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CHIQINDI POLIMERNING KOMPOZITSION POLIMER GRANULALARNING SUYUQLANMA OQIM INDEKSI TA'SIRINI TADQIQ ETISH

Ozoda Sadinova, Dilshoda Musoyeva, Feruz To'xtayev

Navoiy davlat universiteti, Navoiy, O'zbekiston

Annotatsiya. Mazkur tadqiqotda PPJ160 va HDPE 7000F polimer chiqindilari asosida bentonit hamda bentonit–CaCO₃ bilan to'ldirilgan kompozitsion polimer granular olindi. Kompozitsiyalarning suyuqlanma oqim indeksi (MFI) o'rganilib, HDPE miqdori va CaCO₃ ning reologik xossalarga ta'siri baholandi. Natijalar HDPE ulushi ortishi bilan MFI oshishini, CaCO₃ qo'shilishi esa uni biroz kamaytirishini ko'rsatdi. Olingan kompozitsiyalar ekstruderlash va granulyatsiya jarayonlari uchun yetarli texnologik oqimchanlikka ega ekanligi aniqlandi..

Kalit so'zlar: polimer, chiqindi, kompozit, granula, polipropilen, polietilen, bentonit, kaltsiy karbonat, MAPP.

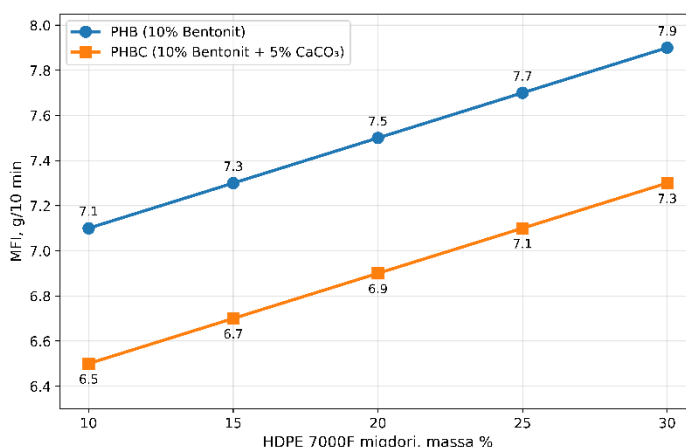
Kirish. Polimer chiqindilarini qayta ishlash va ulardan yuqori qo'shimcha qiymatga ega kompozitsion materiallar olish bugungi kunda ekologik hamda iqtisodiy jihatdan dolzarb yo'nalishlardan biri hisoblanadi. Polimer matritsalar tarkibiga mineral to'ldiruvchilar va kompatibilizatorlarni kiritish orqali ularning fizik-mexanik hamda texnologik xossalarni maqsadli boshqarish imkoniyati yaratiladi. Ayniqsa, bentonit va kaltsiy karbonat kabi arzon hamda mahalliy mineral to'ldiruvchilar kompozitsion materiallarning mustahkamligi, qattiqligi va qayta ishlash qobiliyatini yaxshilashda muhim ahamiyat kasb etadi. Shu bilan birga, bunday kompozitsiyalarning qayta ishlash texnologiyasini tanlashda suyuqlanma oqim indeksi (MFI) asosiy reologik ko'rsatkichlardan biri hisoblanadi. Shu munosabat bilan mazkur tadqiqotda PPJ160 va HDPE 7000F polimer chiqindilari asosida bentonit hamda bentonit–CaCO₃ bilan modifikatsiyalangan kompozitsion granular tayyorlanib, ularning suyuqlanma oqim indeksiga HDPE miqdori va mineral to'ldiruvchilar tarkibining ta'siri kompleks ravishda o'rganildi.

Asosiy qism. Tadqiqotlar standart laboratoriya sharoitida, havo harorati (23±2) °C va nisbiy namligi (50±5) % bo'lgan muhitda olib borildi. Barcha xomashyo va tayyorlangan namunalar sinovlardan oldin kamida 24 soat davomida standart atmosfera sharoitida konditsionerlandi. Bentonitning armaturalovchi xususiyatlari

hamda CaCO_3 ning iqtisodiy va texnologik afzalliklarini baholash maqsadida ikki guruh kompozitsion namunalar shakllantirildi. Birinchi guruh namunalarida bentonit yagona mineral to'ldiruvchi sifatida qo'llanilgan bo'lsa, ikkinchi guruh namunalarida 10 massa % bentonit bilan birgalikda qo'shimcha ravishda 5 massa % CaCO_3 kiritildi.

Kompozitsion granularni olish uchun PPJ160 va HDPE 7000F chiqindilari maydalanib, bentonit va CaCO_3 esa 105 °C haroratda quritildi. Komponentlar kerakli nisbatlarda tortilib, laboratoriya mikserida 10–15 minut davomida quruq aralashtirildi. Tayyorlangan aralashmalar ikki vintli ekstruder yordamida kompaundlandi. Ekstruziya jarayoni 170–210 °C harorat oralig'ida va vintlarning 60±5 ayl/min aylanish tezligida olib borildi.

Kompozitsion polimer granularning MFI qiymatlari olindi, olingan natijalar 1-rasmda keltirilgan.



1-rasm. HDPE 7000F miqdorining PHB va PHBC seriyali kompozitsion granularning suyuqlanma oqim indeksiga ta'siri

1-rasmda keltirilgan natijalardan ko'rinadiki, har ikkala seriyada ham HDPE 7000F miqdorining ortishi bilan suyuqlanma oqim indeksi muntazam ravishda oshib borgan. Xususan, PHB seriyasida MFI qiymati PHB-1 namunasidagi 7,1 g/10 min dan PHB-5 namunasida 7,9 g/10 min gacha, PHBC seriyasida esa 6,5 g/10 min dan 7,3 g/10 min gacha ortgan. Kuzatilgan qonuniyat kompozitsiya tarkibidagi polimer fazalarning nisbatlari o'zgarishi bilan izohlanadi. HDPE 7000F ulushining ortishi natijasida kompozitsiya eritmasining ichki qarshiligi kamayadi va makromolekulalarning oqim yo'nalishida harakatlanishi yengillashadi. Natijada eritmaning oqimchanligi ortib, MFI qiymati yuqorilaydi.

PHB va PHBC seriyalarining qiyosiy tahlili shuni ko'rsatdiki, barcha tarkiblarda PHBC namunalarining MFI qiymatlari mos PHB namunalariga nisbatan past bo'lgan.

Masalan, HDPE miqdori 20 % bo'lgan tarkiblarda PHB-3 namunasining MFI qiymati 7,5 g/10 min ni tashkil etgan bo'lsa, PHBC-3 namunasida ushbu ko'rsatkich 6,9 g/10 min ga teng bo'lgan. Shunga o'xshash holat barcha kompozitsiyalarda kuzatildi. Bu holat PHBC seriyasi tarkibiga qo'shimcha ravishda 5 massa % CaCO_3 kiritilishi bilan bog'liq. CaCO_3 zarrachalari bentonit bilan birgalikda polimer matritsa ichida qo'shimcha dispers faza hosil qilib, makromolekulalar harakatchanligini ma'lum darajada cheklaydi. Natijada eritmaning qovushqoqligi ortadi va suyuqlanma oqim indeksi kamayadi. Biroq MFI ning pasayishi keskin xarakterga ega emasligi CaCO_3 ning kompozitsiyaning qayta ishlanish qobiliyatiga salbiy ta'siri cheklanganligini ko'rsatadi.

Natijalarning tahlili shuni ko'rsatdiki, PHB seriyasida eng yuqori MFI qiymati PHB-5 namunasida (7,9 g/10 min), PHBC seriyasida esa PHBC-5 namunasida (7,3 g/10 min) kuzatildi. Shu bilan birga barcha kompozitsiyalar uchun MFI qiymatlarining 6,5–7,9 g/10 min oralig'ida bo'lishi ularning ekstruderlash va granulyatsiya jarayonlari uchun yetarli texnologik oqimchanlikka ega ekanligini ko'rsatadi.

Xulosa. Tadqiqot natijalariga ko'ra, PPJ160 va HDPE 7000F polimer chiqindilari asosida bentonit hamda bentonit– CaCO_3 ishtirokida kompozitsion polimer granulalar olindi. HDPE miqdorining ortishi bilan suyuqlanma oqim indeksi (MFI) oshishi, CaCO_3 qo'shilishi esa MFI qiymatini biroz kamaytirishi aniqlandi. Barcha namunalarda MFI 6,5–7,9 g/10 min oralig'ida bo'lib, kompozitsiyalarning ekstruderlash va granulyatsiya jarayonlari uchun yetarli texnologik oqimchanlikka ega ekanligi tasdiqlandi.

Foydalanilgan adabiyotlar

1. Peško M., et al. Plant-based biofillers for polymer composites // *Polymers*. – 2025. – Vol. 17. – №17. – Article 2286.
2. Alqahtani F.K., Khan M.I., Ghataora G., Dirar S. Production of recycled plastic aggregates and their utilization in concrete // *Journal of Building Engineering*. – 2021. – Vol. 44. – Article 103321.
3. Kareem I., Alzuhairi M., Hashim F.A., Al-Ghaban A.H. Recycled plastics in green building materials: Current trends and development prospects // *International Journal of Design & Nature and Ecodynamics*. – 2025. – Vol. 20. – №4. – P. 1–12.
4. Gall M., Schweighuber A., Buchberger W., Lang R.W. Plastic bottle cap recycling—Characterization of recyclate composition and opportunities for design from recycling // *Sustainability*. – 2021. – Vol. 13. – №5. – P. 1–20.
5. To'xtayev F., Musoyeva D. Kompozitsion polimer granulalarining termik xossalari tadqiq etish. "Ilm-fan va innovatsiya" respublika ilmiy-amaliy

konferensiyasi. 2026-yil 167-169-bet.

6. To‘xtayev F., Musoyeva D.. Ikkilamchi polietilen va polipropilen polimerlari asosida modifikatsiyalangan kompozitsion granulalarning mexanik xossalar tadqiq etish. “YOSH OLIMLAR” respublika ilmiy-amaliy konferensiyasi 2026-yil 36-39-bet

PASTKI JAG‘ SINISHLARIDA OSTEOSINTEZ USULLARINING KLINIK SAMARADORLIGINI BAHOLASH

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ANNOTATSIYA

Maqolada pastki jag‘ sinishlarini ochiq repozitsiya va ichki fiksatsiya yo‘li bilan davolashda qo‘llanadigan zamonaviy osteosintez usullarining klinik samaradorligi tahlil qilindi. Ish narrativ-sistematik adabiyotlar sintezi tamoyilida bajarilib, randomizatsiyalangan va qiyosiy tadqiqotlar, meta-tahlillar hamda AO CMF biomekanik tavsiyalari ko‘rib chiqildi. Bitta miniplastina, ikkita miniplastina, 3D/strut plastina, locking va non-locking tizimlar, lag-vintlar hamda load-bearing rekonstruktiv plastinalarning klinik natijalari infeksiya, malokkluziya, yara dehisseyasi, apparat nosozligi, neyrosensor buzilish, operatsiya vaqti va funksional tiklanish mezonlari bo‘yicha qiyoslandi. Dalillar oddiy, siljimagan yoki mos reduksiya qilingan burchak sinishlarida bitta Champy miniplastinasining ko‘pincha yetarli ekanini, ikkinchi plastinani rutinda qo‘shish esa har doim klinik foyda bermasligini ko‘rsatadi. 3D plastinalar ayrim tadqiqotlarda apparat nosozligi va operatsiya vaqtini kamaytirgan bo‘lsa-da, umumiy asoratlar bo‘yicha ustunlik barcha meta-tahlillarda bir xil emas. Locking tizimlar mexanik jihatdan afzal va plastinani mutlaq aniq moslashtirish talabini kamaytiradi, biroq klinik qisqa muddatli asoratlar ko‘pincha non-locking tizimlar bilan o‘xshash. Murakkab, komminut va atrofik sinishlarda load-bearing rekonstruktiv plastina asosli tanlov hisoblanadi.

Kalit so‘zlar: pastki jag‘ sinishi, osteosintez, miniplastina, 3D plastina, locking plastina, rekonstruktiv plastina, ichki fiksatsiya, malokkluziya, asoratlar.

АННОТАЦИЯ

В статье проанализирована клиническая эффективность современных методов остеосинтеза при переломах нижней челюсти. Работа выполнена как аналитический обзор сравнительных исследований, рандомизированных

испытаний, мета-анализов и биомеханических рекомендаций АО CMF. Сопоставлены одна и две минипластины, 3D/strut-пластины, блокируемые и неблокируемые системы, лаг-винты и несущие реконструктивные пластины по частоте инфекции, нарушения окклюзии, расхождения раны, отказа металлоконструкции, нейросенсорных нарушений, длительности операции и функционального восстановления. Для простых переломов угла адекватно установленная одна минипластина по линии Champy во многих случаях обеспечивает достаточную стабильность, тогда как рутинное добавление второй пластины не демонстрирует стабильного клинического преимущества. 3D-пластины могут уменьшать аппаратные осложнения и время операции, но результаты различных мета-анализов неоднородны. Блокируемые системы обладают биомеханическими преимуществами, однако краткосрочная клиническая частота осложнений часто сопоставима с неблокируемыми системами. При оскольчатых, атрофических и дефектных переломах предпочтение следует отдавать несущей реконструктивной фиксации.

Ключевые слова: перелом нижней челюсти, остеосинтез, минипластина, 3D-пластина, блокируемая пластина, реконструктивная пластина, внутренняя фиксация, окклюзия, осложнения.

ABSTRACT

This article evaluates the clinical effectiveness of contemporary osteosynthesis techniques for mandibular fractures. The study was designed as an analytical literature synthesis incorporating randomized and comparative clinical studies, meta-analyses, and AO CMF biomechanical principles. Single and double miniplates, three-dimensional/strut plates, locking and non-locking systems, lag screws, and load-bearing reconstruction plates were compared in terms of infection, malocclusion, wound dehiscence, hardware failure, neurosensory disturbance, operative time, and functional recovery. The evidence indicates that a single Champy miniplate is frequently sufficient for properly reduced simple mandibular angle fractures, while routine placement of a second plate does not consistently improve outcomes. Three-dimensional plates may reduce hardware-related complications and operative time in selected studies, although superiority for overall complications is not uniform across meta-analyses. Locking systems have biomechanical advantages and are less dependent on perfect plate adaptation, but short-term clinical complication rates are often comparable with those of non-locking systems. Load-bearing reconstruction plates remain indicated for comminuted, atrophic, infected, or defect fractures.

Keywords: mandibular fracture, osteosynthesis, miniplate, three-dimensional plate, locking plate, reconstruction plate, internal fixation, malocclusion, complications.

KIRISH

Pastki jagʻ yuz skeletining eng koʻp shikastlanadigan suyaklaridan biri boʻlib, uning sinishlari okkluziya buzilishi, chaynash funksiyasining pasayishi, yuz konturining deformatsiyasi va pastki alveolyar nerv shikastlanishi bilan kechishi mumkin. Davolashning maqsadi anatomik reduksiya, barqaror fiksatsiya, toʻgʻri okkluziyani qayta tiklash, erta funksional yuklama va asoratlarni minimal darajaga tushirishdan iborat.

Zamonaviy yuz-jagʻ jarrohligida ochiq repozitsiya va ichki fiksatsiya (ORIF) koʻplab siljigan pastki jagʻ sinishlarida standart yondashuv sifatida qoʻllanadi. Biroq plastina soni, profili, locking mexanizmi va load-sharing yoki load-bearing konstruksiya tanlovi hali ham sinishning anatomik joyi, fragmentlar soni, suyak sifati, tish qatori va jarroh tajribasiga bogʻliq.

Champy konsepsiyasi mandibulaning funksional kuchlanish zonalaridan foydalanib, oddiy sinishlarda kam travmatik load-sharing miniplastina fiksatsiyasini asoslaydi. Shu bilan birga, simfiz-parasimfizda torsion kuchlar, komminut sinishlarda esa segmentlar orasida yuk uzatilishining buzilishi qoʻshimcha yoki kuchliroq fiksatsiyani talab qiladi. AO CMF tavsiyalarida oddiy burchak va tana sinishlari uchun load-sharing yondashuv, murakkab va defektli sinishlar uchun esa load-bearing rekonstruktiv plastinalar tavsiya etiladi.

Maqolaning maqsadi pastki jagʻ sinishlarida asosiy osteosintez usullarining klinik samaradorligini zamonaviy dalillar asosida taqqoslash, ularning afzallik va cheklovlarini aniqlash hamda sinish morfologiyasiga mos ratsional fiksatsiya algoritmini ishlab chiqishdan iborat.

METODOLOGIYA VA ADABIYOTLAR TAHLILI

Ushbu maqola strukturaviy narrativ sharh va qiyosiy dalillar sintezi dizaynida tayyorlandi. PubMed/NCBI maʼlumotlari, 2014–2026-yillarda eʼlon qilingan meta-tahlillar, randomizatsiyalangan va prospektiv qiyosiy tadqiqotlar hamda AO Surgery Reference manbalari koʻrib chiqildi. Qidiruv tushunchalari: “mandibular fracture osteosynthesis”, “miniplate”, “3D plate”, “locking plate”, “one versus two miniplates”, “mandibular angle fracture” va “reconstruction plate”.

Asosiy natija koʻrsatkichlari sifatida jarrohlik joyi infeksiyasi, malokkluziya, yara dehissensiyasi, pseudoartroz/nonunion, neyrosensor disfunktsiya, hardware failure,

postoperativ maxillomandibulyar fiksatsiya (MMF), operatsiya vaqti hamda maksimal og‘iz ochilishi tanlandi. Birlamchi bemor bazasi mavjud bo‘lmagani sababli maqolada muallif tomonidan yaratilgan sun‘iy klinik foizlar ishlatilmadi; diagrammadagi raqamlar nashr etilgan meta-tahlillarning effekt ko‘rsatkichlaridan olindi.

Dalillar fiksatsiya biomekanikasi bo‘yicha load-sharing va load-bearing guruhlarga, implant konstruksiyasi bo‘yicha esa standart miniplastina, 3D plastina, locking tizim va rekonstruktiv plastinalarga ajratildi. Natijalar klinik kontekst bilan talqin qilindi, chunki bitta texnikani barcha mandibular sinishlar uchun universal ustun deb hisoblash biomekanik jihatdan noto‘g‘ri.

NATIJALAR

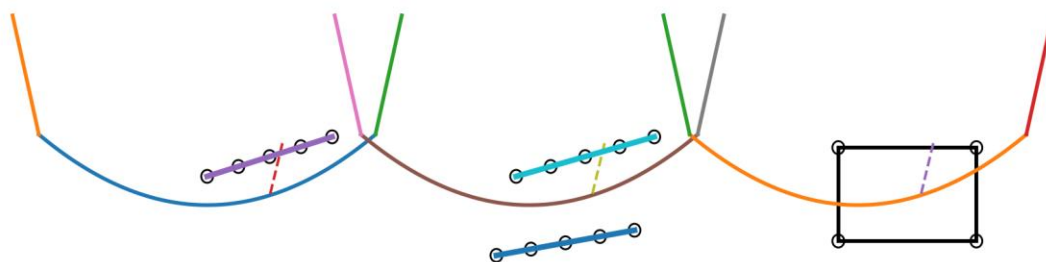
Adabiyotlar sintezi shuni ko‘rsatdiki, osteosintez samaradorligini faqat “plastina turi” bilan izohlash yetarli emas. Sinish lokalizatsiyasi, reduksiya sifati, kortikal kontakt, tish qatori orqali okklyuzion nazorat, yumshoq to‘qimalar holati va infeksiya xavfi implant tanlovidan kam bo‘lmagan darajada natijaga ta’sir qiladi.

Usul	Biomekanik prinsip	Asosiy ko‘rsatma	Afzallik	Cheklov
Bitta miniplastina	Load-sharing, tension-band	Oddiy burchak/tana sinishi, yaxshi reduksiya	Kam disseksiya, qisqa operatsiya, kam implant	Murakkab/torsion holatlarda yetarli bo‘lmisligi mumkin
Ikki miniplastina	Ikki nuqtali stabilizatsiya	Torsion kuchlar yuqori bo‘lgan tanlangan holatlar	Qo‘shimcha rigidlik	Ko‘proq disseksiya; ayrim meta-tahlillarda hardware va yara asoratlari ko‘proq
3D/strut plastina	Geometrik uch o‘lchamli rigidlik	Oddiy angle/body va ayrim condylar holatlar	Kam vint bilan rigid ramka; operatsiya vaqti qisqarishi mumkin	Adaptatsiya murakkab; dalillar heterogen

Locking plastina	Vint boshi plastinaga qulflanadi	Suyak sifati past, aniq adaptatsiya qiyin, rigid fiksatsiya zarur	Plastina-suyak bosimiga kam bog'liq, mexanik stabil	Narxi yuqori; umumiy klinik asoratlar har doim past emas
Lag-vint	Interfragmenta r kompressiya	Mos yo'nalishli simfiz/parasimfiz sinishi	Kuchli kompressiya, kam implant	Texnik aniqlik talab qiladi; torsion uchun kamida 2 nuqta kerak
Rekonstruktiv plastina	Load-bearing	Komminut, atrofik, infeksiyalangan yoki defektli sinish	Yukni sinish zonasi orqali ko'priklaydi	Katta implant, ko'proq disseksiya; nerv/tish ildizi xavfi

1-jadval. Pastki jag' sinishlarida asosiy osteosintez usullarining qiyosiy tavsifi.

Pastki jag' sinishlarida asosiy osteosintez konfiguratsiyalarining sxematik ko'rinishi



A. Bitta miniplastina
(load-sharing, Champy chizig'i)

B. Ikki miniplastina
(torsion/rotatsiyani neytrallash)

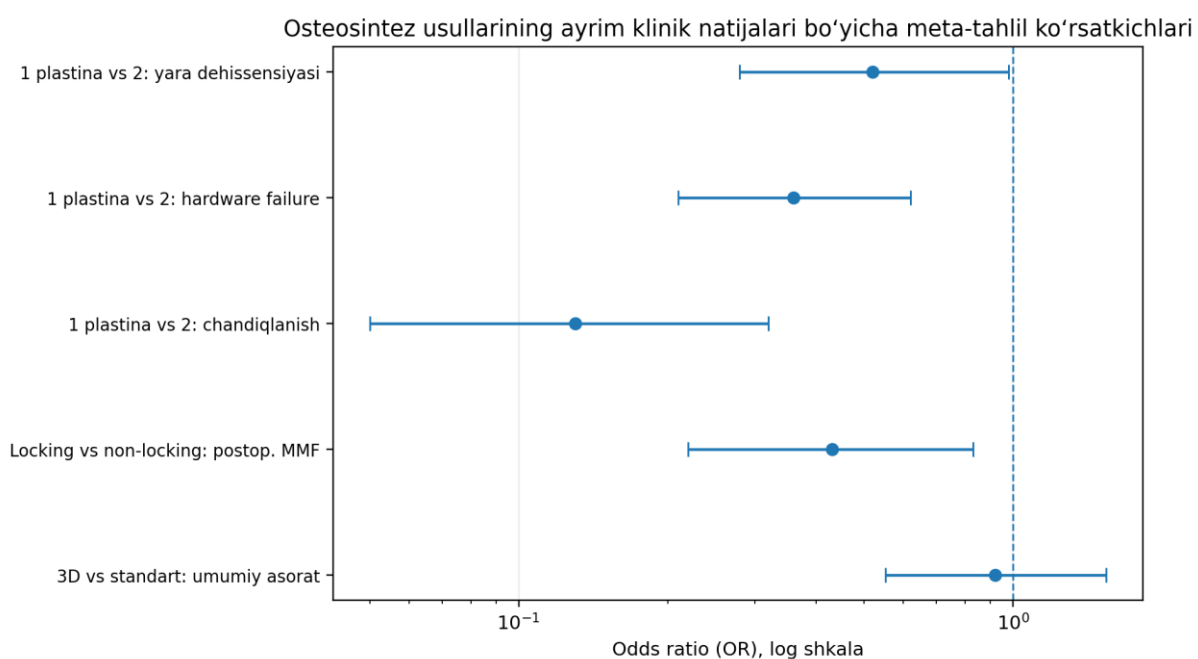
C. 3D/strut plastina
(uch o'lchamli barqarorlik)

1-rasm. Pastki jag' sinishlarida osteosintez konfiguratsiyalarining sxematik ko'rinishi (mualliflik sxemasi).

Burchak sinishlarida bitta va ikkita miniplastinani taqqoslagan 2022-yilgi yangilangan meta-tahlil 17 tadqiqot va 1667 bemorni qamrab olgan. Infeksiya (OR 0.94), malokkluziya (OR 0.97), neyrosensor disfunksiya (OR 0.67) va pseudoartroz (OR 0.90) bo'yicha statistik farq topilmagan. Aksincha, bitta plastina guruhida yara dehissensiyasi (OR 0.52), hardware failure (OR 0.36) va chandiqlanish (OR 0.13) kamroq kuzatilgan. Bu natija oddiy burchak sinishlarida "ko'proq metall — yaxshiroq natija" degan farazni qo'llab-quvvatlamaydi.

Locking va non-locking 2.0-mm tizimlarini baholagan meta-tahlilda umumiy asoratlar, infeksiya va okkluzion nomuvofiqlik bo'yicha sezilarli farq aniqlanmagan; biroq locking tizim postoperativ MMFga ehtiyojni kamaytirgan (OR 0.43). Biomekanik jihatdan locking plastinada vint boshi plastinaga qulflanib, suyak va plastina orasidagi ishqalanishga kamroq bog'liq rigid konstruksiya hosil qiladi. Shu sababli plastinani mutlaq aniq konturlash talabi non-locking tizimga qaraganda pastroq.

3D plastinalar bo'yicha dalillar bir xil yo'nalishda emas. Randomizatsiyalangan tadqiqotlar meta-tahlilida umumiy asoratlar (OR 0.92), infeksiya, yara dehissensiyasi, paresteziya va malokkluziya bo'yicha standart miniplastinaga nisbatan sezilarli farq kuzatilmagan. Boshqa kengroq meta-tahlillarda esa 3D tizimlar hardware failure va malokkluziya xavfini kamaytirishi qayd etilgan. 2024-yilgi 60 bemorli qiyosiy tadqiqotda 3D locking plastinalarda operatsiya vaqti qisqaroq va postoperativ okkluziyani tuzatish ehtiyoji kamroq bo'lgan, infeksiya esa o'xshash bo'lgan.



1-diagramma. Nashr etilgan meta-tahlillardan olingan ayrim effekt ko'rsatkichlari. $OR < 1$ birinchi ko'rsatilgan usul foydasiga yo'nalishni bildiradi; 95% CI 1 ni kesib o'tsa, farq statistik jihatdan noaniq.

Taqqoslash	Dalil bazasi	Asosiy natija	Klinik talqin	Dalil cheklovi
1 vs 2 miniplastin a (angle)	17 tadqiqot, 1667 bemor	Infeksiya/malokkluziya o'xshash; 1 plastinada dehissensiya, chandiq va hardware failure kamroq	Oddiy angle sinishida ikkinchi plastinani rutinda qo'shish shart emas	Tadqiqot dizaynlari aralash
3D vs standart miniplastin a	9 RCT, 283 bemor	Umumiy asorat OR 0.92; sezilarli farq yo'q	Ikkala usul ham maqbul; holat va tajribaga mos tanlash	Namuna kichik, lokalizatsiyalar turli
Locking vs non- locking	9 qiyosiy ish, 380 bemor/55 1 sinish joyi	Umumiy asorat o'xshash; postop. MMF lockingda kamroq	Locking mexanik va amaliy afzallik beradi, lekin klinik ustunlik absolyut emas	Eskiroq dalillar, implantlar evolyutsiyasi
3D vs standart (2024 klinik)	60 bemor	3D: qisqaroq operatsiya, kamroq okkluzion korreksiya; infeksiya o'xshash	Tanlangan angle/body sinishlarda samarali alternativ	Bir markaz, kichik namuna
Rekonstruktiv plastina	AO biomekanik tavsiya	Murakkab sinishda load-bearing	Komminut/atrofik/defektli sinishda strukturaviy tanlov	RCT bilan universal taqqoslash maqsadga muvofiq emas

2-jadval. Osteosintez usullarining klinik dalillar bo'yicha taqqoslanishi.

Sinish turi	Tavsiya etiladigan konstruksiya	Asos	Muhim ehtiyot choralari
Oddiy angle sinishi	1 ta superior miniplastina yoki 3D/strut	Load-sharing, kam disseksiya	Okkluziya va reduksiya mukammal bo'lishi kerak
Simfiz/parasimfiz	2 nuqtali fiksatsiya: 2 plastina, 2 lag-vint yoki 3D	Torsion/rotatsion kuchlar	Mental nerv va tish ildizlarini saqlash
Oddiy tana sinishi	1 load-sharing plastina; zaruratda ikkinchi	Funksional osteosintez	Mandibular kanal va ildizlar zonasi
Komminut/segmental defekt	Locking rekonstruktiv plastina	Load-bearing bridging	Har tomonda yetarli sog'lom suyakda vintlar
Atrofik edentul jag'	Load-bearing rekonstruktiv plastina	Suyak kontakt yuzasi va sifati past	Katta profil va yumshoq to'qima qoplamasi
Condylar process	Ko'pincha 2 plastina yoki stabil 3D konstruksiya	Ko'p yo'nalishli kuchlar	Yuz nervi, kirish yo'li va segment o'lchami

3-jadval. Sinish morfologiyasiga qarab osteosintez konstruksiyasini tanlash.

MUHOKAMA

Dalillar pastki jag' sinishlarida osteosintez samaradorligi implantning "kuchliligi"dan ko'ra biomekanik vazifaga mosligiga bog'liqligini ko'rsatadi. Oddiy load-sharing sinishda fragmentlar o'zaro kontakt orqali chaynash yukining bir qismini o'tkazadi; shuning uchun katta va rigid rekonstruktiv plastina ortiqcha bo'lishi mumkin. Aksincha, komminut yoki atrofik sinishda suyakning o'zi yukni ishonchli o'tkaza olmaydi va load-bearing konstruksiya talab etiladi.

Burchak sinishlari alohida ahamiyatga ega, chunki bu zona m. masseter va m. pterygoideus medialis hosil qiladigan kuchlar tufayli biologik va mexanik jihatdan

murakkab. 2022-yilgi meta-tahlil bitta superior miniplastina va ikkita plastina o'rtasida infeksiya yoki malokkluziya bo'yicha foyda yo'qligini, ikkinchi plastina esa qo'shimcha disseksiya va metall yuklamasi sabab ayrim asoratlarni ko'paytirishi mumkinligini ko'rsatdi. Demak, ikkinchi plastina "profilaktik" ravishda emas, konkret biomekanik sabab bo'lsa qo'llanishi kerak.

3D/strut plastina gorizontal va vertikal elementlarni yagona ramkada birlashtirib, egilish va torsionga qarshilikni oshiradi. Bu konstruksiya nazariy jihatdan kam sonli vintlar bilan yaxshi rigidlik beradi. Biroq meta-tahlillar natijalaridagi tafovutlar 3D plastinaning barcha oddiy sinishlar uchun mutlaq ustunligini isbotlamaydi. Klinik foyda ayniqsa operatsiya vaqti, apparat stabiliteti va ayrim lokalizatsiyalarda namoyon bo'lishi mumkin.

