повышению качества жизни пациентов.

Лапароскопическая герниопластика является методом выбора при лечении первичных и рецидивных вентральных грыж с размером дефекта до 15 см при отсутствии противопоказаний к лапароскопическому вмешательству. Дальнейшее совершенствование техники операции и имплантируемых материалов позволит расширить показания к лапароскопическому лечению и улучшить результаты хирургического лечения данной категории пациентов.

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Юлдашев П. А.
ассистент
кафедра хирургических болезней №1 и трансплантологии
Самаркандский государственный медицинский университет

ОПТИМИЗАЦИЯ ЭНДОВИДЕОХИРУРГИЧЕСКОГО ЛЕЧЕНИЯ ГРЫЖ ПЕРЕДНЕЙ БРЮШНОЙ СТЕНКИ С ПРИМЕНЕНИЕМ СОВРЕМЕННЫХ ПРОТЕЗИРУЮЩИХ МАТЕРИАЛОВ

Аннотация: *Статья посвящена анализу эффективности модернизированного подхода к эндовидеохирургическому устранению дефектов передней брюшной стенки. Обследовано 312 больных, распределённых на две когорты: исследуемую (n=168) с применением инновационного протокола и сравнительную (n=144) со стандартным подходом. Период наблюдения охватил 2018-2024 годы. Модернизированный протокол включал применение самофиксирующихся эндопротезов, интракорпоральное ушивание апоневротического дефекта и дифференцированный выбор способа аллопластики. Установлено достоверное снижение частоты повторного грыжеобразования с 7,6% до 2,4%, уменьшение персистирующего дискомфорта с 13,2% до 4,8%. Продолжительность стационарного этапа сократилась на 1,8 суток. Представленная методика обеспечивает существенное повышение результативности хирургической коррекции грыжевой патологии.*

Ключевые слова: *эндовидеохирургия, грыжа брюшной стенки, аллопластика, самофиксирующийся эндопротез, интракорпоральный шов, рецидив, хроническая боль.*

Yuldashev P. A.
assistant
department of surgical diseases no. 1 and transplantology
Samarkand State Medical University

OPTIMIZATION OF ENDOVIDEOSURGICAL TREATMENT OF ANTERIOR ABDOMINAL WALL HERNIAS USING MODERN PROSTHETIC MATERIALS

Abstract. *The article analyzes the effectiveness of a modernized approach to endovideosurgical elimination of anterior abdominal wall defects. A total of 312 patients were examined, divided into two cohorts: the study group (n=168) with an innovative protocol and the comparison group (n=144) with a standard approach. The observation period covered 2018-2024. The modernized protocol included the use of self-fixating endoprostheses, intracorporeal suturing of the aponeurotic defect, and differentiated selection of alloplasty method. A significant*

reduction in recurrence rate from 7.6% to 2.4% and persistent discomfort from 13.2% to 4.8% was established. Hospital stay duration decreased by 1.8 days. The presented technique provides a substantial improvement in the effectiveness of surgical correction of hernia pathology.

Keywords: *endovideosurgery, abdominal wall hernia, alloplasty, self-fixating endoprosthesis, intracorporeal suture, recurrence, chronic pain.*

Введение

Грыжевая патология передней брюшной стенки остаётся одной из доминирующих проблем современной абдоминальной хирургии. Согласно эпидемиологическим сведениям, распространённость данной нозологии достигает 3-7% в общей популяции, при этом после абдоминальных оперативных вмешательств частота формирования послеоперационных грыж варьирует от 15% до 35%. Ежегодно в мире производится свыше 25 миллионов герниологических операций, что определяет колоссальную социально-экономическую значимость проблемы.

Эволюция хирургических технологий привела к широкому распространению эндовидеохирургических методик в лечении грыж различной локализации. Малоинвазивный доступ обеспечивает минимизацию операционной травмы, редукцию интенсивности алгического синдрома, ускорение реконвалесценции и сокращение периода временной нетрудоспособности. Тем не менее, эндоскопическая герниопластика сопряжена с определёнными техническими затруднениями и специфическими осложнениями.

Центральное место среди нерешённых задач занимают: формирование патологических жидкостных скоплений в зоне имплантации, дислокация протезирующего материала, развитие персистирующего болевого синдрома, а также рецидивирование грыжевого выпячивания. Частота рецидивов после лапароскопической пластики колеблется от 4% до 12% в зависимости от применяемой техники и характеристик грыжевого дефекта.

Современные тенденции развития герниологии направлены на совершенствование имплантируемых материалов и оптимизацию хирургической техники. Появление самофиксирующихся эндопротезов открыло новые возможности для упрощения процедуры фиксации и снижения риска повреждения нервных структур. Концепция интракорпорального закрытия фасциального дефекта позволяет восстановить анатомическую целостность брюшной стенки и уменьшить вероятность образования серомы.

Дифференцированный подход к выбору методики аллопластики с учётом индивидуальных анатомо-функциональных особенностей пациента и характеристик грыжевого дефекта представляется наиболее перспективным направлением. Разработка персонализированных алгоритмов хирургического лечения способствует улучшению клинических исходов и повышению удовлетворённости пациентов результатами операции.

Целью настоящего исследования явилась оценка эффективности модернизированного протокола эндовидеохирургического лечения грыж передней брюшной стенки с применением современных протезирующих материалов и усовершенствованной хирургической техники.

Материалы и методы исследования

Клинический материал представлен результатами хирургического лечения 312 пациентов с грыжами передней брюшной стенки, находившихся на стационарном лечении в период с марта 2018 по ноябрь 2024 года. Возраст больных варьировал от 24 до 78 лет, медиана составила 54 года.

Критериями включения служили: верифицированная грыжа передней брюшной стенки размером от 2 до 12 см по наибольшему диаметру, возраст старше 18 лет, отсутствие декомпенсированной соматической патологии, добровольное информированное согласие. Критериями исключения являлись: осложнённые формы грыж (ущемление, невправимость), гигантские грыжи с потерей домицилия, выраженная коморбидность, противопоказания к эндотрахеальному наркозу.

Формирование групп осуществлялось методом стратифицированной рандомизации. Исследуемую когорту составили 168 больных (53,8%), которым выполнялось эндовидеохирургическое вмешательство по модернизированному протоколу. Сравнительная когорта включала 144 пациента (46,2%), оперированных по стандартной методике интраперитонеальной аллопластики.

Таблица 1

Демографическая характеристика исследуемых когорт

Параметр	Исследуемая когорта (n=168)	Сравнительная когорта (n=144)	p-value
Лица мужского пола, абс. (%)	78 (46,4%)	64 (44,4%)	0,724
Лица женского пола, абс. (%)	90 (53,6%)	80 (55,6%)	0,724
Возраст, M±σ, лет	53,8±13,4	54,2±12,9	0,812
ИМТ, кг/м², M±σ	29,4±4,8	28,9±5,1	0,456
Коморбидность (индекс Чарлсона), M±σ	2,8±1,6	2,6±1,5	0,341

Анализ демографических показателей подтвердил однородность сформированных когорт по основным базовым характеристикам. Статистически значимых различий по полу, возрасту, индексу массы тела и коморбидности не выявлено ($p>0,05$).

Верификация диагноза базировалась на данных клинического осмотра, ультрасонографии брюшной стенки и мультиспиральной компьютерной томографии с трёхмерной реконструкцией. Объём грыжевого содержимого рассчитывался по формуле эллипсоида. Классификация грыж

осуществлялась согласно рекомендациям Европейского герниологического общества.

Таблица 2

Морфологическая характеристика грыжевых дефектов

Характеристика	Исследуемая когорта (n=168)	Сравнительная когорта (n=144)	p-value
Первичные грыжи, абс. (%)	112 (66,7%)	98 (68,1%)	0,795
Рецидивные грыжи, абс. (%)	56 (33,3%)	46 (31,9%)	0,795
Диаметр дефекта <5 см, абс. (%)	52 (31,0%)	48 (33,3%)	0,652
Диаметр дефекта 5-10 см, абс. (%)	88 (52,4%)	72 (50,0%)	0,673
Диаметр дефекта >10 см, абс. (%)	28 (16,6%)	24 (16,7%)	0,988
Площадь дефекта, см², M±σ	38,6±22,4	36,8±21,7	0,523

Модернизированный протокол эндовидеохирургического вмешательства включал следующие ключевые компоненты. Оперативный доступ формировался с использованием техники оптической пункции, обеспечивающей визуальный контроль прохождения троакара через слои брюшной стенки. Рабочие инструменты устанавливались по принципу «бейсбольного ромба» с адаптацией к локализации грыжевого дефекта.

Диссекция спаечных сращений выполнялась с применением биполярной коагуляции и ультразвуковой диссекции. При наличии грыжевого содержимого производилась его мобилизация и репозиция в брюшную полость. Особое внимание уделялось идентификации и защите петель тонкой кишки, большого сальника и других структур.

Принципиальным отличием модернизированного протокола являлось обязательное интракорпоральное ушивание апоневротического дефекта при его размере более 5 см. Данная манипуляция выполнялась непрерывным обвивным швом рассасывающейся нитью с длительным сроком биодеградации. Ушивание позволяло восстановить линейность белой линии живота и уменьшить объём «мёртвого пространства» между эндопротезом и передней брюшной стенкой.

В качестве протезирующего материала использовались композитные эндопротезы с антиадгезивным барьерным покрытием. В исследуемой когорте преимущественно применялись самофиксирующиеся сетки с микрокрючками, обеспечивающими надёжную атравматичную фиксацию без необходимости использования дополнительных фиксирующих элементов.

Размер эндопротеза подбирался индивидуально с обеспечением

перекрытия краёв дефекта минимум на 5 см по всем направлениям. Позиционирование сетки осуществлялось под визуальным контролем с равномерным распределением без формирования складок и деформаций. При использовании несамофиксирующихся эндопротезов дополнительная фиксация выполнялась рассасывающимися такерами по периметру сетки.

Статистическая обработка материала проводилась с использованием программных пакетов SPSS Statistics 26.0 и MedCalc 20.0. Количественные переменные представлены в формате M±σ (среднее арифметическое ± стандартное отклонение) или Me [Q1; Q3] (медиана с интерквартильным размахом). Для межгрупповых сравнений применялись t-критерий Стьюдента, критерий Манна-Уитни, критерий χ^2 Пирсона. Анализ выживаемости проводился методом Каплана-Мейера с оценкой различий по логранговому критерию. Пороговый уровень статистической значимости принят равным 0,05.

Результаты исследования

Сравнительный анализ периоперационных показателей выявил ряд статистически значимых различий между исследуемыми когортами. Длительность оперативного вмешательства в исследуемой когорте составила 68,4±16,8 минуты, в сравнительной — 82,6±19,4 минуты, что соответствует сокращению на 17,2% ($p<0,001$).

Несмотря на выполнение дополнительного этапа интракорпорального ушивания дефекта, общая продолжительность операции оказалась меньше за счёт отсутствия необходимости многоточечной такерной фиксации эндопротеза. Использование самофиксирующихся сеток позволило существенно упростить и ускорить этап имплантации.

Таблица 3
Периоперационные показатели

Показатель	Исследуемая когорта (n=168)	Сравнительная когорта (n=144)	p-value
Длительность операции, мин, M±σ	68,4±16,8	82,6±19,4	<0,001
Интраоперационная кровопотеря, мл, M±σ	35,2±12,6	48,4±18,2	<0,001
Конверсия к лапаротомии, абс. (%)	3 (1,8%)	9 (6,3%)	0,042
Интраоперационные осложнения, абс. (%)	6 (3,6%)	14 (9,7%)	0,027
- энтеротомия	1 (0,6%)	5 (3,5%)	0,068
- кровотечение из троакарной раны	3 (1,8%)	6 (4,2%)	0,212
- повреждение эпигастральных сосудов	2 (1,2%)	3 (2,1%)	0,532

Частота конверсии к открытому вмешательству в исследуемой когорте составила 1,8% против 6,3% в сравнительной (p=0,042). Основными причинами перехода к лапаротомии явились: выраженный адгезивный процесс, препятствующий безопасному манипулированию (n=8), интраоперационное повреждение кишечника, требующее открытой ревизии (n=4).

Интраоперационные осложнения зафиксированы у 6 пациентов (3,6%) исследуемой когорты и у 14 пациентов (9,7%) сравнительной когорты (p=0,027). Снижение частоты ятрогенных повреждений обусловлено применением усовершенствованной техники адгезиолизиса и более щадящей фиксации эндопротеза.

Анализ течения раннего послеоперационного периода продемонстрировал преимущества модернизированного протокола по ряду клинических параметров. Выраженность алгического синдрома по числовой рейтинговой шкале в первые сутки после операции составила 3,8±1,2 балла в исследуемой когорте против 5,4±1,6 балла в сравнительной (p<0,001).

Таблица 4

Показатели раннего послеоперационного периода

Показатель	Исследуемая когорта (n=168)	Сравнительная когорта (n=144)	p-value
Болевой синдром (NRS), 1-е сутки, баллы	3,8±1,2	5,4±1,6	<0,001
Болевой синдром (NRS), 3-и сутки, баллы	1,6±0,8	2,8±1,1	<0,001
Потребность в наркотических анальгетиках, абс. (%)	12 (7,1%)	38 (26,4%)	<0,001
Время до вертикализации, часы, M±σ	6,2±2,1	12,4±3,8	<0,001
Начало энтерального питания, часы, M±σ	8,4±2,6	16,2±4,2	<0,001
Длительность госпитализации, сутки, M±σ	3,6±1,2	5,4±1,8	<0,001
Раневые осложнения, абс. (%)	8 (4,8%)	22 (15,3%)	<0,001
- серома	5 (3,0%)	14 (9,7%)	0,014
- гематома	2 (1,2%)	5 (3,5%)	0,168
- раневая инфекция	1 (0,6%)	3 (2,1%)	0,254

Потребность в назначении наркотических анальгетиков отмечена у 7,1% пациентов исследуемой когорты и у 26,4% сравнительной когорты ($p<0,001$). Уменьшение интенсивности болевого синдрома обусловлено отсутствием металлических фиксирующих элементов, способных травмировать нервные окончания и вызывать персистирующий дискомфорт.

Ранняя вертикализация пациентов в исследуемой когорте осуществлялась в среднем через 6,2±2,1 часа после завершения операции, в сравнительной — через 12,4±3,8 часа ($p<0,001$). Начало энтерального питания также происходило существенно раньше — 8,4±2,6 часа против 16,2±4,2 часа соответственно.

Продолжительность стационарного этапа лечения в исследуемой когорте составила 3,6±1,2 суток, в сравнительной — 5,4±1,8 суток ($p<0,001$). Сокращение госпитализации на 1,8 суток обеспечивает значимый экономический эффект и повышает пропускную способность хирургического отделения.

Частота раневых осложнений достоверно различалась между когортами: 4,8% в исследуемой против 15,3% в сравнительной ($p<0,001$). Наиболее значимым являлось трёхкратное снижение частоты формирования сером — с 9,7% до 3,0% ($p=0,014$), что обусловлено ликвидацией «мёртвого пространства» за счёт интракорпорального ушивания дефекта.

Отдалённые результаты оценены у всех 312 пациентов при медиане

наблюдения 28 месяцев (диапазон 12-72 месяца). Контрольные визиты осуществлялись через 1, 6, 12 месяцев после операции, далее ежегодно. Обследование включало клинический осмотр, ультрасонографию зоны операции, оценку качества жизни и удовлетворённости результатом.

Рецидив грыжевого выпячивания в исследуемой когорте диагностирован у 4 пациентов (2,4%), в сравнительной — у 11 пациентов (7,6%) (p=0,028). Все рецидивы возникли в сроки от 6 до 36 месяцев после первичного вмешательства. Анализ причин рецидивирования показал, что в большинстве наблюдений они были связаны с недостаточным перекрытием краёв дефекта или несоблюдением принципов фиксации эндопротеза.

Таблица 5

Отдалённые результаты хирургического лечения

Показатель	Исследуемая когорта (n=168)	Сравнительная когорта (n=144)	p-value
Рецидив грыжи, абс. (%)	4 (2,4%)	11 (7,6%)	0,028
Хронический болевой синдром, абс. (%)	8 (4,8%)	19 (13,2%)	0,008
Ощущение дискомфорта в зоне сетки, абс. (%)	12 (7,1%)	28 (19,4%)	0,001
Качество жизни (EQ-5D VAS), баллы, M±σ	86,4±9,2	78,6±12,4	<0,001
Удовлетворённость результатом, абс. (%)	158 (94,0%)	118 (81,9%)	0,001
Срок возврата к труду, недели, M±σ	2,8±0,9	4,2±1,4	<0,001
Возврат к полной физ. активности, недели, M±σ	6,4±1,8	9,2±2,6	<0,001

Хронический болевой синдром, персистирующий более 3 месяцев после операции, отмечен у 4,8% пациентов исследуемой когорты и у 13,2% сравнительной (p=0,008). Редукция частоты данного осложнения почти в 3 раза обусловлена применением самофиксирующихся эндопротезов, исключающих травматизацию нервных структур металлическими такерами.

Субъективное ощущение дискомфорта или инородного тела в зоне имплантации эндопротеза отметили 7,1% пациентов исследуемой когорты и 19,4% сравнительной (p=0,001). Данный показатель напрямую коррелирует с удовлетворённостью результатом операции и качеством жизни в отдалённом периоде.

Оценка качества жизни по визуально-аналоговой шкале опросника EQ-5D через 12 месяцев после операции составила 86,4±9,2 балла в исследуемой когорте против 78,6±12,4 балла в сравнительной (p<0,001). Удовлетворённость результатом хирургического вмешательства выразили

94,0% пациентов исследуемой когорты и 81,9% сравнительной.

Сроки возвращения к профессиональной деятельности составили 2,8±0,9 недели в исследуемой когорте и 4,2±1,4 недели в сравнительной ($p<0,001$). Восстановление полной физической активности происходило в среднем через 6,4±1,8 недели и 9,2±2,6 недели соответственно.

Результаты проведённого исследования подтверждают эффективность модернизированного протокола эндовидеохирургического лечения грыж передней брюшной стенки. Комплексный подход, включающий применение самофиксирующихся эндопротезов и интракорпоральное закрытие фасциального дефекта, обеспечивает статистически значимое улучшение клинических исходов.

Трёхкратное снижение частоты рецидивов грыжи (с 7,6% до 2,4%) является одним из наиболее значимых достижений модернизированной методики. Ключевым фактором профилактики рецидивирования служит интракорпоральное ушивание апоневротического дефекта, обеспечивающее восстановление анатомической целостности брюшной стенки и создающее условия для оптимальной интеграции эндопротеза.

Концепция IPOM-Plus, предусматривающая обязательное закрытие фасциального дефекта перед имплантацией сетки, получает всё большее признание в мировом герниологическом сообществе. Метаанализы рандомизированных исследований демонстрируют снижение частоты рецидивов на 40-60% при применении данной техники по сравнению со стандартной интраперитонеальной пластикой.