Locking plastinalarning muhim afzalligi shundaki, vintni qotirishda plastina suyak yuzasiga bosilib, fragmentni ikkilamchi siljitmaydi. Bu aniq konturlash qiyin bo'lgan holatlar va suyak sifati past bemorlarda foydali. Shunga qaramay, meta-tahlillarda infeksiya va umumiy asoratlarni bo'yicha katta klinik farq aniqlanmagan. Shuning uchun locking tizimdan foydalanish yomon reduksiya yoki noto'g'ri implant pozitsiyasini kompensatsiya qiladigan "xavfsizlik kafolati" emas.

Operatsiya muvaffaqiyatining asosiy mezonlari implantdan mustaqil ravishda bir xil: anatomik reduksiya, to'g'ri interkuspatsiya, sinish chizig'idagi tishlarning asosli boshqaruvi, yumshoq to'qimalarni ehtiyotkor disseksiya qilish, mandibular kanal va mental nervni himoya qilish, barqaror fiksatsiya va infeksiya nazorati. Hardware failure ko'pincha faqat metallning mexanik yetishmovchiligi emas, balki malreduksiya, infeksiya, yetarli bo'lmagan vint fiksatsiyasi yoki bemorning rejimga rioya qilmasligi bilan bog'liq.

Ushbu ishning asosiy cheklovi — birlamchi klinik kohortning yo'qligi va turli lokalizatsiyalar, implant dizaynlari hamda kuzatuv muddatlarini birlashtirgan adabiyotlarga tayanishidir. Shu sababli natijalar individual bemor uchun mutlaq protokol emas, balki dalillarga asoslangan klinik qaror matritsasi sifatida talqin qilinishi lozim.

XULOSA

Pastki jag' sinishlarida osteosintez usulini tanlashda universal "eng yaxshi plastina" mavjud emas. Klinik samaradorlik sinish morfologiyasiga mos biomekanik konstruksiya tanlash, anatomik reduksiya va okkluziyani tiklash sifatiga bog'liq.

Oddiy mandibular angle sinishlarida bitta Champy miniplastinasi ko‘pincha ikki plastinaga teng klinik natija beradi va ayrim yara/hardware asoratlarini kamaytirishi mumkin. 3D plastinalar tanlangan holatlarda yaxshi uch o‘lchamli stabilitet va qisqaroq operatsiya vaqtini ta‘minlaydi, biroq umumiy asoratlar bo‘yicha mutlaq ustunlik izchil isbotlanmagan. Locking tizimlar biomekanik jihatdan afzal, ayniqsa aniq adaptatsiya qiyin yoki suyak sifati past holatlarda, lekin ularning klinik natijalari ko‘pincha standart tizimlarga yaqin.

Komminut, atrofik, infeksiyalangan yoki segmental defektli sinishlarda load-bearing locking rekonstruktiv plastina asosli tanlov hisoblanadi. Amaliyotda implantni ko‘paytirish emas, minimal yetarli va biomekanik jihatdan to‘g‘ri fiksatsiya tamoyili ustun bo‘lishi kerak.

FOYDALANILGAN ADABIYOTLAR (APA 7)

1. Vitkos, E. N., Papadopoulos, K. A., Dimasis, P., Weissinger, C., & Kyrgidis, A. (2022). One miniplate versus two miniplates in the fixation of mandibular angle fractures: An updated systematic review and meta-analysis. *Journal of Stomatology, Oral and Maxillofacial Surgery*, 123(6), e865–e873. <https://doi.org/10.1016/j.jormas.2022.07.008>
2. Balani, A., Saroj, P., Kharsan, V., Karan, A., Mazhar, H., & Awasthy, A. (2024). Management of mandibular angle and body fractures using miniplates and 3D plates. *Bioinformation*, 20(6), 605–609. <https://doi.org/10.6026/973206300200605>
3. Zhan, S., Jiang, Y., Cheng, Z., & Ye, J. (2017). Three dimensional versus standard miniplate fixation in the management of mandibular fractures: A meta-analysis of randomized controlled trials. *Kaohsiung Journal of Medical Sciences*, 33(9), 464–472. <https://doi.org/10.1016/j.kjms.2017.05.001>
4. Al-Moraissi, E. A., El-Sharkawy, T. M., El-Ghareeb, T. I., & Chrcanovic, B. R. (2014). Three-dimensional versus standard miniplate fixation in the management of mandibular angle fractures: A systematic review and meta-analysis. *International Journal of Oral and Maxillofacial Surgery*, 43(6), 708–716. <https://doi.org/10.1016/j.ijom.2014.02.002>
5. Guo, S. S., Zhou, W. N., Wan, L. Z., Yuan, H., & Yuan, Y. (2014). A meta-analysis comparing the 2.0-mm locking plate system with the 2.0-mm nonlocking plate system in treatment of mandible fractures. *Journal of Craniofacial Surgery*, 25(6), 2094–2097. <https://doi.org/10.1097/SCS.0000000000001018>

6. AO Foundation. (2026). Locking plate principles. AO Surgery Reference. Retrieved September 12, 2026, from <https://surgeryreference.aofoundation.org/cmfbasic-technique/locking-plate-principles>
7. AO Foundation. (2026). ORIF, one load-sharing plate for body—simple. AO Surgery Reference. Retrieved September 12, 2026, from <https://surgeryreference.aofoundation.org/cmftrauma/mandible/body-simple/orif-one-load-sharing-miniplate>
8. AO Foundation. (2026). ORIF, load-bearing plate with or without simplification for body—complex. AO Surgery Reference. Retrieved September 12, 2026, from <https://surgeryreference.aofoundation.org/cmftrauma/mandible/body-complex/orif-load-bearing-plate-with-or-without-simplification>
9. AO Foundation. (2026). ORIF, arch bar and load-sharing plate for symphysis and parasymphysis—simple. AO Surgery Reference. Retrieved September 12, 2026, from <https://surgeryreference.aofoundation.org/cmftrauma/mandible/symphysis-and-parasymphysis-simple/arch-bar-and-plate>
10. AO Foundation. (2026). ORIF, lag screws for symphysis and parasymphysis—simple. AO Surgery Reference. Retrieved September 12, 2026, from <https://surgeryreference.aofoundation.org/cmftrauma/mandible/symphysis-and-parasymphysis-simple/orif-lag-screws>
11. AO Foundation. (2026). ORIF, strut plate for angle—simple. AO Surgery Reference. Retrieved September 12, 2026, from <https://surgeryreference.aofoundation.org/cmftrauma/mandible/angle-simple/orif-strut-plate>

YUZ-JAG‘ JARROHLIGIDA TROMBOTSITLARGA BOY PLAZMA — PRP VA PRF TEXNOLOGIYALARINING QO‘LLANILISHI

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ANNOTATSIYA

Ushbu maqolada yuz-jag‘ jarrohligida autolog trombosit konsentratlari — trombositlarga boy plazma (platelet-rich plasma, PRP) va trombositlarga boy fibrin (platelet-rich fibrin, PRF) texnologiyalarining biologik asoslari, tayyorlash protokollari va klinik samaradorligi zamonaviy dalillar asosida tahlil qilindi. Adabiyotlar sintezi tish ekstraksiyasi va alveolyar ridge saqlanishi, uchinchi molyar jarrohligi, alveolyar augmentatsiya va yo‘naltirilgan suyak regeneratsiyasi, implantologiya, jag‘ sinishlari, yumshoq to‘qima bitishi hamda dori vositalari bilan bog‘liq jag‘ osteonekrozi kabi yo‘nalishlarni qamrab oldi. PRP yuqori trombosit konsentratsiyasiga ega suyuq yoki gel shaklidagi preparat bo‘lib, ko‘pincha antikoagulyant va keyingi aktivatsiyani talab qiladi; PRF esa antikoagulyantsiz hosil qilinadigan uch o‘lchamli fibrin matriksi bo‘lib, trombositlar, leukositlar va biologik mediatorlarning nisbatan uzoq muddatli ajralishini ta‘minlaydi. Zamonaviy sistematik sharhlar PRFning ekstraksiya alveolasida yumshoq to‘qima bitishi, og‘riqni kamaytirish, alveolyar o‘lchamlarni saqlash va yangi suyak hosil bo‘lishini qo‘llab-quvvatlashini ko‘rsatadi. Biroq alveolyar ridge rekonstruksiya va GBRda suyak hajmini oshirish bo‘yicha natijalar bir xil emas. PRP uchun oral jarrohlikdagi mavjud dalillar ko‘proq heterogen va ayrim natijalar uchun past sifatli. Shuning uchun PRP/PRF asosiy jarrohlik texnikasini almashtiruvchi emas, balki to‘g‘ri ko‘rsatmada qo‘llanadigan biologik adjuvant sifatida baholanishi lozim.

Kalit so‘zlar: PRP, PRF, trombosit konsentratlari, fibrin matriksi, yuz-jag‘ jarrohligi, alveolyar ridge, suyak regeneratsiyasi, yumshoq to‘qima bitishi, implantologiya, MRONJ.

АННОТАЦИЯ

В статье проанализированы биологические основы, методы приготовления и клиническая эффективность аутологичных концентратов тромбоцитов — плазмы, обогащённой тромбоцитами (PRP), и фибрина, обогащённого тромбоцитами (PRF), в челюстно-лицевой хирургии. Рассмотрены применение после удаления зубов и для сохранения альвеолярного гребня, в хирургии третьих моляров, при костной аугментации и направленной костной регенерации, имплантации, переломах челюстей, заживлении мягких тканей и медикаментозно-ассоциированном остеонекрозе челюстей. PRP представляет собой жидкий или гелеобразный концентрат с высокой концентрацией тромбоцитов, который обычно готовится с антикоагулянтом и последующей активацией. PRF получают без антикоагулянта в виде трёхмерной фибриновой матрицы, обеспечивающей более продолжительное высвобождение клеток и биологических медиаторов. Современные систематические обзоры показывают положительное влияние PRF на заживление мягких тканей, уменьшение боли, сохранение размеров альвеолярного гребня и образование новой кости после удаления зубов. Однако при реконструкции альвеолярного гребня и GBR эффект на прирост объёма кости остаётся неоднозначным. Доказательства в отношении PRP в оральной хирургии более гетерогенны и для ряда исходов имеют низкую определённость. Следовательно, PRP и PRF следует рассматривать как биологические адьюванты, а не как замену базовым хирургическим принципам.

Ключевые слова: PRP, PRF, концентрат тромбоцитов, фибриновый матрикс, челюстно-лицевая хирургия, альвеолярный гребень, костная регенерация, заживление мягких тканей, имплантология, MRONJ.

ABSTRACT

This article analyzes the biological basis, preparation methods, and clinical effectiveness of autologous platelet concentrates—platelet-rich plasma (PRP) and platelet-rich fibrin (PRF)—in oral and maxillofacial surgery. The evidence synthesis covers tooth extraction and alveolar ridge preservation, third-molar surgery, alveolar augmentation and guided bone regeneration, implant dentistry, jaw fractures, soft-tissue healing, and medication-related osteonecrosis of the jaw. PRP is a liquid or gel preparation with an increased platelet concentration and commonly requires anticoagulation followed by activation. PRF is prepared without anticoagulants and forms a three-dimensional fibrin matrix capable of retaining platelets, leukocytes, and signaling molecules with a comparatively prolonged release profile. Recent systematic reviews suggest that PRF can enhance soft-tissue healing, reduce postoperative pain,

mitigate post-extraction ridge resorption, and support new bone formation. However, the additional effect of PRF on absolute bone gain in alveolar ridge reconstruction or guided bone regeneration remains inconsistent. Evidence supporting PRP in oral surgery is more heterogeneous and of low certainty for several outcomes. Therefore, PRP and PRF should be considered biologic adjuncts used for specific indications rather than substitutes for sound surgical technique and appropriate defect management.

Keywords: PRP, PRF, platelet concentrate, fibrin matrix, oral and maxillofacial surgery, alveolar ridge, bone regeneration, soft-tissue healing, implant dentistry, MRONJ.

KIRISH

Autolog trombosit konsentratlari regenerativ tibbiyotning eng ko‘p o‘rganilayotgan biologik vositalaridan biridir. Ularning nazariy asosi trombositlarning faqat gemostazda emas, balki PDGF, TGF- β , VEGF, EGF va boshqa mediatorlarni saqlash va ajratish orqali angiogenez, hujayra migratsiyasi, fibroblast faolligi va ekstrasellyulyar matriks shakllanishiga ta‘sir ko‘rsatishiga bog‘liq. Yuz-jag‘ jarrohlida bu xususiyatlar ekstraksiya alveolasi, suyak defekti, yumshoq to‘qima yarasi va graft bilan bog‘liq rekonstruktiv jarayonlarda klinik jihatdan jozibador hisoblanadi.

PRP birinchi avlod trombosit konsentratlaridan biri bo‘lib, uni tayyorlash protokollari sezilarli farq qiladi. Ko‘pchilik tizimlarda venoz qon antikoagulyant bilan olinadi, sentrifugatsiya orqali trombositlar konsentratsiyasi oshiriladi va ishlatishdan oldin trombin yoki kaltsiy preparati bilan aktivatsiya qilinadi. Natijada suyuq PRP yoki gel hosil bo‘ladi. Ushbu heterogenlik klinik tadqiqotlarni bir-biri bilan taqqoslashni qiyinlashtiradi, chunki trombosit konsentratsiyasi, leukotsit tarkibi va aktivatsiya usuli turlicha bo‘lishi mumkin.

PRF ikkinchi avlod autolog trombosit konsentratlari sifatida antikoagulyantsiz tayyorlanadi. Qon olingach darhol sentrifugatsiya qilinadi va tabiiy koagulyatsiya jarayonida fibrin matriksi hosil bo‘ladi. L-PRF, A-PRF, A-PRF+ va i-PRF kabi variantlar nisbiy markazdan qochma kuch, vaqt va naycha xususiyatlariga qarab farq qiladi. PRFning amaliy afzalligi — fibrin scaffoldning mavjudligi va uni membrana, plug yoki suyuq biologik qo‘shimcha shaklida qo‘llash imkoniyatidir.

So‘nggi yillarda PRF bo‘yicha dalillar soni PRPga qaraganda tezroq oshdi. 2024-yilgi L-PRF sistematik sharhi yuz-jag‘ va oral jarrohlikdagi yumshoq to‘qima bitishi va suyak reparatsiyasida ko‘plab ijobiy klinik signallarni qayd etgan. A-PRF bo‘yicha

2024-yilgi sistematik sharh esa protokol standartlashtirilmagan bo'lsa, natijalarni umumlashtirish qiyinligini ko'rsatgan. PRP bo'yicha 2019-yilgi sistematik sharh oral jarrohlikdagi umumiy dalil sifatini past deb baholagan.

Ushbu maqolaning maqsadi — yuz-jag' jarrohligida PRP va PRF texnologiyalarining tayyorlanishi, biologik xususiyatlari va klinik qo'llanishlarini zamonaviy sistematik sharhlar va meta-tahlillar asosida qiyosiy baholash hamda amaliy ko'rsatmalar uchun dalillarga asoslangan qaror modelini shakllantirish.

METODOLOGIYA VA ADABIYOTLAR TAHLILI

Ushbu ish strukturaviy narrativ sharh va dalillar sintezi dizaynida bajarildi. PubMed/NCBI bazasida 2019–2026-yillar oralig'ida e'lon qilingan sistematik sharhlar, meta-tahlillar va klinik jihatdan muhim qiyosiy tadqiqotlar ustuvor ravishda tanlandi. Qidiruv tushunchalari “platelet-rich plasma”, “platelet-rich fibrin”, “oral surgery”, “maxillofacial surgery”, “alveolar ridge preservation”, “guided bone regeneration”, “third molar”, “fracture”, “implant”, “MRONJ” va ularning kombinatsiyalarini o'z ichiga oldi.

Kiritish mezonlari: (1) odamlar ishtirokidagi klinik tadqiqotlar yoki ularning sistematik sharhlari; (2) PRP, L-PRF, A-PRF/A-PRF+ yoki i-PRFning yuz-jag'/oral jarrohlikdagi qo'llanishiga bevosita aloqadorlik; (3) og'riq, yumshoq to'qima bitishi, alveolyar o'lchamlar, suyak hosil bo'lishi, graft natijalari, implant bilan bog'liq natijalar, sinish reparatsiyasi yoki MRONJ kabi klinik ko'rsatkichlarning baholanishi. Faqat in vitro yoki hayvon modellari asosidagi ishlar klinik xulosa uchun asosiy dalil sifatida qabul qilinmadi.

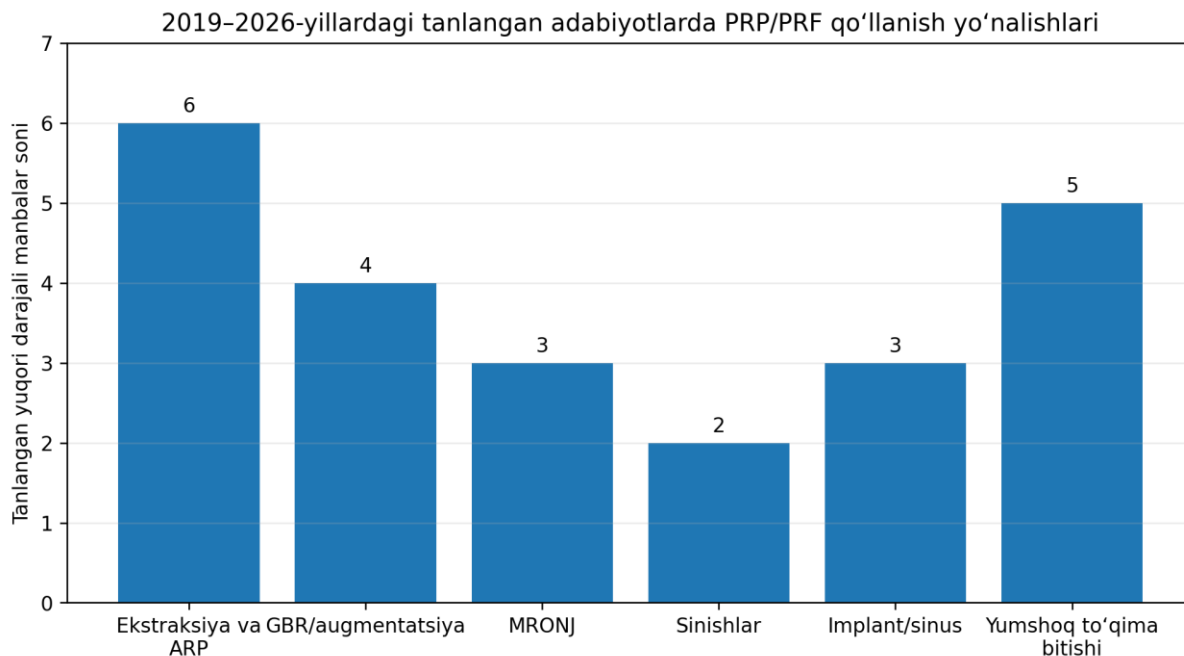
Dalillar oltita amaliy yo'nalishga ajratildi: ekstraksiya va alveolyar ridge preservation; alveolyar ridge rekonstruksiya/GBR; implantologiya va sinus augmentatsiyasi; jag' sinishlari; yumshoq to'qima reparatsiyasi; MRONJ. PRP va PRFni to'g'ridan-to'g'ri universal “g'olib” sifatida taqqoslashdan qochildi, chunki ularning tayyorlash protokollari, fizik shakli va klinik nishonlari bir xil emas.

Birlamchi bemor ma'lumotlari mavjud bo'lmagani sababli maqolada uydirma klinik foizlar yaratilmadi. Natijalar bo'limidagi diagramma tanlangan yuqori darajali manbalarning qaysi klinik yo'nalishlarni yoritganini ko'rsatadi; bu diagramma epidemiologik chastotani emas, adabiyotlar sintezining tarkibini ifodalaydi.

NATIJALAR

Dalillar sintezi PRF bo'yicha eng izchil klinik signal tish ekstraksiyasidan keyingi yumshoq to'qima bitishi, postoperativ noqulaylik va alveolyar ridge o'lchamlarini

saqlashda mavjudligini ko'rsatdi. PRP uchun ayrim ijobiy natijalar qayd etilgan bo'lsa-da, preparat standartlashtirilmaganligi va tadqiqotlar heterogenligi sabab dalil aniqligi pastroq.



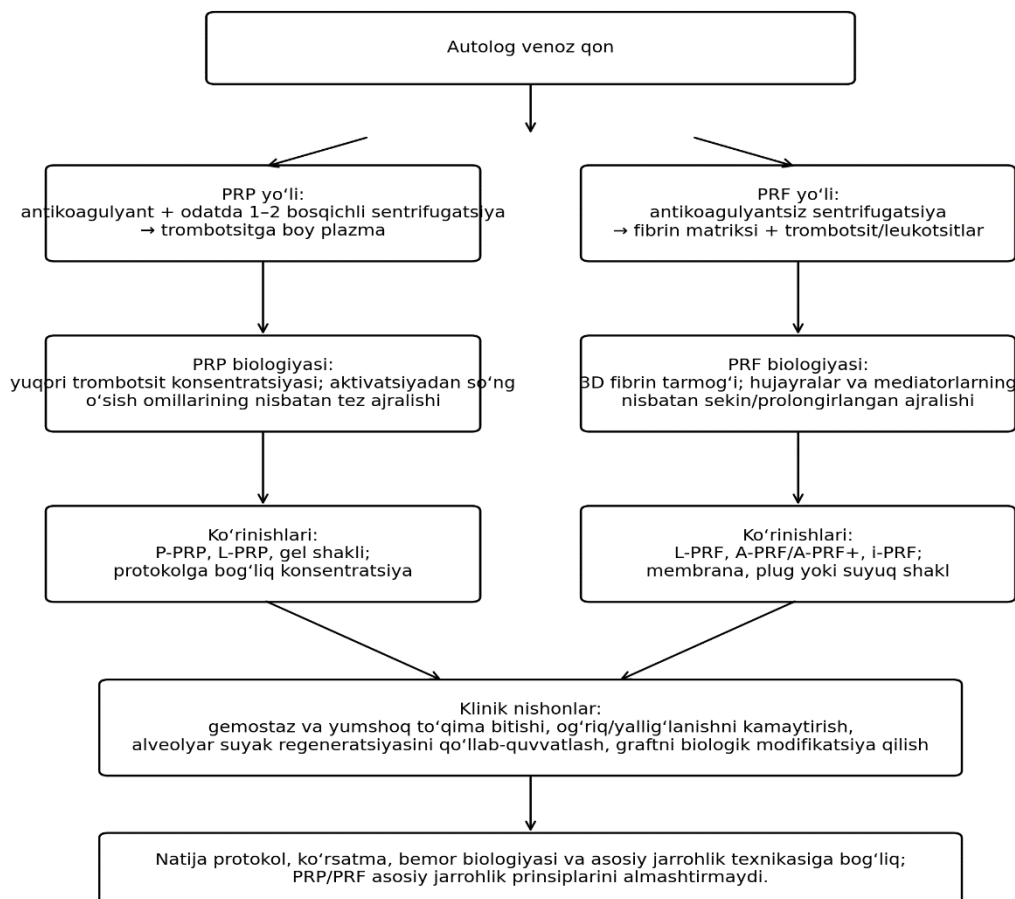
1-diagramma. Tanlangan zamonaviy sistematik sharh va meta-tahlillarda PRP/PRF qo'llanish yo'nalishlarining taqsimoti.

Xususiyat	PRP	PRF	Klinik ahamiyati
Tayyorlash	Ko'pincha antikoagulyant; 1–2 bosqichli sentrifugatsiya; keyin aktivatsiya	Antikoagulyantsiz; tezkor sentrifugatsiya va tabiiy fibrin polimerizatsiyasi	Protokol natijaga bevosita ta'sir qiladi
Asosiy fizik shakl	Suyuqlik yoki gel	Membrana, plug yoki suyuq i-PRF	Defekt turi va ishlov berish usulini belgilaydi
Matriks	Faollashtirilganda fibrin gel, odatda nisbatan nozik	Zich 3D fibrin tarmog'i	Hujayra va mediatorlar uchun scaffold
Leukotsit tarkibi	P-PRP yoki L-PRP protokoliga bog'liq	L-PRF/A-PRFda leukotsitlar saqlanishi mumkin	Yallig'lanish va reparatsiyaga ta'siri ehtimoliy

Xususiyat	PRP	PRF	Klinik ahamiyati
Growth-factor release	Ko'pincha tezroq boshlanuvchi release	Ko'proq davomli release profili haqida eksperimental dalillar mavjud	Klinik afzallikni protokol va indikatsiya belgilaydi
Standartlashtirish	Tizimlar orasida katta farq	RCF, vaqt, naycha va sentrifuga radiusiga sezgir	RPMni yakka ko'rsatish yetarli emas; RCF muhim
Amaliy murakkablik	Aktivatsiya va qo'shimcha reagent talab qilishi mumkin	Ko'pincha sodda chairside protokol	Vaqt va xarajatga ta'sir qiladi

1-jadval. PRP va PRF texnologiyalarining asosiy qiyosiy xususiyatlari.

PRP va PRF tayyorlash hamda biologik ta'sirining soddalashtirilgan sxemasi



1-rasm. PRP va PRF tayyorlash hamda biologik ta'sirining soddalashtirilgan sxemasi (mualliflik sxemasi).

Alveolyar ridge preservation bo'yicha 2025-yilda chop etilgan sistematik sharh va meta-tahlillar autolog trombosit konsentratlari, ayniqsa L-PRF, spontan bitishga nisbatan yumshoq to'qima bitishini tezlashtirishi, postekstraksion og'riqni kamaytirishi, ridge rezorbsiyasini cheklashi va socket bone fill/bone density ko'rsatkichlarini yaxshilashi mumkinligini ko'rsatdi. Biroq tadqiqotlar orasidagi jarrohlik protokoli va natija o'lchovlari heterogen bo'lgan. 2026-yilgi faqat PRFni alohida biomaterial sifatida baholagan meta-tahlilda 18 RCT kiritilib, 3–6 oy oralig'ida alveolyar balandlik yo'qotilishi kamaygani, 2–3 oyda kenglik yo'qotilishi kamaygani va 3–4 oyda yangi suyak hosil bo'lish foizi yuqoriroq bo'lgani qayd etilgan.

2019-yilgi PRP sistematik sharhiga 21 RCT kiritilgan bo'lsa-da, meta-tahlil periodontal defektlar bilan cheklangan, chunki ekstraksiya alveolasi va sinus lift kabi yo'nalishlarda tadqiqotlar soni kam va protokollar juda heterogen bo'lgan. Mualliflar PRPning ayrim natijalarda kichik klinik foydasini qayd etgan, ammo dalil sifatini past deb baholagan. Bu PRP samarasiz degani emas; asosiy muammo — standartlashtirish va ishonchli taqqoslashlarning yetishmasligi.

Alveolyar ridge rekonstruksiyasi va GBRda PRFning qo'shimcha qiymati yanada murakkab. 2024-yil oxirida e'lon qilingan sistematik sharh PRF yumshoq to'qima bitishi va postoperativ noqulaylikni kamaytirishi mumkinligini, lekin gorizontal/vertikal suyak gainiga qo'shimcha ta'sir har doim ham aniq emasligini ko'rsatgan. Shuning uchun PRFni suyak grafti yoki barqaror membrananing o'rniga emas, balki biologik adjuvant yoki graft modifier sifatida ko'rish maqsadga muvofiq.

Jag' sinishlari bo'yicha 2026-yilgi sistematik sharh va meta-tahlil PRP/PRF qo'llanishining radiologik suyak zichligi va reparatsiya ko'rsatkichlariga ta'sirini baholagan. Ijobiy signal bo'lsa-da, tadqiqotlar soni cheklangan va protokollar turlicha bo'lganligi sabab bu usullar osteosintezning biomekanik barqarorligini almashtira olmaydi. Ular faqat reduksiya va fiksatsiya to'g'ri bajarilganidan keyingi biologik yordamchi vosita sifatida o'rin tutadi.

MRONJ bo'yicha 2024-yilgi sistematik sharhlar autolog trombosit konsentratlarini jarrohlik debridment/reseksiya bilan birga qo'llashda yumshoq to'qima yopilishi va klinik rezolyutsiya bo'yicha istiqbolli natijalarni qayd etadi. Biroq dalil bazasida case series va kuzatuv tadqiqotlari ko'p, shuning uchun PRF/PRPni standart davolash o'rniga qo'yish uchun yetarli asos yo'q. MRONJda asosiy qaror kasallik bosqichi, nekrotik suyakni boshqarish va sistemik terapiyaga bog'liq.

Klinik yo‘nalish	Dalil signali	PRP/PRFning mumkin bo‘lgan roli	Muhim cheklov
Tish ekstraksiyasi / ARP	PRF foydasiga eng izchil dalil	Og‘riqni kamaytirish, yumshoq to‘qima bitishi, ridge rezorbsiyasini kamaytirish, bone fill	Protokollar va ekstraksiya dizayni heterogen
Uchinchi molyar jarrohligi	PRF ko‘plab tadqiqotlarda ijobiy	Alveolit, og‘riq, shish va socket bitishiga yordamchi	Natijalar o‘lchovi va PRF turi turlicha
GBR / ridge augmentatsiya	Yumshoq to‘qima va noqulaylikda foyda ehtimoli yuqori; bone gain noaniqroq	Graftni biologik modifikatsiya qilish, membrane/plug sifatida	Suyak hajmi uchun strukturaviy biomaterialni almashtirmaydi
Implant / sinus augmentatsiya	Aralash dalil	Erta yumshoq to‘qima bitishi, graft handling, ehtimoliy biologik yordam	Implant survival bo‘yicha mutlaq ustunlik izchil isbotlanmagan
Jag‘ sinishlari	Ijobiy, lekin cheklangan dalil	Suyak reparatsiyasini biologik qo‘llab-quvvatlash	Osteosintez barqarorligini almashtirmaydi
MRONJ	Istiqbolli, ammo certainty cheklangan	Reseksiya/debridmentdan keyin wound closure va regenerativ yordam	Bosqich, antiresorptiv dori va asosiy jarrohlik taktika hal qiluvchi

2-jadval. Yuz-jag‘ jarrohligida PRP/PRFning asosiy klinik qo‘llanishlari va dalil talqini.

Klinik savol	Afzal yondashuv	PRP/PRFdan kutiladigan foyda	Noto'g'ri talqin xavfi
Oddiy ekstraktsiya alveolasida bitishni tezlashtirish kerakmi?	PRF ko'proq amaliy va dalili ko'proq	Yumshoq to'qima, og'riq va ridge preservationga yordam	PRFni majburiy standart deb qabul qilish
Katta ridge defektini tiklash kerakmi?	Graft + stabil membrana/fiksatsiya; PRF adjuvant	Graft biologiyasini va wound healingni qo'llab-quvvatlash	PRFni hajm beruvchi graft o'rniga ishlatish
Suyuq biologik modifier kerakmi?	i-PRF yoki protokolga mos PRP	Graft zarrachalarini aglomeratsiya qilish, mahalliy mediatorlar	Tarkibni nazorat qilmasdan faqat "PRF/PRP" nomiga tayanish
MRONJ yoki yuqori xavfli yara bormi?	Asosiy jarrohlik protokoli + tanlangan APC	Yopilish va reparatsiyani qo'llab-quvvatlash	APCni nekrektomiya yoki infeksiya nazoratining o'rniga qo'yish
Sinish reparatsiyasini yaxshilash kerakmi?	Anatomik reduksiya + stabil osteosintez; APC qo'shimcha	Biologik reparatsiya uchun potensial yordam	Mexanik stabilitet muammosini biologik preparat bilan "davolash"

3-jadval. PRP/PRFdan foydalanishda klinik qaror matritsasi.