Существенное уменьшение частоты формирования сером (с 9,7% до 3,0%) также обусловлено ликвидацией «мёртвого пространства» между эндопротезом и передней брюшной стенкой. Серома представляет собой одно из наиболее распространённых осложнений лапароскопической герниопластики, негативно влияющее на комфорт пациента и увеличивающее риск инфекционных осложнений.

Применение самофиксирующихся эндопротезов позволило минимизировать использование металлических фиксирующих элементов, травмирующих нервные структуры и обусловливающих развитие хронического болевого синдрома. Снижение частоты персистирующей боли с 13,2% до 4,8% существенно повышает качество жизни пациентов и удовлетворённость результатами операции.

Сокращение длительности стационарного этапа на 1,8 суток и периода нетрудоспособности на 1,4 недели обеспечивает значимый социально-экономический эффект. Быстрое восстановление функциональной активности способствует возвращению пациентов к привычному образу жизни и профессиональной деятельности.

Полученные данные согласуются с результатами крупных многоцентровых исследований, продемонстрировавших преимущества современных протезирующих материалов и усовершенствованных хирургических техник в лечении грыж передней брюшной стенки. Тем не

менее, эндовидеохирургические вмешательства требуют специализированной подготовки хирургов и соответствующего технического оснащения операционной.

Ограничениями настоящего исследования являются: одноцентровый характер работы, отсутствие слепого дизайна, относительно небольшой срок наблюдения для оценки отдалённых результатов. Необходимо проведение многоцентровых рандомизированных исследований с длительным периодом мониторинга для окончательной верификации эффективности предложенного протокола.

Заключение

Модернизированный протокол эндовидеохирургического лечения грыж передней брюшной стенки, включающий применение самофиксирующихся композитных эндопротезов и интракорпоральное закрытие фасциального дефекта, обеспечивает достоверное улучшение непосредственных и отдалённых клинических исходов.

Внедрение предложенной методики позволяет снизить частоту рецидивов грыжи с 7,6% до 2,4%, хронического болевого синдрома — с 13,2% до 4,8%, формирования сером — с 9,7% до 3,0%. Продолжительность госпитализации сокращается на 1,8 суток, период временной нетрудоспособности — на 1,4 недели.

Ключевыми компонентами оптимизации являются: дифференцированный выбор методики аллопластики в зависимости от размера дефекта, обязательное интракорпоральное ушивание дефектов более 5 см, использование современных протезирующих материалов с антиадгезивным покрытием и атравматичной системой фиксации.

Представленный протокол рекомендуется к широкому внедрению в клиническую практику специализированных хирургических отделений, располагающих необходимым техническим оснащением и подготовленными кадрами. Дальнейшее совершенствование методики будет способствовать расширению показаний к малоинвазивному лечению грыжевой патологии и улучшению результатов хирургической помощи населению.

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Юлдашев П. А.
ассистент
кафедра хирургических болезней №1 и трансплантологии
Самаркандский государственный медицинский университет

МИНИМАЛЬНО ИНВАЗИВНЫЕ ТЕХНОЛОГИИ В ХИРУРГИЧЕСКОМ ЛЕЧЕНИИ СРЕДИННЫХ ГРЫЖ ЖИВОТА: СРАВНИТЕЛЬНЫЙ АНАЛИЗ РАЗЛИЧНЫХ МЕТОДИК ПРОТЕЗИРОВАНИЯ

Аннотация*: провести сравнительную оценку результатов применения различных методик минимально инвазивного протезирования при срединных грыжах живота. В проспективное контролируемое исследование включены 284 пациента, распределённых на три группы: группа А (n=96) — лапароскопическая интраперитонеальная пластика (IPOM), группа Б (n=94) — эндоскопическая ретромускулярная пластика (eTEP), группа В (n=94) — гибридная техника с трансабдоминальной препаровкой (TAPP-модификация). Срок наблюдения составил 24-48 месяцев. Минимальная частота рецидивов зафиксирована в группе Б — 1,1%, в группе А — 5,2%, в группе В — 2,1%. Хронический дискомфорт реже отмечался при ретромускулярном размещении протеза (3,2%) по сравнению с интраперитонеальной (11,5%) и гибридной (6,4%) техниками. Эндоскопическая ретромускулярная пластика демонстрирует оптимальное соотношение эффективности и безопасности при хирургической коррекции срединных грыж.*

Ключевые слова: *срединная грыжа, минимально инвазивная хирургия, ретромускулярная пластика, eTEP, IPOM, сетчатый протез, рецидив грыжи, хроническая боль.*

Yuldashev P. A.
assistant
department of surgical diseases no. 1 and transplantology
Samarkand State Medical University

MINIMALLY INVASIVE TECHNOLOGIES IN SURGICAL TREATMENT OF MIDLINE ABDOMINAL HERNIAS: COMPARATIVE ANALYSIS OF DIFFERENT PROSTHETIC TECHNIQUES

Abstract*: Objective: to conduct a comparative evaluation of the results of various minimally invasive prosthetic techniques for midline abdominal hernias. A prospective controlled study included 284 patients divided into three groups: group A (n=96) — laparoscopic intraperitoneal plasty (IPOM), group B (n=94) — endoscopic retromuscular plasty (eTEP), group C (n=94) — hybrid technique*

with transabdominal dissection (TAPP modification). Follow-up period was 24-48 months. The lowest recurrence rate was recorded in group B — 1.1%, in group A — 5.2%, in group C — 2.1%. Chronic discomfort was less common with retromuscular mesh placement (3.2%) compared to intraperitoneal (11.5%) and hybrid (6.4%) techniques. Endoscopic retromuscular plasty demonstrates optimal efficacy-safety ratio in surgical correction of midline hernias.

Keywords: *midline hernia, minimally invasive surgery, retromuscular plasty, eTEP, IPOM, mesh prosthesis, hernia recurrence, chronic pain.*

Введение

Срединные грыжи живота объединяют гетерогенную группу дефектов апоневроза белой линии, включающую пупочные, параумбиликальные, эпигастральные грыжи, а также послеоперационные грыжи срединной локализации. Данная патология характеризуется высокой распространённостью: пупочные грыжи диагностируются у 2-3% взрослого населения, а частота инцизионных грыж после срединной лапаротомии достигает 20-25%.

Исторически хирургическое лечение срединных грыж базировалось на принципах аутопластики с использованием местных тканей. Методики Мейо, Сапежко, Напалкова обеспечивали удовлетворительные результаты при небольших дефектах, однако при средних и крупных грыжах частота рецидивирования достигала 30-50%. Революционным этапом стало внедрение ненатяжной аллопластики с применением синтетических протезов, позволившей снизить частоту рецидивов до 5-15%.

Развитие эндоскопических технологий обусловило появление минимально инвазивных методик герниопластики. Лапароскопическая интраперитонеальная техника (IPOM — Intraperitoneal Onlay Mesh) получила широкое распространение благодаря относительной простоте выполнения и хорошей визуализации операционного поля. Вместе с тем, интраабдоминальное расположение протеза сопряжено с риском спайкообразования, кишечных осложнений и формирования хронического болевого синдрома.

Альтернативой интраперитонеальному размещению протеза служит ретромускулярная позиция, воспроизводящая принципы открытой пластики по Rives-Stoppa. Эндоскопическая техника eTEP (enhanced-view Totally Extraperitoneal) позволяет имплантировать протез в предбрюшинное пространство без вскрытия брюшной полости, минимизируя контакт сетки с внутренними органами и снижая риск адгезивных осложнений.

Гибридные техники сочетают элементы различных подходов, обеспечивая индивидуализацию хирургической тактики в зависимости от анатомических особенностей пациента и характеристик грыжевого дефекта. Трансабдоминальная препаровка с ретромускулярным размещением протеза объединяет преимущества лапароскопической визуализации и экстраперитонеальной позиции сетки.

Несмотря на накопленный опыт применения минимально инвазивных методик, вопрос оптимального выбора техники протезирования при срединных грыжах остаётся дискуссионным. Отсутствуют убедительные данные рандомизированных исследований, позволяющие сформулировать однозначные рекомендации по предпочтительной методике в зависимости от клинической ситуации.

Целью настоящего исследования явилось проведение сравнительной оценки непосредственных и отдалённых результатов применения трёх методик минимально инвазивного протезирования — IPOM, eTEP и гибридной техники — при срединных грыжах живота.

Материалы и методы

Проспективное контролируемое исследование выполнено на клинической базе кафедры хирургии в период с января 2020 по декабрь 2024 года. Протокол исследования одобрен локальным этическим комитетом. Все участники подписали информированное добровольное согласие.

В исследование включены 284 пациента с первичными и рецидивными срединными грыжами живота. Критериями включения служили: возраст 18-75 лет, размер грыжевого дефекта 2-12 см, отсутствие экстренных показаний к операции, согласие на участие в исследовании. Критериями исключения являлись: наличие ущемления или странгуляции, гигантские грыжи с потерей домицилия, декомпенсированная соматическая патология, предшествующие операции с установкой сетчатого протеза, иммуносупрессивная терапия.

Рандомизация осуществлялась методом конвертов с распределением в одну из трёх групп. Группу А составили 96 пациентов, которым выполнялась лапароскопическая интраперитонеальная пластика (IPOM). В группу Б вошли 94 пациента с эндоскопической ретромускулярной пластикой (eTEP). Группа В включала 94 пациента с гибридной техникой (TAPP-модификация с ретромускулярным размещением).

Таблица 1

Исходные характеристики исследуемых групп

Параметр	Группа А IPOM (n=96)	Группа Б eTEP (n=94)	Группа В Гибрид (n=94)	p
Возраст, лет	51,4±12,8	52,6±11,9	50,8±13,2	0,612
Мужчины/женщины	42/54	44/50	40/54	0,784
ИМТ, кг/м²	30,2±5,4	29,8±4,9	30,6±5,1	0,548
ASA I-II, абс. (%)	78 (81,3%)	80 (85,1%)	76 (80,9%)	0,698
ASA III, абс. (%)	18 (18,7%)	14 (14,9%)	18 (19,1%)	0,698
Сахарный диабет, абс. (%)	14 (14,6%)	12 (12,8%)	16 (17,0%)	0,712
Курение, абс. (%)	28 (29,2%)	24 (25,5%)	30 (31,9%)	0,624

Сформированные группы были сопоставимы по основным демографическим и клиническим параметрам (p>0,05 для всех показателей). Средний возраст пациентов составил 51,6±12,6 лет, преобладали женщины (55,6%). Избыточная масса тела и ожирение (ИМТ≥25 кг/м²) отмечены у 78,5% больных.

Таблица 2
Характеристика грыжевых дефектов

Характеристика	Группа А (n=96)	Группа Б (n=94)	Группа В (n=94)	p
Пупочная грыжа, абс. (%)	38 (39,6%)	36 (38,3%)	40 (42,6%)	0,824
Эпигастральная грыжа, абс. (%)	22 (22,9%)	24 (25,5%)	20 (21,3%)	0,776
Послеоперационная грыжа, абс. (%)	36 (37,5%)	34 (36,2%)	34 (36,1%)	0,968
Диаметр дефекта <4 см, абс. (%)	32 (33,3%)	30 (31,9%)	34 (36,2%)	0,812
Диаметр дефекта 4-8 см, абс. (%)	48 (50,0%)	50 (53,2%)	46 (48,9%)	0,846
Диаметр дефекта >8 см, абс. (%)	16 (16,7%)	14 (14,9%)	14 (14,9%)	0,924
Средняя площадь дефекта, см²	28,4±18,6	26,8±17,2	27,6±16,8	0,768

Структура грыжевой патологии была однородной во всех группах. Наиболее часто встречались пупочные грыжи (40,1%), послеоперационные грыжи составили 36,6%, эпигастральные — 23,3%. Преобладали дефекты среднего размера (4-8 см) — 50,7%.

Техника выполнения операций в группе А (IPOM) включала: формирование карбоксиперитонеума, установку трёх троакаров по латеральному краю прямой мышцы живота контралатерально грыжевому дефекту, адгезиолизис при необходимости, вправление грыжевого содержимого, имплантацию композитного протеза с антиадгезивным покрытием и фиксацию его герниостеплером и трансфасциальными швами.

В группе Б (eTEP) операция выполнялась следующим образом: оптический доступ в ретромускулярное пространство ниже пупка, формирование рабочей полости путём диссекции между задней стенкой прямой мышцы и задним листком её влагалища, пересечение белой линии на стороне доступа, переход в контралатеральное ретромускулярное пространство, закрытие грыжевого дефекта непрерывным швом, имплантация полипропиленового протеза без дополнительной фиксации.

Гибридная техника в группе В сочетала лапароскопический

трансабдоминальный доступ с ретромускулярным размещением протеза. После создания пневмоперитонеума и адгезиолизиса выполнялось рассечение брюшины и заднего листка влагалища прямой мышцы по периметру грыжевого дефекта с формированием ретромускулярного пространства. Дефект ушивался непрерывным швом, протез укладывался ретромускулярно и фиксировался рассасывающимися такерами.

Оценка результатов проводилась на этапах: интраоперационно, при выписке, через 1, 6, 12, 24 месяца после операции. Анализировались: длительность вмешательства, объём кровопотери, частота конверсий и интраоперационных осложнений, интенсивность болевого синдрома (шкала NRS), сроки госпитализации, частота ранних и поздних осложнений, рецидивы грыжи, качество жизни (опросник Carolina Comfort Scale — CCS).

Статистический анализ выполнен с использованием программы R (версия 4.2). Межгрупповые сравнения проводились с помощью однофакторного дисперсионного анализа (ANOVA) с последующими попарными сравнениями по критерию Тьюки для количественных переменных и критерия χ^2 для качественных. Анализ времени до рецидива выполнялся методом Каплана-Мейера с оценкой различий логранговым критерием. Уровень значимости принят равным 0,05.

Результаты и их обсуждение

Все запланированные оперативные вмешательства были успешно выполнены. Анализ интраоперационных показателей выявил статистически значимые различия между группами по нескольким параметрам. Средняя продолжительность операции составила: в группе А — 72,4±16,2 минуты, в группе Б — 98,6±22,4 минуты, в группе В — 86,4±19,8 минуты ($p<0,001$).

Большая длительность вмешательства в группе Б обусловлена необходимостью формирования протяжённого ретромускулярного пространства и технической сложностью эндоскопической диссекции. Однако по мере накопления опыта продолжительность операций eTEP существенно сократилась: если в первой четверти наблюдений она составляла 118,4±24,6 минуты, то в последней четверти — 82,6±18,2 минуты.

Таблица 3

Интраоперационные показатели

Показатель	Группа А (n=96)	Группа Б (n=94)	Группа В (n=94)	p
Длительность операции, мин	72,4±16,2	98,6±22,4	86,4±19,8	<0,001
Кровопотеря, мл	28,6±12,4	42,8±18,6	38,4±15,2	<0,001
Размер протеза, см²	412±124	468±142	448±136	0,024
Конверсия, абс. (%)	4 (4,2%)	6 (6,4%)	3 (3,2%)	0,542
Осложнения всего, абс. (%)	8 (8,3%)	6 (6,4%)	5 (5,3%)	0,682
- повреждение кишки	3 (3,1%)	0 (0%)	1 (1,1%)	0,108
- кровотечение	3 (3,1%)	4 (4,3%)	2 (2,1%)	0,684
- повреждение брюшины	2 (2,1%)	2 (2,1%)	2 (2,1%)	1,000

Частота конверсий статистически не различалась между группами и составила 4,2%, 6,4% и 3,2% соответственно (p=0,542). Основными причинами перехода к открытой операции служили: выраженный спаечный процесс (n=7), невозможность идентификации анатомических ориентиров (n=4), интраоперационные осложнения (n=2).

Примечательно отсутствие случаев повреждения кишечника в группе Б, что обусловлено экстраперитонеальным доступом без контакта с внутренними органами. В группе А ятрогенные энтеротомии отмечены у 3 пациентов (3,1%), в группе В — у 1 пациента (1,1%).

Анализ раннего послеоперационного периода продемонстрировал преимущества ретромускулярной позиции протеза по интенсивности болевого синдрома. В первые сутки после операции показатель NRS составил: группа А — 4,8±1,4 балла, группа Б — 3,2±1,1 балла, группа В — 3,6±1,2 балла (p<0,001 для сравнения А vs Б и А vs В).

Таблица 4

Показатели раннего послеоперационного периода

Показатель	Группа А (n=96)	Группа Б (n=94)	Группа В (n=94)	p
Боль (NRS), 1-е сутки, баллы	4,8±1,4	3,2±1,1*	3,6±1,2*	<0,001
Боль (NRS), 3-и сутки, баллы	2,6±0,9	1,4±0,6*	1,8±0,7*	<0,001
Опиоидные анальгетики, абс. (%)	24 (25,0%)	8 (8,5%)*	12 (12,8%)*	0,006
Активизация, часы	10,2±3,4	6,8±2,2*	7,4±2,6*	<0,001
Госпитализация, сутки	4,2±1,4	2,8±0,9*	3,2±1,1*	<0,001
Серома, абс. (%)	12 (12,5%)	4 (4,3%)*	6 (6,4%)	0,068
Гематома, абс. (%)	4 (4,2%)	6 (6,4%)	4 (4,3%)	0,724
Раневая инфекция, абс. (%)	2 (2,1%)	2 (2,1%)	2 (2,1%)	1,000

Примечание: * — *p<0,05 по сравнению с группой А*

Потребность в назначении опиоидных анальгетиков была максимальной в группе А (25,0%) и минимальной в группе Б (8,5%). Более выраженный болевой синдром при интраперитонеальной пластике обусловлен травматизацией брюшины фиксирующими элементами и контактом протеза с внутренними органами.

Средняя продолжительность госпитализации составила 4,2±1,4 суток в группе А, 2,8±0,9 суток в группе Б и 3,2±1,1 суток в группе В (p<0,001). Сокращение стационарного этапа при ретромускулярной пластике обусловлено меньшей интенсивностью болевого синдрома и более ранней активизацией пациентов.

Частота формирования сером была максимальной в группе А (12,5%), что связано с наличием «мёртвого пространства» между сеткой и брюшной стенкой. При ретромускулярном расположении протеза данное осложнение развивалось реже — в 4,3% наблюдений в группе Б и 6,4% в группе В.

Отдалённые результаты оценены у всех 284 пациентов при сроках наблюдения от 24 до 48 месяцев (медиана 32 месяца). Рецидив грыжи диагностирован у 5 пациентов (5,2%) группы А, у 1 пациента (1,1%) группы Б и у 2 пациентов (2,1%) группы В. Различия между группами А и Б статистически значимы (p=0,038).

Все рецидивы в группе А локализовались по краю протеза в зонах недостаточного перекрытия или несостоятельности фиксации. Единственный рецидив в группе Б развился у пациента с ожирением III степени и сахарным диабетом. В группе В оба рецидива связаны с техническими погрешностями на этапе освоения методики.

Таблица 5

Отдалённые результаты хирургического лечения

Показатель	Группа А (n=96)	Группа Б (n=94)	Группа В (n=94)	p
Рецидив грыжи, абс. (%)	5 (5,2%)	1 (1,1%)*	2 (2,1%)	0,038
Хроническая боль, абс. (%)	11 (11,5%)	3 (3,2%)*	6 (6,4%)	0,048
Ощущение протеза, абс. (%)	16 (16,7%)	4 (4,3%)*	8 (8,5%)	0,012
CCS общий балл, M±σ	12,4±8,6	4,2±3,8*	6,8±5,2*	<0,001
CCS боль при движении	3,8±2,4	1,2±1,1*	1,8±1,4*	<0,001
CCS ощущение сетки	4,2±2,8	1,4±1,2*	2,2±1,6*	<0,001
Удовлетворённость, абс. (%)	78 (81,3%)	90 (95,7%)*	86 (91,5%)*	0,006
Возврат к труду, недели	3,8±1,4	2,4±0,8*	2,8±1,0*	<0,001

Примечание: * — *p<0,05 по сравнению с группой А; CCS — Carolina Comfort Scale (меньший балл = лучший результат)*

Хронический болевой синдром или дискомфорт в зоне операции, персистирующий более 3 месяцев, отмечен у 11 пациентов (11,5%) группы А, 3 пациентов (3,2%) группы Б и 6 пациентов (6,4%) группы В (p=0,048). Субъективное ощущение инородного тела зафиксировано у 16,7%, 4,3% и 8,5% пациентов соответственно.

Оценка качества жизни по опроснику Carolina Comfort Scale продемонстрировала достоверно лучшие показатели в группе Б по всем доменам. Общий балл CCS составил 4,2±3,8 в группе Б против 12,4±8,6 в группе А (p<0,001). Удовлетворённость результатом операции выразили 95,7% пациентов группы Б, 91,5% группы В и 81,3% группы А.

Результаты проведённого исследования свидетельствуют о преимуществах ретромускулярного размещения протеза по сравнению с интраперитонеальной позицией при минимально инвазивном лечении срединных грыж живота. Техника eTEP демонстрирует оптимальное соотношение эффективности и безопасности, обеспечивая минимальную частоту рецидивов и наилучшие показатели качества жизни.

Четырёхкратное снижение частоты рецидивов при ретромускулярной пластике (1,1% против 5,2% при IPOM) обусловлено рядом биомеханических преимуществ данной позиции протеза. Размещение сетки между задней стенкой прямых мышц и задним листком их влагалища обеспечивает оптимальные условия для интеграции протеза: близость к хорошо васкуляризированной мышечной ткани способствует врастанию соединительнотканных элементов, а внутрибрюшное давление прижимает сетку к брюшной стенке, усиливая фиксацию.

Значительное снижение частоты хронического болевого синдрома при

экстраперитонеальном размещении протеза (3,2% против 11,5%) подтверждает роль контакта сетки с брюшиной в патогенезе данного осложнения. Интраперитонеальная фиксация металлическими такерами неизбежно травмирует нервные окончания и может провоцировать хроническую невропатическую боль. При ретромускулярной технике протез не контактирует с брюшиной и висцеральными органами, что минимизирует риск адгезивных осложнений.

Трёхкратное снижение частоты формирования сером при eTEP (4,3% против 12,5% при IPOM) объясняется отсутствием «мёртвого пространства» между протезом и брюшной стенкой. При интраперитонеальной технике сетка располагается свободно под брюшиной, формируя полость, в которой может накапливаться серозная жидкость. Ретромускулярное размещение обеспечивает плотный контакт протеза с окружающими тканями.

Большая продолжительность операции eTEP на начальном этапе освоения методики компенсируется по мере накопления опыта. После преодоления кривой обучения (40-50 вмешательств) длительность операции приближается к показателям стандартной IPOM. При этом сокращение сроков госпитализации и периода нетрудоспособности обеспечивает экономическое преимущество ретромускулярной техники.

Гибридная техника занимает промежуточное положение по большинству анализируемых параметров. Сочетание лапароскопического доступа с ретромускулярным размещением протеза позволяет использовать преимущества обоих подходов. Данная методика может быть рекомендована при невозможности выполнения чисто экстраперитонеального доступа, например при выраженном рецидивном характере грыжи или особенностях анатомии.

Полученные результаты согласуются с данными недавних метаанализов, продемонстрировавших преимущества ретромускулярного размещения протеза по сравнению с интраперитонеальной позицией. Техника eTEP рассматривается как перспективное направление развития минимально инвазивной герниопластики, сочетающее преимущества эндоскопического доступа и открытой ретромускулярной пластики по Rives-Stoppa.

Ограничениями настоящего исследования являются одноцентровый характер работы и относительно небольшой срок наблюдения. Для окончательных выводов необходимы многоцентровые рандомизированные исследования с длительным периодом мониторинга. Также требуется дальнейшее изучение отдалённых результатов у пациентов с факторами риска рецидивирования.

Заключение

Сравнительный анализ трёх методик минимально инвазивного протезирования при срединных грыжах живота продемонстрировал преимущества эндоскопической ретромускулярной пластики (eTEP) по ключевым клиническим параметрам.

Техника eTEP обеспечивает минимальную частоту рецидивов (1,1% против 5,2% при IPOM и 2,1% при гибридной методике), наименьшую выраженность хронического болевого синдрома (3,2% против 11,5% и 6,4% соответственно), а также оптимальные показатели качества жизни по опроснику Carolina Comfort Scale.

Интраперитонеальная техника IPOM сохраняет значение при небольших грыжевых дефектах и в условиях ограниченного хирургического опыта, однако сопряжена с более высокой частотой рецидивов и хронических болевых синдромов.

Гибридная техника с трансабдоминальной препаровкой и ретромускулярным размещением протеза может рассматриваться как альтернатива при технических затруднениях выполнения чисто экстраперитонеального доступа.

Эндоскопическая ретромускулярная пластика рекомендуется в качестве метода выбора при минимально инвазивном лечении срединных грыж живота средних и крупных размеров в условиях специализированных хирургических центров, располагающих необходимым техническим оснащением и подготовленными кадрами.

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Юлдашев П. А.
ассистент
кафедра хирургических болезней №1 и трансплантологии
Самаркандский государственный медицинский университет

МУЛЬТИДИСЦИПЛИНАРНАЯ ПЕРИОПЕРАЦИОННАЯ ПРОГРАММА ПРОФИЛАКТИКИ ОСЛОЖНЕНИЙ ПРИ ЛАПАРОСКОПИЧЕСКОЙ КОРРЕКЦИИ ВЕНТРАЛЬНЫХ ГРЫЖ

Аннотация*: Актуальность: послеоперационные осложнения остаются значимой проблемой лапароскопической герниопластики. Цель: оценить эффективность мультидисциплинарной периоперационной программы профилактики осложнений при лапароскопической коррекции вентральных грыж. Материал и методы: проспективное сравнительное исследование охватило 298 пациентов (2020-2024 гг.), разделённых на две группы: основная (n=152) — мультидисциплинарная программа, контрольная (n=146) — стандартное ведение. Программа включала преабилитацию, нутритивную поддержку, контроль гликемии, деколонизацию носительства S. aureus, протокол ERAS. Результаты: внедрение программы снизило общую частоту осложнений с 22,6% до 9,2% (p<0,001), раневых инфекций — с 8,2% до 1,3% (p=0,004), сером — с 11,0% до 4,6% (p=0,038). Сроки госпитализации сократились на 2,1 суток. Частота рецидивов за 24 месяца снизилась с 7,5% до 2,0% (p=0,028). Выводы: мультидисциплинарная периоперационная программа существенно улучшает результаты лапароскопической герниопластики.*

Ключевые слова: *вентральная грыжа, лапароскопическая герниопластика, профилактика осложнений, преабилитация, ERAS, мультидисциплинарный подход, раневая инфекция, серома.*

Yuldashev P. A.
assistant
department of surgical diseases no. 1 and transplantology
Samarkand State Medical University

MULTIDISCIPLINARY PERIOPERATIVE PROGRAM FOR COMPLICATION PREVENTION IN LAPAROSCOPIC CORRECTION OF VENTRAL HERNIAS

Abstract*: Background: postoperative complications remain a significant problem in laparoscopic hernioplasty. Objective: to evaluate the effectiveness of a multidisciplinary perioperative program for complication prevention in laparoscopic correction of ventral hernias. Material and methods: a prospective comparative study included 298 patients (2020-2024), divided into two groups:*

main (n=152) — multidisciplinary program, control (n=146) — standard management. The program included prehabilitation, nutritional support, glycemic control, S. aureus carriage decolonization, and ERAS protocol. Results: program implementation reduced overall complication rate from 22.6% to 9.2% (p<0.001), surgical site infections from 8.2% to 1.3% (p=0.004), seromas from 11.0% to 4.6% (p=0.038). Hospital stay decreased by 2.1 days. Recurrence rate over 24 months decreased from 7.5% to 2.0% (p=0.028). Conclusions: multidisciplinary perioperative program significantly improves laparoscopic hernioplasty outcomes.

Keywords: *ventral hernia, laparoscopic hernioplasty, complication prevention, prehabilitation, ERAS, multidisciplinary approach, surgical site infection, seroma.*

Введение

Лапароскопическая герниопластика заняла прочные позиции в арсенале методов хирургического лечения вентральных грыж, демонстрируя очевидные преимущества перед открытыми вмешательствами в отношении травматичности, выраженности болевого синдрома и сроков реабилитации. Тем не менее, частота послеоперационных осложнений при данных операциях остаётся существенной и варьирует от 15% до 30% по данным различных авторов.

Структура осложнений лапароскопической герниопластики включает раневые инфекции, формирование сером и гематом, хронический болевой синдром, рецидивирование грыжи. Инфекция области хирургического вмешательства развивается в 3-10% наблюдений и может приводить к необходимости удаления имплантированного протеза с катастрофическими последствиями для пациента. Серомы диагностируются у 5-20% оперированных больных и существенно снижают качество жизни в послеоперационном периоде.

Анализ факторов риска послеоперационных осложнений свидетельствует о значительной роли модифицируемых параметров: нутритивного статуса, гликемического контроля, бактериального носительства, физической подготовленности пациента. Целенаправленное воздействие на данные факторы в периоперационном периоде способно существенно улучшить результаты хирургического лечения.

Концепция преабилитации предполагает комплексную подготовку пациента к хирургическому вмешательству, включающую физические тренировки, нутритивную коррекцию, психологическую поддержку и оптимизацию сопутствующей патологии. Протоколы ускоренного восстановления после операции (ERAS — Enhanced Recovery After Surgery) стандартизируют периоперационное ведение и способствуют сокращению сроков реабилитации.

Мультидисциплинарный подход, объединяющий усилия хирургов, анестезиологов, диетологов, реабилитологов и медицинских сестёр,

обеспечивает комплексное воздействие на все звенья патогенеза послеоперационных осложнений. Формирование единой команды с чётким распределением функций и координацией действий является залогом успешной реализации профилактических программ.

Несмотря на очевидную целесообразность комплексного подхода к профилактике осложнений, в специализированной литературе представлено ограниченное количество исследований, посвящённых оценке эффективности мультидисциплинарных программ применительно к лапароскопической герниопластике. Большинство работ сфокусировано на отдельных компонентах профилактики без анализа интегративного эффекта.

Целью настоящего исследования явилась оценка эффективности комплексной мультидисциплинарной периоперационной программы профилактики осложнений при лапароскопической коррекции вентральных грыж.

Материал и методы

Проспективное сравнительное нерандомизированное исследование выполнено на базе хирургического центра в период с января 2020 по июнь 2024 года. В исследование включены 298 пациентов с первичными и рецидивными вентральными грыжами, которым выполнялась плановая лапароскопическая герниопластика.

Критерии включения: возраст 18-75 лет, вентральная грыжа размером 3-15 см, планируемое лапароскопическое вмешательство, согласие на участие в исследовании. Критерии исключения: экстренные операции, иммуносупрессия, активная инфекция, тяжёлая органная недостаточность, невозможность выполнения программы преабилитации.

Пациенты распределены в две группы в зависимости от периода лечения. Контрольную группу составили 146 больных, оперированных в 2020-2021 годах по стандартному протоколу. Основную группу составили 152 пациента, пролеченных в 2022-2024 годах с применением мультидисциплинарной периоперационной программы.

Таблица 1.
Клинико-демографическая характеристика групп

Показатель	Основная группа (n=152)	Контрольная группа (n=146)	p
Возраст, лет	54,8±11,6	53,4±12,2	0,312
Мужчины/женщины	68/84	62/84	0,648
ИМТ, кг/м²	32,6±5,8	31,8±6,2	0,264
Ожирение (ИМТ≥30), n (%)	98 (64,5%)	88 (60,3%)	0,452
Сахарный диабет 2 типа, n (%)	38 (25,0%)	34 (23,3%)	0,728
Носительство S. aureus, n (%)	42 (27,6%)	— *	—
Курение, n (%)	44 (28,9%)	46 (31,5%)	0,624
ASA III-IV, n (%)	28 (18,4%)	24 (16,4%)	0,652

Примечание: * — *скрининг носительства S. aureus в контрольной группе не проводился*

Группы были сопоставимы по основным демографическим и клиническим параметрам. Преобладали женщины (56,4%), средний возраст составил 54,1±11,9 лет. Ожирение диагностировано у 62,4% пациентов, сахарный диабет 2 типа — у 24,2%.

Мультидисциплинарная программа реализовывалась командой специалистов: хирург-координатор, анестезиолог, диетолог, врач ЛФК, медицинская сестра-куратор. Программа включала три этапа: предоперационный (преабилитация), интраоперационный и послеоперационный (ERAS-протокол).

Предоперационный этап (преабилитация) продолжительностью 4 недели включал следующие компоненты. Физическая подготовка: аэробные нагрузки (ходьба 30 минут ежедневно), дыхательная гимнастика, упражнения для укрепления мышц брюшного пресса под контролем врача ЛФК.

Нутритивная коррекция: оценка нутритивного статуса по шкале NRS-2002, назначение высокобелковой диеты (1,5 г белка/кг/сут), дополнительный приём сипинговых смесей при недостаточности питания, коррекция дефицита витамина D и железа при выявлении.

Метаболический контроль: достижение целевого уровня гликированного гемоглобина менее 8% у пациентов с сахарным диабетом, коррекция сахароснижающей терапии совместно с эндокринологом, мониторинг гликемии в амбулаторном режиме.

Деколонизация носительства S. aureus: бактериологический скрининг мазков из носа, при выявлении носительства — интраназальная мупироциновая мазь 2 раза в день в течение 5 дней до операции, антисептические души с хлоргексидином.

Модификация образа жизни: рекомендации по отказу от курения минимум за 4 недели до операции, ограничение употребления алкоголя, нормализация режима сна.

Таблица 2.
Характеристика грыжевых дефектов

Характеристика	Основная группа (n=152)	Контрольная группа (n=146)	p
Первичная грыжа, n (%)	94 (61,8%)	92 (63,0%)	0,832
Послеоперационная грыжа, n (%)	58 (38,2%)	54 (37,0%)	0,832
Диаметр дефекта, см	6,8±3,2	6,4±2,9	0,268
Дефект W1 (<4 см), n (%)	42 (27,6%)	46 (31,5%)	0,462
Дефект W2 (4-10 см), n (%)	84 (55,3%)	78 (53,4%)	0,752
Дефект W3 (>10 см), n (%)	26 (17,1%)	22 (15,1%)	0,632
Срединная локализация, n (%)	118 (77,6%)	112 (76,7%)	0,848

Интраоперационный этап включал: антибиотикопрофилактику цефазолином 2 г внутривенно за 30 минут до разреза с повторным введением при длительности операции более 3 часов; поддержание нормотермии (согревающие одеяла, подогрев инфузионных растворов); контроль интраоперационной гликемии с целевым уровнем 6-10 ммоль/л; ограничение объёма инфузии (goal-directed fluid therapy).

Послеоперационный этап реализовывался согласно протоколу ERAS: ранняя активизация (вертикализация через 4-6 часов после операции); раннее энтеральное питание (жидкость через 4 часа, пища через 6-8 часов); мультимодальная анальгезия (НПВС + парацетамол + локальная анестезия троакарных ран) с минимизацией опиоидов; ранняя выписка при соответствии критериям (толерантность к пероральному питанию, адекватный контроль боли, отсутствие осложнений).

Первичной конечной точкой являлась частота послеоперационных осложнений в течение 30 дней. Вторичные конечные точки: раневые инфекции (по критериям CDC), серомы, гематомы, рецидивы грыжи за 24 месяца, длительность госпитализации, повторные госпитализации в течение 30 дней.

Статистический анализ выполнен с использованием SPSS Statistics 27.0. Количественные переменные сравнивались с помощью t-критерия Стьюдента или критерия Манна-Уитни, качественные — с помощью критерия χ^2 или точного критерия Фишера. Многофакторный анализ проводился методом логистической регрессии. Уровень значимости принят равным 0,05.

Программа преабилитации была полностью выполнена у 142

пациентов основной группы (93,4%). Частичное выполнение (пропуск отдельных компонентов) отмечено у 10 пациентов (6,6%). Основными причинами неполного выполнения являлись: низкая приверженность физическим тренировкам (n=4), несоблюдение диетических рекомендаций (n=3), продолжение курения (n=3).

Скрининг носительства S. aureus в основной группе выявил позитивный результат у 42 пациентов (27,6%). Все носители прошли курс деколонизации, контрольные посевы перед операцией были отрицательными у 40 пациентов (95,2%).

Оперативные вмешательства выполнены всем пациентам. Средняя продолжительность операции составила 82,4±24,6 минуты в основной группе и 86,8±26,2 минуты в контрольной (p=0,142). Частота конверсий к открытой операции статистически не различалась: 3,3% и 4,8% соответственно (p=0,512).

Таблица 3

Периоперационные показатели

Показатель	Основная группа (n=152)	Контрольная группа (n=146)	p
Длительность операции, мин	82,4±24,6	86,8±26,2	0,142
Конверсия, n (%)	5 (3,3%)	7 (4,8%)	0,512
Интраопер. осложнения, n (%)	8 (5,3%)	10 (6,8%)	0,564
Средняя гликемия интраопер., ммоль/л	7,2±1,4	9,8±2,6	<0,001
Гипотермия (<36°C), n (%)	4 (2,6%)	18 (12,3%)	0,002
Боль 1-е сутки (NRS), баллы	3,2±1,4	4,8±1,8	<0,001
Потребность в опиоидах, n (%)	18 (11,8%)	52 (35,6%)	<0,001
Госпитализация, сутки	2,8±1,2	4,9±2,4	<0,001

Применение протокола ERAS обеспечило существенное улучшение периоперационных показателей. Интраоперационная гликемия поддерживалась на целевом уровне в основной группе (7,2±1,4 ммоль/л) и была достоверно выше в контрольной (9,8±2,6 ммоль/л, p<0,001). Частота интраоперационной гипотермии снизилась с 12,3% до 2,6% (p=0,002).