MUHOKAMA

PRP va PRFni bir-birining to'g'ridan-to'g'ri alternativi sifatida ko'rish metodologik jihatdan noto'g'ri. PRP ko'pincha biologik suyuqlik yoki gel sifatida ishlatiladi; PRF esa o'zining fibrin scaffoldi sabab membrana va plug vazifasini ham bajaradi. Shu sabab bir xil klinik endpointda ham ularning mexanik va biologik roli farq qiladi.

PRF bo'yicha so'nggi dalillarning eng kuchli qismi ekstraktsiya alveolasi va alveolyar ridge preservation bilan bog'liq. 2025-yilgi 33 tadqiqotni qamragan sharhda L-PRFga

oid ishlar soni eng ko'p bo'lgan va spontan bitishga nisbatan tezroq yumshoq to'qima bitishi, kamroq og'riq, kamroq ridge rezorbsiyasi va yuqoriroq bone fill/bone density signallari qayd etilgan. 2026-yilgi 18 RCTli meta-tahlil ushbu yo'nalishda PRF foydasini vaqt nuqtalari bo'yicha aniqroq ko'rsatgan. Bu PRFning eng asosli klinik indikatsiyalaridan biri ekanini ko'rsatadi.

GBR va ridge augmentatsiyada vaziyat boshqacha. Suyak gain uchun uchta omil hal qiluvchi: barqaror bo'shliq, angiogenez va osteogen/osteokonduktiv muhit. PRF angiogenez va yumshoq to'qima komponentini qo'llab-quvvatlashi mumkin, ammo o'zi katta hajmli defektda yetarli strukturaviy scaffold yoki space maintenance bermaydi. Shuning uchun murakkab vertikal/horizontal augmentatsiyada uni graft va barqaror membrananing o'rniga qo'yish biologik jihatdan jozibador bo'lsa ham, klinik jihatdan zaif qarordir.

PRP bo'yicha asosiy muammo samaradorlikning yo'qligi emas, balki termin va protokol intizomining zaifligidir. "PRP" nomi ostida trombosit konsentratsiyasi, leukotsit miqdori, antikoagulyant va aktivatsiya usuli turlicha bo'lgan preparatlar qo'llangan. Bu heterogenlik 2019-yilgi sistematik sharhda dalil aniqligining past bo'lishiga sabab bo'lgan. Zamonaviy tadqiqotlarda minimal reporting standartlari — boshlang'ich va yakuniy trombosit soni, leukotsit tarkibi, sentrifugatsiya parametrlari va aktivatsiya usuli — ko'rsatilishi kerak.

PRFda ham "past tezlik yaxshiroq" degan umumiy shior yetarli emas. Klinik taqqoslash uchun RPMdan ko'ra relative centrifugal force (RCF), rotor radiusi, vaqt, naycha materiali va qon olishdan sentrifugatsiyagacha o'tgan vaqt muhim. 2023-yilgi meta-tahlil turli PRF protokollari ekstraksiyadan keyingi wound healing va ridge preservation natijalariga ta'sir qilishi mumkinligini ko'rsatadi. Demak, PRF preparati biologik mahsulot bo'lib, uning sifati protokol intizomiga bog'liq.

MRONJ va sinishlarda PRP/PRF istiqbolli bo'lsa-da, klinik shoshilinch yoki asosiy jarrohlik qarorlarini o'zgartirmasligi kerak. MRONJda nekrotik to'qima boshqaruvi va kasallik bosqichi; sinishda esa reduksiya va stabil fiksatsiya birlamchi. Biologik adjuvant noto'g'ri jarrohlikni kompensatsiya qila olmaydi.

Ushbu maqolaning cheklovi birlamchi klinik kohortning yo'qligi va turli PRP/PRF klassifikatsiyalarini birlashtirgan sistematik sharhlarga tayanishidir. Shuningdek, ayrim yangi texnologiyalar bo'yicha RCTlar soni hali kam. Shu sabab tavsiyalar "majburiy protokol" emas, balki mavjud dalillar asosidagi ehtiyotkor klinik interpretatsiya sifatida qaralishi lozim.

XULOSA

Yuz-jag‘ jarrohlida PRP va PRF autolog biologik adjuvantlar sifatida foydali imkoniyat yaratadi, biroq ularning klinik qiymati ko‘rsatma va tayyorlash protokoliga bog‘liq. PRFning fibrin matriksi uni ekstraktsiya alveolasi, yumshoq to‘qima bitishi va alveolyar ridge preservationda amaliy jihatdan qulay qiladi; bu yo‘nalishlarda so‘nggi sistematik sharhlar eng izchil ijobiy dalillarni ko‘rsatadi.

PRP uchun oral jarrohlikdagi ijobiy natijalar mavjud, ammo preparat heterogenligi va dalil sifatining pastligi sabab universal ustunlik haqida xulosa qilish mumkin emas. PRP yoki i-PRF suyuq biologik modifier sifatida graft bilan kombinatsiyada muayyan amaliy afzallik berishi mumkin, lekin bu yondashuv strukturaviy graft, membrana yoki mexanik fiksatsiyaning o‘rnini bosmaydi.

GBR, katta suyak defektlari, jag‘ sinishlari va MRONJda PRP/PRF asosiy jarrohlik prinsiplarini to‘ldiruvchi vosita sifatida qo‘llanishi kerak. Kelajakdagi tadqiqotlarning eng muhim vazifasi PRP/PRF preparatlarini standart tavsiflash, RCF va biologik tarkibni to‘liq hisobot qilish hamda klinik jihatdan muhim, uzoq muddatli endpointlar bilan yuqori sifatli randomizatsiyalangan tadqiqotlar o‘tkazishdir.

FOYDALANILGAN ADABIYOTLAR (APA 7)

1. Franchini, M., Cruciani, M., Mengoli, C., Masiello, F., Marano, G., D’Aloja, E., Dell’Arima, C., Pati, I., Veropalumbo, E., Pupella, S., Vaglio, S., & Liumbruno, G. M. (2019). The use of platelet-rich plasma in oral surgery: A systematic review and meta-analysis. *Blood Transfusion*, 17(5), 357–367. <https://doi.org/10.2450/2019.0177-19>
2. Pan, J., Xu, Q., Hou, J., Wu, Y., Liu, Y., Li, R., Pan, Y., & Zhang, D. (2019). Effect of platelet-rich fibrin on alveolar ridge preservation: A systematic review. *Journal of the American Dental Association*, 150(9), 766–778. <https://doi.org/10.1016/j.adaj.2019.04.025>
3. Wolf, M., Torchetti, L., & Wolf-Brandstetter, C. (2023). Does the choice of preparation protocol for platelet-rich fibrin have consequences for healing and alveolar ridge preservation after tooth extraction? A meta-analysis. *Journal of Oral and Maxillofacial Surgery*, 81(5), 534–546. <https://doi.org/10.1016/j.joms.2023.01.004>
4. Ribeiro, E. D., de Santana, I. H. G., Viana, M. R. M., Honfi Júnior, E. S., Dias, J. C. P., Ferreira-Júnior, O., & Sant’Ana, E. (2024). The efficacy of platelet and leukocyte-rich fibrin (L-PRF) in the healing process and bone repair in oral and maxillofacial surgeries: A systematic review. *Clinical Oral Investigations*, 28(7), 414. <https://doi.org/10.1007/s00784-024-05817-w>

5. Chmielewski, M., Pilloni, A., & Adamska, P. (2024). Application of advanced platelet-rich fibrin in oral and maxillo-facial surgery: A systematic review. *Journal of Functional Biomaterials*, 15(12), 377. <https://doi.org/10.3390/jfb15120377>
6. Siawasch, S. A. M., Yu, J., Castro, A. B., Dhondt, R., Teughels, W., Temmerman, A., & Quirynen, M. (2025). Autologous platelet concentrates in alveolar ridge preservation: A systematic review with meta-analyses. *Periodontology 2000*, 97(1), 104–130. <https://doi.org/10.1111/prd.12609>
7. Lu, E., et al. (2025). The effectiveness of platelet rich fibrin in alveolar ridge reconstructive or guided bone regenerative procedures: A systematic review and meta-analysis. *Journal of Dentistry*, 152, 105548. <https://doi.org/10.1016/j.jdent.2024.105548>
8. Nowak, S. M., Sacco, R., Mitchell, F. L., Patel, V., & Gurzawska-Comis, K. (2024). The effectiveness of autologous platelet concentrates in prevention and treatment of medication-related osteonecrosis of the jaws: A systematic review. *Journal of Cranio-Maxillofacial Surgery*, 52(6), 671–691. <https://doi.org/10.1016/j.jcms.2024.01.007>
9. Aljohani, M. H. (2024). Platelet-rich plasma in the prevention and treatment of medication-related osteonecrosis of the jaw: A systematic review and meta-analysis. *Journal of Craniofacial Surgery*. Advance online publication. <https://doi.org/10.1097/SCS.00000000000010664>
10. Sivaramakrishnan, G., et al. (2026). Effectiveness of platelet-rich fibrin or platelet-rich plasma in mandibular fracture management: A systematic review and meta-analysis. *Journal of Stomatology, Oral and Maxillofacial Surgery*, 127(1).
11. Zhang, Y., et al. (2024). Efficacy of autologous platelet concentrate products for alveolar preservation: A meta-analysis. *Oral Diseases*. <https://doi.org/10.1111/odi.14874>
12. Ye, L., He, Y., Ma, W., Zhou, F., & Liu, J. (2024). Effect of platelet-rich fibrin on the recovery after third molar surgery: A systematic review and meta-analysis. *Journal of Cranio-Maxillofacial Surgery*, 52(10), 1095–1108. <https://doi.org/10.1016/j.jcms.2024.06.022>
13. Miron, R. J., Fujioka-Kobayashi, M., Bishara, M., Zhang, Y., Hernandez, M., & Choukroun, J. (2017). Platelet-rich fibrin and soft tissue wound healing: A systematic review. *Tissue Engineering Part B: Reviews*, 23(1), 83–99. <https://doi.org/10.1089/ten.TEB.2016.0233>

14. Miron, R. J., Zucchelli, G., Pikos, M. A., Salama, M., Lee, S., Guillemette, V., Fujioka-Kobayashi, M., Bishara, M., Zhang, Y., Wang, H.-L., Chandad, F., Nacopoulos, C., Simonpieri, A., Aalam, A. A., Felice, P., Sammartino, G., Ghanaati, S., & Hernandez, M. A. (2017). Use of platelet-rich fibrin in regenerative dentistry: A systematic review. *Clinical Oral Investigations*, 21(6), 1913–1927. <https://doi.org/10.1007/s00784-017-2133-z>
15. Choukroun, J., Adda, F., Schoeffler, C., & Vervelle, A. (2001). Une opportunité en paro-implantologie: Le PRF. *Implantodontie*, 42, 55–62.

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Annotatsiya. Mazkur maqolada O'zbekiston Respublikasining mustaqillik yillarida iqtisodiy xavfsizlikni ta'minlash borasida amalga oshirilgan islohotlar tahlil qilinadi. Tahlil jarayonida O'zbekiston Respublikasi Statistika qo'mitasining rasmiy ma'lumotlari, qonun hujjatlari va davlat dasturlari asos qilib olindi. Maqolada iqtisodiy xavfsizlikka tahdid soluvchi ichki va tashqi omillar aniqlanib, ularning ta'sir darajasi baholanadi. Yakunda iqtisodiy barqarorlikni mustahkamlash va mavjud xavflarni kamaytirishga qaratilgan beshta amaliy taklif ilgari suriladi.

Kalit so'zlar: iqtisodiy xavfsizlik, mustaqillik, makroiqtisodiy barqarorlik, oziq-ovqat xavfsizligi, energiya mustaqilligi, tashqi qarz, demografik bosim, bandlik, diversifikatsiya, institutsional islohotlar.

Аннотация. В статье анализируются реформы, направленные на обеспечение экономической безопасности в Республике Узбекистан за годы независимости. Анализ базируется на официальных данных Комитета по статистике Республики Узбекистан, законодательных актах и государственных программах. В статье определены внутренние и внешние факторы, угрожающие экономической безопасности, и дана оценка их влияния. В заключение выдвинуты пять практических предложений, нацеленных на укрепление экономической стабильности и снижение существующих рисков.

Ключевые слова: экономическая безопасность, независимость, макроэкономическая стабильность, продовольственная безопасность, энергетическая независимость, внешний долг, демографическое давление, занятость, диверсификация, институциональные реформы.

Abstract. This article analyzes the reforms implemented to ensure economic security in the Republic of Uzbekistan during the years of independence. The analysis is based on official data from the Statistics Committee of the Republic of Uzbekistan, legislative acts, and state programs. The article identifies internal and external factors threatening economic security and assesses their impact. Finally, five practical

proposals aimed at strengthening economic stability and mitigating existing risks are put forward.

Keywords: economic security, independence, macroeconomic stability, food security, energy independence, external debt, demographic pressure, employment, diversification, institutional reforms.

Mustaqillikning o'ttiz besh yilligi O'zbekiston uchun nafaqat tarixiy sana, balki bosib o'tilgan yo'lni chuqur tahlil qilish va kelgusi o'n yilliklar uchun strategik yo'nalishlarni belgilash davri hamdir. Iqtisodiy xavfsizlik masalasi hozirgi davrda alohida ahamiyat kasb etadi, chunki davlat suverenitetining mustahkamligi bevosita milliy iqtisodiyotning ichki va tashqi tahdidlarga qarshi tura olish salohiyati bilan o'lchanadi. O'tgan davr mobaynida mamlakatimiz iqtisodiyoti chuqur tarkibiy o'zgarishlarni boshdan kechirdi, bozor munosabatlariga o'tish, xususiylashtirish, tashqi savdoni liberallashtirish va investitsion muhitni yaxshilash kabi jarayonlar izchil amalga oshirildi. Shu bilan birga, global iqtisodiyotdagi beqarorlik, mintaqaviy ziddiyatlar va iqlim o'zgarishining kuchayishi iqtisodiy xavfsizlikka yangi tahdidlarni keltirib chiqarmoqda. Bugungi kunda mamlakat oldida turgan asosiy vazifa - erishilgan yutuqlarni saqlab qolish bilan birga, yangi davr talablariga moslashish va iqtisodiy mustaqillikni yanada mustahkamlashdan iborat. Mazkur maqolada aynan shu masalalar aniq statistik ma'lumotlar va huquqiy asoslar orqali tahlil qilinadi.

Iqtisodiy xavfsizlik tushunchasi keng qamrovli bo'lib, u o'z ichiga makroiqtisodiy barqarorlik, moliyaviy mustaqillik, oziq-ovqat va energiya ta'minoti, demografik muvozanat hamda tashqi iqtisodiy aloqalarning barqarorligini oladi. Mustaqillikning dastlabki yillarida O'zbekiston iqtisodiy xavfsizligi bir qator jiddiy sinovlarga duch kelgan, chunki sobiq ittifoq iqtisodiy aloqalarining uzilishi, ishlab chiqarishning qisqarishi va inflyatsiyaning yuksalishi kuzatilgan.

1992-1995-yillardagi iqtisodiy ko'rsatkichlarga nazar tashlaydigan bo'lsak, mamlakatimizda yalpi ichki mahsulot hajmi qariyb 20 foizga qisqargan, bu esa aholi turmush darajasining pasayishiga olib keldi [1, O'zbekiston Respublikasi Milliy statistika qo'mitasi, "O'zbekiston iqtisodiyoti: 1991-2000-yillar", 2001, 28-bet]. Biroq davlat tomonidan qo'llanilgan bosqichma-bosqich islohotlar strategiyasi, ya'ni "kuchli ijtimoiy siyosat va davlat tartibga solishining uyg'unligi" tamoyili iqtisodiyotni tezda barqarorlashtirish imkonini berdi.

1996-yildan boshlab iqtisodiy o'sish qayta tiklandi va keyingi yillarda barqaror sur'atlar bilan davom etdi. Shu davrda yaratilgan institutsional asoslar bugungi iqtisodiy xavfsizlik tizimining poydevori bo'lib xizmat qilmoqda.

Mustaqillik davridagi iqtisodiy o'sish sur'atlarini tahlil qilish mamlakatning barqaror rivojlanish yo'liga chiqib olganini tasdiqlaydi. 2000-yildan 2023-yilgacha

bo'lgan davrda yalpi ichki mahsulotning o'rtacha yillik o'sish sur'ati 6 foiz atrofida bo'lgan, bu ko'rsatkich Markaziy Osiyo davlatlari orasida eng yuqorilaridan biri hisoblanadi [2, Milliy statistika qo'mitasi, "O'zbekiston yalpi ichki mahsuloti dinamikasi", 2024, 14-bet]. Ayniqsa, 2017-yildan keyingi davrda amalga oshirilgan keng ko'lamli islohotlar natijasida iqtisodiyotning tarkibiy tuzilishi sezilarli yaxshilandi, sanoatning ulushi oshdi, xizmatlar sohasi kengaydi. Biroq o'sish sur'atlarining yuqoriligi o'z-o'zidan iqtisodiy xavfsizlikni kafolatlamaydi, chunki rivojlanishning sifat ko'rsatkichlari ham muhim ahamiyatga ega. Xususan, iqtisodiyotning diversifikatsiya darajasi, eksport tarkibi, bandlikning barqarorligi va daromadlar tengsizligi kabi omillar iqtisodiy xavfsizlikning mustahkamligini belgilaydi. Shu bois keyingi tahlillarimizda ushbu omillarning har biriga alohida e'tibor qaratamiz.

Oziq-ovqat xavfsizligi iqtisodiy xavfsizlikning eng muhim tarkibiy qismlaridan biri bo'lib, O'zbekiston bu borada jiddiy yutuqlarga erishdi. Mamlakatimizda mustaqillik yillarida asosiy oziq-ovqat mahsulotlari bo'yicha o'zini-o'zi ta'minlash darajasini sezilarli oshirildi, jumladan, g'alla mustaqilligiga 1990-yillarning oxirida erishildi. 2023-yilda g'alla yetishtirish hajmi 8,2 million tonnani tashkil etib, ichki ehtiyojni to'liq qoplash barobarida eksport qilish imkoniyatini ham yaratdi [3, Milliy statistika qo'mitasi, "Qishloq xo'jaligi statistikasi", 2024, 36-bet]. Shuningdek, mevasabzavot, go'sht va sut mahsulotlari bo'yicha ham o'zini ta'minlash darajasi 90 foizdan yuqori. Biroq oziq-ovqat xavfsizligiga oid ayrim xavflar saqlanib qolmoqda, chunki qishloq xo'jaligining suv resurslariga qaramligi yuqori, iqlim o'zgarishi esa hosildorlikka salbiy ta'sir ko'rsatishi mumkin. Shu bilan birga, aholi sonining tez o'sishi oziq-ovqat mahsulotlariga bo'lgan talabni doimiy ravishda oshirib bormoqda. Bu omillar

ozuq-ovqat xavfsizligini ta'minlashda yangi texnologiyalarni joriy etish va resurslardan samarali foydalanishni taqozo etadi.

Energiya xavfsizligi masalasi iqtisodiy mustaqillikning yana bir hal qiluvchi omilidir. Yurtimizda uzoq yillar davomida elektr energiyasi ishlab chiqarishda asosan tabiiy gaz va ko'mirga tayanganilgan, bu esa energiya resurslarining tugashi bilan bog'liq uzoq muddatli xavflarni keltirib chiqargan. 2023-yilda mamlakatda ishlab chiqarilgan elektr energiyasining 70 foizi issiqlik elektr stansiyalariga to'g'ri keldi, qayta tiklanuvchi manbalarning ulushi esa 15 foizni tashkil etdi [4, Milliy statistika qo'mitasi, "Energiya balansi", 2024, 18-bet]. Shu bilan birga, so'nggi yillarda quyosh va shamol elektr stansiyalariga yo'naltirilgan yashil investitsiyalar hajmi jadal oshdi, bu esa energiya tarkibini diversifikatsiya qilishga xizmat qilmoqda. Energiya samaradorligini oshirish bo'yicha qabul qilingan davlat dasturlari natijasida yalpi ichki

mahsulotning energiya sig'imi 2017-yildan

2023-yilgacha qariyb 18 foizga kamaydi. Bu ko'rsatkich iqtisodiyotning energiya resurslariga qaramligi pasayib borayotganini ko'rsatadi, ammo energiya xavfsizligini ta'minlash uchun elektr tarmoqlarini modernizatsiya qilish va energiya saqlash tizimlarini rivojlantirish bo'yicha qo'shimcha ishlar talab etiladi.

Demografik omillar iqtisodiy xavfsizlikka sezilarli ta'sir ko'rsatadi. Yurtimiz aholisi 2024-yil boshida 36,9 million kishiga yetdi, bu 1991-yildagi ko'rsatkichdan qariyb 16 million kishiga ko'pdir [6, Milliy statistika qo'mitasi, "Demografik holat", 2024, 5-bet]. Aholining bunday tez o'sishi mehnat bozoriga har yili 500-600 ming yangi ishchi kuchining kirib kelishini anglatadi. Bu holat bir tomondan iqtisodiy o'sish uchun katta imkoniyat bo'lsa, ikkinchi tomondan bandlikni ta'minlash, uy-joy qurilishi, ta'lim va sog'liqni saqlash xizmatlarini kengaytirish kabi jiddiy vazifalarni qo'yadi. 2023-yilda mehnatga layoqatli aholining bandlik darajasi 68,4 foizni tashkil etdi, bu ko'rsatkich o'tgan yilga nisbatan deyarli o'zgarmadi [7, Milliy statistika qo'mitasi, "Mehnat bozori ko'rsatkichlari", 2024, 22-bet]. Demografik bosimning kuchayishi iqtisodiy xavfsizlikka yangi talablarni qo'ymoqda, chunki ish o'rinlari yetarli darajada yaratilmasa, ijtimoiy norozilik va norasmiy bandlikning oshishi kuzatilishi mumkin. Shu sababli demografik omilni iqtisodiy siyosatning markaziy masalalaridan biri sifatida ko'rib chiqish zarur.

Eksport tarkibini diversifikatsiya qilish iqtisodiy xavfsizlikni mustahkamlashning muhim yo'nalishlaridan biridir. Mustaqillikning dastlabki yillarida eksport asosan paxta tolasi va oltin kabi bir nechta xomashyo mahsulotlariga tayangan bo'lib, bu tashqi bozor kon'yunkturasining o'zgarishiga nisbatan yuqori darajada ta'sirchanlikni keltirib chiqargan. So'nggi yillarda amalga oshirilgan sanoatlashtirish siyosati natijasida eksport tarkibida tayyor mahsulotlar, xususan, to'qimachilik, oziq-ovqat va kimyo sanoati mahsulotlarining ulushi sezilarli oshdi. 2023-yilda tayyor mahsulotlarning eksportdagi ulushi 35 foizga yetdi, bu 2017-yildagi 25 foizlik ko'rsatkichdan ancha yuqori [8, Milliy statistika qo'mitasi, "Tashqi savdo statistikasi", 2024, 31-bet]. Eksport geografiyasining kengayishi ham ijobiy tendensiya bo'lib, endilikda mahsulotlar 150 dan ortiq mamlakatga yetkazilmoqda. Shunga qaramay, eksportda xomashyo mahsulotlarining ulushi hali ham yuqori bo'lib, tashqi shoklarga qarshi chidamlilikni oshirish uchun yuqori qo'shilgan qiymatli mahsulotlar ishlab chiqarishni kengaytirish zarur. Bu esa o'z navbatida texnologik modernizatsiya va innovatsion rivojlanishni taqozo etadi.

Moliya tizimining barqarorligi iqtisodiy xavfsizlikning yana bir muhim ustunidir. O'zbekistonda bank tizimi mustaqillik yillarida sezilarli rivojlanish yo'lini bosib o'tdi, davlat banklarining ulushi asta-sekin kamayib, xususiy banklar soni ortdi.

2023-yilda bank tizimining jami aktivlari yalpi ichki mahsulotning 62 foizini tashkil etdi, bu ko'rsatkich 2017-yildagi 45 foizdan sezilarli o'sishni ko'rsatadi [9, Milliy statistika qo'mitasi, "Moliyaviy sektor ko'rsatkichlari", 2024, 27-bet]. Shu bilan birga, bank tizimida davlat ishtiroki hali ham yuqori bo'lib, bu xususiy sektorning rivojlanishini sekinlashtirishi mumkin. Kredit portfelining sifati ham diqqat bilan kuzatilishi lozim bo'lgan masala, chunki iqtisodiy o'sishning sekinlashishi sharoitida muammoli kreditlar hajmi oshishi mumkin.

Valyuta bozorining barqarorligi esa so'nggi yillarda sezilarli yaxshilandi, chunki 2017-yildan boshlab milliy valyutaning erkin konvertatsiyasi joriy etildi va inflyatsiya darajasi izchil pasayib bormoqda.

Quyidagi jadvalda mamlakat iqtisodiy xavfsizligining asosiy indikatorlari 2017 va 2025-yillar kesimida O'zbekiston Respublikasi Milliy statistika qo'mitasi tomonidan taqdim etilgan ma'lumotlar asosida tahlil qilingan bo'lib, iqtisodiy xavfsizlik sohasidagi o'zgarishlarni yorqin aks ettiradi.

2017 va 2025-yillar kesimida O'zbekiston Respublikasi iqtisodiy xavfsizligining asosiy indikatorlari tahlili.

Ko'rsatkichlar	2017-yil	2025-yil	O'zgarish
Yalpi ichki mahsulot hajmi, mlrd so'm	302 536	1 849 700	6,11 baravar
Yalpi ichki mahsulotning o'sish sur'ati	4,4 %	7,7 %	+3,3 %
Aholi jon boshiga yalpi ichki mahsulot hajmi, mln so'm	9,3	11,7	+2,4
Inflyatsiya darajasi	14,4 %	7,3 %	-5,6 %
Tashqi savdo aylanmasi, mlrd AQSh dollari	26,9	81,2	3 baravar
Eksport hajmi, mlrd AQSh dollari	12,6	33,8	2,7 baravar
Davlat tashqi qarzi, mlrd AQSh dollari	12,5	40,5	3,24 baravar
Davlat tashqi qarzining YaIMga nisbati	19,0 %	31,9 %	+12,9 %

Jadval ma'lumotlari iqtisodiy xavfsizlik ko'rsatkichlarining aksariyati ijobiy tomonga o'zgarganini yaqqol namoyish etadi. Yalpi ichki mahsulot hajmining 6,11 baravar oshishi va aholi jon boshiga to'g'ri keladigan daromadning 2,4 million so'mga ko'payishi iqtisodiyotning mustahkam o'sishini tasdiqlaydi. Inflyatsiya

darajasining 14,4 foizdan 7,3 foizgacha pasayishi esa makroiqtisodiy barqarorlik mustahkamlanib borayotganini ko'rsatadi. Shu bilan birga, davlat tashqi qarzining yalpi ichki mahsulotga nisbati 19 foizdan 31,9 foizgacha oshgan. Umuman olganda, jadvalda keltirilgan ko'rsatkichlar iqtisodiy xavfsizlikning asosiy elementlari bo'yicha sezilarli yutuqlarga erishilganini, ammo ayrim yo'nalishlarda ehtiyotkor siyosat yuritish zarurligini ko'rsatadi.

Iqtisodiy xavfsizlikka tahdid soluvchi tashqi omillarni tahlil qilish ham muhimdir. Global iqtisodiyotdagi noaniqliklar, jumladan, xalqaro savdo urushlari, moliyaviy bozorlarning beqarorligi va geosiyosiy ziddiyatlar O'zbekiston kabi ochiq iqtisodiyotga ega davlatlar uchun bevosita xavf tug'diradi. Ayniqsa, energiya narxlarining keskin o'zgarishi, asosiy eksport tovarlari bo'lgan oltin va paxta narxlarining pasayishi tashqi tushumlarni kamaytirishi mumkin. Shuningdek, asosiy savdo hamkorlari bo'lgan Rossiya, Xitoy va Qozog'iston iqtisodiyotidagi pasayishlar O'zbekiston eksportiga salbiy ta'sir ko'rsatadi. COVID-19 pandemiyasi davrida bu omillar o'z ta'sirini yaqqol namoyon etdi, chunki 2020-yilda tashqi savdo aylanmasi 13 foizga qisqardi [11, Milliy statistika qo'mitasi, "2020-yil yakunlari bo'yicha tashqi savdo", 2021, 12-bet]. Shu sababli tashqi iqtisodiy o'zgarishlarga qarshi chidamlilikni oshirish iqtisodiy xavfsizlik siyosatining ustuvor yo'nalishiga aylanishi lozim.

Ichki omillar ichida esa norasmiy iqtisodiyotning katta ulushi jiddiy tashvish manbai bo'lib qolmoqda. Turli hisob-kitoblarga ko'ra, 2020-2023-yillarda norasmiy sektor yalpi ichki mahsulotning 40-50 foizini tashkil etardi. Amalga oshirilayotgan islohotlarning samarasi o'laroq, 2025-yilda bu ko'rsatkich 26,9 foizni tashkil etdi. [12, Milliy statistika qo'mitasi, "Norasmiy iqtisodiyotni baholash", 2025-yil, 16-bet]. Norasmiy bandlikning yuqori darajasi aholining ijtimoiy himoyasiz qolishiga, pensiya tizimining barqarorligiga putur yetkazishiga olib kelishi mumkin. Ushbu muammolarni hal etishsiz iqtisodiy xavfsizlikni to'liq ta'minlab bo'lmaydi, chunki ular iqtisodiyotning samaradorligini pasaytirib, investitsiyalar oqimini sekinlashtiradi.

Iqtisodiy xavfsizlikni ta'minlashda institutsional islohotlarning ahamiyati tobora ortib bormoqda. 2017-yilda qabul qilingan "2017-2021-yillarda O'zbekiston Respublikasini rivojlantirishning beshta ustuvor yo'nalishi bo'yicha Harakatlar strategiyasi" iqtisodiy xavfsizlikni mustahkamlashning huquqiy asoslarini yaratdi. Ushbu hujjatda sud-huquq tizimini isloh qilish, davlat boshqaruvini samarali tashkil etish va iqtisodiyotni liberallashtirish kabi vazifalar belgilandi. Keyinchalik 2022-yilda qabul qilingan "2022-2026-yillarga mo'ljallangan Yangi O'zbekistonning taraqqiyot strategiyasi" iqtisodiy xavfsizlik masalalarini yanada kengroq qamrab oldi [13, O'zbekiston Respublikasi Prezidentining PF-60-son Farmoni, 2022-yil 28-

yanvar]. Strategiyada makroiqtisodiy barqarorlikni ta'minlash, raqobat muhitini rivojlantirish, tashqi iqtisodiy aloqalarni kengaytirish va aholi farovonligini oshirish bo'yicha aniq maqsadli ko'rsatkichlar belgilandi. Institutsional islohotlarning izchilligi iqtisodiy xavfsizlik tizimining samarali ishlashini ta'minlaydi, chunki barqaror institutlarsiz hech qanday iqtisodiy siyosat uzoq muddatli natija bera olmaydi.