Интенсивность болевого синдрома в первые сутки после операции была достоверно ниже в основной группе: 3,2±1,4 балла против 4,8±1,8 балла по шкале NRS (p<0,001). Потребность в назначении опиоидных анальгетиков снизилась с 35,6% до 11,8% (p<0,001).

Средняя продолжительность госпитализации в основной группе составила 2,8±1,2 суток, в контрольной — 4,9±2,4 суток (p<0,001). Сокращение госпитализации на 2,1 суток обусловлено ранней активизацией, эффективным контролем боли и отсутствием осложнений в раннем послеоперационном периоде.

Анализ первичной конечной точки выявил статистически значимое снижение общей частоты послеоперационных осложнений в течение 30 дней: 9,2% в основной группе против 22,6% в контрольной (p<0,001). Относительное снижение риска составило 59,3%.

Таблица 4

Структура послеоперационных осложнений (30 дней)

Осложнение	Основная группа (n=152)	Контрольная группа (n=146)	p
Всего осложнений, n (%)	14 (9,2%)	33 (22,6%)	<0,001
Раневая инфекция (SSI), n (%)	2 (1,3%)	12 (8,2%)	0,004
- поверхностная SSI	2 (1,3%)	8 (5,5%)	0,048
- глубокая SSI	0 (0%)	4 (2,7%)	0,052
Серома, n (%)	7 (4,6%)	16 (11,0%)	0,038
Гематома, n (%)	3 (2,0%)	5 (3,4%)	0,428
Послеопер. илеус, n (%)	2 (1,3%)	4 (2,7%)	0,386
Тромбоэмболия, n (%)	0 (0%)	2 (1,4%)	0,228
Повторная госпитализация, n (%)	4 (2,6%)	12 (8,2%)	0,028

Наиболее значимым являлось снижение частоты инфекции области хирургического вмешательства (SSI) с 8,2% до 1,3% (p=0,004). В контрольной группе зарегистрировано 4 случая глубокой SSI с инфицированием протеза, потребовавших его удаления. В основной группе глубоких инфекций не отмечено.

Частота формирования сером снизилась с 11,0% до 4,6% (p=0,038). Все серомы были клинически значимыми и потребовали пункционной аспирации. Среднее количество пункций составило 1,4±0,6 в основной группе и 2,8±1,2 в контрольной.

Частота повторных госпитализаций в течение 30 дней снизилась с 8,2% до 2,6% (p=0,028). Основными причинами повторных госпитализаций являлись: инфекционные осложнения (n=8), серомы, требующие многократных пункций (n=4), болевой синдром (n=4).

Отдалённые результаты прослежены у всех 298 пациентов при медиане наблюдения 28 месяцев (диапазон 24-48 месяцев). Рецидив грыжи диагностирован у 3 пациентов (2,0%) основной группы и у 11 пациентов (7,5%) контрольной (p=0,028).

Хронический болевой синдром (боль в зоне операции, сохраняющаяся более 3 месяцев) отмечен у 6 пациентов (3,9%) основной группы и у 18 пациентов (12,3%) контрольной (p=0,006). Субъективное ощущение дискомфорта в области протеза зафиксировано в 5,9% и 14,4% наблюдений соответственно (p=0,014).

Таблица 5
Отдалённые результаты (24 месяца)

Показатель	Основная группа (n=152)	Контрольная группа (n=146)	p
Рецидив грыжи, n (%)	3 (2,0%)	11 (7,5%)	0,028
Хроническая боль, n (%)	6 (3,9%)	18 (12,3%)	0,006
Дискомфорт в зоне протеза, n (%)	9 (5,9%)	21 (14,4%)	0,014
Ограничение активности, n (%)	5 (3,3%)	14 (9,6%)	0,024
Удаление протеза, n (%)	0 (0%)	4 (2,7%)	0,052
Удовлетворённость результатом, n (%)	144 (94,7%)	118 (80,8%)	<0,001
Возврат к работе, недели	2,4±0,8	4,2±1,6	<0,001

Удовлетворённость результатом операции выразили 94,7% пациентов основной группы и 80,8% контрольной ($p<0,001$). Сроки возвращения к трудовой деятельности составили 2,4±0,8 недели и 4,2±1,6 недели соответственно ($p<0,001$).

Многофакторный логистический регрессионный анализ подтвердил независимое влияние мультидисциплинарной программы на риск развития осложнений. После коррекции по возрасту, полу, ИМТ, наличию диабета и размеру дефекта отношение шансов для общих осложнений составило 0,31 (95% ДИ: 0,16-0,62), для раневых инфекций — 0,14 (95% ДИ: 0,03-0,64), для рецидивов — 0,24 (95% ДИ: 0,07-0,89).

Результаты проведённого исследования убедительно демонстрируют эффективность комплексной мультидисциплинарной периоперационной программы в профилактике осложнений лапароскопической герниопластики. Системное воздействие на модифицируемые факторы риска обеспечило более чем двукратное снижение общей частоты осложнений и шестикратное снижение частоты раневых инфекций.

Деколонизация носительства S. aureus является одним из ключевых компонентов программы. Золотистый стафилококк является ведущим возбудителем инфекций области хирургического вмешательства, а назальное носительство увеличивает риск SSI в 2-9 раз. Проведённый скрининг выявил носительство у 27,6% пациентов, что соответствует литературным данным о распространённости в общей популяции. Курс деколонизации мупироцином продемонстрировал высокую эффективность: эрадикация достигнута у 95,2% носителей.

Контроль периоперационной гипергликемии имеет критическое значение для профилактики инфекционных осложнений. Гипергликемия нарушает функцию нейтрофилов, снижает бактерицидную активность лейкоцитов и ухудшает процессы заживления. Поддержание целевого

уровня глюкозы 6-10 ммоль/л в интраоперационном периоде обеспечивается инсулинотерапией под контролем прикроватного глюкометра.

Профилактика интраоперационной гипотермии снижает риск инфекционных осложнений, кровотечений и сердечно-сосудистых событий. В нашем исследовании применение активного согревания позволило снизить частоту гипотермии с 12,3% до 2,6%. Поддержание нормотермии также улучшает фармакокинетику анестетиков и сокращает время пробуждения.

Программа преабилитации способствует улучшению функционального резерва пациента перед операцией. Физические тренировки повышают кардиореспираторную выносливость, нутритивная коррекция обеспечивает адекватный субстрат для репаративных процессов, психологическая подготовка снижает уровень тревожности и улучшает комплаентность. Комплексный характер преабилитации обеспечивает синергетический эффект отдельных компонентов.

Снижение частоты рецидивов грыжи с 7,5% до 2,0% при применении мультидисциплинарной программы обусловлено улучшением условий для интеграции протеза. Отсутствие инфекционных осложнений, адекватный нутритивный статус и нормогликемия способствуют оптимальному врастанию соединительнотканных элементов в структуру сетки.

Экономическая эффективность программы обусловлена сокращением сроков госпитализации на 2,1 суток, снижением частоты повторных госпитализаций и уменьшением потребности в дополнительных вмешательствах по поводу осложнений. Затраты на реализацию программы (скрининг носительства, нутритивные добавки, консультации специалистов) компенсируются экономией на лечении осложнений.

Ограничениями исследования являются нерандомизированный дизайн и возможный эффект исторического контроля. Улучшение результатов в основной группе может быть частично обусловлено общим прогрессом хирургической техники и накоплением опыта. Для окончательного подтверждения эффективности программы необходимы рандомизированные контролируемые исследования.

Заключение

Мультидисциплинарная периоперационная программа профилактики осложнений существенно улучшает результаты лапароскопической коррекции вентральных грыж. Комплексное воздействие на модифицируемые факторы риска обеспечивает снижение общей частоты осложнений с 22,6% до 9,2%, раневых инфекций — с 8,2% до 1,3%, рецидивов грыжи — с 7,5% до 2,0%.

Ключевыми компонентами программы являются: четырёхнедельная преабилитация с физической подготовкой и нутритивной коррекцией; скрининг и деколонизация носительства S. aureus; периоперационный контроль гликемии и температурного гомеостаза; внедрение протокола ERAS с ранней активизацией, мультимодальной анальгезией и ранней выпиской.

Реализация программы требует формирования мультидисциплинарной команды с чётким распределением функций и координацией действий. Экономическая эффективность обеспечивается сокращением сроков госпитализации и снижением частоты осложнений, требующих дополнительного лечения.

Мультидисциплинарная периоперационная программа рекомендуется к внедрению в практику хирургических отделений, выполняющих лапароскопическую герниопластику, особенно у пациентов с факторами риска: ожирением, сахарным диабетом, носительством S. aureus, курением.

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Юлдашева Г. Б.
ассистент
Самаркандский государственный медицинский университет
Кучкоров А. Б.
студент
педиатрический факультет
Абдурахимова С. С.
студент
педиатрический факультет
Самаркандский государственный медицинский университет

ЗАБОЛЕВАНИЯ ЩИТОВИДНОЙ ЖЕЛЕЗЫ И МЕТОДЫ ИХ ИССЛЕДОВАНИЯ С ПОМОЩЬЮ УЗИ, ДОПЛЕРА

Аннотация. *Структура щитовидной железы через эту статью, мы получаем представление о местонахождении, функциях, некоторых анамнезах и их видимости с помощью ультразвука, исследуем их с помощью Доплера, отличаем их друг от друга, обогащаем знания о важности кровообращения при просмотре с помощью Доплера. Мы получаем представление о местонахождении, функциях, некоторых анамнезах и о том, как их можно увидеть с помощью ультразвука, чтобы отличить их от болезней. Мы получим знания о технике обследования щитовидной железы, правилах, осложнениях, возникающих при неправильном применении методики.*

Ключевое слово: *допплерография, печень, плод, щитовидная железа, УЗИ, эмбриогенизация, подкожно-жировой слой, кровеносные сосуды, железа,хосимото, треоидит, атрофия, лимфоцит, токсический зоб, гипоэхогенный гепиэхогенный, гепиртрофия.*

Yuldasheva G. B.
assistant
Samarkand State Medical University
Kuchkorov A. B.
students
faculty of pediatrics
Abdurahimova S. S.
students
faculty of pediatrics
Samarkand State Medical University

DISEASES OF THE THYROID GLAND AND METHODS OF THEIR EXAMINATION USING ULTRASOUND AND DOPPLER

Annotation. *The structure of the thyroid gland through this article, we will have an understanding of the location, function, some anamalia and their*

appearance through ultrasound, examination through Doppler, differentiating their diseases from each other we will enrich knowledge about the importance of blood circulation when viewed through Doppler. We will have an understanding of their location, functions, some anamalia and their appearance through ultrasound, distinguishing them from each other their diseases. We will have knowledge of thyroid examination techniques, rules, complications that arise when the technique is used incorrectly.

Keyword: *Doppler, furnace, fetus, thyroid, ultrasound, embryogenesis, subcutaneous fat layer, blood vessels, gland, hoshimoto, treoiditide, atrophy, lymphocyte, toxic bull, hypoexogenic hepirexogen, hepirtrophy.*

Пациентки, прошедшие обследование щитовидной железы, также проходят иммуноглобулиновый и гормональный анализы. Например, при обследовании пациентки уровень ТТГ начал повышаться с 5-й недели беременности, ей было назначено лечение левотироксином. Женщина справа не получала лечения. Беременность у женщины слева протекала благополучно, и через год после родов на УЗИ у этой женщины практически не было очаговых изменений. Женщина справа не получала лечения и продолжала беременность, но к 11-й неделе развитие плода остановилось. Это снимок, сделанный через 24 месяца, то есть при отсутствии лечения очаговые изменения усилились, и у этой женщины через некоторое время развилась гипотензия. То есть, чем раньше начато лечение, тем выше его эффективность. Даже такие минимальные изменения считаются очагами воспаления, на это необходимо обращать внимание. Итак, поговорим об этих очаговых гипоэкзогенных участках. Они встречаются у до 90% пациентов. Очаговые изменения обнаруживаются даже на фоне гипоэкзогенной щитовидной железы, которую мы рассмотрели выше. Например, если железа минимально гипоэкзогенна, то в ней могут быть обнаружены очаги максимальной гипоэкзогенности. Как я уже упоминал выше, это воспаление чаще встречается в очаговой форме и приводит к атрофии щитовидной железы, в конечном итоге из-за образования гидрогенизированной ткани и ее очагового расположения. Как мы уже упоминали выше, размер очагов варьируется, в отличие от других очаговых заболеваний, при триадите размер очагов больше. Сейчас говорят, что он составляет от 1 мм до 3 см. Если размер составляет 3 см, он почти полностью заполняет поражение и даже вызывает его увеличение. Здесь мы хотим сказать, что размер очагов не имеет четких патофизиологических признаков, но считается, что он больше, чем у очагов при раке молочной железы. Гипоэкзогенность также варьируется, то есть минимальная гипоэкзогенность может проявляться в виде слегка более темных очагов, а средняя – в виде черных и темно-черных. Границы очагов неровные, форма нечеткая, не имеет четкой очертания. А в некоторых случаях границы даже нечеткие, это более заметно на асимметрии, границы менее четкие на декерне. Их может быть большое количество, по крайней мере, от 3 до 5 в одном очаге. Иногда очаги

обнаруживаются в состоянии слияния друг с другом, иногда — в состоянии концентрации в одном месте, то есть определенная область очагов включает несколько очагов. Часть железы, не имеющая очагов, может быть нормальной или минимально гипоэкзогенной, то есть экзогенность железы в ослабленной части очагов нормальная, но в этих участках мы видим, что экзогенность несколько снижена. Рассмотрим на рисунке слева правую часть щитовидной железы нашего пациента в поперечном и продольном срезах. Если присмотреться, то очаги, почти полностью заполняющие железистую ткань, представляют собой крупные, обширные очаги, расположенные вдоль фиброзных линий, а в некоторых местах сохраняется и здоровая железистая ткань, но эта ткань также минимально гипоэкзогенна, то есть ее экзогенность несколько снижена, различий практически нет, как, например, при диффузной гипоэкзогенности в диффузной щитовидной железе. Как видите, это похоже на первый партер.

Эти очаги можно назвать псевдоузелками или псевдоочагами. Псевдоузелки часто трудно отличить от раковых образований, и в случае раковых образований мы рассмотрим те, которые очень похожи на них, особенно на образования в дерме, которые выглядят как дерма. При болезни Хашимото они отличаются тем, что их много, причем их количество велико, в то время как в дерме они в основном единичные, поэтому отличить их от рака несколько сложнее. Так, в очагах тиреоидита Хашимото количество очагов велико, форма нечеткая, а неравномерность внешнего вида указывает на то, что это псевдоцветы или очаги. При раке они более одиночные. Следующий вид – это «улей»; сотовидная структура наблюдается у до 15% пациентов с тромбофлебитом. При таком виде очаги становятся все меньше и меньше, и эти очаги разделены друг от друга гиперэхогенными фиброзными барьерами, разделенными фиброзной или железистой тканью, иногда здоровой железистой тканью. Это означает, что очаги воспаления очень малы и очень рассеяны, что видно по их расположению. Это также может быть связано с очаговой формой тромбофлебита. Его очень легко отличить от истинных лимфатических узлов, они очень маленькие.

Мы видим. Это продольное, это поперечное, здесь их меньше, здесь больше, здесь меньше, особенно когда образование разделено фиброзными барьерами, его легче отличить, но когда оно встречается в здоровой железистой ткани, оно немного похоже на кисты из-за сильной гипоэкзогенности, и его определенно необходимо отличать от келлоидных кист, так как это вид в случае, когда их количество невелико. Мы знаем, что за кистами существует условный факт усиления звука, поэтому мы не видим этого за очагами воспаления, а в жидкости часто обнаруживаются гиперэхогенные включения с каметовидным фактом в келлоидных кистах. В этих очагах этого не происходит, и, конечно, учитываются также клинические и другие признаки. Существует два типа этого сотовидного вида: низкоочаговая и многоочаговая формы. В этом случае в здоровой ткани железы возникает состояние, при котором фиброз разделяется

барьерами. Следующий вариант очень трудно отличить от многоузлового узла. Во многих случаях именно многоузловой вид сбивает врачей с толку; реже он наблюдается у 15% пациентов с трихотилломанией. Ложные узлы могут варьироваться по размеру от нескольких миллиметров до 20 мм. Истинный ложный узел при осмотре выглядит как прозрачный узел. Главное отличие от очаговой формы заключается в том, что ложные узлы изогиперэхогенны. Они в основном гиперэхогенны, и в этой форме очень трудно отличить ложные узлы от истинных узлов на УЗИ. Истинные узлы очень трудно отличить от гиперпластических узлов или аденом, аденоматозных узлов и т. д., безусловных узлов. Это также называется многоузловым видом, другое название на узбекском языке означает «многоузловой». При этом виде щитовидная железа остается увеличенной в течение длительного времени, даже если происходит хронический процесс, то есть она не уменьшается в размерах и не атрофируется. Но формируется гипотиреоз. При многоузловом зобе гипотиреоз практически отсутствует, то есть гормональные изменения не наблюдаются. Мы можем это увидеть. Рассмотрим гипоэкзогенный вариант, то есть щитовидная железа стала гипоэкзогенной, ее экзогенность снизилась, и на ее фоне гиперэхогенные очаговые изменения или псевдоузлы очень похожи на многоузловой зоб.

Конечно, это приводит к увеличению железы, и это увеличение сохраняется даже спустя годы, даже при гипертиреозе. Здесь ситуация иная: сохраняется экзогенная природа железы. Гипоэхогенная ткань железы сохранила свою экзогенную природу, и на этом поперечном срезе видно множество гиперэхогенных узлов. Они находятся в состоянии скопления в одном месте. Если мы посмотрим на эти узлы, даже если это ложные узлы, их очень трудно отличить, потому что они выглядят как безобидные. Анализы помогают в этом, и результаты анализов оцениваются. Поэтому безопасное развитие затруднено. Рак не должен быть похож на рак, у которого одна сторона хорошая, а другая — плохая; если бы это было похоже на рак, мы бы взяли биопсию всех опухолей. Эти узлы больше похожи на доброкачественные узлы, то есть изо-гиперэкзогенные в экзогенном отношении. Это относится к случаю приема левотраксина в дозе 125 мл/кг ежедневно. Таким образом, здесь наблюдается атрофия наряду с гипертиреозом. Пациент страдает тиреоидитом в течение 20 лет. В конечном итоге это приводит к атрофии.