Iqtisodiy xavfsizlikni ta'minlashda raqamli transformatsiya jarayonlarining roli ham oshib bormoqda. So'nggi yillarda soliq ma'muriyatchiligi, bojxona xizmatlari va bank tizimida raqamli texnologiyalar keng joriy etildi, bu esa davlat daromadlarining oshishiga va iqtisodiy jarayonlarning shaffofligini ta'minlashga xizmat qildi. 2023-yilda soliq to'lovchilar soni 2017-yilga nisbatan 2,5 baravar oshdi, bu raqamlashtirish natijasida soliq bazasining kengayganini ko'rsatadi [14, Milliy statistika qo'mitasi, "Soliq statistikasi", 2024, 25-bet]. Shu bilan birga, raqamli iqtisodiyotning rivojlanishi kiberxavfsizlikka oid yangi tahdidlarni keltirib chiqarmoqda, chunki moliyaviy ma'lumotlarning raqamli formatda saqlanishi ularni kiberhujumlarga nisbatan zaif qiladi. Shu sababli iqtisodiy xavfsizlik siyosatida raqamli infratuzilmani himoya qilishga alohida e'tibor qaratish zarur. Bundan tashqari, raqamli savodxonlikni oshirish orqali aholining kiberfiribgarlikdan himoyalaniishini ta'minlash ham dolzarb vazifadir.

Tahlillar shuni ko'rsatadiki, O'zbekiston iqtisodiy xavfsizligini ta'minlash borasida sezilarli yutuqlarga erishgan bo'lsa-da, mavjud xavflar hali to'liq bartaraf etilmagan. Iqtisodiy o'sishning barqarorligi, tashqi qarzning boshqarilishi, energiya va oziq-ovqat xavfsizligining mustahkamligi hamda demografik bosimga chidamlilik asosiy e'tibor talab qiladigan yo'nalishlar bo'lib qolmoqda. Ayniqsa, tashqi omillar ta'siriga nisbatan zaiflikni kamaytirish uchun iqtisodiyotni diversifikatsiya qilish jarayonini jadallashtirish zarur. Ushbu muammolarni hal etishda davlatimiz siyosatining izchilligi, institutsional mustahkamlik va xalqaro hamkorlikning samaradorligi hal qiluvchi ahamiyatga ega bo'ladi.

Yuqoridagi tahlillar asosida O'zbekistonda iqtisodiy xavfsizlikni yanada mustahkamlash va barqarorlikni ta'minlashga qaratilgan quyidagi beshta amaliy taklifni ilgari surish maqsadga muvofiqdir.

Birinchidan, eksport tarkibini diversifikatsiya qilishni jadallashtirish uchun yuqori qo'shilgan qiymatli mahsulotlar ishlab chiqarishga qaratilgan maxsus sanoat dasturlarini qabul qilish zarur. Bunda to'qimachilik, oziq-ovqat qayta ishlash, kimyo va farmatsevtika sohalarida klaster tizimini rivojlantirish orqali eksportda tayyor mahsulotlar ulushini 2030-yilgacha 50 foizga yetkazish mumkin. Davlat tomonidan bu tarmoqlarga soliq imtiyozlari va kredit kafolatlari berilishi xususiy investitsiyalarni

jalb qilishni tezlashtiradi. Shuningdek, eksport bozorlarini kengaytirish uchun savdo vakolatxonalari faoliyatini kuchaytirish va yangi bozorlar bilan erkin savdo bitimlarini imzolash lozim.

Ikkinchidan, tashqi qarzni boshqarish tizimini takomillashtirish zarur. Buning uchun tashqi qarz olishning yagona strategiyasini ishlab chiqish, unda yillik qarz olish limiti, qarzga xizmat ko'rsatish xarajatlarining budjetga nisbatan chegarasi va imtiyozli kreditlarga ustuvorlik berish tamoyillari belgilanishi kerak. Qarz mablag'larining maqsadli ishlatilishini nazorat qilishni kuchaytirish orqali ularning samaradorligini oshirish mumkin. Shuningdek, davlat-xususiy sheriklik mexanizmlarini kengaytirish orqali budjetdan tashqari moliyalashtirish manbalarini rivojlantirish lozim.

Uchinchidan, norasmiy iqtisodiyotni rasmiylashtirish bo'yicha kompleks choralar ko'rish zarur. Soliq yukini bosqichma-bosqich kamaytirish, soddalashtirilgan soliq rejimlarini kengaytirish va norasmiy bandlikdan rasmiy sektorga o'tishni rag'batlantirish orqali norasmiy iqtisodiyot ulushini sezilarli qisqartirish mumkin. Ayniqsa, kichik biznes va o'zini o'zi band qilgan shaxslar uchun qulay shart-sharoitlar yaratish bu jarayonni tezlashtiradi.

Norasmiy iqtisodiyotning qisqarishi budjet daromadlarini oshiradi va ijtimoiy himoya tizimining qamrovini kengaytiradi.

To'rtinchidan, energiya xavfsizligini mustahkamlash uchun qayta tiklanuvchi energiya manbalariga investitsiyalarni yanada ko'paytirish va energiya saqlash texnologiyalarini joriy etish zarur. Quyosh va shamol elektr stansiyalarining quvvatini 2030-yilgacha 10 gigavattgacha yetkazish, shuningdek, aqlli tarmoqlarni rivojlantirish orqali energiya tizimining barqarorligini oshirish mumkin. Bu maqsadga erishish uchun xalqaro moliya institutlari bilan hamkorlikni kengaytirish va yashil obligatsiyalar bozorini rivojlantirish lozim.

Beshinchidan, iqtisodiy xavfsizlikning monitoring tizimini yaratish zarur. Statistika agentligi huzurida iqtisodiy xavfsizlik indikatorlarini doimiy kuzatib boruvchi maxsus bo'linma tashkil etilib, har chorakda milliy iqtisodiyotning xavfsizlik holati bo'yicha ochiq hisobot e'lon qilinishi kerak. Ushbu tizim iqtisodiy xavflarni erta aniqlash va ularga o'z vaqtida javob qaytarish imkonini beradi. Iqtisodiy xavfsizlikka tahdid soluvchi omillarning muntazam monitoringi davlat siyosatining samaradorligini oshirishga xizmat qiladi. Mustaqillikning o'ttiz besh yilligi nafaqat sarhisob, balki kelgusi o'n yilliklar uchun mustahkam poydevor yaratish davri ekanini unutmasligimiz lozim.

Foydalanilgan adabiyotlar ro'yxati

1. O'zbekiston Respublikasi Milliy statistika qo'mitasi. O'zbekiston iqtisodiyoti: 1991-2000-yillar. Toshkent, 2001. 28-bet.
2. O'zbekiston Respublikasi Milliy statistika qo'mitasi. O'zbekiston yalpi ichki mahsuloti dinamikasi. Toshkent, 2024. 14-bet.
3. O'zbekiston Respublikasi Milliy statistika qo'mitasi. Qishloq xo'jaligi statistikasi. Toshkent, 2024.
4. O'zbekiston Respublikasi Milliy statistika qo'mitasi. Energiya balansi. Toshkent, 2024.
5. O'zbekiston Respublikasi Milliy statistika qo'mitasi. Davlat moliyasi statistikasi. Toshkent, 2024. 42-bet.
6. O'zbekiston Respublikasi Milliy statistika qo'mitasi. Demografik holat. Toshkent, 2024. 5-bet.
7. O'zbekiston Respublikasi Milliy statistika qo'mitasi. Mehnat bozori ko'rsatkichlari. Toshkent, 2024. 22-bet.
8. O'zbekiston Respublikasi Milliy statistika qo'mitasi. Tashqi savdo statistikasi. Toshkent, 2024. 31-bet.
9. O'zbekiston Respublikasi Milliy statistika qo'mitasi. Moliyaviy sektor ko'rsatkichlari. Toshkent, 2024. 27-bet.
10. O'zbekiston Respublikasi Milliy statistika qo'mitasi. Narxlar statistikasi. Toshkent, 2024. 19-bet.
11. O'zbekiston Respublikasi Milliy statistika qo'mitasi. 2020-yil yakunlari bo'yicha tashqi savdo. Toshkent, 2021. 12-bet.
12. O'zbekiston Respublikasi Milliy statistika qo'mitasi. Norasmiy iqtisodiyotni baholash. Toshkent, 2023. 16-bet.
13. O'zbekiston Respublikasi Prezidentining 2022-yil 28-yanvardagi PF-60-son Farmoni. "2022-2026-yillarga mo'ljallangan Yangi O'zbekistonning taraqqiyot strategiyasi to'g'risida". 5-bet.
14. O'zbekiston Respublikasi Milliy statistika qo'mitasi. Soliq statistikasi. Toshkent, 2024. 25-bet.

BYUDJET MUASSASALARIDA XODIMLARNI RAG‘BATLANTIRISH MEXANIZMLARI NAZORATI: AMALDAGI KAMCHILIKLAR VA ULARNI BARTARAF ETISH YO‘NALISHLARI

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Annotatsiya

Ushbu maqolada byudjet tashkilotlarida xodimlarni moddiy rag‘batlantirish tizimini audit qilish jarayoni tahlil qilinadi. Tadqiqotda mavjud muammolar, ularning sabablari hamda takomillashtirish yo‘llari o‘rganilgan. Muallif tomonidan nazariy tahlil, qiyosiy va empirik usullar asosida auditning samaradorligini oshirishga qaratilgan takliflar ishlab chiqilgan. Tadqiqot natijalari shuni ko‘rsatdiki, audit faqat nazorat vositasi emas, balki boshqaruvni takomillashtiruvchi strategik mexanizm sifatida qo‘llanishi zarur. Natijada, byudjet tashkilotlarida mehnat samaradorligini oshirish, xodimlar motivatsiyasini kuchaytirish va shaffoflikni ta‘minlash imkoniyati yaratiladi.

***Kalit so‘zlar:** audit, byudjet tashkiloti, moddiy rag‘batlantirish, mehnat motivatsiyasi, boshqaruv samaradorligi, moliyaviy nazorat.*

Аннотация

В статье рассматривается процесс аудита системы материального стимулирования работников бюджетных организаций. Исследованы существующие проблемы, причины их возникновения и пути совершенствования системы. На основе теоретического, сравнительного и эмпирического анализа разработаны предложения по повышению эффективности аудита. Результаты исследования показали, что аудит должен рассматриваться не только как инструмент контроля, но и как стратегический механизм управления, направленный на повышение производительности труда, мотивации персонала и прозрачности деятельности государственных учреждений.

***Ключевые слова:** аудит, бюджетная организация, материальное стимулирование, мотивация труда, эффективность управления, финансовый контроль.*

Abstract

This article analyzes the audit process of the employee financial incentive system in public sector organizations. The study identifies existing problems, their underlying

causes, and suggests ways to improve the system. Based on theoretical, comparative, and empirical methods, the author proposes measures to enhance the effectiveness of audit practices. The findings show that audit should not only serve as a control mechanism but also function as a strategic management tool aimed at increasing labor productivity, employee motivation, and transparency within public institutions.

Keywords: *audit, public organization, financial incentives, labor motivation, management efficiency, financial control.*

Oxirgi yillarda yurtimizda davlat boshqaruvini yangilash, byudjet resurslaridan oqilona foydalanish hamda kadrlar salohiyatini yuksaltirish davlat siyosatining ustuvor vazifalaridan biriga ko'tarildi. Xususan, byudjet muassasalarida xodimlarni rag'batlantirish mexanizmlari ish samaradorligini oshirish, mehnat unumdorligini ta'minlash hamda malakali mutaxassislarni o'rnida saqlab qolishning asosiy vositasi sifatida e'tirof etilmoqda. Shunga qaramay, amaldagi rag'batlantirish amaliyotining aksariyatida mukofot pullarini bo'lib berishda inson omilining ta'siri (sub'yektivlik), baholash mezonlarining yetarlicha aniq emasligi hamda mablag'larni o'z o'rnida ishlatmaslik kabi holatlar hamon uchrayib turibdi. Bu holat xodimlarning ishtiyoqi pasayishiga hamda ko'rsatilgan mehnat natijalari bilan berilayotgan rag'bat o'rtasidagi uzviylikning yo'qolishiga sabab bo'lmoqda. Mazkur holatdan kelib chiqib, rag'batlantirish tizimi ustidan nazorat va taftishni takomillashtirish, uni zamonaviy hamda tizimli yondashuvlar asosida yo'lga qo'yish bugungi kunning kechiktirib bo'lmaydigan vazifasidir. Audit tadbirlari faqatgina ajratilgan mablag'larning qonuniy sarflanganini tekshirish bilangina cheklanib qolmay, balki rag'batlantirish mexanizmlarining iqtisodiy jihatdan asoslanganligini va ochiqlik darajasini baholashga ham xizmat qiladi. Samarali audit xodimlarni rag'batlantirishda adolat va samaradorlik tamoyillarini ta'minlab, byudjet tashkilotlarida mehnat faoliyatini yanada faollashtirish imkonini beradi. Maqolaning maqsadi — byudjet tashkilotlarida xodimlarni moddiy rag'batlantirish tizimi auditining mavjud muammolarini tahlil qilish hamda uni takomillashtirish bo'yicha ilmiy-amaliy takliflar ishlab chiqishdan iborat.

Metodlar

Tadqiqot jarayonida byudjet tashkilotlarida xodimlarni moddiy rag'batlantirish tizimi auditini o'rganish maqsadida bir nechta ilmiy-uslubiy yondashuvlardan foydalanildi. Birinchidan, nazariy tahlil metodi yordamida rag'batlantirish tizimining iqtisodiy mohiyati, uning audit bilan o'zaro bog'liqligi, hamda davlat sektorida mehnatni rag'batlantirish bo'yicha mavjud qonunchilik bazasi o'rganildi. Shu jumladan, O'zbekiston Respublikasi Moliya vazirligi, Hisob palatasi va tegishli me'yoriy-huquqiy hujjatlar tahlil qilindi. Ikkinchidan, qiyosiy tahlil usuli orqali byudjet tashkilotlari va xususiy sektor o'rtasidagi rag'batlantirish tizimlarining farqli jihatlari solishtirildi. Bu orqali samaradorlikni

ta'minlovchi omillar hamda nazorat mexanizmlarining ustuvor jihatlari aniqlab olindi. Uchinchidan, empirik tahlil doirasida ayrim davlat muassasalarining rag'batlantirish fondlaridan foydalanish ko'rsatkichlari, audit hisobotlari va xodimlarning motivatsiya darajalari o'rganildi. Ushbu ma'lumotlar asosida rag'batlantirish tizimining amaldagi samaradorlik darajasi baholandi. To'rtinchidan, sistemali yondashuv asosida moddiy rag'batlantirish tizimi va uning audit mexanizmlari o'zaro bog'liq bo'lgan yagona boshqaruv tizimi sifatida ko'rib chiqildi. Bu yondashuv auditning faqat moliyaviy nazorat emas, balki boshqaruv qarorlarini takomillashtirish vositasi sifatidagi rolini ochib berish imkonini berdi. Tadqiqotning metodologik asosini iqtisodiy tahlil nazariyasi, davlat moliyasi, audit standartlari (ISA) hamda milliy me'yoriy hujjatlar tashkil etadi.

Natijalar

Tadqiqot natijalari shuni ko'rsatdiki, byudjet tashkilotlarida xodimlarni moddiy rag'batlantirish tizimini audit qilish jarayoni ko'plab amaliy va tashkiliy muammolar bilan bog'liq. Amaldagi tizimda rag'batlantirish fondlarining shakllanishi, ularning maqsadli ishlatilishi hamda mukofotlarni taqsimlash mezonlari to'liq ochiq va shaffof emas. Natijada, ayrim holatlarda xodimlar o'rtasida adolatsizlik seziladi, bu esa mehnat motivatsiyasining pasayishiga va ish samaradorligining sustlashuviga olib keladi. Empirik tahlillar asosida aniqlanishicha, audit tekshiruvlari ko'pincha mablag'larning qonuniyligi va buxgalteriya to'g'riligini baholash bilan cheklanmoqda. Biroq, rag'batlantirish tizimi samaradorligi, xodimlarning mehnat natijalari bilan moddiy mukofotlar o'rtasidagi bog'liqlik yetarlicha baholanmayapti. Shu bois, auditning vazifasi faqat tekshirish emas, balki samaradorlikni oshirishga xizmat qiluvchi tahliliy va maslahat beruvchi jarayon sifatida kengaytirilishi lozim. Tadqiqot natijalari shuni ham ko'rsatdiki, zamonaviy audit yondashuvlarini — xususan, riskka asoslangan audit, samaradorlik auditi, va strategik audit tamoyillarini qo'llash byudjet tashkilotlarida moddiy rag'batlantirish tizimining shaffofligini va natijadorligini sezilarli darajada oshiradi.

Muhokama

Tadqiqot natijalari tahlili shuni ko'rsatadiki, byudjet tashkilotlarida xodimlarni moddiy rag'batlantirish tizimini audit qilish masalasi faqat moliyaviy nazorat bilan cheklanmasligi kerak. Bu tizimni boshqaruvning samarali elementi sifatida ko'rish zarur. O'zbekistonlik olim A. Karimov (2020) o'z tadqiqotlarida ta'kidlaganidek, moddiy rag'batlantirishni adolatli tashkil etish xodimlarning mehnat faolligini oshiradi va ularning kasbiy mas'uliyatini kuchaytiradi¹. Shu bois audit jarayonida nafaqat moliyaviy hisobotlarning

¹ Karimov, A. (2020). *Byudjet tashkilotlarida mehnatni rag'batlantirish tizimi va audit nazorati*. Toshkent: Iqtisodiyot va moliya nashriyoti.

to‘g‘rili, balki rag‘batlantirish tizimining motivatsion samarasi ham tahlil qilinishi lozim. Rus iqtisodchisi I. Mamonova (2019) o‘z asarida davlat sektorida moliyaviy nazoratning yangi funksiyalarini belgilab, auditni boshqaruv tizimining muhim strategik vositasi sifatida talqin qiladi². Uning fikricha, audit xodimlarni moddiy rag‘batlantirish jarayonlarida shaffoflikni ta‘minlaydi, korrupsiya xavfini kamaytiradi va resurslardan oqilona foydalanish imkonini yaratadi. Bundan tashqari, iqtisodchi N. Sorokina (2021) o‘z tadqiqotlarida davlat tashkilotlarida auditning axborot-analitik ahamiyatini alohida ta‘kidlab o‘tadi³. Unga ko‘ra, audit nafaqat aniqlangan xatolarni bartaraf etishga, balki boshqaruv qarorlarini ilmiy asoslashga ham xizmat qilishi kerak. Shunday qilib, o‘zbek va rus olimlarining qarashlarini umumlashtirar ekanmiz, quyidagi xulosaga kelish mumkin: byudjet tashkilotlarida moddiy rag‘batlantirish tizimi audit — bu faqat nazorat vositasi emas, balki inson resurslarini boshqarish samaradorligini oshirishga xizmat qiluvchi tahliliy mexanizmdir. Bunday yondashuv auditni strategik boshqaruv vositasi sifatida yangi bosqichga olib chiqadi.

Xulosa

O‘tkazilgan tadqiqot natijalari shuni ko‘rsatadiki, byudjet tashkilotlarida xodimlarni moddiy rag‘batlantirish tizimi audit mehnat samaradorligini oshirish, adolat va shaffoflikni ta‘minlashda muhim o‘rin tutadi. Hozirgi amaliyotda audit asosan moliyaviy qonuniylikni nazorat qilish bilan cheklanayotgan bo‘lsa-da, u boshqaruvning tahliliy va strategik vositasi sifatida yanada kengroq qo‘llanilishi lozim. Rag‘batlantirish tizimini samarali tashkil etish uchun audit quyidagi yo‘nalishlarda takomillashtirilishi zarur: Normativ-huquqiy asoslarni mustahkamlash – rag‘batlantirish fondlarini shakllantirish, taqsimlash va hisobotini yuritishda yagona mezonlarni belgilovchi aniq reglamentlar ishlab chiqilishi kerak. Auditning analitik funksiyasini kuchaytirish – xodimlarning mehnat natijalari va ularning moddiy rag‘batlantirilishi o‘rtasidagi bog‘liqlikni baholovchi indikatorlar joriy etilishi lozim. tizimlaridan keng foydalanish – rag‘batlantirish jarayonlarini raqamlashtirish orqali shaffoflik va nazoratni kuchaytirish mumkin. Ichki audit xizmati faoliyatini faollashtirish – tashkilot darajasida mustaqil ichki nazorat tizimi orqali xatoliklarni erta aniqlash va bartaraf etish imkoniyati yaratiladi. Kadrlar salohiyatini oshirish – auditorlar va moliya xodimlari uchun zamonaviy audit yondashuvlari, xalqaro standartlar va motivatsiya iqtisodiyoti bo‘yicha malaka oshirish dasturlari ishlab chiqilishi zarur. Umuman olganda, byudjet tashkilotlarida xodimlarni moddiy rag‘batlantirish tizimi auditni takomillashtirish — bu nafaqat moliyaviy intizomni mustahkamlash, balki inson kapitalini rivojlantirish, mehnat

² Мамонова, И. В. (2019). *Государственный финансовый контроль и аудит: теория и практика*. Москва: Финансы и статистика.

³ Сорокина, Н. А. (2021). *Аудит в государственном секторе: современные тенденции и перспективы*. Санкт-Петербург: Питер.

samaradorligini oshirish va davlat sektorida boshqaruv madaniyatini yuksaltirishga xizmat qiluvchi muhim omildir.

Foydalanilgan adabiyotlar;

1. Karimov, A. (2020). *Byudjet tashkilotlarida mehnatni rag'batlantirish tizimi va audit nazorati*. Toshkent: Iqtisodiyot va moliya nashriyoti.
2. Raximov, Sh. & Qodirov, B. (2022). *Davlat moliyasi va nazorat tizimi*. Toshkent: Fan va texnologiya nashriyoti.
3. Xolmurodov, D. (2021). "Byudjet tashkilotlarida moliyaviy intizomni ta'minlashda auditning o'rni." *Moliyaviy tahlil jurnali*, №4, 56–63-betlar.
4. Мамонова, И. В. (2019). *Государственный финансовый контроль и аудит: теория и практика*. Москва: Финансы и статистика.
5. Сорокина, Н. А. (2021). *Аудит в государственном секторе: современные тенденции и перспективы*. Санкт-Петербург: Питер.
6. Смирнов, В. Н. (2020). "Современные подходы к мотивации персонала в бюджетных учреждениях." *Финансовый контроль*, №3, с. 44–51.
7. OECD (2022). *Public Sector Integrity and Transparency: Building Accountability in Government Institutions*. Paris: OECD Publishing.
8. Drucker, P. (1954). *The Practice of Management*. New York: Harper & Row.
9. Armstrong, M. (2020). *A Handbook of Human Resource Management Practice*. London: Kogan Page.
10. World Bank (2023). *Public Financial Management and Accountability in Developing Countries*. Washington, DC: World Bank Publications.

FORMATION OF VALUES AMONG ADOLESCENTS RAISED IN INCOMPLETE FAMILIES



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Abstract. This study examines the formation of values among adolescents raised in incomplete families, with particular attention to the socio-psychological factors that may influence their value orientations. The study is based on Shalom Schwartz's theory of basic human values, which provides a framework for understanding the motivational goals underlying adolescents' value preferences. A mixed-methods research design was employed, combining quantitative and qualitative approaches. The participants were 100 adolescents aged 10–17 who were raised in incomplete families. Data were collected using an adapted version of the Schwartz Value Survey, a socio-demographic questionnaire, and semi-structured interviews. Quantitative data were analyzed using

descriptive statistics, correlation analysis, and non-parametric statistical procedures, while qualitative responses were examined thematically. The findings indicate that adolescents' value orientations are shaped by a combination of family circumstances, social support, interpersonal relationships, and individual characteristics. The results also suggest that although substantial differences in normative value ideals were not observed across gender groups, self-direction demonstrated a statistically significant difference, with higher levels among girls. The qualitative findings further highlight the importance of emotional support, communication, and stable interpersonal relationships in adolescents' value development. The study contributes to a better understanding of the socio-psychological mechanisms underlying value formation among adolescents from incomplete families and may provide a basis for developing psychologically informed family and educational interventions.

Keywords. Adolescents; incomplete families; value formation; value orientations; socio-psychological factors; Shalom Schwartz; basic human values; self-direction; social support; family relationships; adolescent development.

Introduction. Adolescence is a critical developmental period characterized by significant changes in cognitive, emotional, social, and moral development. During this stage, young people gradually develop more stable beliefs, attitudes, behavioral principles, and value orientations that influence their interpersonal relationships, educational choices, social behavior, and future life goals. Values serve as important psychological regulators of behavior because they provide individuals with principles for evaluating situations, making decisions, and establishing priorities. The family represents one of the primary social environments in which children acquire and internalize values. Through parental communication, emotional relationships, modeling, discipline, and everyday interactions, children learn social norms and develop attitudes toward themselves and others. Consequently, changes in family structure may influence the processes through which adolescents develop and prioritize values.

Adolescents raised in incomplete families may experience specific social and psychological circumstances associated with the absence of one parent or substantial changes in family functioning. These circumstances do not necessarily lead to negative developmental outcomes. However, the quality of family relationships, emotional support, economic conditions, communication patterns, and relationships with significant adults may influence adolescents' psychological development and value orientations. From a socio-psychological perspective, value formation should therefore be understood as a multidimensional process resulting from the interaction between individual characteristics and the social environment. In this context, examining the

value priorities of adolescents raised in incomplete families can contribute to a deeper understanding of their developmental needs and the factors supporting their psychological adaptation. One of the influential theoretical approaches to the study of values is Shalom Schwartz's theory of basic human values. Schwartz conceptualizes values as desirable, transsituational goals that vary in importance and serve as guiding principles in people's lives. The theory identifies a set of motivationally distinct values organized within a broader circular structure of value relations. The present study aims to examine the formation of values among adolescents raised in incomplete families and to identify socio-psychological factors associated with their value orientations. Particular attention is given to gender differences in value priorities and the potential role of social support and interpersonal relationships.

The study addresses the following research questions:

1. What value orientations are characteristic of adolescents raised in incomplete families?
2. Are there statistically significant differences in value priorities between male and female adolescents?
3. What socio-psychological factors are associated with the formation of values among adolescents raised in incomplete families?
4. How do adolescents describe the role of family relationships and social support in their value development?

Literature review. Values have been widely examined in psychology, sociology, and social psychology because they influence attitudes, behavioral choices, interpersonal relationships, and social adaptation. Values are not limited to specific behaviors; rather, they represent broader principles that individuals use to evaluate experiences and determine what is important in their lives. Schwartz's theory of basic human values provides one of the most widely used frameworks for investigating individual value priorities. According to Schwartz, values represent desirable and transsituational goals that function as guiding principles. The theory proposes several motivationally distinct value types, including self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, benevolence, and universalism. The structure of values reflects motivational compatibility and conflict. For example, self-direction emphasizes independent thought and action, whereas conformity emphasizes the restriction of actions and impulses that may violate social expectations. Security focuses on safety, harmony, and stability, while stimulation emphasizes novelty and challenge. Thus, adolescents may simultaneously endorse different values, but the relative importance of these values can differ according to their developmental and social circumstances. Adolescence is a period in which individuals increasingly

move beyond direct parental regulation and begin to develop greater autonomy in their thinking and decision-making. Cognitive development, peer relationships, educational experiences, media exposure, and family interactions contribute to this process. During adolescence, young people increasingly question previously accepted norms and begin to construct their own understanding of responsibility, independence, achievement, relationships, and social expectations. Consequently, the development of values during this period is closely connected with identity formation and socialization. Research based on Schwartz's framework has demonstrated that value priorities can vary according to age, gender, cultural context, and social environment. However, value development should not be interpreted as determined by a single factor. Rather, it emerges through the interaction of personal characteristics and social experiences. The family is an important context for socialization. Parents and other significant family members provide adolescents with behavioral models, emotional support, expectations, and opportunities to develop social competencies. Research on family structure has produced complex findings. Living in an incomplete family does not automatically predict psychological difficulties or problematic value orientations. The effects of family structure may depend on the circumstances surrounding the family situation and the quality of relationships within the family. For example, adolescents may respond differently depending on the availability of emotional support, the level of family conflict, socioeconomic circumstances, parental involvement, and the presence of supportive adults. Therefore, the concept of an incomplete family should not itself be treated as a direct indicator of developmental disadvantage. Social support is particularly relevant during adolescence because young people increasingly interact with multiple social groups, including peers, teachers, relatives, and community members. Supportive relationships can provide adolescents with emotional security, opportunities for communication, and models of constructive social behavior. The presence of supportive relationships may also facilitate the development of autonomy. Adolescents who receive appropriate emotional support may have greater opportunities to express their opinions, make decisions, and develop independent perspectives while maintaining meaningful interpersonal connections. Thus, social support may function as an important contextual factor in value formation among adolescents raised in incomplete families.

Methodology. The study employed a mixed-methods research design combining quantitative and qualitative approaches. The quantitative component was used to identify patterns in adolescents' value orientations and examine differences between groups. The qualitative component provided additional information about adolescents' perceptions of family relationships, social support, and factors influencing their

personal development. The sample consisted of 100 adolescents aged between 10 and 17 years who were raised in incomplete families. Participants were selected in accordance with the inclusion criteria established for the study. The participants represented different age groups and included both male and female adolescents. Sociodemographic information was collected to provide contextual information about participants and their family circumstances.

Three principal instruments were used. An age-appropriate version of Schwartz's value methodology was used to assess adolescents' value priorities. The instrument allows the relative importance of different motivational values to be examined. The questionnaire collected information concerning participants' age, gender, family structure, educational context, and other relevant background characteristics. Semi-structured interviews were conducted to explore adolescents' perceptions of family relationships, sources of emotional support, personal priorities, and factors that they considered important in shaping their beliefs and behavior. Quantitative data were analyzed using descriptive and inferential statistical procedures. Descriptive statistics were used to summarize participants' value orientations. The Kolmogorov–Smirnov test was used to examine the distributional characteristics of the data. Because the relevant variables did not consistently meet the assumptions required for parametric analysis, non-parametric procedures were applied. The Mann–Whitney U test was used to examine differences in value orientations between male and female adolescents. Correlation analysis was also used to examine associations between relevant variables. Qualitative interview data were analyzed thematically. Responses were reviewed to identify recurring themes related to family relationships, emotional support, autonomy, interpersonal communication, and adolescents' understanding of important life values. The study followed relevant ethical principles for psychological research involving minors. Participation was voluntary, and appropriate procedures concerning informed consent and confidentiality were followed. Participants' personal information was treated confidentially and used exclusively for research purposes.