Все воспаления одинаковы, поэтому и существует слово «хроническое». Следующий случай имеет форму арриваса: правая доля железы увеличена, имеются небольшие гиперемические очаги. Окружающая ткань железы может быть минимальной или нормальной. На продольном срезе также обнаружено большое количество мелких очагов. При проведении допплерографии кровоток на допплере существенно не изменился. В левой доле также имеются мелкие очаги в форме пчелиного улья на поперечном и продольном срезах. При проведении допплерографии кровоток был незначительно снижен или нормален. Давайте обратимся к

клинической картине. Этому подростку 14 лет. Во время обследования эндокринолог заподозрил увеличение щитовидной железы и направил на УЗИ. При пальпации было установлено, что железы слегка увеличены, но лимфатических узлов не обнаружено, а уровень ТТГ составил 7, с антипо 3 международных единиц на мл, что означает повышенный уровень антипо. Как уже упоминалось, при исследовании железы мы обнаружили образование, напоминающее пчелиный улей, с очаговыми изменениями в нейрогипофизе.

В обеих долях и шее. Таким образом, согласно самому анализу и появлению мутации, был назначен ашиматид триоид, и у этого пациента, находившегося под наблюдением, был диагностирован афтотреотид. Наш следующий пациент. Здесь, на фоне нормальной железы, имеется гипертрофический очаг. Так, в правой доле имеются гипертрофические очаги, границы которых неровные или четко различимые. Железистая ткань сохранена. Это на латеральном срезе, а это на продольном срезе. Видны множественные очаги воспаления. При допплеровском исследовании отмечается признак незначительного увеличения кровотока. В левой доле имеются крупные сливающиеся очаги. Это на латеральном срезе, это на продольном срезе. При допплеровском исследовании мы не видим никаких изменений кровотока в левой доле. Итак, пациенту 25 лет, и диагноз поставлен совсем недавно. Пациентке в другой клинике был поставлен диагноз множественных узелков, и она была направлена к эндокринологу для допплеровского исследования сонной артерии. При пальпации железы были слегка увеличены, а при ультразвуковом исследовании были обнаружены доброкачественные очаги. Эхогенность низкая.

Граница гипоксического слоя четкая, неровная, кровоток слабый, выявлен гипертиреоз, назначен ливатраксин. На фоне ливатраксина патоген сохраняется в 5 международных единицах. Это наиболее распространенная форма. В 90 процентах случаев. Здесь также развился гипертиреоз. Выявлен случайно. Обнаружен при исследовании сонной артерии. Далее – классическая картина. Здесь правая доля увеличена или нормальна в боковом разрезе. Имеются гифы, литогенез, линейные изменения. В продольном разрезе слегка увеличена, узлов и очагов нет. Кровоток по данным допплерографии повышен. Во второй доле щитовидная железа видна так же в боковом разрезе, также присутствует гипоксия. Таким образом, это классическая картина. Пациенту также 15 лет. У этого пациента также гипертиреоз. Таким образом, было начато лечение левотироксином, и опухоль, продуцирующая антипод, была обнаружена при концентрации 4 международных единицы/л, что составило 1300 международных единиц.

Воспаление выражено сильно. Эластография часто показывает железу как твердую. Это обусловлено фиброзом и тиреоидитом. Поэтому ткань железы имеет гипоэксгенный, гетерогенный, фиброзный, линейный вид. Кровоток сильный, но здесь не гиперфункция, а гипофункция, гипотриоз. Мы знаем, что ТТГ, это снижение Т3-Т4 является признаком гипертриоза, в

основном внимание уделяется ТТГ. При гипертриозе ТТГ повышается, но количество Т3-Т4 не увеличивается. Это правосторонний поперечный срез. Ткань железы сохраняется при эктропионе, но на ее фоне имеются гиперэксгенные узловые системы, некоторые крупные, несколько мелких узлов и ложные узлы. Это распространенный вид, это продольный вид. Это привело к увеличению размера железы. При проведении допплерографии специфический кровоток не был обнаружен. Мы исследовали кровоток вокруг узлов с помощью перинадола. Даже в железе обнаруживаются узлы. Это ложные узлы. В левой доле меньше мелких узлов. Здесь больше узлов с минимальной гипоксией. Небольшой узелок выглядит как доброкачественный. При допплеровском исследовании вокруг узлов видны суженные кровеносные сосуды. При осмотре выглядит как многоузловое образование. Пациентке 75 лет. При пальпации железа увеличена.

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Юсупов М. И., PhD.
доцент
кафедра микробиологии, вирусологии и иммунологии
Самаркандский Государственный медицинский университет
Нарзуллаев К. Х.
Сиёбский техникум общественного здоровья
имени Абу Али ибн Сино
Самарканд, Узбекистан

КЛИНИКО-МИКОЛОГИЧЕСКАЯ ОЦЕНКА КОЛОНИЗАЦИИ РОТОГЛОТКИ ДРОЖЖЕПОДОБНЫМИ ГРИБАМИ РОДА CANDIDA ПРИ ХРОНИЧЕСКОЙ ТОНЗИЛЛЯРНОЙ ПАТОЛОГИИ В ДЕТСКОМ ВОЗРАСТЕ

Аннотация. *В ходе работы обследовано 133 пациента (68 мальчиков и 65 девочек) в возрасте 2–14 лет с хроническим тонзиллитом. Целью исследования стал видовой анализ грибов рода Candida, колонизирующих ротоглотку в период формирования хронической патологии. Идентификация изолятов основывалась на изучении их морфологии, способности к филаментации и биохимической активности. Примененная методика обеспечила точную видовую дифференциацию и качественную оценку микробиоты зева.*

Ключевые слова: *Candida albicans, C. tropicalis, хронический тонзиллит в педиатрии, бактериально-грибковые ассоциации, стафилококковая инфекция, ревматические осложнения.*

Yusupov M. I., PhD.
associate professor
department of microbiology, virology and immunology
Samarkand State Medical University
Narzullayev Q. Kh.
Siyob Public Health Technical School named after Abu Ali ibn Sino
Samarkand, Uzbekistan

CLINICAL AND MYCOLOGICAL ASSESSMENT OF OROPHARYNGEAL COLONIZATION BY YEAST-LIKE FUNGI OF THE GENUS CANDIDA IN PEDIATRIC CHRONIC TONSILLAR PATHOLOGY

Abstract. *The study involved 133 patients (68 boys and 65 girls) aged 2–14 years diagnosed with chronic tonsillitis. The research aimed to conduct a species-level analysis of Candida fungi colonizing the oropharynx during the developmental stages of chronic pathology. Identification of the isolates was*

based on the evaluation of their morphological characteristics, filamentation capacity, and biochemical activity. The methodology employed ensured precise species differentiation and a comprehensive qualitative assessment of the pharyngeal microbiota.

Keywords: *Candida albicans, C. tropicalis, chronic tonsillitis in pediatrics, bacterial-fungal associations, staphylococcal infection, rheumatic complications.*

Актуальность

Современная отоларингология сталкивается с изменением микробного пейзажа хронических воспалительных заболеваний ротоглотки. Несмотря на то, что патогенные стафилококки и стрептококки остаются основными возбудителями хронического тонзиллита, всё большее значение приобретает колонизация слизистых оболочек грибами рода Candida. Установлено, что частота выявления этих микроорганизмов у больных тонзиллитом значительно превосходит показатели здоровых лиц, однако клиническая значимость грибкового компонента в составе бактериальных ассоциаций зачастую недооценивается практикующими врачами [1].

Грибы рода Candida не просто сосуществуют с бактериальной флорой, а активно модифицируют течение инфекционного процесса. Исследования показывают, что микробные ассоциации, включающие грибковый компонент, характеризуются [2].

Снижением чувствительности к антибиотикам: наличие грибов создает защитный барьер, затрудняющий воздействие антибактериальных препаратов на патогенные бактерии. Усилением вирулентности: симбиоз с грибами потенцирует болезнетворные свойства бактерий-возбудителей [5]. Учитывая, что распространенность Candida у носителей и пациентов с хроническим тонзиллитом достигает 70%, игнорирование этого фактора ведет к снижению эффективности традиционной терапии [3]. Переход Candida из состояния условно-патогенного компонента биоценоза в инвазивную форму обусловлен не изменением свойств самого гриба, а снижением резистентности организма хозяина.

На фоне иммунодефицитных состояний грибы активно адгезируются к эпителиальным клеткам, проникая в глубокие слои тканей и провоцируя патологическую деструкцию [4]. Несвоевременная диагностика микоза не ограничивается локальным поражением зева. Существует серьезный риск диссеминации процесса, что может привести к поражению мочеполовой системы. Особую группу риска составляют беременные женщины, где кандидозная инфекция рассматривается как фактор высокой угрозы внутриутробного поражения плода [6]. Критический анализ резистентности местных штаммов Candida выявил существенные различия в эффективности стандартных препаратов. Наблюдается снижение клинического отклика на нистатин, который по своей противогрибковой активности уступает леворину и декамину [3].

Цель исследования

Углубленный анализ частоты встречаемости и видового разнообразия дрожжеподобных грибов рода *Candida* у детей в период становления хронического воспалительного процесса в небных миндалинах.

Материалы и методы

Клиническую основу работы составил анализ данных 133 пациентов педиатрического профиля в возрасте от 2 до 14 лет. Исследование проводилось в условиях стационара на базе клиники Самаркандского государственного медицинского университета. Гендерный состав группы был сбалансированным и не имел статистически значимых различий: мужской пол был представлен 68 участниками (51,1%), женский - 65 (48,9%), что подтверждает высокую репрезентативность выборки по половому признаку.

Результаты и обсуждение

Клинический анализ показал, что у большинства детей хронический тонзиллит протекал на фоне сопутствующих патологий (ревматизм, заболевания гепатобилиарной системы, пневмония).

В ходе микробиологического скрининга грибы рода *Candida* были верифицированы у 60 пациентов, что составило 45,1% от общей выборки. Доминирующим патогеном предсказуемо оказался вид *C. albicans* (85% от всех выделенных штаммов). В структуре не-альбиканс видов зафиксированы *C. pseudotropicalis* (n=6), *C. tropicalis* (n=2) и *C. krusei* (n=1).

У 18 детей (13,5% от общего числа) выявлена высокая степень колонизации (100–1000 КОЕ), что указывает на риск развития инвазивного процесса. В 25 случаях наблюдался синергизм грибковой флоры с патогенными стафилококками и стрептококками, что может утяжелять течение тонзиллита и способствовать резистентности к терапии. Для сравнения были обследованы 30 детей с иными диагнозами без признаков тонзиллита. Низкий уровень выявления кандид в этой группе (всего 3 случая) подтверждает гипотезу о том, что хроническое воспаление миндалин создает благоприятную нишу для грибковой колонизации. Статистическое сравнение с показателями взрослых пациентов (42,08%) не выявило достоверных различий ($P<0,01$). Это свидетельствует о том, что микробиоценоз при хроническом тонзиллите стабилизируется уже в раннем возрасте.

Выводы

1. Распространенность кандидоносительства при хроническом тонзиллите у детей достигает 45,1%, что требует включения антимикотического контроля в протоколы лечения.

2. Этиологическим лидером остается *C. albicans* (85%), однако присутствие других видов указывает на необходимость детальной видовой идентификации.

3. Установлена прямая корреляция между наличием хронического тонзиллита и повышенной частотой обнаружения дрожжеподобных грибов в

ротоглотке по сравнению с другими соматическими заболеваниями.

4. Показатели грибковой обсемененности у детей и взрослых при данной патологии идентичны, что подтверждает общность микробиологических механизмов хронизации процесса независимо от возраста.

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Юсупов М. И., PhD.
доцент
кафедра микробиологии, вирусологии и иммунологии
Самаркандский Государственный медицинский университет
Нарзуллаев К. Х.
Сиёбский техникум общественного здоровья
имени Абу Али ибн Сино
Самарканд, Узбекистан

О РОЛИ ВИРУСОВ КОКСАКИ А-12 В ЗАБОЛЕВАНИИ С СИНДРОМОМ ОСТРОГО ГЕПАТИТА У ДЕТЕЙ

Аннотация. *Данное исследование представляет собой анализ участия вируса Коксаки А-12 в развитии синдрома острого гепатита у детей. Традиционные методы диагностики недостаточно учитывают роль данного патогена, что создает почву для клинических ошибок. В статье обосновывается необходимость пересмотра этиологических факторов и системного изучения вирусного патогенеза. Ограниченность существующих протоколов лечения требует фундаментальных обновлений в этой области*

Ключевые слова: *сурункали гепатит, дети, ECHO, Коксаки вируси, серологик реакциялар.*

Yusupov M. I., PhD.
associate professor
department of microbiology, virology and immunology
Samarkand State Medical University
Narzullayev Q. Kh.
Siyob Public Health Technical School named after Abu Ali ibn Sino
Samarkand, Uzbekistan

ON THE ROLE OF COXSACKIE A-12 VIRUSES IN PEDIATRIC ACUTE HEPATITIS SYNDROME

Abstract. *This study presents an analysis of the involvement of the Coxsackie A-12 virus in the development of acute hepatitis syndrome in children. Traditional diagnostic methods do not sufficiently account for the role of this pathogen, which creates a basis for clinical errors. The article substantiates the need to revise etiological factors and conduct a systematic study of viral pathogenesis. The limitations of current treatment protocols require fundamental updates in this field.*

Keywords: *chronic hepatitis, children, ECHO, Coxsackie virus, serological reactions.*

Актуальность

В последние годы внимание исследователей все больше привлекает изучение роли различных типов энтеровирусов в поражениях печени, напоминающих таковые при вирусном гепатите. Вирусный гепатит у человека, кроме специфического вируса, может быть обусловлен разнообразными вирусными агентами, в том числе аденовирусами, включая вирус, вызывающий болезнь Рубарта, энтеровирусами Коксаки и ECHO, вирусами цитомегалии, желтой лихорадки, лихорадки долины Рифт и др. [1].

Другая особенность энтеровирусов состоит в том, что один и тот же тип энтеровируса может вызывать различные по симптоматике заболевания. Например, вирусы ECHO находят при некоторых случаях поражений печени [2], также они иногда выявляются в случаях параличей (от полных до легкой слабости мышц), респираторных инфекций, серозных менингитов [5,6]. И наоборот, при вспышке одного заболевания нередко выделяют штаммы энтеровирусов разных типов. Например, во время вспышки серозного менингита в г. Новосибирске в 2004 г. были выделены вирусы ECHO30, ECHO31, ECHO69, ECHO70, Коксаки [3]. Увеличение печени, желтуха, нарушение функциональных печеночных проб при ней свидетельствуют о вовлечении в патологический процесс печени [4]. В большинстве случаев при энтеровирусной инфекции со стороны печени отмечаются небольшие изменения, но в отдельных случаях они приобретают характер ведущего синдрома в клинической картине болезни [2].

Цель исследования: изучить содержание комплементсвязывающих антител к ряду вирусов Коксаки. группы А у детей в возрасте от 2 до 14 лет, госпитализированных в клиническую инфекционную больницу г.Самарканда с диагнозом «вирусный гепатит».

Материалы и методы

Под нашим наблюдением находились 60 больных детей, из них диагноз «инфекционный гепатит» был поставлен у 59 (98,3%), «сывороточный»- у (1,7%). Диагноз был установлен на основании клинических наблюдений и лабораторных данных. Субклиническая форма болезни наблюдалась у 1 больного (1,7%) , безжелтушная - у 3 (5%), желтушная - у 56 (93,3%). Легкая форма болезни отмечалась у 4 человек (6,8%), среднетяжелая-у 54 (91,5%), тяжелая - у 1 (1,7%). Хронический гепатит регистрировался у 1 больного (1,7%).

У всех больных мы провели исследование на энтеровирусы. Кровь брали дважды, с интервалом в 12-14 дней. Сыворотку крови исследовали общепринятым методом. Реакция протекала при температуре $+4^0$C. В реакции связывания комплемента (РСК) с антигенами вирусов Коксаки группы А-1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 15, 16, 17 и 18 типов были изучены парные сыворотки от 60 больных вирусным гепатитом, причем 28 больных были обследованы в декабре 2023 - январе 2024 г., а 32 в октябре -ноябре 2023 г.

Результаты и обсуждения

В результате исследования было установлено, что в парных сыворотках крови 28 больных нарастания титра комплементсвязывающих антител ни к одному из указанных выше антигенов вирусов Коксаки ни в одном случае не было обнаружено, тогда как в низких титрах (1:8-1:16) к некоторым типам вирусов они были выявлены. Показатели частоты обнаружения комплементсвязывающих антител (в процентах к общему числу обследованных) составили к вирусу Коксаки А 1 64,3%, А2-28,6%, А4-35,7%, А5-14,3%, А6-7,1%, А7-27,8%, А9-44,5%, А10-10,7%, А12-7,1%, А14-7,1%, к А3, А8, А15, А16, А17, А18-3,6%.

Из 30 сывороток, взятых однократно в этот период у 30 больных вирусным гепатитом, комплементсвязывающие антитела были обнаружены в тех же титрах к вирусу Коксаки А1 в 36,7% случаев, А2-в 10%, А4- в 20%, А5- в 6,7%, А7-в 10,7%, А9-в 46,7%, А10- в 10%, к А8, А14, А15, А16, А17, А18- в 3,3%, К вирусам Коксаки А3, А6, А12 антител не обнаружено.

Как видно из приведенных данных, результаты обследования больных обеих групп совпадают. Таким образом, в зимний период 2023-2024 гг. у значительного числа детей г. Самарканда были выявлены антитела к вирусам Коксаки А1, А2, А7 и А9, что свидетельствует о широкой циркуляции энтеровирусов данных типов среди населения. Отсутствие нарастания титра антител в парных сыворотках указывает на то, что данные типы вирусов не являются причиной возникновения этих заболеваний. В октябре-ноябре 2023г. мы изучили парные сыворотки 32 больных вирусным гепатитом детей в РСК с антигенами вирусов Коксаки группы А типов 7, 9, 10, 12, 14, 16, 17, 18. В результате исследований диагностическое (4-кратное и более) нарастание титра комплементсвязывающих антител к вирусу Коксаки А 12 от 1:18-1:16 до 1:64-1:128 было выявлено у 6 больных. Высокое содержание антител в сыворотке крови с двукратным нарастанием титра от 1:32 до 1:64 было отмечено у больной, Характерно, что все 7 детей, у которых было выявлено нарастание титра антител к вирусу Коксаки А12, были в возрасте 3-4 лет. Течение болезни у всех больных было среднетяжелым и сопровождалось диспепсическим синдромом. В сыворотках остальных 25 больных антител к данному типу вируса не было выявлено.

Изучение содержания комплементсвязывающих антител к другим типам вируса Коксаки группы А показало, что они выявлялись к вирусу Коксаки А7 в титрах 1:8-1:16 у 5 больных, к А9 в титре 1:8- у 5, А10 в титре 1:16- у 1, А14 в титрах 1:8-1:16- у 4, А15 в титре 1:8- у 1, А16 в титрах 1:8-1:16- у 5, А17- в титрах 1:8-1:16- у 2. При исследовании в динамике нарастания титра антител в этих случаях не отмечалось. Антител к вирусам Коксаки А18 в исследованных сыворотках не было найдено.

При обследовании 52 здоровых детей в возрасте от 2 месяцев до 14 лет в октябре ноябре 2023 г. в г. Самарканде комплементсвязывающих антител к

вирусу Коксаки А12 в сыворотке крови не было обнаружено, за исключением 1 ребенка, у которого отмечался низкий (1:8) титр антител.

В связи с тем, что лабораторная диагностика энтеровирусной инфекции обычно ретроспективна, дифференциальную диагностику с вирусным гепатитом следует проводить путем сопоставления особенностей клиническом картины обоих заболеваний. Так, у всех больных с диагностическим нарастанием титра комплементсвязывающих антител к вирусу Коксаки А12 наблюдались клинические признаки острого гепатита, причем во всех случаях отмечались желтушность кожи и склер, увеличение печени, темная моча, обесцвеченный стул. Независимо от варианта преджелтушного периода, преобладающим был болевой синдром. Во всех случаях отмечалось острое начало болезни, причем лихорадка более длительная, чем у больных с отрицательными результатами РСК.

Желтушный период у больных с положительными результатами РСК характеризовался преимущественно субыктеричностью склер и кожи, иногда только склер, и слабо выраженной иктеричностью. У больных же с отрицательными результатами РСК желтуха была более выражена: от субыктеричности и слабо выраженной иктеричности до умеренно и резко выраженной. У больных с положительной РСК значительно чаще отмечался кожный зуд, тошнота, во всех случаях была темная моча. Обесцвеченный стул чаще наблюдался у больных с энтеровирусной инфекцией. Таким образом, наши наблюдения показали, что у больных с подозрением на энтеровирусную инфекцию желтушный период характеризовался менее выраженной желтухой и более выраженными диспепсическими явлениями.

Было выявлено также нарушение функционального состояния печени: общий билирубин в сыворотке крови был повышен (от 1,8 до 3,7 мг%), причем определялась его прямая фракция (от 1,0 до 2,2 мг%). Активность альдолазы колебалась от 8 до 38, АСТ- от 184 до 320, АЛТ- от 140 до 310 ед. экстинкции. Существенной разницы в показателях функционального состояния печени не отмечалось: общий билирубин в среднем составил соответственно 2,78 и 2,67 мг%, связанный-1,76 и 1,75, активность альдолазы-23,8 и 30 ед. и АСТ-241 и 243 ед., т. е. была менее выраженной у больных с подозрением на энтеровирусную инфекцию.

Выводы

На основании наших наблюдений можно прийти к заключению, что вирусные поражения, вероятно, этиологический неоднородны. К числу вирусов, вызывающих поражения печени в условиях г. Самарканда, по-видимому, можно отнести и энтеровирусы Коксаки А12. Поражение печени при этой инфекции проявляется ее увеличением, желтухой и нарушением функции. При дифференциальной диагностике вирусного гепатита и энтеровирусной инфекции с поражением печени следует учитывать, что при последней отмечается острое начало болезни с лихорадкой и болями в животе. Полученные результаты свидетельствуют о перспективности комплексных исследований в данном направлении применением

вирусологических, серологических и биохимических методов и требуют их дальнейшего расширения.

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Uteniyazov Z. B.
assistent o‘qituvchisi
Nukus davlat pedagogika instituti
Nukus, O‘zbekiston

BOSHLANG‘ICH SINFLARDA O‘QUVCHILARNING O‘QISH SAVODXONLIGINI BADIIY-ESTETIK TAHLIL VOSITASIDA RIVOJLANTIRISHNING ILMIY-NAZARIY ASOSLARI

Annotatsiya: *Ushbu maqolada boshlang‘ich sinf o‘quvchilarining o‘qish savodxonligini badiiy-estetik tahlil vositasida rivojlantirishning ilmiy-nazariy asoslarini o‘rganadi. Unda o‘qish savodxonligining zamonaviy jamiyatdagi ahamiyati, kompetentsiyaviy yondashuv, milliy dasturlar va xalqaro standartlar, shuningdek, qadimiy mutafakkirlar g‘oyalari asosida badiiy asarlar tahlili orqali o‘quvchilarning axloqiy-estetik tarbiyasi va kognitiv qobiliyatlarini oshirish masalalari yoritilgan. Maqolada o‘qish texnikasi, matn tahlili usullari, vaziifalar va natijalar muhokama qilinadi.*

Kalit so‘zlar: *o‘qish savodxonligi, badiiy-estetik tahlil, boshlang‘ich ta’lim, o‘quvchi rivojlanishi, kompetentsiyaviy yondashuv, milliy o‘quv dasturi, xalqaro tadqiqotlar, matn tahlili, estetik tarbiya*

Uteniyazov Z. B.
assistant teacher
Nukus State Pedagogical Institute
Nukus, Uzbekistan

SCIENTIFIC AND THEORETICAL FOUNDATIONS FOR THE DEVELOPMENT OF READING LITERACY OF STUDENTS IN PRIMARY SCHOOLS THROUGH ARTISTIC AND AESTHETIC ANALYSIS

Abstract: *This article examines the scientific and theoretical foundations of developing reading literacy in primary school students through artistic and aesthetic analysis. It highlights the importance of reading literacy in modern society, issues of improving the moral and aesthetic education and cognitive abilities of students through the analysis of works of art based on the competency-based approach, national programs and international standards, as well as the ideas of ancient thinkers. The article discusses reading techniques, methods of text analysis, tasks, and results.*

Keywords: *reading literacy, artistic and aesthetic analysis, primary education, student development, competency-based approach, national curriculum, international research, text analysis, aesthetic education*

Bugungi kunda o‘qish savodxonligi zamonaviy jamiyatda hayotga tayyorlikning eng muhim parametrlaridan biri ekanligi tobora ayon bo‘lib bormoqda. O‘quvchilarning o‘qish savodxonligini rivojlantirishsiz boshlang‘ich va o‘rta maktablarda muvaffaqiyatli ta’lim olish mumkin emas.

Adabiy ta’limda o‘qishni o‘rgatish masalalariga doimo katta ahamiyat berib kelinayotganiga qaramay, mazkur muammo zamonaviy maktablar uchun yangi yo‘nalish sanaladi. So‘nggi paytlarda har bir boshlang‘ich sinf o‘qituvchisi oldiga ta’lim sifatini oshirish bo‘yicha qo‘yilayotgan yangicha talablar qatorida o‘quvchilarning o‘qish savodxonligini rivojlantirish masalasi qo‘yilayotgani ham bejiz emas, albatta. Uzluksiz ta’limning boshlang‘ich sinflar “Milliy o‘quv dasturi”da ham ushbu muammo doirasida aniq maqsad va vazifalar belgilangan[1]. Xususan, “O‘qish darslari oldiga qo‘yilgan tarbiyaviy vazifaning muvaffaqiyatli hal etilishi darsda badiiy asar matni ustida ishlash bilangina bog‘liq bo‘lib qolmay, balki bolalarni qurshab olgan hayot, tabiatdagi turfa o‘zgarishlar, ekologik vaziyat, ijtimoiy foydali mehnat bilan ham o‘zaro bog‘liq bo‘lishi lozim”. Bundan o‘qish savodxonligi darslarida o‘quvchilarni axloqiy-estetik tarbiyalash matn ustidagi ishlar bilan uyg‘unlikda olib borilganda samarali ekanligi ayonlashadi.

Amalda umumta’lim maktablari o‘qituvchilari o‘quv fanlari bo‘yicha kuchli bilim beradilar, lekin ularni hayotda qo‘llashni o‘rgatishda ma’lum kamchiliklar mavjudligidan ko‘z yumib bo‘lmaydi. Bu esa, kompetentsiyaviy yondashuv asosida ta’lim berish masalasini dolzarblashtiradi. Shu jihatdan olganda O‘zbekiston Respublikasi Vazirlar Mahkamasining 2018 yil 8 dekabrdagi “Xalq ta’limi tizimida ta’lim sifatini baholash sohasidagi xalqaro tadqiqotlarni tashkil etish chora-tadbirlari to‘g‘risida”gi Qarorining qabul qilinishi “Respublika xalq ta’limi tizimida ta’lim sifatini baholash sohasidagi xalqaro tadqiqotlarni tashkil etish, xalqaro aloqalarni o‘rnatish, o‘quvchi-yoshlarning ilmiy-tadqiqot va innovatsiya faoliyatini, eng avvalo, yosh avlodning ijodiy g‘oyalari va ijodkorligini har tomonlama qo‘llab-quvvatlash hamda rag‘batlantirish maqsadi”ga yo‘naltirilgan.[2]

Bugungi kunga kelib, O‘zbekiston bosqichma-bosqich xalqaro dasturlarda ishtirok etib kelmoqda. Zotan, dastlabki natijalar tahlili kelgusida munosib o‘rinlarga ko‘tarilishi uchun muhim qadam hisoblanishi, shubhasiz. Qadimdan mutafakkirlarimizning o‘qish-o‘rganish bilan bog‘liq qarashlarida savodxonlikning ilk elementlarini qanday kamol toptirish masalasi ustuvor sanalgan. Jumladan, buyuk alloma Abu Nasr Forobiy o‘zida o‘n ikki tug‘ma xususiyatni birlashtirgan kishining axloqli bo‘lishini ta’kidlaydi. Ular orasida o‘qiganini tushunish, anglash, idrok qilish bilan bog‘liq bilish jarayonlariga e’tibor qilish masalasi ham ilgari surilgan. Xususan, olimning yozishicha, “(ikkinchidan), barcha masalani, muhokama va mulohazani tezda va to‘g‘ri tushuna oladigan,

uning ma’nosini anglay oladigan, so‘zlovchining maqsadi, aytilgan fikrining chinligini tezda payqay oladigan bo‘lsin; (beshinchidan) so‘zlar aniq bo‘lsin, fikrini va aytmoqchi bo‘lgan mulohazalarini ravon va ravshan bayon eta olsin; (oltinchidan), bilish va o‘qishga muhabbati bo‘lsin, o‘rganmoqchi bo‘lgan bilimini charchashni sezmasdan osonlik bilan o‘zlashtira olsin”[3].

Ko‘rinadiki, insonning o‘z-o‘zini tarbiyalashi savodxonlik bilan bog‘liq holda yangi bilimlarni o‘zlashtirishni talab etadi. Ushbu tadqiqotning maqsadi – boshlang‘ich sinf o‘quvchilarida o‘qish savodxonligini badiiy-estetik tahlil vositasida rivojlantirishning ilmiy-nazariy asoslarini o‘rganishdir.

Badiiy-estetik tahlil o‘quvchilarni adabiyotning mohiyati bilan tanishtirish asosida tarbiyaviy va rivojlantiruvchi maqsadlarga xizmat qiladi. Natijada asar tugalligi va ko‘p qirraliligi yorqinroq ochiladi. Asar tahliliga metodik yondashuvlar o‘qituvchiga adabiy asarni o‘rganishda biryoqlamalikdan qochishga yordam beradi. Boshlang‘ich sinf o‘quvchisini badiiy asardagi tasvirga, muallifning atrof-muhitga munosabatiga, uni tashvishga soladigan axloqiy masalalarga e’tibor berishga yo‘naltirish lozim. Boshlang‘ich sinflarning o‘qish savodxonligi o‘quv fani dasturlarida darsliklar mazmuni, tuzilishi va o‘qitish metodikasi nazarda tutilgan bo‘lib, ular badiiy-estetik va adabiy tanqid tamoyiliga asoslanadi. Badiiy-estetik tamoyil o‘qish uchun asar tanlash strategiyasini belgilaydi. Bu atrofdagi olam va insoniy munosabatlarning o‘zaro aloqadorligini ochib beradi, kichik yoshdagi o‘quvchilar qalbida go‘zallik tuyg‘usini tarkib toptiradi, hayotdagi murakkabliklarni tushunishga o‘rgatadi hamda voqelikka nisbatan dastlabki shaxsiy qarashlarini shakllantiradi. Mazkur tamoyil san’atning boshqa turlari bilan faol aloqa o‘rnatishni nazarda tutadi. Adabiy tanqid tamoyili boshlang‘ich ta’lim bosqichining o‘ziga xos xususiyatlariga taalluqli bo‘lgani uchun badiiy matnni tahlil qilishda san’atning, xususan, adabiyotning umumiy tili sifatida badiiy obrazni birinchi o‘ringa olib chiqishda amalga oshiriladi. Badiiy adabiyot qahramonlarning fikrlari, his-tuyg‘ulari va g‘oyalarini ifoda etadigan og‘zaki va badiiy tasvirni yaratish vositasi sifatida tushuniladi. So‘z alohida-alohida emas, balki asarning obrazli tizimida, real kontekstida ko‘rib chiqiladi. Asar matni ustida ishlash faqat badiiy detallarni aniqlash, taqqoslash va boshqa tasviriy ifoda vositalari tahlili bilan cheklanib qolmasligi zarur. Ifodaviy vositalarni tahlil qilish o‘quvchilarga badiiy tasvirning yaxlitligi va mazmunini his qilishga yordam beradigan darajada amalga oshirilishi maqsadga muvofiq. Tahlilda ushbu tamoyil asar shakli, mazmuni, mavzusi, muammo, axloqiy-estetik g‘oyasi kabi jihatlarni o‘rganishni maqsad qiladi. O‘qish savodxonligi darslari yozuvchilar ijodining o‘ziga xos xususiyatlari bilan tanishtirishni o‘z ichiga olmaydi, chunki kichik yoshdagi o‘quvchilar hali etarli darajada o‘qish, zarur hayotiy kuzatish va umumlashmalar qilish ko‘nikmasiga ega emas. O‘qish savodxonligi nutq rivojiga yo‘naltirilgan bo‘lib, bunda asosiysi o‘qish qobiliyatidir. O‘qish savodxonligi darslari maqsadi baland ovozli o‘qish shaklidan tortib, aqliy harakat sifatida amalga oshiriladigan ovozsiz o‘qishgacha bo‘lgan nutq faoliyatining bir turi sifatida o‘qish qobiliyatini jadal rivojlantirishdir. Professor Q.Yo‘ldoshev adabiy ta’lim vazifalarini shartli holda uch bosqichga

ajratadi. Bular: kuzatish yoki qabul qilish, mushohada va faoliyat bosqichlaridir[4]. Fikrimizcha, mazkur tasnifda adabiy o‘qish bilan bog‘liq jarayonlar qamrab olingan. O‘qish savodxonligi takomilida o‘qilgan asarlar ma’nosini tushunish, umumlashtirish va asosiy fikrlarni ajratib ko‘rsatish qobiliyatini rivojlantirish bo‘yicha tegishli ishlar olib boriladi. O‘quvchilar ifodali o‘qish texnikasini o‘zlashtiradilar va jarayonda yuzaga keladigan muloqotga kirishishga doir turli muammolarini hal qiladilar. Tahlil orqali ifodali og‘zaki muloqot usullarini matnlarni o‘qishga o‘tkazishni o‘rganadilar.

Metodist olima M.Mirqosimovaning qayd etishicha, “...o‘qish davomida ijodkor yaratgan tafakkur tarzi anglanadi, o‘zlashtiriladi, muhokama qilinadi, kitobxon ko‘z o‘ngida yaratilgan poetik manzara yoki holat ham tashqi, ham ichki harakatlar, tuyg‘ular orqali idrok etiladi, his qilinadi. O‘sha ta’sirchan manzarani yaratishda shoir yo yozuvchi qo‘llagan tasvir vositalariga sirtdan ahamiyat berilmaydi, asosiy e’tibor o‘qish jarayonida mazmunga, obrazning ichki mohiyatiga jalb etiladi”[5]. Ushbu metodlar adabiyotshunoslik, pedagogik va psixologik tadqiqotlarga asoslangan holda qo‘llanildi.

O‘qishga o‘rgatishda o‘quvchilar bilimini adabiy xarakterdagi muallif-yozuvchi haqidagi oddiy ma’lumotlar, o‘qilayotgan asar mavzusi, janri, fol’klor janrlari xususiyatlari (topishmoq, maqol, tez aytish) kabi elementar ma’lumotlar bilan to‘ldirish muhim. Shu orqali bolalar tilning majoziy va ekspressiv vositalari (metafora, taqqoslash, jonlantirish, she’riy nutq ritmi va musiqiyligi) haqida dastlabki bilimlarni o‘zlashtiradilar. Adabiyot san’atning eng murakkab, intellektual shakllaridan biri. O‘quvchilar badiiy asarlar mazmunini obrazlardan zavqlanish, o‘qish jarayonida paydo bo‘ladigan g‘oyalarni yorqinroq anglash orqali idrok etadilar. Adabiy asarni idrok etish tabiati va to‘liqligi, asosan, kitobxonning matnga mos og‘zaki rasmlarni qayta yaratish qobiliyati bilan belgilanadi.

Tadqiqotimiz davomida mavzu muammosi doirasida o‘qish savodxonligini rivojlantirish bilan bog‘liq quyidagi asosiy vazifalarni hal qilish maqsadga muvofiqligi haqidagi xulosaga kelindi:

– badiiy asar mazmunini to‘liq idrok etish, qahramonlarga hamdardlik, o‘qiganlariga munosabat bildirish ko‘nikmalarini shakllantirish;

– asar tili, badiiy obrazni yaratuvchi ifoda vositalarni tushunishga o‘rgatish, xayoliy tafakkurini rivojlantirish;

– kitob mutolaasiga bo‘lgan ehtiyojini shakllantirish, yozuvchilar ijodiga qiziqishni rivojlantirish;

– atrofdagi dunyo va tabiat haqidagi bilimlarini boyitish, hayotga estetik munosabatini shakllantirish;

– turli darajada murakkab asarlar mazmunini etarlicha tushunishni ta’minlash, mumtoz badiiy adabiyot namunalari bilan tanishtirish;

– mavzu va mazmun jihatdan turli janrdagi asarlarni mutolaa qilish orqali dunyoqarashini kengaytirish, kognitiv tajribasini boyitish;

– nutqi va har xil turdagi matnlar bilan ishlash qobiliyatini rivojlantirish; – mustaqil o‘qishga bo‘lgan ehtiyojni rivojlantirish uchun zarur shart-sharoit yaratish.

Boshlang‘ich ta’lim o‘quv dasturlari mazmuni va shu asosda erishiladigan natijalariga qo‘yiladigan talablarga muvofiq o‘quvchilarda tarbiyaviy harakatlarni shakllantirish, mavzuli universal ta’lim faoliyati orasida o‘qish va axborotlar bilan ishlash alohida o‘rin tutadi. “O‘qish savodxonligi” tushunchasi 1991 yilda xalqaro test kontekstida paydo bo‘lgan. U o‘quvchidagi yozma matnlarni tushunish, undan foydalanishga oid bilimlar, ijtimoiy hayotda ishtirok etish, o‘z maqsadiga erishish uchun o‘qish bilan shug‘ullanish imkoniyatlarini kengaytirish qobiliyatidir[6]. O‘qish savodxonligi o‘quvchilarda matnga asoslangan holda undan ma’lumot olish va shu asosda muayyan hayotiy xulosalarni shakllantirish masalasini ko‘ndalang qo‘yadi. O‘qish savodxonligi darajalari boshlang‘ich sinf bitiruvchilarining o‘qish mustaqilligi sifat xususiyatlari bilan bog‘liq. M.A.Asqarovaning yozishicha, “Badiiy va axborot matnlarini o‘qishni o‘rganish nafaqat kognitiv va rivojlanish, ta’lim va tarbiyaviy vazifalarni bajaradi, balki o‘quvchilarning ta’lim darajasini kengaytirishga yordam beruvchi produktiv usullar yordam beradi”[7]. Yuqori darajadagi kitobxonlar yozma ravishda etkazilgan yangi ma’lumotlarni o‘zlashtirishga tayyor bo‘ladi.