Results. The analysis indicates that adolescents raised in incomplete families demonstrated a range of value priorities rather than a single dominant value pattern. Their responses reflected the importance of interpersonal relationships, security, personal development, autonomy, and socially oriented values. The findings suggest that adolescents' value orientations are influenced by multiple aspects of their social environment. In particular, qualitative responses indicated that relationships with parents, relatives, teachers, and peers can contribute to adolescents' understanding of responsibility, trust, independence, and interpersonal respect. The comparison of male and female adolescents using the Mann–Whitney U test indicated that statistically

significant gender differences were not observed across the majority of normative value ideals. However, a statistically significant difference was identified for **self-direction**. Female adolescents demonstrated higher scores on this value dimension than male adolescents ($U = 886.000$, $p = .012$). This finding indicates that the importance attached to independent thought, choice, and autonomous action may differ between male and female adolescents in the studied sample. At the same time, the absence of statistically significant differences across most other values suggests that gender alone does not account for the majority of variation in adolescents' value orientations. The qualitative findings highlighted the importance of social support in adolescents' perceptions of their development. Participants frequently referred to supportive relationships with significant adults and peers as important sources of emotional security and guidance. Adolescents described support in terms of being listened to, receiving advice, experiencing understanding, and having someone available during difficult situations. These findings suggest that the quality of interpersonal relationships may be particularly relevant to adolescents growing up in changing or non-traditional family circumstances. The interview data indicated that adolescents associate family relationships with the development of values such as respect, responsibility, trust, care, and mutual understanding. Importantly, the findings do not support the assumption that incomplete family structure itself determines adolescents' value development. Instead, adolescents' responses point toward the importance of the quality of relationships and the availability of emotional and social resources within their environment.

Discussion. The findings of this study provide insight into the value orientations of adolescents raised in incomplete families. The results support the view that value formation during adolescence is a complex socio-psychological process influenced by family relationships, social support, interpersonal experiences, and individual characteristics. One of the notable findings was the absence of statistically significant gender differences across most normative value ideals. This suggests that male and female adolescents in the present sample share a number of common value priorities despite differences in their individual experiences. Such a finding is consistent with the broader understanding that values are shaped by multiple socialization processes rather than by gender alone. At the same time, the statistically significant difference observed for **self-direction** is particularly noteworthy. Female adolescents in the sample demonstrated higher self-direction scores than male adolescents ($U = 886.000$, $p = .012$). Within Schwartz's theoretical framework, self-direction is associated with independent thought, freedom of choice, creativity, and autonomy. The finding may indicate that the female participants in this sample placed comparatively greater importance on autonomy and independent decision-making. However, this result

should be interpreted cautiously. The observed association does not establish that gender causes differences in self-direction. Other variables, such as age, educational experiences, family relationships, social expectations, and opportunities for independent decision-making, may also contribute to this pattern. The qualitative findings further emphasize the role of social support. Adolescents frequently identified emotional understanding, communication, and supportive relationships as important aspects of their lives. This finding is consistent with developmental perspectives emphasizing the importance of secure interpersonal relationships during adolescence. An important implication of the findings is that incomplete family structure should not be regarded as a sufficient explanation for adolescents' psychological or value development. Two adolescents living in similar family structures may demonstrate substantially different developmental trajectories depending on the quality of their relationships, parental involvement, socioeconomic circumstances, peer relationships, and access to supportive adults. The findings therefore suggest that psychological and educational interventions should focus not only on family structure but also on strengthening adolescents' social and emotional resources. Programs designed for adolescents from incomplete families may benefit from activities that develop self-awareness, autonomous decision-making, interpersonal communication, emotional regulation, and access to supportive relationships. The study also contributes to the application of Schwartz's value theory in the context of adolescents raised in incomplete families. By combining quantitative measurement with qualitative interviews, the research provides both a structured assessment of value orientations and contextual information concerning adolescents' experiences. Nevertheless, several limitations should be considered. First, the sample consisted of 100 adolescents, which limits the generalizability of the findings to broader adolescent populations. Second, the study focused specifically on adolescents raised in incomplete families and therefore does not provide a direct comparison with adolescents from complete families. Third, the cross-sectional design does not allow conclusions to be drawn about changes in value orientations over time. Finally, self-report measures may be affected by participants' perceptions and social desirability. Future research could use larger and more diverse samples, include comparison groups, and employ longitudinal designs to examine how adolescents' value orientations develop over time. Further studies could also investigate the contribution of parental involvement, socioeconomic conditions, peer relationships, school climate, and perceived social support to value formation.

Conclusion. The findings indicate that adolescents raised in incomplete families demonstrate diverse value orientations and that their value development is associated

with a combination of individual and socio-environmental factors. The statistically significant difference identified in self-direction, together with the qualitative importance attributed to social support and interpersonal relationships, highlights the need to consider both autonomy and relational resources when examining adolescent value formation.

References

1. Schwartz S.H. Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries // *Advances in Experimental Social Psychology*. – 2002. – Vol. 25. – P. 1–65.
2. Schwartz S.H. An overview of the Schwartz theory of basic values // *Online Readings in Psychology and Culture*. – 2012. – Vol. 2, No. 1. – P. 1–20.
3. Schwartz S.H., Cieciuch J., Vecchione M., Davidov E., Fischer R., Beierlein C. et al. Refining the theory of basic individual values // *Journal of Personality and Social Psychology*. – 2012. – Vol. 103, No. 4. – P. 663–688.
4. Schwartz S.H., Rubel T. Sex differences in value priorities: Cross-cultural and multimethod studies // *Journal of Personality and Social Psychology*. – 2005. – Vol. 89, No. 6. – P. 1010–1028.
5. Erikson E.H. *Identity: Youth and Crisis*. – New York: W.W. Norton & Company, 2008. – 336 p.
6. Steinberg L. *Adolescence*. – 11th ed. – New York: McGraw-Hill Education, 2017. – 608 p.
7. Amato P.R. The consequences of divorce for adults and children // *Journal of Marriage and Family*. – 2000. – Vol. 62, No. 4. – P. 1269–1287.
8. Amato P.R. Research on divorce: Continuing trends and new developments // *Journal of Marriage and Family*. – 2010. – Vol. 72, No. 3. – P. 650–666.
9. Lansford J.E. Parental divorce and children's adjustment // *Perspectives on Psychological Science*. – 2009. – Vol. 4, No. 2. – P. 140–152.
10. Bornstein M.H. *Handbook of Parenting: Volume 1. Children and Parenting*. – 3rd ed. – New York: Routledge, 2019. – 536 p.

EARLY DETECTION OF GLAUCOMA AND MODERN TREATMENT APPROACHES: DIAGNOSIS, RISK FACTORS, AND INTRAOCULAR PRESSURE CONTROL

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ABSTRACT: Glaucoma comprises a group of progressive optic neuropathies characterized by retinal ganglion cell loss, optic nerve damage, and irreversible visual field loss. Because early disease is frequently asymptomatic, timely detection is essential for preserving visual function. This article aims to synthesize major risk factors, diagnostic criteria, and contemporary management strategies for glaucoma. Evidence was reviewed from the World Health Organization (WHO), the National Institute for Health and Care Excellence (NICE), the European Glaucoma Society (EGS), and peer-reviewed articles indexed in PubMed. The evidence indicates that intraocular pressure is the principal modifiable risk factor for glaucoma onset and progression, but diagnosis should not rely on tonometry alone. A comprehensive assessment should include gonioscopy, optic nerve head evaluation, optical coherence tomography, and standard automated perimetry. Treatment is directed toward achieving an individualized target intraocular pressure and slowing structural and functional progression. Topical medication, selective laser trabeculoplasty, and surgical options should be selected according to glaucoma type, disease severity, progression rate, life expectancy, treatment tolerance, and adherence. Risk-based follow-up and improved adherence are central to reducing preventable irreversible visual loss from glaucoma.

Keywords: glaucoma, intraocular pressure, optic neuropathy, optical coherence tomography, perimetry, gonioscopy, selective laser trabeculoplasty, visual field.

INTRODUCTION

Glaucoma is one of the most important chronic diseases in ophthalmology and is regarded as an optic neuropathy associated with the progressive loss of retinal ganglion cells and their axons. Its clinical significance lies in the fact that established optic nerve damage and visual field defects are generally irreversible. According to

WHO information updated in 2026, glaucoma is among the leading causes of distance vision impairment or blindness worldwide; glaucoma-related visual impairment or blindness affects millions of people [1].

The clinical spectrum of glaucoma is broad, with primary open-angle glaucoma and primary angle-closure glaucoma among the most common forms. Other forms include normal-tension glaucoma, pseudoexfoliative glaucoma, pigmentary glaucoma, secondary glaucoma, and congenital glaucoma. Although the mechanisms of disease development vary, intraocular pressure (IOP) remains the principal modifiable risk factor confirmed in major randomized clinical trials [2, 3].

One of the major challenges in glaucoma is the scarcity of subjective symptoms in the early and sometimes intermediate stages of the disease. Gradual loss of the peripheral visual field may be noticed late by the patient. Therefore, it is incorrect to base the diagnosis solely on complaints or on a single IOP measurement. Modern diagnostics relies on the combined assessment of the optic nerve head, retinal nerve fiber layer, ganglion cell complex, and visual field [4, 5].

Global epidemiological analyses have estimated the overall prevalence of glaucoma among people aged 40–80 years at approximately 3.54%. A classic projection model suggested that the number of people aged 40–80 years living with glaucoma could reach 111.8 million by 2040 [6]. Population aging, the widespread prevalence of diabetes and cardiovascular risk factors, disparities in access to medical care, and undiagnosed cases increase the burden of this disease on healthcare systems.

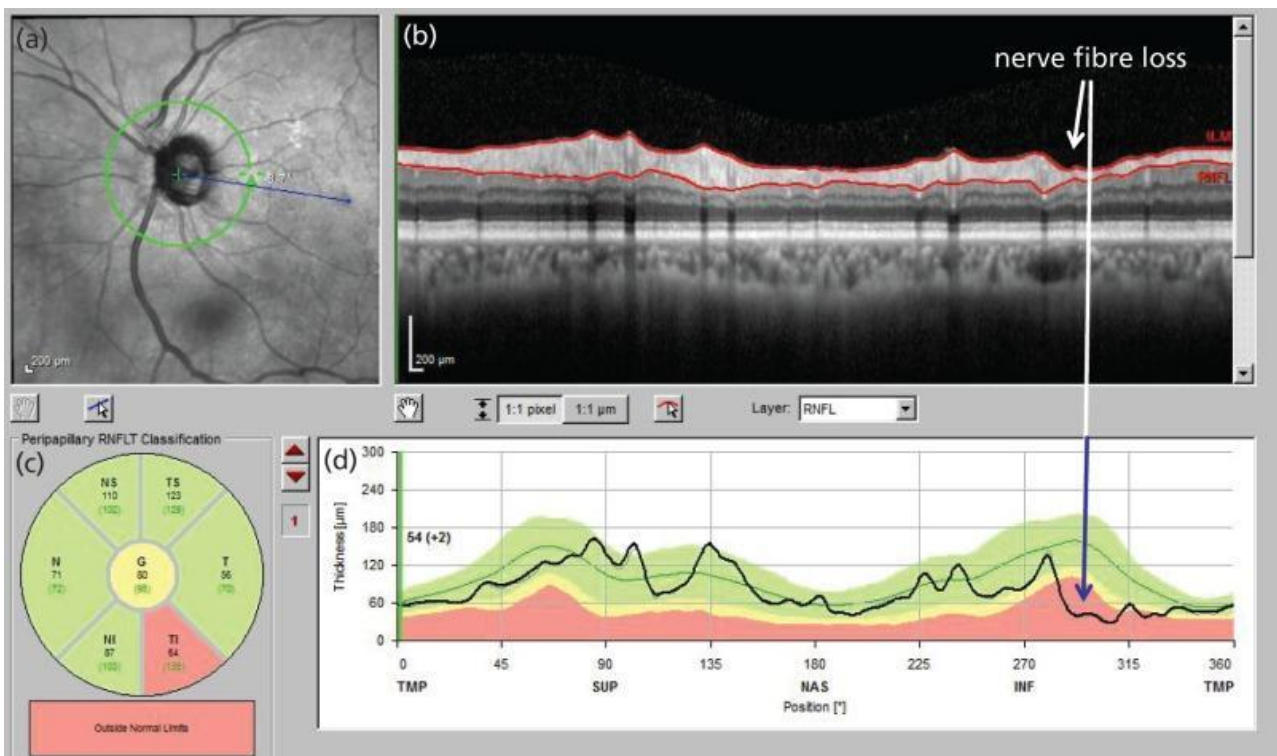
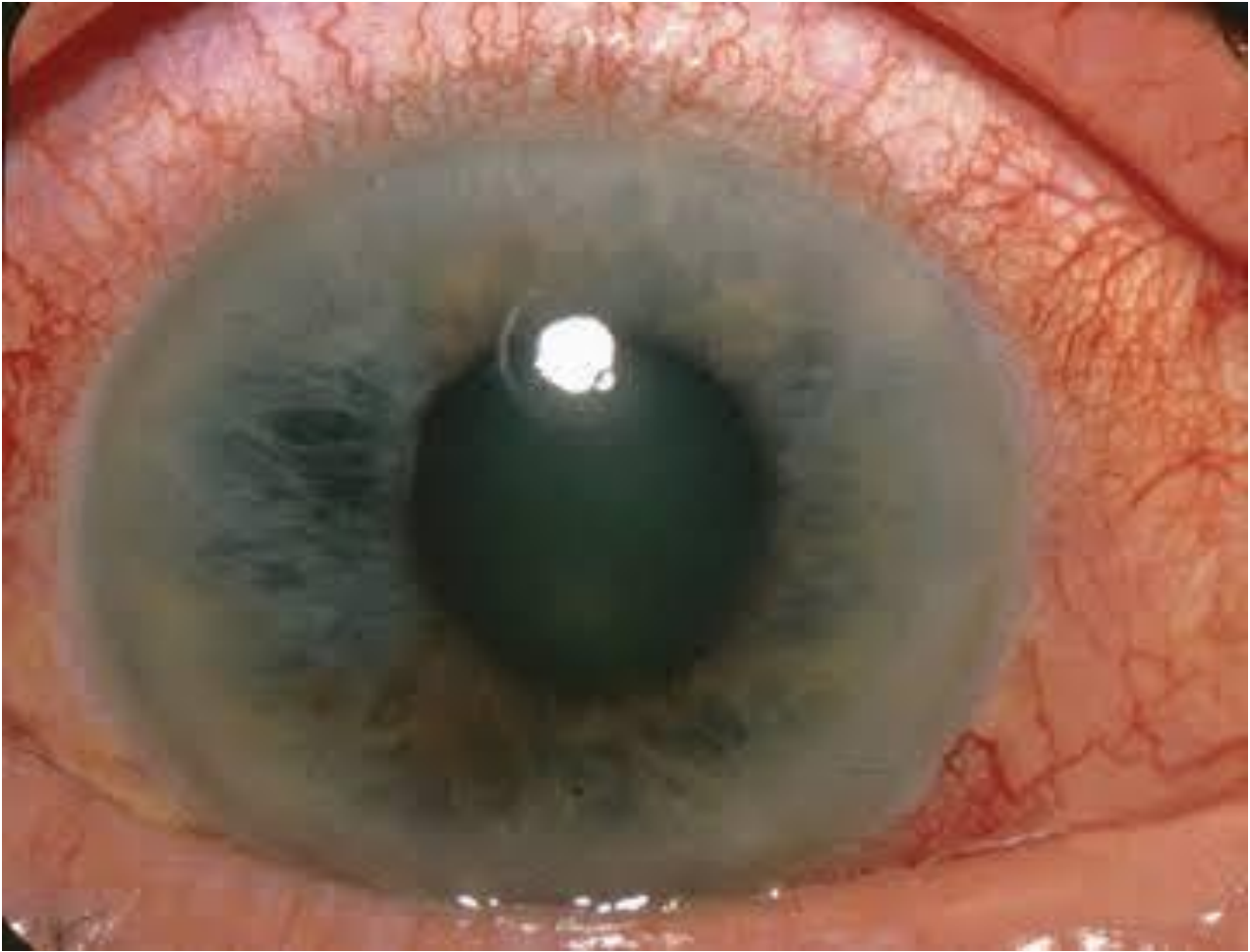
The aim of this article is to summarize, on the basis of evidence-based sources, the main risk factors involved in glaucoma pathogenesis, modern diagnostic algorithms, the concept of individualized target IOP, and medical, laser, and surgical treatment methods. The practical importance of assessing disease progression and improving patient adherence to treatment is also discussed.

MATERIALS AND METHODS

This study was conducted as a structured narrative review. Priority was given to clinical guidelines, systematic reviews, meta-analyses, and major scientific articles devoted to the diagnosis and treatment of glaucoma. Official documents from the WHO, NICE, and the European Glaucoma Society, as well as publications indexed in PubMed, were reviewed as information sources.

The search used the keywords “glaucoma,” “primary open-angle glaucoma,” “angle-closure glaucoma,” “intraocular pressure,” “optical coherence tomography,” “visual field,” “selective laser trabeculoplasty,” “glaucoma surgery,” and “adherence,” as well as combinations of these terms. Clinically important data were extracted on disease definition, global burden, diagnostic examinations, the effect of IOP reduction

on progression, and treatment methods.



The findings were synthesized by topic: 1) epidemiology and risk factors; 2) minimum and extended diagnostic components; 3) assessment of progression; 4) IOP-lowering treatment; 5) laser and surgical methods; and 6) treatment adherence. No new patient cohort or experimental clinical data were generated in this article; all numerical data were taken from published sources.

RESULTS

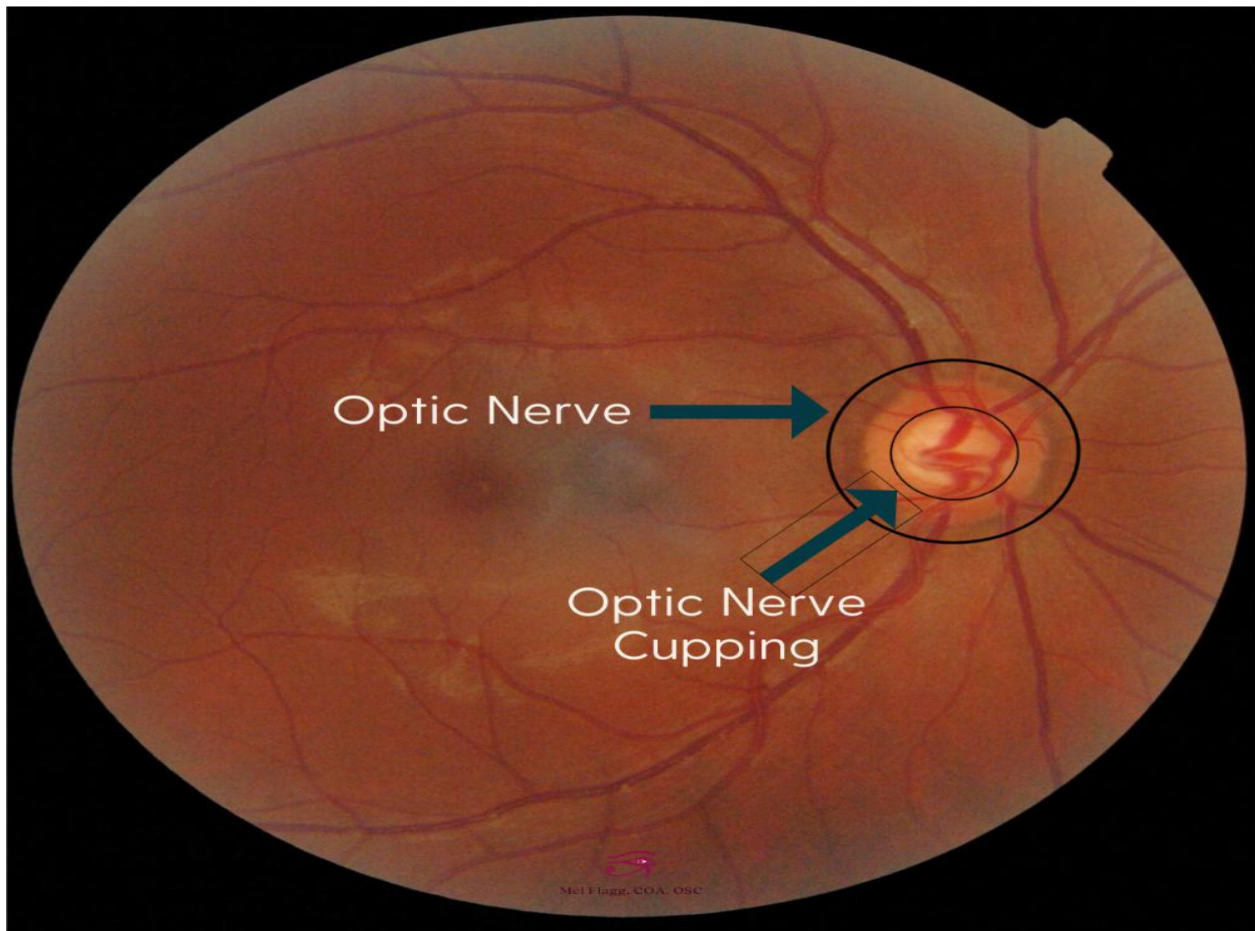
The analysis demonstrated the need for a comprehensive approach to glaucoma diagnosis. NICE recommendations for identifying chronic open-angle glaucoma and related conditions include standard automated perimetry, stereoscopic optic nerve head assessment, OCT or another imaging method where available, Goldmann-type applanation tonometry, and gonioscopic assessment of the anterior chamber angle [4]. Measurement of central corneal thickness is also important for interpreting IOP findings and assessing risk.

Intraocular pressure plays a central role in clinical decision-making, but glaucoma cannot be equated solely with elevated IOP. Normal-tension glaucoma demonstrates that glaucomatous optic neuropathy can develop even in patients whose IOP lies within the statistically “normal” range. Conversely, not every patient with ocular hypertension develops glaucoma. Structural and functional data must therefore be analyzed together.

OCT allows quantitative assessment of losses in the retinal nerve fiber layer and ganglion cell complex. Standard automated perimetry demonstrates functional damage. These two methods are not interchangeable: in early disease, structural changes may be detected before functional defects, whereas in advanced stages OCT may be limited in assessing progression because of the “floor effect.” Repeated examinations over time and trend analysis are therefore important components of

clinical

follow-up.



The primary goal of glaucoma treatment is to preserve an acceptable quality of life and visual function for the patient. This is often achieved by reducing IOP according to the individual risk profile. “Target IOP” is not a fixed universal number; it should be reassessed according to disease stage, baseline IOP, visual field damage, rate of progression, age, life expectancy, and other risk factors [2, 5].

Medical therapy includes prostaglandin analogues, beta-blockers, carbonic anhydrase inhibitors, alpha-2 agonists, and other IOP-lowering drug classes. When selecting a medication, efficacy should be considered together with cardiovascular and respiratory comorbidities, ocular surface status, adverse effects, the number of daily instillations, and the patient’s technical ability to administer drops. In chronic, often asymptomatic disease, poor adherence can substantially reduce treatment effectiveness [7].

Selective laser trabeculoplasty is an important option for lowering IOP in open-angle glaucoma and ocular hypertension and may also be selected as initial treatment in some patients. Surgical treatment is considered when target IOP is not achieved despite maximally tolerated conservative or laser therapy, when progression continues, or when very low IOP is required. Although trabeculectomy, drainage implants, and

minimally invasive glaucoma surgery serve the same clinical goal, they differ in IOP-lowering potency, risk profile, and indications.

A systematic review published in 2025 noted that data directly comparing the rate of visual field progression before and after IOP-lowering therapy at the individual level were limited. Nevertheless, in the available cohort, the rate of mean deviation decline slowed after treatment compared with the pretreatment period, and this change was associated with IOP reduction [8]. This finding reinforces the need to assess progression not only by a single IOP measurement but also by functional and structural changes over time.

Table 1. Key examinations in glaucoma diagnosis and follow-up

Examination	Primary purpose	Strength	Important limitation
Goldmann applanation tonometry	Measure IOP	One of the clinical standard methods	IOP varies throughout the day; CCT and corneal biomechanics affect the result
Gonioscopy	Assess the anterior chamber angle	Differentiates open-angle and angle-closure mechanisms	Operator-dependent
OCT	Assess RNFL/GCC and the optic nerve head	Quantifies early structural damage	Artifacts may occur in high myopia, media opacity, and advanced disease
Standard automated perimetry	Assess the visual field	Demonstrates functional damage and progression	Affected by learning effect and patient cooperation

Examination	Primary purpose	Strength	Important limitation
Stereoscopic disc assessment/photography	Assess optic nerve cupping and hemorrhages	Allows documentation over time	Possibility of subjective interpretation
Pachymetry	Measure central corneal thickness	Helps interpret IOP and risk	Does not independently confirm glaucoma

DISCUSSION

The reviewed sources show that a simplified “IOP measurement - diagnosis - treatment” approach is insufficient for glaucoma management. First, glaucoma is a progressive structural and functional disease of the optic nerve, and IOP is only one of its biological mechanisms, although it is the most clinically important and modifiable factor. Therefore, normal IOP does not exclude glaucoma, and elevated IOP does not automatically confirm it.

Second, early diagnosis depends on high-quality baseline documentation. Initial OCT and visual field results provide a reference point for subsequent examinations. It is incorrect to diagnose “progression” from a single result; measurement error, the learning effect in perimetry, OCT segmentation errors, and diurnal IOP variability must be considered. Clinical decisions should preferably be based on concordant structural and functional data obtained at multiple time points.

Third, the intensity of treatment should correspond to disease severity and the rate of progression. In mild, slowly progressing disease, excessively aggressive treatment may increase adverse effects and costs. Conversely, in rapidly progressing glaucoma or glaucoma threatening the central visual field, excessive reliance on “observation” may lead to irreversible visual loss. Thus, target IOP is a dynamic clinical parameter that should be redefined when new information becomes available.

Fourth, treatment does not end with prescribing medication. Incorrect drop instillation, forgetfulness, financial barriers, preservative-related ocular surface symptoms, and complex dosing regimens reduce adherence [7]. In clinical practice, checking instillation technique, simplifying the regimen, and explaining to the patient that glaucoma is progressive even when it is often asymptomatic should be integral components of treatment.

Fifth, laser and surgical methods should not be regarded as a “last resort,” but rather as part of the treatment arsenal tailored to individual risk and therapeutic goals. The patient’s clinical type, angle anatomy, previous operations, concomitant ocular disease, target IOP level, and quality of life influence treatment selection. From this perspective, although glaucoma management is algorithmic, it is not completely standardized and requires individualization.

A limitation of this review is that it is not a formal meta-analysis and does not present data from a new clinical cohort. Nevertheless, the combined analysis of current guidelines and major scientific publications clearly demonstrates the practical foundations of glaucoma diagnosis and management.

CONCLUSION

1. Glaucoma is a progressive optic neuropathy that may lead to irreversible visual loss, and its effective management relies on early detection, individualized risk assessment, and long-term follow-up.

2. Diagnosis should not be based on intraocular pressure alone. Goldmann applanation tonometry, gonioscopy, central corneal thickness measurement, optic nerve head assessment, OCT, and standard automated perimetry are complementary examinations.

3. Lowering intraocular pressure is the principal evidence-based strategy for slowing glaucoma progression. Medications, selective laser trabeculoplasty, and surgical treatment are selected according to the patient’s clinical profile and target IOP.

4. Patient adherence, correct eye-drop technique, and compliance with scheduled follow-up examinations directly affect clinical outcomes. In glaucoma, the main practical goal is not to achieve a single “normal IOP” reading, but to preserve visual function throughout the patient’s lifetime.

REFERENCES

1. World Health Organization. (2026, February 10). Blindness and vision impairment. WHO. <https://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment>
2. Jonas, J. B., Aung, T., Bourne, R. R. A., Bron, A. M., Ritch, R., & Panda-Jonas, S. (2017). Glaucoma. *The Lancet*, 390(10108), 2183–2193. [https://doi.org/10.1016/S0140-6736\(17\)31469-1](https://doi.org/10.1016/S0140-6736(17)31469-1)
3. Jayaram, H., Kolko, M., Friedman, D. S., & Gazzard, G. (2023). Glaucoma: now and beyond. *The Lancet*, 402(10414), 1788–1801. [https://doi.org/10.1016/S0140-6736\(23\)01289-8](https://doi.org/10.1016/S0140-6736(23)01289-8)

4. National Institute for Health and Care Excellence. (2022). Glaucoma: diagnosis and management (NICE Guideline NG81). Last reviewed March 26, 2025. <https://www.nice.org.uk/guidance/ng81>
5. European Glaucoma Society. (2021). Terminology and Guidelines for Glaucoma, 5th Edition. European Glaucoma Society.
6. Tham, Y. C., Li, X., Wong, T. Y., Quigley, H. A., Aung, T., & Cheng, C. Y. (2014). Global prevalence of glaucoma and projections of glaucoma burden through 2040: a systematic review and meta-analysis. *Ophthalmology*, 121(11), 2081–2090. <https://doi.org/10.1016/j.ophtha.2014.05.013>
7. Quaranta, L., Novella, A., Tettamanti, M., Pasina, L., Weinreb, R. N., & Nobili, A. (2023). Adherence and persistence to medical therapy in glaucoma: an overview. *Ophthalmology and Therapy*, 12(5), 2227–2240. <https://doi.org/10.1007/s40123-023-00730-z>
8. Naik, V., Ohri, S., Fernandez, E., Mwanza, J.-C., & Fleischman, D. (2025). Changes in individuals' glaucoma progression velocity after IOP-lowering therapy: A systematic review. *PLOS ONE*, 20(5), e0324806. <https://doi.org/10.1371/journal.pone.0324806>
9. Lauwers, A., Breda, J. B., & Stalmans, I. (2023). The natural history of untreated ocular hypertension and glaucoma. *Survey of Ophthalmology*, 68(3), 388–424. <https://doi.org/10.1016/j.survophthal.2022.12.001>
10. GBD 2019 Blindness and Vision Impairment Collaborators; Vision Loss Expert Group. (2021). Causes of blindness and vision impairment in 2020 and trends over 30 years. *The Lancet Global Health*, 9(2), e144–e160. [https://doi.org/10.1016/S2214-109X\(20\)30489-7](https://doi.org/10.1016/S2214-109X(20)30489-7)
11. Li, F., et al. (2022). Current situation and progress of drugs for reducing intraocular pressure. *Therapeutic Advances in Chronic Disease*, 13, 20406223221140392. <https://doi.org/10.1177/20406223221140392>
12. Weinreb, R. N., Aung, T., & Medeiros, F. A. (2014). The pathophysiology and treatment of glaucoma: a review. *JAMA*, 311(18), 1901–1911. <https://doi.org/10.1001/jama.2014.3192>

QUALITY OF LIFE DYNAMICS IN PATIENTS IN THE LONG-TERM PERIOD AFTER ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY

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Annotation: *This paper investigates the long-term changes (6 to 12 months and beyond) in the quality of life (QoL) of patients who underwent elective laparoscopic cholecystectomy (LC). The evaluation is based on standard, validated international questionnaires (SF-36, GIQLI). Factors driving sub-optimal outcomes and persistent pain within the spectrum of post-cholecystectomy syndrome (PCS) are thoroughly analyzed. The study highlights the necessity of structured long-term monitoring and targeted gastrointestinal rehabilitation.*

Key words: laparoscopic cholecystectomy, quality of life, long-term outcomes, SF-36 questionnaire, GIQLI questionnaire, post-cholecystectomy syndrome.