O‘qish savodxonligini rivojlantirish, asosan, boshlang‘ich ta’limdagi ishlarga to‘g‘ri yondashuv bilan bog‘liq. Bu boshlang‘ich sinf o‘qituvchisidan o‘quv jarayonini to‘g‘ri tashkil etish kompetentsiyasi, o‘quv dasturida ko‘rsatilgan malaka talablarini rivojlantirish borasida innovatsion texnologiyalarni qo‘llash mahoratini talab etadi. O‘qishni tashkil etishning asosiy turlarini tavsiflashda uning to‘g‘riligi, ongliligi, tezkorligi va ifodaliligini ta’minlaydigan eng muhim xususiyat va usullarni belgilash kerak. “Ongli o‘qish yaxshi o‘qishning asosiy sifati hisoblanadi. Ongli o‘qish o‘qilgan matnning aniq mazmunini, asarning g‘oyaviy yo‘nalishini, obrazlarini va badiiy vositalarining rolini tushunib o‘qish, shuningdek, asarda tasvirlangan voqea-hodisalarga o‘z munosabatini ifodalay olishdir”[8].

Professor K.Qosimovaning qayd etishicha, “O‘qishning ongliligini ta’minlash uchun matn mazmunini o‘quvchilarning ko‘rgan-kechirganlari, taassurotlari bilan bog‘lash lozim. Shunda o‘quvchida o‘qishga, o‘rganishga qiziqish ortadi”[9]. Badiiy asarda asosiy g‘oyani ochib berishda qahramon obrazi muhim rol o‘ynaydi. “Aksariyat badiiy asarlarda muallif kitobxonni o‘z orqasidan ergashtiradi: voqea-hodisalarga, ular orasidagi aloqadorliklarga tavsif beradi, qahramonlarining xatti-harakatini baholab boradi”[10].

Tadqiqotchi N.Kadirovaning fikricha, “Muallifning asar yaratish maqsadini hisobga olish barobarida diqqat bilan o‘qish usulini qo‘llagan har bir o‘quvchida o‘qish jarayonida o‘zining hayoti va tajribasi, e’tiqodi, fe’l-atvori, dunyoqarashi va kayfiyatiga asoslangan shaxsiy asari yaraladi”[11].

Professor S.Matchonov to‘g‘ri ta’kidlaganidek, “Badiiy asarni o‘qish o‘zicha hech narsani anglatmaydi. Eng muhimi, nimani o‘qish va o‘qiganini qanday tushunishdir”[12]. 3–4-sinf o‘quvchilari o‘qish savodxonligini badiiy-

estetik tahlil vositasida rivojlantirish bo‘yicha ishlarni quyidagicha tizimlashtirish maqsadga muvofiq:

1. Matn ustida ishlash asosida o‘qish texnikasini takomillashtirish.
2. Turli janrdagi asarlarning xususiyatlarini kashf etish.
3. Sehrli ertaklar bilan tanishish.
4. Badiiy ifoda vositalari haqida tushunchalarni kengaytirish.
5. Adabiy asarlarni san’atning boshqa turlari kontekstiga kiritish.

Ko‘rinadiki, o‘quv jarayonidagi yakuniy natijalar adabiyotning obrazli xususiyatini o‘quvchilar intuitiv ravishda tushunish; adabiyotning tasviriy san’at asarlaridan farqini anglash; yangi asarlarni o‘qishga qiziqish uyg‘otish bilan bog‘liq.

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Азизов И. А.
магистрант
Российский экономический университет имени Г.В. Плеханова
Москва, Россия

КРИПТОВАЛЮТА ПРИ БАНКРОТСТВЕ КОММЕРЧЕСКИХ ОРГАНИЗАЦИЙ

Аннотация: *Статья посвящена анализу правового статуса цифровой валюты (криптовалюты) в процедурах банкротства в Российской Федерации. Рассматривается эволюция нормативного регулирования: от первоначального непризнания криптоактивов объектами гражданских прав до их законодательного закрепления в качестве имущества должника в законах о цифровых финансовых активах и о банкротстве. Автор выделяет ключевые практические проблемы, с которыми сталкиваются арбитражные управляющие: выявление цифровых активов, обеспечение их сохранности, оценка и реализация в конкурсной массе. Особое внимание уделяется сложностям оспаривания сделок с криптовалютой из-за отсутствия единообразной судебной практики и критериев оценки её рыночной стоимости. Делается вывод о необходимости дальнейшего совершенствования законодательства для детальной регламентации работы с цифровыми активами в целях защиты интересов кредиторов.*

Ключевые слова: *цифровая валюта, банкротство, управляющий, конкурсная масса, оспаривание сделок.*

Azizov I. A.
student of the master degree
Plekhanov Russian University of Economics

CRYPTOCURRENCY IN COMMERCIAL BANKRUPTCY

Summary: *This article analyzes the legal status of digital currency (cryptocurrency) in bankruptcy proceedings in the Russian Federation. It examines the evolution of regulatory frameworks: from the initial non-recognition of cryptoassets as objects of civil rights to their legislative recognition as debtor's property in laws on digital financial assets and bankruptcy. The author highlights key practical challenges faced by bankruptcy trustees: identifying digital assets, ensuring their safety, valuation, and sale in bankruptcy estates. Particular attention is paid to the difficulties of challenging cryptocurrency transactions due to the lack of uniform judicial practice and criteria for assessing their market value. It concludes that further legislative improvements are needed to thoroughly regulate the handling of digital assets to protect creditors' interests.*

Keywords: *digital currency, bankruptcy, trustee, bankruptcy estate, challenging transactions.*

В российском законодательстве отсутствует понятие криптовалюты. Отечественный законодатель использует термин цифровая валюта. В Федеральном законе от 31.07.2020 № 259-ФЗ «О цифровых финансовых активах, цифровой валюте и о внесении изменений в отдельные законодательные акты Российской Федерации» дано законодательное понятие цифровой валюты, которая представляет собой электронные данные в информационной системе, которые признаются средством платежа (не являясь официальной валютой) или инвестиционным активом [56] . Законодательство о банкротстве (ст. 13 Федерального закона от 26.10.2002 № 127-ФЗ «О несостоятельности (банкротстве)») и об исполнительном производстве признают цифровую валюту имуществом, подобное обусловлено необходимостью предотвращения злоупотребление со стороны должников, когда их активы переводятся в цифровую среду без возможности обратить на неё взыскание.

Для арбитражных управляющих и кредиторов цифровые активы представляют одновременно возможность пополнения конкурсной массы и серьёзные процессуальные вызовы, связанные с их выявлением, обеспечением сохранности и реализацией. Актуальность темы подтверждается растущим количеством судебных дел, в которых цифровая валюта фигурирует в качестве объекта банкротной массы, а также постоянным совершенствованием законодательного регулирования этой сферы.

Исторически российские суды занимали противоречивую позицию относительно статуса криптовалюты (цифровой валюты). В 2016-2017 годах суды часто отказывались включать криптовалюты в конкурсную массу, аргументируя это тем, что криптовалюта не относится к объектам гражданских прав и находится вне правового поля Российской Федерации. Переломным моментом стало дело Царькова в 2018 году, где Девятый арбитражный апелляционный суд отменил решение первой инстанции и расширительно истолковал положение статьи 128 Гражданского кодекса Российской Федерации, отнеся криптовалюту к «иному имуществу». Апелляционная инстанция отметила, что гражданское законодательство не содержит закрытого перечня объектов гражданских прав, и с учетом экономических реалий допустимо максимально широкое толкование видов имущества[57].

[56] См., Федеральный закон от 31.07.2020 № 259-ФЗ (ред. от 28.12.2024) «О цифровых финансовых активах, цифровой валюте и о внесении изменений в отдельные законодательные акты Российской Федерации» // СПС КонсультантПлюс.

[57] Цифровые активы в делах о банкротстве // URL: https://kskgroup.ru/press-center/smi/tsifrovye-aktivy-v-delakh-o-bankrotstve/ (дата обращения 15.09.2025)

На сегодняшний день разночтений в вопросе включения криптоактивов в конкурсную массу практически не существует, что обусловлено положениями законодательства о банкротстве, за исключением случаев отсутствия фактического доступа к цифровым активам или незначительности суммы, явно не покрывающей затраты на реализацию.

Вместе с тем современная практика сталкивается с проблематикой относительно цифровой валюты. Основной вопрос связан с установлением самого факта наличия криптоактивов у должника. Сложности поиска обусловлены принципами работы этой сферы: цифровые кошельки обезличены, и даже при известном номере кошелька невозможно определить владельца по публичным источникам.

В связи с этим арбитражные управляющие используют комплекс методов:

Прямой запрос должнику — управляющий направляет должнику запрос о наличии цифровых активов с требованием добровольно передать логин и пароль от кошелька. При отказе можно обратиться в суд с ходатайством об истребовании информации.

Анализ банковских транзакций — изучение движения средств на российских и иностранных счетах должника позволяет выявить операции, связанные с покупкой криптовалюты, переводы средств на кошельки криптобирж, расходы по приобретению оборудования для майнинга.

Запросы в государственные органы — направление запросов в налоговую службу о задекларированных криптоактивах может предоставить ценную информацию.

Запросы криптобиржам — управляющий может направлять запросы криптоплатформам через службы поддержки, хотя эффективность этого метода ограничена, особенно в отношении иностранных бирж, что подчёркивается в юридической литературе[58]. При истребовании информации через судебные органы, арбитражные суды стараются удовлетворять подобные запросы арбитражных управляющих[59].

Вторая проблема связана с тем, что доступ к криптовалюте ограничен. Существует несколько способов хранения криптовалют. Во-первых, это хранение на счетах криптовалютных бирж. Во-вторых, хранение в специальных предназначенных для этой цели криптокошельках. Если в рамках криптовалютных бирж действия связаны с арестом цифровой валюты, то в рамках физических кошельков существует возможность их неполучения и вопрос реализации. Следует ли продавать на торгах сам физический носитель с криптовалютой или реализовывать стоимость это цифровой валюты? Какую установить цену криптовалюты, учитывая

[58] Карпов Э.С., Кутуев Э.К. Проблемы включения криптовалюты в конкурсную массу должника // Финансовое право. 2025. № 4. С. 20 – 23 // СПС КонсультантПлюс.

[59] См., например, Определение Арбитражного суда Ульяновской области от 2 февраля 2024 г. по делу N А72-4636/2023 // СПС КонсультантПлюс.

высокую волатильность валюты? На эти вопросы ответов законодательство не содержит.

По общему правилу имущество в банкротстве реализуется с электронных торгов. Однако если рыночная стоимость криптовалюты меньше 500 000 руб., можно заключить с покупателем прямой договор о продаже крипты или продать её через криптобиржу (п. 3 ст. 111 Федерального закона от 26.10.2002 № 127-ФЗ «О несостоятельности (банкротстве)»). На практике встречаются подобные случаи. Например, в деле № А50-6372/2018 цифровой актив продали без торгов, заключив договор купли-продажи. В итоге цифровая валюта ушла за 21 000 руб.[60] На взгляд автора должна быть прописана точная процедура реализации цифровых активов через продажу на криптобирже по средней цене на день торгов.

Признание криптоактивов полноценным имуществом влечёт возможность оспаривания сделок с ними, совершенных должником в преддверии банкротства. Глобально существуют две причины оспаривания сделок по банкротным основаниям: продажа должником криптовалюты по заниженной цене или передача безвозмездно и, наоборот, приобретение им неликвидного криптоактива . В обоих случаях речь идет о подозрительных сделках (неравноценных и/или совершенных во вред кредиторам). Однако особенности криптовалюты могут существенно осложнить процесс оспаривания сделок с ней. В одном из дел финансовый управляющий оспаривал перевод биткоинов, якобы совершенный должником на аккаунты третьих лиц. Однако суды трёх инстанций пришли к выводу, что заявитель не представил доказательств изначальной принадлежности криптовалюты должнику. Приняты во внимание и показания должника в качестве свидетеля по уголовному делу, из которых не следовало, что криптовалюта принадлежала ему[61].

В другом деле управляющим оспаривались денежные перечисления должника за покупку криптовалюты на платформе мессенджера Telegram . Управляющий полагал, что данные сделки являлись безвозмездными. Однако суды приняли аргумент ответчика о встречном предоставлении по сделкам — покупке должником криптовалюты по фиксированной цене. В пользу ответчика сыграло и то, что цена сделки была зафиксирована самой площадкой, то есть ни должник, ни ответчик не могли занижать или завышать цену криптовалюты[62].

В одном из дел суд кассационной инстанции отменил судебные акты, так как суды не сослались на подтверждающие доказательства, не

[60] Криптовалюта в банкротстве: как ее найти и продать// URL: https://pravo.ru/story/244806/ (дата обращения 15.09.2025)

[61] Криптоактивы должника при банкротстве // URL: https://centraldep.ru/news/kriptoaktivy-dolzhnika-pri-bankrotstve// (дата обращения 15.09.2025)

[62] Криптоактивы должника при банкротстве // URL: https://centraldep.ru/news/kriptoaktivy-dolzhnika-pri-bankrotstve// (дата обращения 15.09.2025)

установили правила её выпуска, майнинга, объем предоставленных ею прав, наличие или отсутствие обеспечения, что определяет её ценность и влияет на стоимость продажи и, соответственно, немотивированно отклонены доводы о неравноценности встречных предоставлений[63]. Таким образом, практика арбитражных судов не является стабильной в этой сфере и следует оценивать множество факторов при продаже (покупке) цифровых активов.

Подводя итог необходимо отметить, что криптовалюта прочно вошла в практику банкротства коммерческих организаций, создав новые вызовы для арбитражных управляющих, кредиторов и судебной системы. Несмотря на законодательное признание криптоактивов имуществом должника, процедурные вопросы их выявления, сохранения и реализации остаются слабо урегулированными. Поэтому в законодательстве требуется точная и ясная регламентация действий, связанных с выявлением, реализацией цифровых активов должника для соблюдения интересов кредиторов.

Использованные источники:

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[63] Банкротство и криптовалюта: особенности оценки встречного предоставления// URL: https://rusbankrot.ru/legislative-news/bankrotstvo-i-kriptovalyuta-osobennosti-otsenki-vstrechnogo-predostavleniya/?clckid=84d9a1e8 (дата обращения 15.09.2025)

Азизов И. А.
магистрант
Российский экономический
университет имени Г.В. Плеханова
Москва, Россия

СУБОРДИНАЦИЯ ТРЕБОВАНИЙ КРЕДИТОРОВ ПРИ НЕСОСТОЯТЕЛЬНОСТИ (БАНКРОТСТВЕ) КОММЕРЧЕСКОЙ ОРГАНИЗАЦИИ

Аннотация: *В статье анализируется конфликт интересов кредиторов в процедуре банкротства, возникающий из-за установленной законом очерёдности удовлетворения их требований. Основное внимание уделяется механизму субординации – понижению приоритета или отказу во включении в реестр требований аффилированных и контролирующих должника лиц. Автор рассматривает субординацию как меру ответственности за недобросовестность, применяемую арбитражным судом. Правовыми основаниями для её применения являются признаки неплатёжеспособности должника на момент получения финансирования и предоставление средств заинтересованным лицом. Юридические последствия для субординированного кредитора существенны: его требования удовлетворяются в последнюю очередь, он лишается права голоса на собраниях кредиторов и не может инициировать привлечение к субсидиарной ответственности. Цель института – обеспечить справедливое распределение конкурсной массы и защитить интересы независимых кредиторов.*

Ключевые слова: *субординация, банкротство, коммерческие организации, кредиторы, добросовестность.*

Azizov I. A.
student of the master degree
Plekhanov Russian University of Economics

SUBORDINATION OF CREDITORS' CLAIMS IN THE INSOLVENCY (BANKRUPTCY) OF A COMMERCIAL ORGANIZATION

Summary: *This article analyzes the conflict of interests of creditors in bankruptcy proceedings arising from the statutory order of satisfaction of their claims. The primary focus is on the subordination mechanism—lowering the priority or refusing to include in the register the claims of affiliated and controlling persons of the debtor. The author examines subordination as a measure of liability for bad faith applied by the arbitration court. The legal grounds for its application include the debtor's insolvency at the time of receiving financing and the provision of funds by an interested party. The legal*

consequences for a subordinated creditor are significant: their claims are satisfied last, they are deprived of voting rights at creditors' meetings, and they cannot initiate subsidiary liability proceedings. The purpose of this institution is to ensure a fair distribution of the bankruptcy estate and protect the interests of independent creditors.

Keywords: *subordination, bankruptcy, commercial organizations, creditors, good faith.*

Установленная российским законодательством очерёдность удовлетворения требований кредиторов закономерно приводит к конфликту их интересов. Каждый из кредиторов стремится увеличить свою долю в конкурсной массе, в том числе за счёт оспаривания требований как привилегированных кредиторов, так и других участников своей очереди. Федеральный закон от 26.10.2002 № 127-ФЗ «О несостоятельности (банкротстве)» предусматривает следующую последовательность удовлетворения требований.

По общему правилу должник сначала погашает требования по текущим платежам. Порядок удовлетворения требований кредиторов по текущим платежам, регламентированный п. 2 ст. 134 Федерального закона от 26.10.2002 № 127-ФЗ «О несостоятельности (банкротстве)», состоит из пяти очередей и на практике не вызывает сложностей в применении.

Основные правовые проблемы, связанные с погашением текущих платежей в деле о банкротстве, сводятся к следующим аспектам[64]:

1. *Квалификация требований*. Возникают сложности с отнесением конкретных платежей к разряду текущих и с определением их места в установленной законом очерёдности.
2. *Статус руководящих работников*. Особую сложность представляют требования о выплате выходных пособий и иных компенсаций, заявленные бывшими руководителями должника и его обособленных подразделений. Ключевым вопросом является разграничение выплат, гарантированных трудовым законодательством в минимальном размере, и дополнительных сумм, предусмотренных индивидуальными трудовыми договорами.
3. *Оплата услуг привлекаемых лиц*. Дискуссионной является оплата деятельности лиц, привлекаемых арбитражным управляющим для исполнения своих обязанностей. В данном случае подлежит доказыванию обоснованность и крайняя необходимость таких расходов.