The surgical extraction of a calculus-filled gallbladder during elective laparoscopic cholecystectomy is routinely accepted as a definitive cure for cholelithiasis. However, removing this organ fundamentally alters the physiological passage of bile and compromises long-term digestive processes. In contemporary healthcare, surgical success is measured not only by the absence of perioperative complications but also by the patient's subjective health perception—specifically, their **quality of life (QoL)**. Examining long-term QoL trajectories helps reveal subtle gastrointestinal dysfunctions and shape personalized rehabilitation pathways.

Results and Discussion

1. Favorable Trajectories in Quality of Life Measures

The vast majority of patients (75–85%) demonstrate statistically significant, sustainable improvements across all QoL parameters in the long term compared to baseline metrics.

- **Physical Component:** Biliary colic events are completely eradicated, the anxiety surrounding food intake disappears, and physical functioning and working capacity are restored. The "Bodily Pain" (BP) and "Physical Functioning" (PF) domains of the SF-36 survey display the most robust positive evolution by month 6 post-surgery.

- **Psychological Component:** Patients experience an obvious drop in anxiety and depressive scores, which were previously tied to the chronic dread of unpredicted painful attacks. Sleep quality and overall emotional well-being improve substantially.

2. Cohorts with Sub-Optimal Outcomes (The PCS Problem)

In 15–20% of operated individuals, long-term QoL scores—particularly when measured by the gastrointestinal-specific GIQLI instrument—remain stagnant or fall below preoperative values. This clinical condition is categorized as **post-cholecystectomy syndrome (PCS)**.

- **Prevalent Presentations:** Chronic duodenogastric or duodenojejunal reflux, chogenic diarrhea, bloating, flatulence, and persistent dull right upper quadrant discomfort.
- **Pathophysiological Underpinnings:** These symptoms frequently stem from sphincter of Oddi dysfunction, the continuous unbuffered trickling of bile into the duodenum (disturbing normal micelle formation), or unrecognized pre-existing gastrointestinal conditions (GERD, chronic pancreatitis, irritable bowel syndrome) that were overshadowed by the presence of gallstones.

3. Predictors of Long-Term Quality of Life Scores

A critical review of clinical follow-up data demonstrates that long-term QoL recovery is negatively impacted by:

- A prolonged history of symptomatic gallstone disease (exceeding 5 years) accompanied by recurrent acute episodes, which establishes fixed visceral hyperalgesia pathways.
- Advanced age combined with underlying metabolic syndrome.
- Poor adherence to temporary dietary modifications during the initial 3–6 postoperative months.

Conclusion

Elective laparoscopic cholecystectomy safely secures a profound long-term boost in both the physical and mental health dimensions of quality of life for most patients. Nonetheless, the persistent subset of patients affected by post-cholecystectomy syndrome serves as a stark reminder that removing the gallbladder does not automatically cure systemic biliary or digestive dysfunctions. Maximizing long-term QoL outcomes demands rigorous preoperative identification of concurrent gastrointestinal disorders and prolonged, structured gastroenterological follow-up.

LIST OF REFERENCES:

1. Хатьков, И. Е. Качество жизни пациентов после лапароскопической холецистэктомии в отдаленном периоде / И. Е. Хатьков, Р. Е. Асхабов // Эндоскопическая хирургия. — 2024. — Т. 30, № 2. — С. 15–22.
2. Ермолов, А. С. Постхолецистэктомический синдром: патогенез, диагностика и тактика ведения пациентов / А. С. Ермолов, Т. В. Андреева // Хирургия. Журнал им. Н.И. Пирогова. — 2025. — № 1. — С. 45–52.
3. Quintana, J. M., et al. (2023). Long-term outcomes and quality of life after laparoscopic cholecystectomy: a prospective cohort study. *Surgical Endoscopy*, 37(4), 2841-2850.
4. Eypasch, E., et al. (1995). Gastrointestinal Quality of Life Index (GIQLI): development, validation and application of a new instrument. *British Journal of Surgery*, 82(2), 216-222. (Классический источник опросника GIQLI).
5. Anis, M., & Ahmad, M. (2025). Evaluation of quality of life changes using SF-36 and GIQLI post elective laparoscopic cholecystectomy: a 1-year follow-up study. *The American Journal of Surgery*, 229(3), 604-611.

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Аннотация

Мақолада Ўзбекистон иқтисодиётининг халқаро меҳнат тақсимоотидаги жорий ўрни ташқи савдо, тармоқлар ихтисослашуви, хизматлар экспорти, меҳнат ресурслари, транспорт-логистика имкониятлари ва институционал интеграция нуқтаи назаридан таҳлил қилинган. 2025 йил ҳамда 2026 йилнинг энг сўнгги очиқ статистик маълумотлари асосида экспорт таркибини диверсификация қилиш, хомашёдан юқори қўшилган қийматли тайёр маҳсулотларга ўтиш, глобал қиймат занжирларига чуқурроқ интеграциялашиш, рақамли хизматлар экспортини кенгайтириш, меҳнат ресурсларининг малака сифатини ошириш, транспорт коридорларидан самарали фойдаланиш ва Жаҳон савдо ташкилотига аъзо бўлиш жараёнини иқтисодий рақобатбардошлик билан боғлаш устувор йўналишлар сифатида асосланган. Тадқиқот натижасида халқаро меҳнат тақсимоотида Ўзбекистоннинг позициясини ресурс ва арзон меҳнатга асосланган ихтисослашувдан билим, технология, логистика ва юқори қўшилган қийматга таянган ихтисослашувга трансформация қилиш зарурлиги илмий жиҳатдан ҳулосаланган.

Калит сўзлар: халқаро меҳнат тақсимооти, ташқи савдо, экспорт диверсификацияси, глобал қиймат занжири, рақамли хизматлар, меҳнат унумдорлиги, логистика, инвестиция, ЖСТ, рақобатбардошлик.

КИРИШ

Жаҳон ҳўжалиги тизимида халқаро меҳнат тақсимооти мамлакатларнинг табиий ресурслари, меҳнат салоҳияти, капитал, технология, институционал муҳит ва географик жойлашуви асосида муайян товар ва хизматларни ишлаб чиқаришга нисбатан ихтисослашувини ифодалайди. Ҳозирги босқичда мазкур жараён оддий товар айирбошлаш доирасидан чиқиб, глобал қиймат занжирлари, рақамли платформалар, аутсорсинг, илмий-технологик кооперация ва

трансчегаравий хизматлар орқали янада мураккаб тус олмақда. Шу сабабли мамлакатнинг халқаро меҳнат тақсимоотидаги ўрни фақат экспорт ҳажми билан эмас, балки экспортдаги маҳаллий қўшилган қиймат, технологик мураккаблик, меҳнат унумдорлиги, бозорлар географияси ва ташқи шокларга чидамлилиги билан баҳоланиши лозим.

Тадқиқотнинг мақсади — Ўзбекистон иқтисодиётининг халқаро меҳнат тақсимоотидаги жорий позициясини энг сўнгги статистик маълумотлар асосида баҳолаш ва уни сифат жиҳатидан юқори босқичга олиб чиқишнинг асосий йўналишларини илмий асослашдан иборат. Тадқиқотда қиёсий таҳлил, статистик гуруҳлаш, динамик таҳлил, тизимли ёндашув ва мантиқий умумлаштириш усулларидан фойдаланилди.

1. ЎЗБЕКИСТОННИНГ ХАЛҚАРО МЕҲНАТ ТАҚСИМОТИДАГИ ЖОРИЙ ПОЗИЦИЯСИ

Ўзбекистоннинг жаҳон ҳўжалигига интеграциялашуви сўнгги йилларда ташқи савдо ва хизматлар соҳасининг тез ўсиши билан тавсифланмоқда. Миллий статистика қўмитаси маълумотларига кўра, 2025 йилда ташқи савдо айланмаси 81,2 млрд АҚШ долларини ташкил этиб, 2024 йилга нисбатан 20,7 фоизга ўсган. Экспорт 33,8 млрд долларга (+24,0 фоиз), импорт эса 47,4 млрд долларга (+18,5 фоиз) етган [1]. Бу кўрсаткичлар очиқлик даражаси ортиб бораётганини кўрсатса-да, импортнинг экспортдан юқорилиги ишлаб чиқаришда технологик ускуналар, бутловчи қисмлар, энергия ресурслари ва оралиқ товарларга талаб катталигини ҳам англатади.

2026 йил январь–июнь ойларида ташқи савдо айланмаси 41,0 млрд долларни ташкил этди. Экспорт 15,9 млрд доллар, импорт 25,1 млрд доллар бўлди. Ушбу даврда умумий экспорт олтин савдоси таъсири туфайли 8,8 фоизга камайган бўлса-да, олтинни ҳисобга олмаган товарлар экспорти 28,7 фоизга ўсган [2]. Бу ҳолат экспортнинг реал сектордаги базаси кенгайиб бораётганини кўрсатувчи муҳим сигналдир. 2026 йил январь–июль ойларида экспорт ҳажми 19,9 млрд долларга етган; Россия, Хитой, Афғонистон, Қозғистон, Франция, Гонконг, Туркия, Қирғизистон, Тожикистон ва БАА асосий экспорт бозорлари қаторида бўлган [3]. Бозорлар географиясининг кенгайиши ташқи талабга боғлиқ рискларни диверсификация қилишга хизмат қилади.

1-жадвал. Ўзбекистон ташқи иқтисодий алоқаларининг айрим кўрсаткичлари

Кўрсаткич	2025 йил	2026 йил (энг сўнгги давр)	Изоҳ
Ташқи савдо айланмаси	81,2 млрд \$	41,0 млрд \$ (янв.–июнь)	2025: +20,7%; 2026 I ярим йил: +7,4%
Экспорт	33,8 млрд \$	19,9 млрд \$ (янв.–июль)	Хизматлар ва ноолтин товарлар роли ўсмоқда
Импорт	47,4 млрд \$	25,1 млрд \$ (янв.–июнь)	Машина-ускуна ва оралиқ товарлар улуши юқори
IT Park хизматлар экспорти	728,4 млн \$	392,5 млн \$ (янв.–июнь)	2026 I ярим йилда йиллик ўсиш +90,3 млн \$
Меҳнат ресурслари	20,60 млн киши	—	2025 йил якуни, расмий статистика

Манба: Ўзбекистон Республикаси Миллий статистика қўмитаси маълумотлари асосида муаллиф томонидан тузилди [1–5].

Хизматлар экспорти халқаро меҳнат тақсимотидаги сифат ўзгаришининг энг муҳим белгиларидан бири бўлиб бормоқда. 2025 йилда хизматлар экспорти 9,76 млрд долларни ташкил этган ва умумий экспортнинг 28,9 фоизига тенг бўлган. Унда туризм хизматлари 4,88 млрд доллар, транспорт хизматлари 3,22 млрд доллар, телекоммуникация, компьютер ва ахборот хизматлари 921,5 млн долларни ташкил этган [4]. Демак, мамлакат ташқи савдосида номоддий, билим ва инфратузилмага асосланган экспорт позициялари шаклланиб бормоқда.

Меҳнат омили ҳам Ўзбекистоннинг халқаро ихтисослашувида ҳал қилувчи аҳамиятга эга. 2025 йилда меҳнат ресурслари сони 20,6 млн кишидан ошган [5]. Кенг меҳнат таклифи демографик дивиденд учун шароит яратади, бироқ халқаро меҳнат тақсимотида узоқ муддатли устунлик фақат арзон ишчи кучи ҳисобига таъминланмайди. Меҳнат ресурсларининг касбий, рақамли, муҳандислик ва тил компетенцияларини ошириш орқали бир иш ўрнига тўғри келадиган қўшилган қийматни кўпайтириш талаб этилади.

2. МАВЖУД ИХТИСОСЛАШУВНИНГ КУЧЛИ ВА ЗАИФ ТОМОНЛАРИ

Ўзбекистоннинг халқаро меҳнат тақсимоотидаги анъанавий устунликлари табиий ресурслар, қишлоқ хўжалиги, тўқимачилик, рангли металлургия, озиқ-овқат маҳсулотлари ҳамда нисбатан катта меҳнат ресурсларига боғлиқ. 2025 йилда тўқимачилик маҳсулотлари экспорти 2,63 млрд долларни ташкил этган, унинг таркибида тайёр тўқимачилик маҳсулотлари 54,3 фоиз, ип-калава 27,0 фоиз бўлган [4]. Тайёр маҳсулот улушининг ошиши ижобий, аммо тармоқда дизайн, бренд, маркетинг ва чакана савдо занжирларига кириш даражаси янада оширилса, экспорт тушумини бир неча босқичда кўпайтириш имкони мавжуд.

Саноатда кон-металлургия, кимё ва қурилиш материаллари тармоқлари иқтисодий базани таъминламоқда. Бироқ глобал қиймат занжирларида юқори даромадли босқичлар одатда илмий-тадқиқот, муҳандислик, патент, юқори аниқликдаги ишлаб чиқариш, сервис, маркетинг ва дистрибуцияда жамланади. Шу нуқтаи назардан мис, олтин, уран ёки бошқа минерал ресурсларни экспорт қилиш билан чекланиш ўрнига, электротехника, кабель, электрон компонентлар, энергия сақлаш тизимлари, саноат материаллари ва махсус кимё маҳсулотларигача бўлган қайта ишлаш занжирларини ривожлантириш стратегик аҳамиятга эга.

Мамлакатнинг заиф томонларидан бири — денгизга чиқиш имконияти йўқлиги ва ташқи бозорларга етказиб беришда бир нечта чегара ва транзит мамлакатлардан ўтиш зарурати. Бу ҳолат логистика харажатлари ва етказиб бериш муддатларига таъсир қилади. Жаҳон банки маълумотига кўра, транспорт соҳаси Ўзбекистон ЯИМининг қарийб 8 фоизини шакллантиради ва тахминан 1 млн кишини иш билан таъминлайди; мамлакат Логистика самарадорлиги индексида 2014 йилдаги 129-ўриндан 2023 йилда 88-ўринга кўтарилган [6]. Бу ижобий силжиш бўлса-да, мамлакатнинг транзит салоҳиятини экспорт рақобатбардошлигига тўлиқ айлантириш учун мультимодал ташувлар, чегара процедуралари ва рақамли логистика сифатини янада яхшилаш зарур.

3. ХАЛҚАРО МЕҲНАТ ТАҚСИМОТИДАГИ ЎРИННИ ОШИРИШНИНГ УСТУВОР ЙўНАЛИШЛАРИ

Биринчи йўналиш — экспорт таркибини юқори қўшилган қийматли маҳсулотлар ҳисобига диверсификация қилиш. Бунда давлат сиёсати экспорт ҳажмининг ўзига эмас, балки бир тонна ёки бир ишчига тўғри келадиган экспорт қийматига йўналтирилиши керак. Масалан, тўқимачиликда тола ва ипдан тайёр кийим, техник текстиль ва маҳаллий брендларга; мисда катоддан кабель, электромобиль компонентлари ва электр жиҳозларига; қишлоқ хўжалигида хом

мевадан тайёр озиқ-овқат ва юқори стандартли ингредиентларга ўтиш зарур. Бундай ёндашув мамлакатнинг нисбий устунлигини динамик рақобат устунлигига айлантиради.

Иккинчи йўналиш — глобал қиймат занжирларига мақсадли кириш. Бунинг учун ҳар бир устувор тармоқ бўйича “қайси маҳсулотни экспорт қиламиз?” деган саволдан “жаҳон ишлаб чиқариш занжирининг қайси босқичида юқори қиймат ярата оламиз?” деган саволга ўтиш зарур. Автомобиль бутловчи қисмлари, электротехника, фармацевтика, агротехнология, кимё, тўқимачилик ва рақамли бизнес жараёнлари шундай тармоқлар қаторига киради. Трансмиллий компанияларни жалб қилишда солиқ имтиёзларидан ташқари маҳаллий етказиб берувчиларни ривожлантириш, технология трансфери, кадр тайёрлаш ва маҳаллийлаштириш бўйича аниқ натижа кўрсаткичлари белгиланиши мақсадга мувофиқ.

Учинчи йўналиш — рақамли хизматлар ва билим экспортини жадал кенгайтириш. Миллий статистика қўмитаси маълумотларига кўра, IT Park иштирокчиларининг хизматлар экспорти 2025 йилда 728,4 млн долларга етган. 2026 йил январь–июнь ойларида эса ушбу кўрсаткич 392,5 млн доллар бўлиб, 2025 йилнинг мос даврига нисбатан 90,3 млн долларга кўпайган [7]. IT Park маълумотларига кўра, 2026 йил I ярим йиллигида экспорт қилувчи резидентлар сони 1 050 тага етган ва улар 102 та мамлакатга хизмат ҳамда рақамли маҳсулотлар экспорт қилган [8]. Бундай хизматлар денгизга чиқиш имкониятига боғлиқ эмас, транспорт харажатлари паст ва инсон капиталига тўғридан-тўғри таянади. Шу сабабли дастурий таъминот, ВРО, финтех, сунъий интеллект, маълумотлар таҳлили, киберхавфсизлик ва муҳандислик хизматлари Ўзбекистоннинг янги халқаро ихтисослашуви ядросига айланиши мумкин.

Тўртинчи йўналиш — меҳнат ресурсларини “сон афзаллиги”дан “сифат афзаллиги”га ўтказиш. 20,6 млн кишидан ортиқ меҳнат ресурслари катта потенциалдир, аммо халқаро меҳнат бозорида юқори иш ҳақи биринчи навбатда малака ва унумдорликка боғлиқ. Жаҳон банкининг 2025 йилги Ўзбекистонда касбий таълим ва миграцияга бағишланган таҳлили касбий кўникмаларни меҳнат бозори талаблари билан мувофиқлаштириш, хорижда ишлаш учун тайёрланаётган фуқароларнинг малакасини расмий тасдиқлаш ва TVET тизимини иш берувчилар билан боғлаш муҳимлигини таъкидлайди [9]. Шу боис дуал таълим, халқаро сертификат, хорижий тил, STEM ва рақамли компетенцияларни оммавийлаштириш меҳнат экспортини ҳам юқори малакали хизматлар экспортига айлантириш имконини беради.

Бешинчи йўналиш — транспорт-логистика функциясини мустақил экспорт ихтисослашувига айлантириш. Ўзбекистон Марказий Осиё, Афғонистон ва Жанубий Осиё, Хитой ҳамда Европа ўртасидаги йўналишларда географик марказ сифатида иштирок этиши мумкин. 2026 йилда Жаҳон банки қўллаб-қувватлаётган транспорт лойиҳалари миллий мультимодал транспорт стратегиясини ишлаб чиқиш, М41 минтақавий йўл коридорининг 91 км қисмини реконструкция қилиш ва темир йўл бошқарувини такомиллаштиришни кўзда тутди [6]. Транзит салоҳиятидан тўлиқ фойдаланиш учун “қуруқ портлар”, логистика марказлари, божхона маълумотларини олдиндан электрон алмашиш, контейнерлаштириш, совуқ занжир ва омбор инфратузилмасини ривожлантириш муҳим.

Олтинчи йўналиш — Жаҳон савдо ташкилотига аъзо бўлишни ички рақобатбардошлик ислохотлари билан уйғунлаштириш. 2026 йил 27–28 июль кунлари ўтказилган Ўзбекистоннинг ЖСТга аъзо бўлиши бўйича Ишчи гуруҳ йиғилишида 31 та икки томонлама бозорга кириш битими ЖСТ котибиятига тақдим этилгани ва март ойидан кейин 190 та норматив-ҳуқуқий ҳужжат ЖСТ қоидаларига мувофиқлаштирилгани қайд этилди [10]. Аъзо бўлиш савдо қоидаларининг прогноз қилинадиганлиги, инвестиция ишончи ва бозорларга киришни яхшилаши мумкин, бироқ маҳаллий корхоналарни рақобатга тайёрлаш, техник регламентлар, стандартлаштириш, санитария-фитосанитария тизими ва рақобат сиёсатини кучайтириш билан бирга амалга оширилиши лозим.

ХУЛОСА

Ўзбекистон иқтисодиётининг халқаро меҳнат тақсимотидаги ўрни сўнгги йилларда миқдорий ва сифат жиҳатдан кенгаймоқда. 2025 йилда ташқи савдо айланмасининг 81,2 млрд долларга етиши, хизматлар экспортининг қарийб 9,8 млрд долларни ташкил этиши, 2026 йилда ноолтин товарлар экспортининг юқори суръатларда ўсиши ва ИТ хизматларининг янги бозорларга чиқиши мазкур жараённинг асосий далиллариدير. Шу билан бирга, импортга юқори эҳтиёж, айрим хомашё позицияларига боғлиқлик, логистика харажатлари ва меҳнат унумдорлигини ошириш зарурати сақланиб қолмоқда.

Таҳлиллар шуни кўрсатадики, Ўзбекистоннинг узок муддатли стратегияси “кўпроқ экспорт қилиш” тамойили билан чекланмасдан, “кўпроқ маҳаллий қўшилган қиймат экспорт қилиш” тамойилига асосланиши керак. Бунинг учун саноатда чуқур қайта ишлаш, глобал қиймат занжирларига интеграция, рақамли хизматлар, юқори малакали меҳнат, транзит-логистика хизматлари, “яшил”

стандартлар ва ЖСТ доирасидаги институционал ислохотлар ўзаро боғланган ҳолда амалга оширилиши лозим.

ФОЙДАЛАНИЛГАН АДАБИЁТЛАР

1. Ўзбекистон Республикаси Миллий статистика қўмитаси. Ўзбекистон ташқи савдо айланмаси — 2025 йил якунлари. 22.01.2026. stat.uz.
2. Ўзбекистон Республикаси Миллий статистика қўмитаси. 2026 йил январь–июнь ойларида ташқи савдо айланмаси. 29.07.2026. stat.uz.
3. National Statistics Committee. Top 10 countries in Uzbekistan's exports. 10.09.2026. stat.uz.
4. National Statistics Committee. Foreign Trade Turnover of the Republic of Uzbekistan: January–December 2025. Press release, 21.01.2026. stat.uz.
5. Миллий статистика қўмитаси, SIAT. Меҳнат ресурслари сони. 20.04.2026 ҳолатига. siat.stat.uz.
6. World Bank. Uzbekistan to Modernize Transport Infrastructure and Reform the Sector. 23.03.2026. worldbank.org.
7. National Statistics Committee. Exports of services by IT Park participants reached USD 392.5 million. 19.08.2026. stat.uz.
8. IT Park Uzbekistan. IT Park Members' Export Geography Reaches 102 Countries. 2026. it-park.uz.
9. Nakata S., Wang K., Kalbfuss M., Fasih T. The Road Home and Abroad: Enhancing TVET for Youth and Migration in Uzbekistan. World Bank, 2025.
10. World Trade Organization. Uzbekistan reaffirms 2026 WTO accession goal. 28.07.2026. wto.org.

INTESTINAL MICROBIOTA CHANGES FOLLOWING CHOLECYSTECTOMY: MECHANISMS OF DYSBIOSIS DEVELOPMENT AND METHODS OF ITS CORRECTION

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Annotation: *The article provides a detailed analysis of the pathogenesis underlying intestinal microbiota transformation in post-cholecystectomy patients. The role of gallbladder reservoir function loss, continuous bile acid influx into the duodenum, and accelerated enterohepatic circulation is thoroughly reviewed. Key taxonomic shifts at the phylum and genus levels, as well as the mechanisms behind the accumulation of cytotoxic secondary bile acids, are described. Modern therapeutic strategies for correcting post-cholecystectomy dysbiosis, including dietary modifications, synbiotics, and targeted pharmacotherapy, are highlighted.*

Key words: cholecystectomy, gut microbiota, dysbiosis, bile acids, deoxycholic acid, post-cholecystectomy syndrome, ursodeoxycholic acid, probiotics.

Cholecystectomy (CE) remains one of the most frequently performed elective and emergency abdominal surgeries worldwide. Despite its technical refinement, the removal of the gallbladder does not always lead to complete clinical recovery. Approximately 15% to 40% of patients experience a cluster of post-operative dyspeptic and motor-evacuation disorders collectively termed "post-cholecystectomy syndrome" (PCS) or bile acid diarrhea (BAD). Modern metagenomic sequencing has demonstrated that the driving force behind PCS is a profound rearrangement of the intestinal microbiome, induced by the loss of physiological regulation over the bile acid (BA) pool. Mechanisms of Post-Cholecystectomy Dysbiosis Physiologically, the gallbladder ensures the timed and concentrated delivery of bile into the duodenum in response to dietary triggers. Following CE, this controlled rhythm is replaced by a continuous, uncoordinated flow of hepatic bile into the intestinal lumen. Three primary pathogenic pathways drive subsequent dysbiosis: Direct Antimicrobial Pressure. Bile acids exhibit robust detergent-like properties. By acting as surfactants, they disrupt the phospholipid bilayer of bacterial membranes, induce protein denaturation, and trigger intracellular oxidative stress. The unremitting presence of free BAs in the lumen selectively suppresses bile-sensitive, predominantly Gram-positive commensal bacteria. Activation of 7 α -Dehydroxylation. The continuous transit of primary BAs—

cholic acid (CA) and chenodeoxycholic acid (CDCA)—provides a selective growth advantage to bile-resistant obligate anaerobes. Species possessing the 7 α -dehydroxylation enzyme (chiefly belonging to Clostridium clusters XIVa and IV) proliferate rapidly. They transform primary BAs into secondary BAs: deoxycholic acid (DCA) and lithocholic acid (LCA). Elevated concentrations of DCA are highly cytotoxic, causing apoptosis of normal colonic epithelium and further driving structural dysbiosis. Accelerated Motility and Metabolic Shift. An excess of free BAs reaching the colon overstimulates smooth muscle receptors, significantly accelerating intestinal transit time. This shortens the window available for the fermentation of dietary fibers by short-chain fatty acid (SCFA)-producing bacteria, precipitating a localized energy deficiency in colonocytes.

Taxonomic Alterations in the Microbiota

Based on 16S rRNA gene sequencing data, post-CE patients display reproducible taxonomic shifts:

- **Phylum-Level Shifts:** Studies reveal a characteristic distortion in the **Bacteroidetes-to-Firmicutes** ratio, typically leaning toward an expansion of Bacteroidetes, alongside a significant enrichment of opportunistic **Proteobacteria**.
- **Genus-Level Shifts:** There is a severe depletion of beneficial *Bifidobacterium*, *Lactobacillus*, and key indigenous butyrate producers, such as *Faecalibacterium prausnitzii*. Conversely, populations of *Bacteroides*, *Escherichia*, and *Bilophila wadsworthia* (a sulfite-reducing pathobiont associated with intestinal inflammation) show marked increases.

Methods of Therapeutic Correction

A comprehensive therapeutic approach is required to target the core pathogenic links of the condition:

1. **Dietary Modification and Mucoprotection.** The administration of soluble dietary fibers (e.g., psyllium, pectin) is essential. These fibers physically adsorb excess hydrophobic BAs, neutralizing their cytotoxic potential. Restricting saturated animal fats reduces hepatic choleresis and minimizes the substrate for toxic secondary BA conversion.
2. **Targeted Probiotic and Prebiotic Support.** Multi-strain probiotics containing bile-resistant *Bifidobacterium* and *Lactobacillus* strains are utilized alongside

prebiotics (inulin, fructooligosaccharides) to stimulate indigenous SCFA production and restore epithelial barrier integrity.

3. **Bile Acid Pool Modification.** Ursodeoxycholic acid (UDCA) represents the primary pharmacological intervention. As a hydrophilic, non-toxic BA, UDCA integrates into the general BA pool, displaces toxic hydrophobic DCA, and mitigates mucosal inflammation. In severe cases of refractory secretory diarrhea, anion-exchange bile acid sequestrants (e.g., cholestyramine, colesevelam) are indicated.

Conclusion

Cholecystectomy acts as a distinct trigger for persistent structural and functional alterations in the gut microbiota, dictated by disrupted bile acid kinetics. Timely nutritional and pharmacological correction stabilizes the intestinal ecosystem, prevents severe dysbiosis, restores metabolic homeostasis, and substantially improves the post-operative quality of life for patients.

LIST OF REFERENCES:

1. **Ardatskaya M. D., Topchiy T. B.** Postcholecystectomy syndrome: modern approaches to diagnosis and treatment from the perspective of correcting metabolic disorders. *Experimental and Clinical Gastroenterology*. 2021;189(5):122-131. (In Russ.)
2. **Keren N., Rainis T., Goldstein M. et al.** Cholecystectomy burden and its effect on the composition and metabolic activity of the human gut microbiota. *Scientific Reports*. 2022;12(1):14235.
3. **Wang W., Wang J., Li J. et al.** Alterations of gut microbiota and bacterially-derived bile acids in patients after cholecystectomy. *Frontiers in Cellular and Infection Microbiology*. 2023;13:1094082.
4. **Maev I. V., Dicheva D. T., Andreev D. N.** Possibilities of using ursodeoxycholic acid in the complex therapy of patients after cholecystectomy. *Therapeutic Archive*. 2022;94(8):998-1004. (In Russ.)
5. **Jia W., Xie G., Jia W.** Bile acid-microbiota crosstalk in gastrointestinal inflammation and carcinogenesis. *Nature Reviews Gastroenterology & Hepatology*. 2018;15(2):111-128.
6. **Grigor'eva I. N., Romanova T. I.** Gut Microbiota and Cholecystectomy. *Diagnostics*. 2024;14(4):421.

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ANNOTATSIYA

Ushbu maqolada XIII asr boshlarida yashab o'tgan buyuk sarkarda va davlat arbobi Jaloliddin Manguberding hayoti va vatanparvarlik faoliyati yoritilgan. Maqolada Xorazmshohlar davlatining ichki siyosiy ahvoli, Chingizxon boshchiligidagi mo'g'ul bosqinchiligining boshlanishi, Jaloliddinning taxt uchun kurashi hamda uning o'n bir yil davomida mo'g'ul istilochilariga qarshi olib borgan mardonavor kurashi tahlil qilingan. Shuningdek, Jaloliddin Manguberding Vatan ozodligi yo'lidagi jasorati va uning xalqimiz tarixidagi o'rni xolisona baholanadi.

Kalit so'zlar: Jaloliddin Manguberdi, Xorazmshohlar davlati, mo'g'ul istilosi, Chingizxon, Parvon jangi, Sind daryosi jangi, vatanparvarlik, milliy qahramon.

KIRISH

O'zbek xalqi tarixida vatan ozodligi va mustaqilligi uchun jonini fido qilgan ko'plab buyuk siymolar yashab o'tgan. Ana shunday shaxslardan biri — Xorazmshohlar davlatining so'nggi hukmdori, jasur sarkarda Jaloliddin Manguberdidir. U yashagan davr jahon tarixining eng fojiali va ayni paytda eng sinovli davrlaridan biri bo'lib, bu davrda Chingizxon boshchiligidagi mo'g'ul qo'shinlari Sharqiy va Markaziy Osiyoning ko'plab davlatlarini vayron etgan edi.

Jaloliddin Manguberdi ana shunday og'ir sinov davrida tarix sahnasiga chiqib, o'z yurti va xalqining ozodligi uchun o'n bir yil davomida tinimsiz kurash olib bordi. Mazkur maqolaning maqsadi — Jaloliddin Manguberding shaxsi, uning davlat va harbiy faoliyati, mo'g'ullarga qarshi olib borgan janglari hamda uning vatanparvarlik namunasi sifatidagi tarixiy ahamiyatini yoritishdan iborat.

1. Xorazmshohlar davlatining ichki ahvoli va taxt uchun kurash

XIII asr boshlarida Xorazmshohlar davlati Movarounnahr, Xuroson va qo'shni hududlarni o'z ichiga olgan yirik davlatlardan biri edi. Biroq davlatning tashqi qudratiga qaramay, uning ichki siyosiy tuzilishi barqaror emasdi. Sulton Alouddin

Muhammad hukmronligi davrida saltanatda markaziy hokimiyat zaiflashgan, amirlar o'rtasida kelishmovchiliklar kuchaygan, harbiy qo'shinning yagona qo'mondonlik ostida bo'lmagani esa davlatning mudofaa qobiliyatiga salbiy ta'sir ko'rsatgan edi.

Jaloliddin Manguberdi Alouddin Muhammadning to'ng'ich o'g'li bo'lishiga qaramay, sultonning onasi Turkon-xotun uni taxtdan chetlatib, o'z urug'idan bo'lgan Qutbiddin O'zloqshohni valiahd etib tayinlagan edi. Bu holat davlat ichida yana bir bo'linish omiliga aylandi. Mo'g'ul bosqinchiligi arafasida yuzaga kelgan ushbu ichki kelishmovchiliklar Xorazmshohlar davlatining yagona mudofaa strategiyasini ishlab chiqishiga to'sqinlik qildi.

2. Mo'g'ul istilosining boshlanishi va Jaloliddinning kurash maydoniga chiqishi

1219-yilda Chingizxon boshchiligidagi mo'g'ul qo'shinlari Xorazmshohlar davlatiga bostirib kirdi. Otror voqeasi bahona qilingan bu bosqin natijasida Buxoro, Samarqand, Urganch kabi yirik shaharlar bosib olindi va vayron etildi. Sulton Alouddin Muhammad mo'g'ullarga qarshi tashkiliy qarshilik ko'rsata olmay, mamlakatni tark etib, Kaspiy dengizidagi bir orolchada vafot etdi.

Davlat parokandalikka yuz tutgan, ko'plab amirlar xoinlik yo'lini tutgan yoki o'z joni va mol-mulkini asrash payida bo'lgan bir sharoitda Jaloliddin Manguberdi mardlik bilan kurash maydoniga chiqdi. U otasi vafotidan so'ng sulton deb e'lon qilindi va qolgan kuchlarni birlashtirib, mo'g'ul istilochilariga qarshi tashkiliy qarshilik ko'rsatishga kirishdi.

3. Parvon jangi va harbiy mahorat namunalari

Jaloliddin Manguberdi G'azna shahriga yetib borgach, u yerda Hirot hokimi va qayinotasi Amin Malik bilan ittifoq tuzdi. Ular birgalikda Qandahor qal'asini qamal qilayotgan mo'g'ul qo'shiniga hujum uyushtirib, ularni mag'lub etishga muvaffaq bo'ldilar. Ushbu jangda Jaloliddin harbiy tarixda ilk marotaba piyoda yoyandozlarni mo'g'ullarning otliq qo'shiniga qarshi qo'yish taktikasini qo'lladi.

1221-yilning kuzida Chingizxon noyon Shiki Xutuxu boshchiligida katta qo'shinni Jaloliddinga qarshi yubordi. Parvon degan joyda bo'lib o'tgan jangda Jaloliddin qo'shini g'alaba qozondi va mo'g'ullarning mingdan ortiq askari halok bo'ldi. Bu g'alaba o'sha davr tarixchilari — Ibn al-Asir, Juvayniy va Rashididdin asarlarida yuksak baholangan bo'lib, u shu paytgacha yengilmagan deb hisoblangan mo'g'ul qo'shiniga qarshi qozonilgan noyob zafarlardan biri sifatida tarixga kirdi.

4. Sind daryosi bo'yidagi jang va Jaloliddinning matonati

Parvon jangidagi g'alabadan so'ng Jaloliddin qo'shinlari orasida o'ljani bo'lishish masalasida kelishmovchilik yuzaga keldi, natijada ittifoqchi kuchlarning bir qismi undan ajralib chiqdi. Bu esa Jaloliddin qo'shinining jangovar qudratini sezilarli darajada susaytirdi. Chingizxon esa bu vaziyatdan foydalanib, shaxsan katta qo'shin bilan Jaloliddinga qarshi yurish boshladi.

Sind (Hind) daryosi bo'yida bo'lib o'tgan hal qiluvchi jangda kuchlar nisbati notekis bo'lganligi sabab Jaloliddin qo'shini mag'lubiyatga uchradi. Rivoyatlarga ko'ra, Jaloliddin qurshovdan chiqib ketish uchun oti bilan baland qoyadan Sind daryosiga sakrab, uni kechib o'tishga muvaffaq bo'lgan. Uning bu jasorati hatto raqibi Chingizxonni ham hayratga solgan va tarixiy manbalarda alohida ta'kidlanadi.

5. Vatan ozodligi yo'lidagi davomiy kurash

Sind daryosidan o'tib, Hindiston hududiga chekingan Jaloliddin bu yerda ham uzoq qololmadi va bir muddat o'tgach, ozgina qo'shin bilan yana Eron va Iroq tomon qaytdi. U yerda mahalliy hukmdorlar bilan ittifoq tuzishga, kuch to'plab mo'g'ullarga qarshi kurashni davom ettirishga harakat qildi. Biroq atrofdagi musulmon hukmdorlarning ko'pchiligi uning kuchayib ketishidan xavotirlanib, unga yordam berishdan tiyilgan, bu esa Jaloliddinning tashqi siyosiy faoliyatidagi asosiy qiyinchiliklardan biriga aylangan edi.

Shunga qaramay, Jaloliddin Manguberdi taslim bo'lmadi. Tarixiy ma'lumotlarga ko'ra, u mo'g'ullarga qarshi jami o'n to'rt marta jangga kirishgan bo'lib, ularning o'n uch tasida g'alaba qozongan. Jaloliddin o'n bir yil davomida — 1220-yildan 1231-yilgacha — mo'g'ul istilochilariga qarshi tinimsiz kurash olib bordi. Bu kurash davomida u goh zafar quchdi, goh mag'lubiyat achchig'ini tortdi, biroq hech qachon vatan ozodligi g'oyasidan voz kechmadi.

6. Jaloliddin Manguberding vafoti va merosi

Jaloliddin Manguberdi 1231-yilning avgust oyida hozirgi Turkiya hududida, kurd tog' aholisi tomonidan fojiali ravishda halok bo'ldi. Shu tariqa o'z umrining bor-yo'g'i o'ttiz ikki yilini vatan va xalq ozodligi uchun kurashga bag'ishlagan buyuk sarkardaning hayoti so'nggi nafasigacha jasorat va matonat ramzi bo'lib qoldi.

Jaloliddin Manguberding vatanparvarlik namunasi keyingi avlodlar xotirasida abadiy saqlanib qoldi. Taniqli o'zbek shoiri va dramaturgi Maqsd Shayxzoda 1944-

yilda “Jaloliddin Manguberdi” nomli tarixiy drama yozib, sarkardaning yurt ozodligi yo‘lidagi jasoratini badiiy tarzda aks ettirdi. Mustaqillik yillariga kelib esa Jaloliddin Manguberdi merosini xolis o‘rganish va uni xalq xotirasida abadiylashtirish davlat siyosati darajasiga ko‘tarildi: O‘zbekiston Respublikasi Vazirlar Mahkamasining 1998-yil 24-sentabrdagi 408-sonli maxsus qarori bilan buyuk sarkardaning tavallud to‘yi keng nishonlandi.

7. Jaloliddin Manguberdi — milliy vatanparvarlik timsoli

Jaloliddin Manguberdi shaxsi va faoliyati o‘zbek xalqi tarixida vatanparvarlik, jasorat va milliy g‘ururning yorqin timsoliga aylangan. U Spitamen, Muqanna, Najmiddin Kubro kabi tarixda o‘chmas iz qoldirgan buyuk ajdodlarimiz qatoridan o‘rin oldi. Uning hayoti shundan dalolat beradiki, qanchalik og‘ir va murakkab tarixiy sharoit bo‘lmasin, vatan va xalq erki uchun kurashish har bir avlod uchun eng oliy burch va sharaf hisoblanadi.

Bugungi kunda mustaqil O‘zbekistonda Jaloliddin Manguberdi xotirasi alohida hurmat bilan e‘zozlanadi: uning nomi bilan ko‘plab ko‘chalar, ta‘lim muassasalari atalgan, poytaxt va boshqa shaharlarda haykallari o‘rnatilgan. Bu esa yosh avlodni vatanparvarlik ruhida tarbiyalashda muhim ahamiyat kasb etadi.

8. Jaloliddin Manguberdi harbiy san’atining o‘ziga xos xususiyatlari

Jaloliddin Manguberdining sarkardalik mahorati o‘z davri uchun juda yuksak baholanadi. U dushman kuchlarini oldindan puxta o‘rganib, jang maydonini to‘g‘ri tanlash, qo‘shinni tez va tartibli safarbar etish hamda notekis kuch sharoitida ham nostandart taktik yechimlar topish qobiliyatiga ega edi. Xususan, piyoda yoyandozlarni otliq qo‘shinga qarshi qo‘llash, tog‘li va tog‘ oldi hududlarining relyefidan unumli foydalanish uning harbiy san’atidagi asosiy yangiliklardan hisoblanadi.

Bundan tashqari, Jaloliddin qo‘shinni safarbar etishda mahalliy aholi va turli qabila-urug‘ vakillarini birlashtirishga, ularning ma’naviy-ruhiy jihatdan safarbarligini ta’minlashga alohida e’tibor qaratgan. Aynan shu jihatlar tufayli u sonli jihatdan ustun bo‘lgan mo‘g‘ul qo‘shiniga qarshi bir necha bor jiddiy zarbalar berishga muvaffaq bo‘lgan. Zamonaviy harbiy tarixchilar Jaloliddinning bu tajribasini o‘rta asr Sharq harbiy san’atining nodir namunalaridan biri sifatida tan olishadi.

9. Jaloliddin Manguberdi obrazi tarixiy va badiiy adabiyotda

Jaloliddin Manguberdining hayoti va faoliyati o‘rta asr tarixchilari asarlarida keng yoritilgan. Uning o‘z vaziri va mirzasi bo‘lmish Shihobiddin Nasaviy “Siyrat as-Sulton Jalol ad-Din Manguberdi” asarida sarkardaning hayoti va janglari haqida qimmatli

ma'lumotlar keltirgan. Shuningdek, Alouddin Atomalik Juvayniyning "Tarixi jahongusho", Rashiduddin Fazlullohning "Jome' ut-tavorix" kabi asarlarida ham Jaloliddin faoliyatiga oid muhim tarixiy dalillar mavjud.

Sobiq sovet davrida Jaloliddin Manguberding sarkardalik faoliyati va uning vatan ozodligi yo'lidagi kurashi bir yoqlama yoritilgan yoxud umuman e'tibordan chetda qolgan edi. Mustaqillik yillariga kelib esa uning tarixiy siymosi xolis ilmiy asosda qayta o'rganila boshlandi. Bugungi kunda Jaloliddin Manguberdi haqida o'nlab ilmiy maqolalar, monografiyalar va o'quv qo'llanmalari nashr etilgan bo'lib, ular yosh avlodni vatanparvarlik ruhida tarbiyalashda muhim manba bo'lib xizmat qilmoqda.

10. Jaloliddin Manguberdi merosining bugungi kundagi ahamiyati

Mustaqillik yillarida O'zbekistonda milliy tarixni xolis o'rganish va ajdodlar merosini e'zozlash davlat siyosati darajasiga ko'tarildi. Shu munosabat bilan Jaloliddin Manguberdi kabi vatanparvar sarkardalarning hayoti va faoliyati keng jamoatchilikka yetkazilishi, ularning jasorati yosh avlod tarbiyasida namuna sifatida qo'llanilishi muhim ahamiyat kasb etmoqda. Maktab va oliy ta'lim muassasalarining tarix darsliklarida Jaloliddin Manguberdi faoliyatiga alohida boblar bag'ishlangan bo'lib, bu orqali o'quvchi va talabalarda vatanga muhabbat, milliy g'urur tuyg'ulari shakllantirilmoqda.

Shuningdek, Jaloliddin Manguberdi nomi bilan atalgan ko'cha, maktab, harbiy bilim yurtlari hamda uning sharafiga o'rnatilgan haykallar xalqimizning ushbu buyuk siymoga bo'lgan cheksiz hurmati va ehtiromining ifodasidir. Bunday tadbirlar nafaqat tarixiy xotirani saqlashga, balki bugungi kun yoshlarida vatanparvarlik, mardlik va Vatanga sodiqlik kabi yuksak fazilatlarni tarbiyalashga ham xizmat qiladi. Jaloliddin Manguberdi timsolida namoyon bo'lgan qat'iyat va fidoyilik xalqimiz uchun barcha davrlarda ibrat bo'lib qoladi.

XULOSA

Xulosa qilib aytganda, Jaloliddin Manguberdi murakkab va og'ir tarixiy sharoitda yashab, o'z vatani va xalqining ozodligi uchun so'nggi nafasigacha kurashgan buyuk sarkarda va davlat arbobidir. Uning Parvon jangidagi zafari, Sind daryosi bo'yidagi jasorati va o'n bir yillik uzluksiz kurashi jahon harbiy tarixida alohida o'rin egallaydi.

Jaloliddin Manguberding hayoti va faoliyati shuni ko'rsatadiki, hatto eng og'ir sinovlar davrida ham vatanga sadoqat, mardlik va qat'iyat bilan ish tutish xalq va davlat taqdirini saqlab qolishning muhim omili bo'lib xizmat qiladi. Shu sababli uning

vatanparvarlik namunasini ilmiy asosda o'rganish va yosh avlodga yetkazish bugungi kunda ham dolzarbligini yo'qotmagan.

ADABIYOTLAR RO'YXATI

1. Ziyoyev H. Jaloliddin Manguberdi — vatan himoyachisi. — Toshkent: Sharq, 2000. — 128 b.
2. Rajabov Q. Jaloliddin Manguberdi: hayoti va faoliyati. — Samarqand: Zarafshon, 2004. — 96 b.
3. Alimova D.A. Xorazmshohlar davlati va mo'g'ul istilosi tarixidan. — Toshkent: Fan, 2006. — 184 b.
4. Sagdullayev A., Mavlonov O'. O'zbekiston tarixi (qadimgi davrdan hozirgi kungacha). — Toshkent: Akademnashr, 2010. — 512 b.
5. Go'zalova M. Jaloliddin Manguberdi obrazi o'zbek adabiyotida // O'zbek tili va adabiyoti jurnali. — Toshkent, 2012. — №4. — B. 61–67.
6. Bo'riyev O. Xorazmshohlar davlatining tanazzulga uchrashi sabablari // Tarix fanlari bo'yicha ilmiy jurnal. — Toshkent, 2014. — №2. — B. 33–40.
7. Golden P.B. Markaziy Osiyo xalqlari tarixi. — Toshkent: Yangi asr avlodi, 2013. — 428 b.
8. O'zbekiston tarixi: davlat va jamiyat taraqqiyoti (jamo'a muallifligi). — Toshkent: Sharq, 2019. — 344 b.
9. Odiljonova D., Qodirova R., Rustamova R. Jaloliddin Manguberdi — vatan himoyachisi // Journal of Science-Innovative Research in Uzbekistan. — 2024. — Vol. 2, №11. — B. 425–429.
10. Ergashev I. Markaziy Osiyoda mo'g'ul istilosi va uning oqibatlari // Ijtimoiy fikr. Inson huquqlari. — Toshkent, 2011. — №3. — B. 54–61.

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Бу ёруғ дунёга келиб ҳаёт ва табиат неъматларидан баҳраманд бўлиб яшаётган ҳар бир инсон энг аввало ўз юртининг тарихини, ўз авлодлари, шажарасини яхши билиб олмоғи лозим. Зеро тарихни билмаган одам келажакни бунёд этишга жуда қийналади. Тарих бу инсон учун мисоли бир кўзгу ёки бўлмаса миллионлаб инсонлар томонидан битилган бебаҳо китобдир. Ҳар бир инсон анашу кўзгуга қараб ўз камчиликларини, усти бошини, афти-ангорини тартибга солгани каби тарих кўзгусига боқиб ўз ўтмишининг қандай бўлганлигини ва келажакда уни нима кутаётганлигини англаб боради.

Мен Сурхондарё вилоятининг Шеробод туманидаги Айинли қишлоғида туғилганман. Демак мен аввало ўз қишлоғим тарихини, унинг нима сабабдан бу ном билан аталганлигини яхши билиб, сўнгра туманимнинг номини, бу ном маъно мазмунини чуқур англаб олмоғим шарт. Натижада эса ватаним ҳақида катта билимга эга бўламан. Айинни қишлоғи. Аслида эса у Ойинли деб аталиши керак эди. Аммо лекин ўтган асрда ҳукмрон бўлган 70 йиллик қизил инперия бу номни тилга олинишига мослаштирилиб яъни рус тили талаффузига қулай қилиниб, Айинни деб аталиб келинди. Аслида бу ном ҳеч қандай маъно касб этмайди. Бу номнинг қадим тарихи йўқ. Лекин Ойинли номининг катта тарихи мавжуд. Бу ном ўзбек халқи уруғларининг бирини номи билан боғлиқдир.

Энди Шеробод номига эътибор қаратсак, бу ном келиб чиқиши тарихи хусусида устозимиз Термиз Давлат университети профессори Сайфулла Турсуновнинг жуда катта меҳнатлари натижасида Шеробод тарихи ва унинг номи билан боғлиқ бўлган мулоҳазалар кенг ёритилган. Биз у кишидан ошириб бу борада фикр билдиришга ожизмиз. Аммо шундай бўлсада ўз фикр-мулоҳазаларим билан газетхонларни хабардор этмоқчиман. Шеробод қадим-қадимдан шарқ-у-ғарбни боғловчи катта йўл бўйида бунёд бўлганлиги бу ҳеч кимга сир эмас. Бу йўл тарихда ипак йўли деб аталган, аниқроғи ўша машҳур ипак йўлининг айнан бир тармоғи Шерободимиз орқали ўтган. Ана шу йўл

бўйида жойлашганлиги боис ҳам узоқ Хитой ўлкасидан йўлга чиққан карвонларнинг бир муддат тўхтаб дам олувчи катта яъни шороботига айланган. Робот сўзи қадимда манзил, макон маъносини билдирган. Кўз олдингизга келтиринг-а баланд тоғлар орасидан машаққатли йўл босиб келаётган узундан-узоқ карвонлар Шеробод кенгликларига чиқиб, тўхтаб дам олишга қарор қилишган. Карвон аҳли шодлигидан бир-бирига шорободга келдик яъни катта рободга келдик, энди дам оламиз дея айтишган бўлса ажаб эмас. Бу бизнинг дастлабки фаразимиз. Шеробод номи билан боғлиқ иккинчи фаразимиз эса қуйидагича. Маълумки Шеробод дарёсининг суви азал-азалдан то ҳозирга қадар шўр ҳисобланади. Лекин уни истёмоқ қилса бўлади, хатто давоий ҳам. Бу сув таркибида қўплаб ёд моддаси мавжуд. Узоқ йўлга чиққан карвон Шерободимизга етиб келгач, ўзаро бир-бирига шўррабодга етиб келдик, энди дам оламиз деган бўсалар не ажаб. Халқимизда ўз оти ўзи билан деган нақл бор. Бу нақлнинг маъноси ҳар бир нарсанинг исми жисмига мос ва хос деган маъно мазмунни ифодалайди. Шу ерда бизнинг иккинчи фаразимиз ўз ифодасини топади. Шеробод эмас балки Шўррабод. Юқорида таъкидлаб ўтганимдай устозимиз Сайфулла Турсунов Шерободга Термиз амири Шералихон асос солган деган фикрни ёзганлар. Менимча эса Шеробод номи Шералихон давридан анча илгари шаклланиб бўлган. Фақатгина унинг исми Шерали бўлганлиги учун ҳам эҳтимол ушбу фараз туғилган. Фикримиз исботи учун Шерободнинг дастлабки маркази Жарқўтон бунга гувоҳлик беради. Чунки Жарқўтонда эрамиздан 4000 йил илгари бронза даврида одамлар яшаганлиги археологик қазилмалар натижасида ўз исботини топди. Академик А.Асқаровнинг ўтган асрнинг 1970 йилларида бу ерда олиб борган қазилма ишлари натижасида Шерободимиз дунёдаги энг қадим аҳоли яшаб ўтган маскан эканлиги маълум бўлди. Ўз даврида Жарқўтонда жуда катта шаҳар мавжуд бўлган. Шеробод дарёси ўз ўзанини ўзгартириб оқиши натижасида бу шаҳар сувсиз қолган. Ҳаммага яхши маълумки сув бор жойда ҳамиша ҳаёт қайнаган. Кейинчалик дарё сувининг бошқа томонга оқиши ҳамда ташқи душманлар ҳужуми натижасида Жарқўтонда ҳаёт тўхтаб у тупроқ остида қолган. Хулоса қилиб айтадиган бўлсак Шеробод номига Шералихон асос солганлиги шубҳа туғдиради.

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Annotatsiya

Maqolada shaxs ismi, etnik guruh nomi, aholi punkti va boshqa geografik nomlar bilan bog‘liq gidronimlarning shakllanishi o‘zbek, ingliz hamda fransuz tilidagi hujjatlashtirilgan misollar asosida qiyoslanadi. Maqsad nom tarkibining tashqi o‘xshashligi bilan tarixiy nomlash manbaini farqlash hamda nomning ko‘chish yo‘nalishini tekshirish mezonlarini belgilashdir. Hudson River, Rivière Jacques-Cartier, Rivière des Hurons, Lac Saint-Charles va Surxondaryo misollarida dalil kuchi turlicha ekani ko‘rsatiladi. Natijada nominatsiya manbasi va oykonim–gidronim munosabatining turli yo‘nalishlari farqlanadi; etimologiyasi tasdiqlanmagan nomlar taxmin sifatida belgilanadi.

Kalit so‘zlar: gidronim, antroponim, etnonim, oykonim, nominatsiya, nom ko‘chishi, toponimik tizim, chog‘ishtirma tahlil.

Аннотация

На документально подтверждённых примерах узбекских, английских и французских гидронимов рассматривается связь названий водных объектов с именами людей, этнических групп, населённых пунктов и других географических объектов. Разграничиваются формальное сходство названий и установленное направление переноса имени; сомнительная этимология не выдаётся за доказанный факт.

Ключевые слова: гидроним, антропоним, этноним, ойконим, номинация, перенос названия.

Abstract

Drawing on documented Uzbek, English and French language examples, this paper examines hydronyms associated with personal names, ethnic labels, settlements and other place names. It distinguishes visible formal similarity from an established historical direction of name transfer. The proposed evidence scale separates confirmed, probable and unresolved naming relations.

Keywords: hydronym, personal name, ethnonym, settlement name, naming motivation, name transfer.

Kirish

Suv obyektining nomi ko‘pincha uning tabiiy belgisi bilangina emas, atrofdagi insoniy va hududiy munosabatlar bilan ham belgilanadi. Shaxs nomi daryo nomiga aylanishi, daryo nomi ko‘l yoki aholi punkti nomiga o‘tishi, etnik guruh nomi esa gidronim tarkibida saqlanishi mumkin. Biroq ikki nomning bir xil shaklda bo‘lishi qaysi biri avval yuzaga kelganini o‘z-o‘zidan isbotlamaydi. Nomlash sababini tasdiqlash uchun tarixiy qayd, mahalliy qo‘llanish, xarita va vakolatli nomlar reyestrini birga ko‘rish zarur.

Maqolaning maqsadi shaxs, etnik guruh, aholi punkti va boshqa toponim bilan aloqador gidronimlarning nominatsion mexanizmlarini ajratish hamda bu aloqani tekshirishning qiyosiy mezonlarini taklif qilishdir. Obyekt sifatida uch tildagi tanlangan rasmiy va tarixiy nomlar, predmet sifatida ularning manba nomi bilan struktur va semantik munosabati olinadi. Tadqiqot sifat yondashuviga asoslangan: tanlanma uch til gidronimlarining chastotasini ifodalash uchun yetarli emas.

Material va usullar

Materialga o‘zbek tilidan Surxondaryo daryosi va shu nomdagi viloyat, ingliz tilidan Hudson River, fransuz tilidagi Kvebek rasmiy nomlar reyestridan Rivière Jacques-Cartier, Rivière des Hurons, Lac Saint-Charles, Rivière Saint-Charles va Les Hurons nomlari olindi [1–8]. Kvebek materiallari fransuz tilida rasmiylashgan gidronimlarga misol bo‘lib, ularni Fransiya hududidagi gidronimlar bilan aynanlashtirish mumkin emas. Inglizcha Hudson River ham Buyuk Britaniya emas, AQShdagi gidronimdir; qiyoslash mezoni til va nom tuzilishidir.

Deskriptiv, onomastik va qiyosiy usullar qo‘llanildi. Har bir misolda to‘rt savol qo‘yildi: 1) suv obyektining turi qanday; 2) nom tarkibidagi identifikator shaxs, etnik birlik yoki boshqa joy nomi bilan qanday bog‘liq; 3) manba nomning o‘tish yo‘nalishini ochiq tasdiqlaydimi; 4) alternativ tarixiy nom mavjudmi? Dalil darajasi “hujjatda qayd qilingan”, “shaklan bog‘liq, ammo yo‘nalishi ochiq emas” va “bahsli” toifalariga ajratildi.

Shaxs ismlari bilan bog‘liq gidronimlar

Antroponimik nominatsiyada shaxs nomi suv obyektini boshqa obyektlardan ajratadigan xususiy qismga aylanadi. AQSh Milliy bog‘lar xizmati Hudson River nomi sayohatchi Henry Hudson bilan bog‘liqligini qayd etadi [1]. Hozirgi inglizcha shaklda Hudson identifikator, River esa obyekt turini anglatuvchi turdosh komponentdir. Bu misol nomning hujjatlashtirilgan shaxsga nisbat berilishini ko‘rsatadi; ayni daryoning mahalliy xalqlar tomonidan ishlatilgan oldingi nomlari mavjudligi tarixiy nominatsiyaning ko‘p qatlamli ekanini ham eslatadi [2].

Fransuzcha Rivière Jacques-Cartier nomi tarkibida ham shaxsning ism-familiyasi va rivière turdosh komponenti aniq ajraladi. Kvebek toponimika komissiyasining kartochkasi nomning rasmiy shakli, obyekt turi va boshqa mahalliy nom variantini qayd etadi [3]. Shaxs nomi komponentining ko‘rinib turishi uning har bir tarixiy bosqichda qachon va qanday qabul qilinganini avtomatik ochib bermaydi. Shu sabab antroponimni aniqlash bilan nomlash tarixini hujjatlashtirish ikki alohida tadqiqot vazifasidir.

Shaxs nomlari diniy xotira, mahalliy tarix yoki siyosiy xotira bilan bog‘liq bo‘lishi mumkin. Lekin Saint-Charles kabi nomdagi “Saint” unsuriga qarab aniq tarixiy shaxsni manbasiz belgilash noto‘g‘ri. Ushbu maqolada bunday birlik shaxsga ishora qilishi mumkin bo‘lgan nom shakli va keyingi nom ko‘chishining materiali sifatida olinadi, uning dastlabki bag‘ishlanish motivi haqida mustaqil hukm chiqarilmaydi.

Etnik birliklar bilan bog‘liq gidronimlar

Etnonimik belgi gidronimga etnik guruhning nomi, laqabi yoki tashqi nomi orqali kirishi mumkin. Rivière des Hurons shaklida Hurons etnik nomi ko‘rinadi. Biroq Kvebek komissiyasi Montérégiedagi shu nomli daryo etimologiyasini noaniq deb belgilaydi va bir necha talqin mavjudligini ko‘rsatadi [4]. Demak, etnik elementning formal mavjudligi daryoni aynan shu guruh nomlaganini yoki u yerda shu guruh yashaganini o‘zi bilan isbotlamaydi.

Etnonimlarni tahlil qilishda endonim va ekzonimni farqlash ham zarur. Rasmiy kartochkada Rivière Jacques-Cartier uchun Wendat tilidagi Yahndawïo’yeh an’anaviy nomi ko‘rsatiladi [3]. Ikki nom bir suv obyektiga tegishli bo‘lishi mumkin, ammo ular turli madaniy va nominatsion an’analarga mansub. Shuning uchun tarixiy hujjatlardagi guruh nomini hozirgi etnik o‘zlik bilan tekshirmay tenglashtirishdan tiyilish kerak.

O‘zbek materialida etnik kelib chiqish haqida tez-tez ilgari suriladigan taxminlar alohida mahalliy yozma va dialektal dalil bilan tekshirilishi lozim. Bir nom tarkibining hozirgi etnonimga o‘xshashi etnonimik etimologiya uchun yetarli emas. Shu metodik talab mavzuga oid o‘zbek mikrogidronimlarini kelgusida arxiv hujjatlari va hududiy so‘rov materiallari bilan tekshirishga yo‘l ochadi.

Aholi punktlari va boshqa toponimlar bilan bog‘liq nomlar

Toponimlar o‘rtasidagi aloqa bir necha yo‘nalishda kechadi: aholi punkti → suv obyekt, suv obyekt → aholi punkti va suv obyekt → boshqa suv obyekt. Har bir yo‘nalish mustaqil tarixiy dalilni talab qiladi. Fransuzcha Les Hurons qishlog‘i haqidagi rasmiy ma’lumot uning Rivière des Hurons bo‘yida joylashganini va nomni shu daryodan olganini bildiradi [5]. Demak, mazkur holatda etnik shaklga ega gidronimdan oykonimga ko‘chish yo‘nalishi hujjatlashtirilgan.

Yana bir aniqlangan yo‘nalish gidronimdan gidronimga ko‘chishdir. Kvebek komissiyasiga ko‘ra Lac Saint-Charles ko‘lining nomi undan oqib chiqadigan Rivière Saint-Charles daryosi nomi bilan bog‘liq [6]. Bu misolda bir obyekt turidan boshqasiga nom ko‘chgan; ko‘l nomidagi Saint-Charles komponenti tarixiy shaxsga bevosita bag‘ishlangan degan xulosa shundan kelib chiqmaydi. Nomning bevosita manbasi daryo nomidir.

O‘zbek tilidagi Surxondaryo nomi daryoga ham, ma’muriy hududga ham tegishli bo‘lib qo‘llanadi; rasmiy gidrologik materialda Surxondaryo viloyatidagi asosiy suv manbai Surxondaryo daryosi sifatida qayd etilgan [7]. Mazkur dalil ikkala obyektning bir xil nomga egaligini va hududiy aloqasini ko‘rsatadi. Ammo aynan qaysi tarixiy davrda qaysi obyekt nomi ikkinchisiga o‘tganini aniqlash uchun bundan qadimiyroq attestatsiyalar kerak. Amudaryo yoki boshqa yirik daryo nomlarini ham shu mezon bilan tekshirish maqsadga muvofiq.

Uch tildagi misollar shu jihatdan umumiyki, identifikator boshqa onomastik birlikka ko‘chib suv obyektining nomi sifatida ishlaydi. Struktur ifoda esa turlicha: inglizcha Hudson River modelida xususiy qism oldinda; fransuzcha Rivière Jacques-Cartier modelida turdosh qism oldinda, Rivière des Hurons birikmasida artiklli bog‘lanish bor; o‘zbekcha Surxondaryo shaklida daryo komponenti nomga qo‘shilib yoziladi. Shakliy farqni nominatsiya manbasining farqi bilan aralashtirmaslik kerak.