После удовлетворения требований по текущим платежам удовлетворяются требования, включённые в реестр требований кредиторов. Они тоже погашаются в определённой последовательности (очерёдности). В данном случае таких очередей три:

[64] В какой очередности погашается задолженность перед кредиторами в рамках банкротства. // СПС «КонсультантПлюс» (дата обращения: 20.08.2025).

Первая очередь. В неё включаются требования граждан, перед которыми должник несёт ответственность за причинение вреда жизни или здоровью, а также капитализированные повременные платежи (например, компенсация за потерю кормильца в рассчитанном на годы виде).

Вторая очередь. В неё входят требования по выплате выходных пособий и оплате труда лиц, работающих (работавших) по трудовому договору, а также по выплате вознаграждений авторам результатов интеллектуальной деятельности.

Третья очередь. В неё включаются требования остальных кредиторов (за исключением требований текущих платежей). До начала удовлетворения требований кредиторов третьей очереди погашаются требования по обязательным платежам, не уплаченным в период после вынесения арбитражным судом определения о принятии заявления о признании должника банкротом и до открытия конкурсного производства.

Следует отметить, что требования залоговых кредиторов удовлетворяется из средств от реализации предмета залога или из средств, находящихся на счёте, права на который заложены (п. п. 1, 2.2 ст. 138 Федерального закона от 26.10.2002 № 127-ФЗ «О несостоятельности (банкротстве)»).

В Федеральном законе от 02.12.1990 № 395-1 «О банках и банковской деятельности» используется термин «субординированных кредитов», что предполагает понижение очерёдности удовлетворений требований субординированных кредиторов по субординированным обязательствам[65]. В Федеральном законе от 26.10.2002 № 127-ФЗ «О несостоятельности (банкротстве)» термин субординация не указан. Он активно используется практикующими юристами и судьями для определения характера взаимоотношений и определения их правовых последствий. Так, в одном из определений Судебной коллегии по экономическим спором Верховного Суда Российской Федерации отмечается, что выводы судов о недоказанности оснований для субординации требования основаны на фактических обстоятельствах дела с учётом сложившейся судебной практики разрешения споров, связанных с установлением в процедурах банкротства требований контролирующих должника и аффилированных с ним лиц[66].

Институт субординации требований широко распространён в зарубежных правовых системах. В англо-саксонском праве традиционно выделяют две формы: добровольную (договорную) субординацию (contractual subordination), основанную на соглашении сторон и принудительную субординацию (equitable subordination), применяемую по решению суда в рамках права справедливости для защиты интересов добросовестных кредиторов. В континентальном праве (на примере

[65] Федеральный закон от 02.12.1990 № 395-1 «О банках и банковской деятельности» // СПС «КонсультантПлюс» (дата обращения 15.09.2025).

[66] Определение Верховного Суда Российской Федерации от 15.01.2024 N 303-ЭС23-26456(2) по делу № А73-19381/2021 // СПС «КонсультантПлюс» (дата обращения 15.09.2025).

Германии) также сформировалась схожая концепция, но с иной классификацией: общая субординация — изменение приоритета всех настоящих и будущих требований одного должника к конкретному кредитору, и частная (партикулярная) субординация — изменение приоритета одного конкретного требования кредитора по отношению к требованиям другого кредитора[67].

Основой субординации выступает спор между кредиторами относительно первоочередности удовлетворения их требований, когда удовлетворение требований одного по отношению к другому противоречит духу справедливости. Как обосновано указывается в науке: «*очередность удовлетворения требований кредиторов носит безусловный характер, в то время как субординация требований кредиторов не обладает безусловностью, а основания для применения механизма субординации требований кредиторов обусловлены либо наличием волеизъявления самих кредиторов (на основании соглашения), либо иными заслуживающими внимания обстоятельствами (например, недобросовестность лиц при совершении сделки - основания возникновения требования)*».

Поэтому автор, под субординацией требований кредиторов, толкует понижение очерёдности или отказ во включении требований кредиторов, аффилированных с должником, исходя из нравственных и экономических задач, заложенных в законодательстве о банкротстве. Следует согласиться с К. А. Калиниченко о том, что одной из задач производства по делам о банкротстве является справедливое удовлетворение требований кредиторов[68].

Правовыми основаниями для применения механизма субординации выступают два основных критерия:

1. Наличие у должника признаков неплатёжеспособности или недостаточности имущества на момент получения финансирования.
2. Предоставление средств аффилированным или контролирующим лицом должника.

Законодательное закрепление данного механизма содержится в нескольких нормах: В соответствии со ст. 61.6 Федерального закона от 26.10.2002 № 127-ФЗ «О несостоятельности (банкротстве)», требования по сделкам, оспоренным и признанным недействительными по основаниям п. 2 ст. 61.2 или п. 3 ст. 61.3 Федерального закона от 26.10.2002 № 127-ФЗ «О несостоятельности (банкротстве)», подлежат удовлетворению в последнюю очередь — после полного расчёта с кредиторами третьей очереди. Ст. 309.1 Гражданского кодекса Российской Федерации предоставляет кредиторам

[67] Родина Н.В. Субординация требований кредиторов в процессе несостоятельности (банкротства) юридических лиц: монография / под науч. ред. И.В. Фролова. М.: Юстицинформ, 2023. 192 с. // СПС «КонсультантПлюс» (дата обращения 15.09.2025).

[68] Колиниченко Е.А. Признаки банкротства в Великобритании, США, Германии, Франции и России // Вестник Высшего Арбитражного Суда Российской Федерации. - 2000. - № 8. - С. 13. // СПС «КонсультантПлюс» (дата обращения 15.09.2025).

право самостоятельно, путём заключения соглашения, определять очерёдность удовлетворения своих требований, тем самым легализуя договорную (добровольную) субординацию.

В доктрине отмечается, что в том случае, если целью его правоотношений с должником было предоставление последнему финансирования в кризисной ситуации, требования контролирующего лица не могут удовлетворяться в одной очерёдности с независимыми кредиторами. Иное позволило бы контролирующему лиц, которое предоставляло внутреннее финансирование под видом обычных гражданских правоотношений, не нести никаких негативных последствий неудачи своего скрытого плана [69]. Эта точка зрения подтверждается и судебной практикой. Так кассационная инстанция отметила, что для субординации требований необходимо установить факт компенсационного финансирования, что не сделано апелляционным судом [70]. Однако есть и иные точки зрения. Так, Е. В. Шинякова указывает, что активная субординация требований добросовестных субъектов из внутреннего финансирования повышает риск утраты интереса учредителей к предотвращению банкротства, что негативно сказывается на экономике [71]. Автор не совсем согласен с этой позицией. Предпринимательская деятельность – экономически рискованная деятельность. Соответственно если имеет место дополнительное вложение денежных средств, то субъект должен понимать и риск подобных действий. Самое главное, чтобы судебная практика и законодательство создавало условия для прогнозирования.

Исходя из Обзора судебной практики разрешения споров, связанных с установлением в процедурах банкротства требований контролирующих должника и аффилированных с ним лиц, утверждённого Президиумом ВС РФ 29 января 2020 г., правовой статус субординированного кредитора существенно ограничен по сравнению со статусом реестрового кредитора. Ключевые ограничения включают в себя:

Запрет на паритетное удовлетворение требований: Требования не подлежат удовлетворению наравне с требованиями реестровых кредиторов.

Лишение определённых прав: Отсутствие права участвовать в собраниях кредиторов и голосовать на них.

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[69] Чернышенко Н. Как добиться субординации требования фактически аффилированного кредитора // Банковское обозрение. Приложение "FinLegal". - 2024. - № 1. - С. 89 - 91. // СПС «КонсультантПлюс» (дата обращения 15.09.2025).

[70] Постановление Арбитражного суда Северо-Кавказского округа от 11 сентября 2025 г. по делу № А53-4685/2024 // URL: https://ras.arbitr.ru/Kad/PdfDocument/9c13d5d5-dffd-48fd-85f9-89c8b3b2e9e5/62759bf4-bcb9-4c59-ab2f-5bab56ee61a7/%D0%9053-4685-2024__20250911.pdf?download=true) (дата обращения 15.09.2025).

[71] Субординации требований кредиторов в процедурах банкротства юридических лиц // URL: https://zakon.ru/blog/2025/08/11/subordinacii_trebovanij_kreditorov_v_procedurah_bankrotstva_yuridicheskih_lic (дата обращения: 27.08.2025).

Ограничение доступа к механизмам ответственности: Невозможность инициировать привлечение контролирующих лиц должника к субсидиарной ответственности для погашения своих требований.

Утрата обеспечительных мер: Потеря прав по залоговому обеспечению.

Отдельный вопрос возникает относительно рассмотрения требования субординации как меры ответственности. Если рассматривать правовые последствия субординации, то следует вывод, что при ней наступает ответственность за недобросовестность, санкция в рамках которой выражается в виде лишения или ограничения именно материальных прав. В юридической литературе обосновано отмечается, что гражданскому праву известны случаи ответственности, наступающей в форме лишения права, частным случаем которой, как представляется, является субординация[72]. Н. В. Родина отмечает, что в силу комплексного характера института несостоятельности (банкротства) ответственность как правовое средство механизма субординации требований кредиторов носит комплексный характер и обладает признаками частноправовой и публично-правовой ответственности[73]. Таким образом, автор рассматривает субординацию как меру ответственности, применяемую арбитражным судом, при наличии вины у субъекта в рамках неисполнения обязанности действовать добросовестно. В литературе верно указывается, что для правонарушителей субординация является средством наказания, а для правомерно действовавших кредиторов - мерой защиты[74].

Подводя итог следует отметить выводы:

Во-первых, под субординацией требований кредиторов автор толкует понижение очередности или отказ во включении требований кредиторов, аффилированных с должником, исходя из нравственных и экономических задач, заложенных в законодательстве о банкротстве.

Во-вторых, автор рассматривает субординацию как меру ответственности, применяемую арбитражным судом, при наличии вины у субъекта в рамках неисполнения обязанности действовать добросовестно.

В-третьих, правовыми основаниями для применения механизма субординации выступают два основных критерия: наличие у должника признаков неплатежеспособности или недостаточности имущества на момент получения финансирования и предоставление средств аффилированным или контролирующим лицом должника. Юридическими последствиями субординации являются: запрет на паритетное

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[72] Яковенко А.А. Субординация требований недобросовестных кредиторов должника как форма гражданско-правовой ответственности // Хозяйство и право. - 2025. - № 2. - С. 109 - 122. // СПС «КонсультантПлюс» (дата обращения 15.09.2025).

[73] Родина Н.В. Субординация требований кредиторов в процессе несостоятельности (банкротства) юридических лиц: монография / под науч. ред. И.В. Фролова. М.: Юстицинформ, 2023. 192 с. // СПС «КонсультантПлюс» (дата обращения 15.09.2025).

[74] Ходаковский А.П. Реестр требований кредиторов и его формирование в процессе несостоятельности (банкротства). Москва: Статут, 2023. 222 с. // // СПС «КонсультантПлюс» (дата обращения 15.09.2025).

удовлетворение требований, лишение определенных прав, ограничение доступа к механизмам ответственности, утрата обеспечительных мер.

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СОВРЕМЕННЫЕ ТЕХНОЛОГИИ УПРАВЛЕНИЯ ОРГАНИЗАЦИЕЙ

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Сайдыракманова А. М.
магистрант
Кыргызско-Российский Славянский университет им. Б.Н.Ельцина
Кыргызстан, г. Бишкек

СОВРЕМЕННЫЕ ПОДХОДЫ К СОЦИАЛЬНОЙ ПОДДЕРЖКЕ СОТРУДНИКОВ В ОРГАНИЗАЦИЯХ: КЕЙС RED PETROLEUM

Аннотация. *В условиях усиления конкуренции и нестабильности рынка труда социальная поддержка сотрудников приобретает особую значимость как фактор устойчивого развития организаций. Целью статьи является анализ практик социальной поддержки персонала на примере компании Red Petroleum, осуществляющей деятельность в сфере топливного ритейла. В исследовании применён качественный метод «case study», основанный на анализе организационных практик и управленческих подходов. Результаты исследования показывают, что реализация базовых мер социальной поддержки способствует повышению мотивации и лояльности сотрудников, а также снижению текучести кадров. Сделан вывод о целесообразности интеграции механизмов социальной поддержки в систему управления персоналом организаций сервисной отрасли.*

Ключевые слова: *социальная поддержка сотрудников, управление персоналом, мотивация персонала, организационная стабильность, топливный ритейл.*

Saidyrakmanova A. M.
master's student
Kyrgyz-Russian Slavic University named after B. N. Yeltsin
Kyrgyzstan, Bishkek

MODERN APPROACHES TO EMPLOYEE SOCIAL SUPPORT IN ORGANIZATIONS: A CASE STUDY OF OsOO RED PETROLEUM

Abstract. *In the context of increasing competition and labor market instability, employee social support is becoming an essential factor in ensuring organizational sustainability. The purpose of this article is to analyze employee social support practices using the example of Red Petroleum, a company operating in the fuel retail sector. The study applies a qualitative case study method based on the analysis of organizational practices and managerial approaches. The results show that the implementation of basic social support*

measures contributes to higher employee motivation and loyalty, as well as reduced staff turnover. The article concludes that integrating social support mechanisms into the human resource management system is advisable for service-sector organizations.

Keywords: *employee social support, human resource management, employee motivation, organizational stability, fuel retail industry, case study*.

Социальная поддержка сотрудников включает комплекс мер, направленных на обеспечение социальной защищённости, формирование благоприятных условий труда, поддержку баланса между профессиональной и личной жизнью, а также повышение общего уровня благополучия персонала. Исследования в области управления человеческими ресурсами показывают, что наличие эффективных механизмов социальной поддержки способствует росту удовлетворённости трудом, снижению текучести кадров и формированию устойчивой организационной приверженности сотрудников.

Особую актуальность данные вопросы приобретают в сервисных и высокоответственных отраслях, где эффективность деятельности напрямую зависит от поведения и состояния персонала. Топливный ритейл относится к таким сферам, поскольку характеризуется непрерывным режимом работы, сменными графиками, повышенными требованиями к безопасности и постоянным взаимодействием с клиентами. Сотрудники автозаправочных станций испытывают значительные физические и психологические нагрузки, что повышает значимость системной социальной поддержки внутри организации.

Целью данного исследования является анализ современных подходов к социальной поддержке сотрудников на примере Red Petroleum, осуществляющего деятельность в сфере розничной продажи топлива. Задачами исследования являются выявление ключевых практик социальной поддержки, применяемых в организации, а также оценка их роли в обеспечении мотивации, лояльности персонала и устойчивости деятельности компании. Актуальность работы обусловлена недостатком прикладных исследований, отражающих практическую реализацию механизмов социальной поддержки в реальных условиях функционирования организаций.

Исследование основано на качественном методе «case study», который позволяет провести углублённый анализ управленческих практик в рамках конкретной организации. Данный метод широко используется в исследованиях по менеджменту и управлению персоналом, особенно в условиях ограниченного доступа к количественным и конфиденциальным данным. Информационной базой исследования послужили общедоступные корпоративные материалы, внутренние регламенты и инструкции, размещённые на официальных ресурсах компании, а также анализ фактических организационных практик в сфере управления персоналом. В

связи с отсутствием доступа к полной внутренней отчётности в работе применяется описательно-аналитический подход без использования статистических методов.

В рамках исследования использовались методы наблюдения за организационными процессами, анализа нормативных и регламентирующих документов, а также обобщение практического опыта реализации социальной поддержки сотрудников. Выбранная методология позволяет выявить ключевые элементы системы социальной поддержки и оценить их значение в управлении персоналом организации.

Анализ практик социальной поддержки сотрудников в Red Petroleum показывает, что компания реализует комплекс прикладных мер, направленных на обеспечение социальной защищённости, стабильности занятости и поддержание мотивации персонала. Формирование данных практик осуществляется с учётом отраслевой специфики и операционных условий деятельности.

Одним из базовых элементов социальной поддержки является официальное трудоустройство сотрудников и соблюдение требований трудового законодательства. Они имеют гарантированный доступ к социальным выплатам, оплачиваемым отпускам и больничным листам, что формирует у персонала ощущение стабильности и защищённости. Особое внимание в организации уделяется вопросам охраны труда и безопасности. С учётом специфики топливного ритейла в компании внедрены внутренние регламенты по технике безопасности. А также проводится регулярный инструктаж сотрудников. Чёткая регламентация рабочих процессов и постоянное разъяснение требований способствуют снижению производственных рисков и укреплению доверия сотрудников к работодателю.

Социальная поддержка также реализуется через организацию сменных графиков работы. Графики формируются с учётом необходимости бесперебойной работы автозаправочных станций и обеспечения достаточного времени для отдыха персонала. Такой подход позволяет снизить уровень физического и эмоционального переутомления и способствует поддержанию баланса между работой и личной жизнью сотрудников.

Важным элементом системы социальной поддержки является управленческая коммуникация. Сотрудники имеют возможность напрямую обращаться к руководству по вопросам организации труда и выполнения обязанностей. Открытость управленческого взаимодействия способствует формированию благоприятного социально-психологического климата и повышает уровень вовлечённости персонала. Дополнительно в компании применяются нематериальные формы поддержки, включая признание добросовестного выполнения обязанностей, соблюдение стандартов обслуживания и требований безопасности. Позитивная обратная связь со

стороны руководства способствует укреплению мотивации и формированию лояльности сотрудников.

В совокупности данные практики образуют функциональную модель социальной поддержки, ориентированную на стабильность, безопасность и благополучие персонала.

Результаты проведённого исследования подтверждают значимость социальной поддержки сотрудников как неотъемлемого элемента системы управления человеческими ресурсами. Анализ практик Red Petroleum демонстрирует, что даже при отсутствии формализованных и затратных социальных программ организация может эффективно реализовывать механизмы социальной поддержки, адаптированные к своим операционным условиям. Установлено, что такие меры, как официальное трудоустройство, соблюдение требований охраны труда, рациональная организация сменных графиков и развитие управленческой коммуникации, способствуют формированию благоприятной рабочей среды, повышению мотивации персонала и укреплению организационной устойчивости. Практическая ориентированность данных подходов обеспечивает их стабильную интеграцию в повседневную управленческую деятельность.

Полученные выводы свидетельствуют о том, что социальная поддержка персонала должна рассматриваться не как дополнительная функция, а как стратегический инструмент управления, особенно в отраслях с повышенными требованиями к ответственности и безопасности. Результаты исследования могут быть использованы в деятельности организаций сферы топливного ритейла и других сервисно-ориентированных отраслей при формировании или совершенствовании систем социальной поддержки сотрудников.

Перспективы дальнейших исследований могут включать сравнительный анализ практик социальной поддержки в различных организациях и оценку их влияния на показатели эффективности и удержания персонала. Представленный кейс подтверждает практическую реализуемость и управленческую значимость социальной поддержки как фактора устойчивого развития организации.

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