Natijalarning qiyosiy umumlashmasi

Nom	Bog‘liq birlik	Manbada aniqlangan munosabat	Dalil maqomi
Hudson River	Henry Hudson	shaxs nomi → daryo nomi	tasdiqlangan [1]
Rivière des Hurons	Hurons etnik nomi	etnik shakl ko‘rinadi; tarixiy sabab bahsli	bahsli [4]
Les Hurons	Rivière des Hurons	daryo nomi → qishloq nomi	tasdiqlangan [5]
Lac Saint-Charles	Rivière Saint-Charles	daryo nomi → ko‘l nomi	tasdiqlangan [6]
Surxondaryo	daryo va viloyat	nom mushtarak, tarixiy yo‘nalish ochiq emas	qisman [7]

Jadval dalil darajasini ham ko'rsatadi: ayrim misolda tarixiy nom ko'chishi vakolatli manbada bevosita yozilgan; ayrimida esa nomning shakli va geografik aloqasi ma'lum, lekin nomlash sababining o'zi noaniq. Bunday farqlash bir xil nomlar zanjirini xato ravishda "birinchi obyekt"dan boshlab chizish xavfini kamaytiradi. Etnik va shaxsga oid nomlar uchun alternativ mahalliy nomlarni ham qayd etish lingvomadaniy tasvirni to'ldiradi.

Xulosa

Shaxs nomiga bog'liq gidronimlarda antroponim identifikator vazifasini bajaradi; etnik birlikli nomlarda formal tarkib tarixiy motivatsiyani har doim ham ochmaydi; aholi punkti va boshqa toponimlar bilan bog'liqlikda esa nomning ko'chish yo'nalishi alohida isbotlanadi. Hudson River antroponimik misol, Rivière des Hurons ehtiyotkor etnonimik talqin, Les Hurons va Lac Saint-Charles esa hujjatlashtirilgan toponimlararo ko'chish namunalaridir. Surxondaryo daryo va viloyat nomining mushtarakligi tarixiy ketma-ketlikni aniqlash uchun qo'shimcha manba zarurligini ko'rsatadi. Keyingi keng korpusli tadqiqotda har bir gidronim uchun manba sanasi, tarixiy shakl, obyekt turi, koordinata, muqobil nomlar va etimologiya dalil darajasini qayd etish tavsiya qilinadi.

Foydalanilgan adabiyotlar

1. U.S. National Park Service. Bard Rock: Hudson River name history. <https://www.nps.gov/places/bard-rock.htm>
2. U.S. National Park Service. Indigenous Peoples of this Area. <https://www.nps.gov/vama/learn/historyculture/indigenous-peoples.htm>
3. Commission de toponymie du Québec. Rivière Jacques-Cartier. https://toponymie.gouv.qc.ca/ct/ToposWeb/Fiche.aspx?no_seq=30610
4. Commission de toponymie du Québec. Rivière des Hurons, Saint-Mathias-sur-Richelieu. https://toponymie.gouv.qc.ca/ct/ToposWeb/fiche.aspx?no_seq=29363
5. Commission de toponymie du Québec. Les Hurons. https://toponymie.gouv.qc.ca/ct/ToposWeb/Fiche.aspx?no_seq=35651
6. Commission de toponymie du Québec. Lac Saint-Charles. https://toponymie.gouv.qc.ca/ct/ToposWeb/Fiche.aspx?no_seq=80027
7. O'zbekiston Respublikasi davlat portali. Yer usti suvlari haqida asosiy ma'lumotlar, 2025. https://api-portal.gov.uz/uploads/178/2025/12/18/cabdbdd2-5f3f-ea28-21d4-27423d09e86f_media_.pdf
8. Müller W. Les hydronymes romands et les toponymes qui en sont dérivés: quelques spécimens. Nouvelle Revue d'Onomastique, 2016, 58: 93–104. https://www.persee.fr/doc/onoma_0755-7752_2016_num_58_1_1851

9. Qorayev S. Toponimika. Toshkent, 2006.
https://www.ziyouz.com/books/uzbek_adabiy_tili/Suyun%20Qorayev.%20Toponimika.pdf

KVANT HISOBLASH DAVRIGA TAYYORGARLIK: MILLIY AXBOROT TIZIMLARINI POSTKVANT KRIPTOGRAFIYAGA BOSQICHMA- BOSQICH O'TKAZISH MODELI

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Termiz iqtisodiyot va servis universiteti

Annotatsiya. Maqolada kvant kompyuterlarining rivojlanishi natijasida zamonaviy ochiq kalitli kriptografik algoritmlarga yuzaga kelayotgan tahdid tahlil qilingan. 2024-yilda AQSh Standartlar va texnologiyalar milliy instituti (NIST) tomonidan qabul qilingan postkvant kriptografiya standartlari ko'rib chiqilgan. Elektron hukumat, bank va elektron raqamli imzo tizimlarini postkvant algoritmlarga bosqichma-bosqich o'tkazish modeli taklif etilgan hamda o'tish davridagi texnik muammolar yoritilgan.

Kalit so'zlar: kvant hisoblash, postkvant kriptografiya, Shor algoritmi, ML-KEM, ML-DSA, kripto-moslashuvchanlik, elektron raqamli imzo.

Аннотация. В статье анализируется угроза, которую развитие квантовых компьютеров создаёт для современных криптографических алгоритмов с открытым ключом. Рассмотрены стандарты постквантовой криптографии, принятые Национальным институтом стандартов и технологий США (NIST) в 2024 году. Предложена модель поэтапного перевода систем электронного правительства, банковских систем и систем электронной цифровой подписи на постквантовые алгоритмы, освещены технические проблемы переходного периода.

Ключевые слова: квантовые вычисления, постквантовая криптография, алгоритм Шора, ML-KEM, ML-DSA, криптогибкость, электронная цифровая подпись.

Abstract. The article analyzes the threat that the development of quantum computers poses to modern public-key cryptographic algorithms. The post-quantum cryptography standards adopted by the US National Institute of Standards and Technology (NIST) in 2024 are reviewed. A model for the phased migration of e-government, banking and electronic digital signature systems to post-quantum algorithms is proposed, and the technical challenges of the transition period are discussed.

Keywords: quantum computing, post-quantum cryptography, Shor's algorithm, ML-KEM, ML-DSA, crypto-agility, electronic digital signature.

KIRISH

Bugungi kunda internet orqali uzatiladigan ma'lumotlar, elektron raqamli imzo va bank tranzaksiyalarining xavfsizligi asosan RSA, Diffi–Xellman va elliptik egri chiziqlarga asoslangan (ECC) algoritmlarga tayanadi. Bu algoritmlarning bardoshlilik katta sonlarni tub ko'paytuvchilarga ajratish va diskret logarifmlash masalalarini klassik kompyuterlarda amalda yechib bo'lmasiligiga asoslangan.

Biroq 1994-yilda P.Shor kvant kompyuterida ushbu masalalarni polinomial vaqtda yechuvchi algoritmi taklif etgan [1]. Yetarli quvvatga ega kvant kompyuteri hali yaratilmagan bo'lsa-da, xavf allaqachon real: tajovuzkorlar hozir shifrlangan ma'lumotlarni to'plab, kelajakda ularni ochish strategiyasini ("harvest now, decrypt later") qo'llashi mumkin. Shu bois uzoq muddat maxfiy saqlanishi lozim bo'lgan ma'lumotlar bugunning o'zida himoyaga muhtoj.

O'zbekistonda elektron hukumat, soliq, bank va elektron raqamli imzo tizimlari jadal rivojlanmoqda, "Kiberxavfsizlik to'g'risida"gi Qonun [7] esa muhim axborot infratuzilmasi obyektlarini himoya qilish tartibini belgilab bergan. Ammo milliy axborot tizimlarini postkvant kriptografiyaga o'tkazish masalasi hali tizimli o'rganilmagan. Maqolaning maqsadi kvant tahdidining mohiyatini tahlil qilish va ushbu o'tishning bosqichma-bosqich modelini taklif etishdan iborat.

ASOSIY QISM

Kvant tahdidining mohiyati. Kvant algoritmlari kriptografik algoritmlarga turlicha ta'sir qiladi. Shor algoritmi ochiq kalitli (asimmetrik) algoritmlarni to'liq zaiflashtiradi, L.Grover algoritmi [2] esa simmetrik shifrlash va xesh-funksiyalarga qarshi hujumni faqat kvadratik darajada tezlashtiradi. Demak, simmetrik algoritmlar uchun kalit uzunligini oshirish yetarli bo'lsa, asimmetrik algoritmlarni butunlay almashtirishga to'g'ri keladi (1-jadval).

1-jadval. Kriptografik algoritmlarga kvant tahdidi darajasi [3–5; 8]

Algoritm	Vazifasi	Tahdid darajasi	Tavsiya etilgan yechim
RSA, ECDSA	Raqamli imzo	Yuqori (Shor algoritmi)	ML-DSA, SLH-DSA
RSA, DH, ECDH	Kalit almashish	Yuqori (Shor algoritmi)	ML-KEM
AES-128	Simmetrik shifrlash	O'rtacha (Grover algoritmi)	AES-256

Algoritm	Vazifasi	Tahdid darajasi	Tavsiya etilgan yechim
SHA-256	Xeshlash	Past	SHA-256 yoki SHA-384

Postkvant standartlar. NIST 2016-yilda boshlagan ko‘p bosqichli tanlovdan so‘ng 2024-yil avgust oyida uchta standartni e‘lon qildi: panjaralarga (lattice) asoslangan ML-KEM kalit inkapsulyatsiya mexanizmi (FIPS 203) [3], ML-DSA raqamli imzo algoritmi (FIPS 204) [4] va xesh-funksiyalarga asoslangan SLH-DSA raqamli imzo algoritmi (FIPS 205) [5]. Ushbu algoritmlarning xavfsizligi kvant kompyuterlari uchun ham samarali yechimi ma‘lum bo‘lmagan matematik masalalarga asoslangan [8]. NIST e‘lon qilgan o‘tish rejasi loyihasida kvant hujumlariga zaif algoritmlarni 2030-yildan keyin eskirgan deb hisoblash, 2035-yildan so‘ng esa ulardan foydalanishni to‘xtatish ko‘zda tutilgan [9].

Xavfni baholash mezoni. Tashkilot qachon harakat boshlashi kerakligini aniqlashda M.Moska taklif etgan mezondan foydalanish qulay [6]: agar $x + y > z$ bo‘lsa, tashkilot xavf ostida hisoblanadi. Bu yerda x – ma‘lumotlarning maxfiy saqlanishi zarur bo‘lgan muddat, y – tizimni yangi algoritmlarga to‘liq o‘tkazish uchun zarur vaqt, z – kriptografik jihatdan xavfli kvant kompyuteri paydo bo‘lishigacha qolgan vaqt. Masalan, soliq yoki tibbiy ma‘lumotlar 20 yil maxfiy saqlanishi, o‘tish esa 7 yil davom etishi kerak bo‘lsa, kvant kompyuteri 27 yildan oldin paydo bo‘lishi ehtimoli bor ekan, bu ma‘lumotlar bugunoq xavf ostida bo‘ladi.

Bosqichma-bosqich o‘tish modeli. Postkvant kriptografiyaga o‘tish bir martalik almashtirish emas, balki bir necha yil davom etadigan jarayondir. Milliy axborot tizimlari uchun quyidagi besh bosqichli model taklif etiladi:

- 1) *kriptografik inventarizatsiya* – qaysi tizimda qanday algoritmlar, kalitlar va sertifikatlar ishlatilayotganini aniqlash;
- 2) *risklar bo‘yicha ustuvorlashtirish* – Moska mezoni asosida uzoq muddat maxfiy saqlanadigan ma‘lumotlarni qayta ishlovchi tizimlarni (soliq, tibbiyot, davlat arxivi, bank) birinchi navbatga qo‘yish;
- 3) *gibrid rejim* – klassik va postkvant algoritmlarni birgalikda qo‘llash, bunda ulardan biri buzilgan taqdirda ham himoya saqlanib qoladi;
- 4) *kripto-moslashuvchanlik* – algoritmnı dastur kodini qayta yozmasdan, sozlamalar orqali almashtirish imkonini beruvchi arxitekturaga o‘tish;
- 5) *to‘liq o‘tish va monitoring* – zaif algoritmlarni bosqichma-bosqich o‘chirish va jarayonni doimiy nazorat qilish.

Gibrid yondashuv amalda o'zini oqlamoqda: yetakchi veb-brauzerlar TLS protokolida klassik X25519 va ML-KEM algoritmlarini birlashtiruvchi gibrid kalit almashish usulini qo'llab-quvvatlay boshladi.

O'tish davridagi muammolar. Postkvant algoritmlarning kalit va imzo o'lchamlari klassik algoritmlarnikidan ancha katta. Masalan, ML-DSA-44 imzosining hajmi 2420 baytni tashkil etadi [4], bu ECDSA P-256 imzosidan (64 bayt) qariyb 38 marta katta. Bu esa tarmoq trafigi, smart-kartalar va USB-tokenlar xotirasiga qo'shimcha yuk tushiradi. Bundan tashqari, elektron raqamli imzo kalitlarini saqlovchi qurilmalarni yangilash, milliy kriptografik standartlarni qayta ko'rib chiqish hamda sohada malakali mutaxassislar tayyorlash zarurati yuzaga keladi.

XULOSA

Kvant hisoblashning rivojlanishi ochiq kalitli kriptografiyaga asoslangan barcha axborot tizimlari uchun strategik tahdid hisoblanadi va unga tayyorgarlikni hozirdan boshlash zarur. Tahlil natijalariga ko'ra quyidagilar taklif etiladi:

- 1) milliy darajada postkvant kriptografiyaga o'tish bo'yicha "yo'l xaritasi"ni ishlab chiqish;
- 2) muhim axborot infratuzilmasi obyektlarida kriptografik inventarizatsiya o'tkazishni majburiy talab sifatida belgilash;
- 3) elektron hukumat va bank tizimlarida gibrid rejimni tajriba-sinov loyihasi sifatida joriy etish;
- 4) milliy kriptografik standartlarga postkvant algoritmlarni kiritish masalasini o'rganish;
- 5) oliy ta'lim muassasalarining kiberxavfsizlik yo'nalishlari o'quv dasturlariga postkvant kriptografiya mavzularini kiritish.

Ushbu choralar milliy axborot tizimlarining uzoq muddatli xavfsizligini ta'minlashga xizmat qiladi.

FOYDALANILGAN ADABIYOTLAR

1. Shor P.W. Algorithms for quantum computation: discrete logarithms and factoring // Proceedings 35th Annual Symposium on Foundations of Computer Science. – IEEE, 1994. – P. 124–134.
2. Grover L.K. A fast quantum mechanical algorithm for database search // Proceedings of the 28th Annual ACM Symposium on Theory of Computing. – 1996. – P. 212–219.
3. NIST FIPS 203. Module-Lattice-Based Key-Encapsulation Mechanism Standard. – Gaithersburg: NIST, 2024.
4. NIST FIPS 204. Module-Lattice-Based Digital Signature Standard. – Gaithersburg: NIST, 2024.

5. NIST FIPS 205. Stateless Hash-Based Digital Signature Standard. – Gaithersburg: NIST, 2024.
6. Mosca M. Cybersecurity in an Era with Quantum Computers: Will We Be Ready? // IEEE Security & Privacy. – 2018. – Vol. 16, No. 5. – P. 38–41.
7. O‘zbekiston Respublikasining “Kiberxavfsizlik to‘g‘risida”gi Qonuni. 2022-yil 15-aprel, O‘RQ-764-son.
8. Bernstein D.J., Lange T. Post-quantum cryptography // Nature. – 2017. – Vol. 549. – P. 188–194.
9. NIST IR 8547 (Initial Public Draft). Transition to Post-Quantum Cryptography Standards. – Gaithersburg: NIST, 2024.

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***Annotatsiya.** Mazkur maqolada O'zbekiston Respublikasida Markaziy bank va uning hududiy boshqarmalari faoliyatining amaldagi holati statistik ko'rsatkichlar asosida tahlil qilinadi. Inflyatsiya darajasi, asosiy stavka, oltin-valyuta zaxiralari hamda depozit foiz stavkalari kabi indikatorlar orqali pul-kredit siyosatining samaradorligi baholanadi. Tadqiqot natijalari markazlashgan boshqaruv tizimi hududiy boshqarmalar vakolatlarini cheklayotganini ko'rsatadi. Shu bilan birga, moliyaviy barqarorlikni ta'minlashda mavjud mexanizmlarning yetarli salohiyatga ega ekani aniqlanadi. Muallif tomonidan hududiy darajada qaror qabul qilish imkoniyatlarini kengaytirish, nazorat funksiyalarini kuchaytirish hamda normativ-huquqiy bazani takomillashtirishga qaratilgan takliflar asoslab beriladi.*

***Kalit so'z.** Markaziy bank, pul-kredit siyosati, inflyatsiya, asosiy stavka, oltin-valyuta zaxiralari, depozit foiz stavkalari, majburiy rezervlar, bank nazorati, hududiy boshqarmalar, moliyaviy barqarorlik, monetar instrumentlar, huquqiy tartibga solish*

Kirish

Bozor iqtisodiyoti sharoitida pul-kredit tizimining barqaror ishlashi mamlakat iqtisodiy rivojlanishining muhim shartlaridan biri hisoblanadi. Ushbu jarayonda Markaziy bank nafaqat pul muomalasini tartibga soluvchi institut sifatida, balki makroiqtisodiy barqarorlikni ta'minlovchi asosiy subyekt sifatida namoyon bo'ladi. Ayniqsa, inflyatsiyani jilovlash, milliy valyuta barqarorligini saqlash hamda moliyaviy tizimning ishonchliligini ta'minlash vazifalari Markaziy bank faoliyatining ustuvor yo'nalishlarini belgilab beradi.¹ Shu bois uning institutsional tuzilmasi va boshqaruv mexanizmlarining samaradorligi iqtisodiy siyosatning umumiy natijadorligiga bevosita ta'sir ko'rsatadi.

O'zbekiston Respublikasida so'nggi yillarda pul-kredit siyosatini modernizatsiya qilish, inflyatsion targetlash tizimiga bosqichma-bosqich o'tish hamda moliyaviy bozorlarni liberallashtirish borasida keng ko'lamli islohotlar amalga oshirildi. Mazkur o'zgarishlar Markaziy bank faoliyatining mazmunini yangilash bilan

¹ O'zbekiston Respublikasining "O'zbekiston Respublikasi Markaziy banki to'g'risida"gi Qonuni.

birga, uning hududiy boshqarmalari oldiga ham yangi vazifalarni qo‘ymoqda. Chunki iqtisodiy jarayonlarning hududlar kesimidagi farqlanishi pul-kredit siyosatini amalga oshirishda differensial yondashuvni talab etadi. Amaldagi tizimda esa boshqaruvning yuqori darajada markazlashgani hududiy bo‘linmalarning imkoniyatlarini to‘liq ishga solishga to‘sqinlik qilishi mumkin.

Shu nuqtai nazardan, Markaziy bank va uning hududiy boshqarmalari faoliyatini takomillashtirish masalasi nafaqat iqtisodiy, balki huquqiy jihatdan ham dolzarb hisoblanadi. Xususan, hududiy boshqarmalarning vakolatlari, ularning qaror qabul qilishdagi ishtiroki, bank nazorati va monitoring jarayonlaridagi roli amaldagi normativ-huquqiy bazada qay darajada mustahkamlanganini chuqur tahlil qilish zarur. Bu esa pul-kredit siyosatining samaradorligini oshirish bilan birga, uning hududiy darajadagi ta’sirchanligini kuchaytirish imkonini beradi.²

Adabiyotlar tahlili

Markaziy bank faoliyati, pul-kredit siyosati va uning institutsional asoslarini o‘rganish iqtisodiy va huquqiy tadqiqotlarda keng yoritilgan yo‘nalishlardan biri hisoblanadi. Ushbu masalaga oid ilmiy qarashlar, avvalo, monetar nazariya doirasida shakllangan bo‘lib, klassik va keynsiy yondashuvlar Markaziy bankning iqtisodiyotdagi rolini turlicha talqin qiladi. Klassik maktab vakillari pul massasini nazorat qilish orqali narxlar barqarorligini ta’minlash mumkinligini ta’kidlasa, keynscha yondashuvda davlatning monetar siyosat orqali iqtisodiy faollikka ta’siri muhim o‘rin egallaydi.³ Ushbu nazariy asoslar Markaziy bank faoliyatining iqtisodiy mohiyatini tushunishda muhim metodologik baza bo‘lib xizmat qiladi.

Zamonaviy iqtisodiy adabiyotlarda Markaziy bankning mustaqilligi masalasi alohida yo‘nalish sifatida ajralib turadi. Xususan, monetar siyosatning samaradorligi bevosita institutsional mustaqillik darajasiga bog‘liqligi ko‘plab tadqiqotlarda asoslab berilgan.⁴ Bu borada Barro va Gordonning inflyatsion kutilmalar modeli, shuningdek, Rogoffning “konservativ markaziy bank” konsepsiyasi muhim ilmiy asos bo‘lib xizmat qiladi. Ushbu yondashuvlarga ko‘ra, Markaziy bankning siyosiy bosimdan xoli bo‘lishi inflyatsiyani barqaror ushlab turish imkoniyatini oshiradi.

Hududiy boshqaruv tizimi va Markaziy bank funksiyalarining markazlashuvi masalasi ham ilmiy adabiyotlarda turlicha yoritilgan. Ayrim tadqiqotchilar markazlashgan model moliyaviy barqarorlikni ta’minlashda samarali ekanini ta’kidlasa, boshqa mualliflar hududiy bo‘linmalarga kengroq vakolat berish iqtisodiy jarayonlarga tezkor moslashuvni ta’minlashini asoslaydi. Xususan, rivojlanayotgan

² Walsh C. *Monetar nazariya va siyosat*. – MIT Press nashriyoti, 2017.

³ Keynes J.M. *Bandlik, foiz va pulning umumiy nazariyasi*. – London: Macmillan nashriyoti, 1936.

⁴ Alesina A., Summers L. “Markaziy bank mustaqilligi va makroiqtisodiy samaradorlik” // *Pul, kredit va bank ishi jurnali (Journal of Money, Credit and Banking)*, 1993.

mamlakatlar tajribasi hududiy darajadagi moliyaviy institutlarning mustaqilligi kreditlash jarayonlari va bank nazoratining samaradorligiga ijobiy ta'sir ko'rsatishini ko'rsatadi.

O'zbekiston Respublikasida Markaziy bank faoliyatiga oid ilmiy va normativ manbalar ham so'nggi yillarda sezilarli darajada kengaydi. "O'zbekiston Respublikasi Markaziy banki to'g'risida"gi Qonun hamda unga kiritilgan o'zgartirishlar Markaziy bankning asosiy vazifalari, vakolatlari va institutsional tuzilmasini huquqiy jihatdan belgilab bergan.⁵ Shuningdek, pul-kredit siyosati konsepsiyalari, inflyatsion targetlash strategiyasi hamda moliyaviy barqarorlikni ta'minlashga doir hukumat qarorlari ushbu sohadagi amaliy yondashuvlarni shakllantirishda muhim o'rin tutadi.

Tadqiqot metodologiyasi

Mazkur tadqiqotda Markaziy bank va uning hududiy boshqarmalari faoliyatini huquqiy va institutsional jihatdan tahlil qilishda kompleks yondashuv qo'llanildi. Asosiy metod sifatida tizimli tahlil tanlanib, u orqali pul-kredit siyosati elementlari o'zaro bog'liqlikda ko'rib chiqildi. Shuningdek, qiyosiy-huquqiy tahlil usuli yordamida milliy normativ-huquqiy baza xorijiy amaliyot bilan solishtirildi va boshqaruv modellaridagi farqlar aniqlandi. Statistik ma'lumotlarni tahlil qilish jarayonida induksiya va deduksiya usullaridan foydalanilib, inflyatsiya, asosiy stavka, zaxiralar hamda bank tizimi ko'rsatkichlari asosida umumiy xulosalar shakllantirildi. Bundan tashqari, mantiqiy umumlashtirish va ilmiy abstraksiyalash usullari orqali hududiy boshqarmalar faoliyatidagi institutsional muammolar ajratib ko'rsatildi hamda ularni takomillashtirish bo'yicha asoslangan ilmiy xulosalar ishlab chiqildi.

Tahlil va natijalar

1-jadval. O'zbekiston Respublikasida Markaziy bank faoliyatiga oid asosiy statistik ko'rsatkichlar

No	Ko'rsatkich nomi	Miqdori	Yil	Huquqiy tahlil uchun ahamiyati
1	Inflyatsiya darajasi	7,1 %	2026	Narxlar barqarorligi to'liq ta'minlanmagan, pul-kredit siyosatini kuchaytirish zarur
2	Inflyatsiya targeti	5 %	2026	"Narxlar barqarorligi" bo'yicha qonuniy maqsad
3	Asosiy stavka	14 %	2025–2026	Markaziy bankning asosiy monetar instrumenti

⁵ O'zbekiston Respublikasining "O'zbekiston Respublikasi Markaziy banki to'g'risida"gi Qonuni.

4	Oltin-valyuta zaxiralari	75 mlrd AQSh dollari	2026	Tashqi barqarorlik va valyuta siyosati samaradorligi
5	Depozit foiz stavkalari	17–19 %	2026	Moliyaviy resurslar narxi yuqori ekanini ko'rsatadi
6	Majburiy rezerv normasi (UZS)	4 %	2026	Bank likvidligini huquqiy tartibga solish vositasi
7	Majburiy rezerv normasi (FX)	8,5 %	2026	Valyuta risklarini kamaytirish mexanizmi

Keltirilgan statistik ko'rsatkichlar O'zbekiston Respublikasida Markaziy bank tomonidan yuritilayotgan pul-kredit siyosatining mazmuni va amaldagi samaradorligini baholash imkonini beradi. Ularning kompleks tahlili shuni ko'rsatadiki, so'nggi yillarda makroiqtisodiy barqarorlikni ta'minlash yo'lida muayyan natijalarga erishilgan bo'lsa-da, ayrim yo'nalishlarda tizimli takomillashtirish zarurati saqlanib qolmoqda.

Avvalo, inflyatsiya darajasining 7,1 foizni tashkil etishi belgilangan maqsadli ko'rsatkichdan yuqori ekanini qayd etish lozim. Bu holat narxlar barqarorligini ta'minlash mexanizmlarining to'liq ishlamayotganini emas, balki iqtisodiyotda saqlanib qolayotgan inflyatsion bosim omillari yetarlicha neytrallashtirilmaganini anglatadi. Shunday sharoitda asosiy stavkaning 14 foiz darajasida ushlab turilishi Markaziy bank tomonidan ehtiyotkor va nisbatan qat'iy monetar siyosat yuritilayotganidan dalolat beradi. Biroq foiz stavkasining yuqoriligi iqtisodiy faollik, xususan, kredit resurslariga bo'lgan talab va investitsion jarayonlarga ma'lum darajada cheklovchi ta'sir ko'rsatishi mumkin. Demak, pul-kredit instrumentlaridan foydalanishda faqat inflyatsiyani jilovlash emas, balki iqtisodiy o'sishni qo'llab-quvvatlash omillari ham inobatga olinishi zarur.

Oltin-valyuta zaxiralari hajmining 75 milliard AQSh dollariga yetgani Markaziy bankning tashqi iqtisodiy barqarorlikni ta'minlash borasida yetarli moliyaviy "yostiq"ka ega ekanini ko'rsatadi. Bu, ayniqsa, global moliyaviy bozorlar beqarorligi sharoitida muhim ahamiyat kasb etadi. Shu bilan birga, zaxiralarning katta qismini oltin tashkil etayotgani ularning daromadliligi va likvidligi nuqtai nazaridan muayyan savollarni yuzaga keltiradi. Xalqaro amaliyot shuni ko'rsatadiki, zaxiralar tarkibining muvozanatli diversifikatsiyasi ularning samarali boshqarilishini ta'minlaydi. Shu bois zaxiralarni boshqarishning huquqiy asoslarini yanada takomillashtirish, risklarni boshqarish mexanizmlarini kuchaytirish dolzarb hisoblanadi.

Depozit foiz stavkalarining 17–19 foiz oralig'ida shakllanishi moliyaviy resurslar narxining yuqori ekanidan dalolat beradi. Bu esa, bir tomondan, aholi va

xo‘jalik yurituvchi subyektlarning jamg‘arish faolligini rag‘batlantirsa, ikkinchi tomondan, kredit resurslarining qimmatlashuviga olib keladi. Natijada real sektor subyektlari uchun moliyalashtirish shartlari murakkablashadi. Shu nuqtai nazardan, banklararo raqobatni kuchaytirish, moliyaviy bozor infratuzilmasini rivojlantirish va foiz siyosatini muvozanatlashtirishga qaratilgan huquqiy mexanizmlarni takomillashtirish zarurati yuzaga keladi.

Majburiy rezerv normalarining milliy valyutada 4 foiz va xorijiy valyutada 8,5 foiz darajasida belgilanishi Markaziy bankning likvidlikni tartibga solish hamda valyuta risklarini cheklashga qaratilgan siyosatini aks ettiradi. Xususan, xorijiy valyutadagi yuqori rezerv talabi bank tizimida dollarizatsiya darajasini pasaytirishga xizmat qiluvchi muhim instrument sifatida namoyon bo‘ladi. Biroq ushbu mexanizmning samaradorligi ko‘p jihatdan uning hududiy darajada qay darajada to‘g‘ri qo‘llanilayotganiga bog‘liq. Amaldagi boshqaruv tizimining yuqori darajada markazlashgani esa hududiy boshqarmalarning operativ va moslashuvchan qarorlar qabul qilish imkoniyatlarini cheklashi mumkin.

Yuqoridagi tahlillar asosida shuni xulosa qilish mumkinki, Markaziy bank tomonidan olib borilayotgan pul-kredit siyosati umumiy barqarorlikni ta‘minlashga qaratilgan bo‘lsa-da, uning samaradorligini oshirish uchun institutsional va huquqiy mexanizmlarni chuqurlashtirish talab etiladi. Xususan, hududiy boshqarmalarning vakolatlarini kengaytirish, ularning nazorat va tahlil funksiyalarini kuchaytirish, shuningdek, monetar instrumentlardan foydalanishning moslashuvchanligini oshirish orqali pul-kredit siyosatining hududlar kesimidagi ta‘sirchanligini kuchaytirish mumkin.

2-jadval. Hududiy boshqarmalar faoliyatiga oid tahliliy ko‘rsatkichlar

№	Ko‘rsatkich	Holati	Huquqiy muammo
1	Hududiy boshqarmalar soni	Respublika bo‘yicha mavjud	Markazlashgan boshqaruv ustun
2	Qaror qabul qilish darajasi	Asosan markazda	Hududiy mustaqillik past
3	Kreditlash monitoringi	Hududlarda olib boriladi	Vakolatlar cheklangan
4	Bank nazorati	Markaziy bank orqali	Hududiy nazoratni kuchaytirish zarur
5	Raqamlashtirish darajasi	O‘sib bormoqda	Huquqiy bazani yangilash talab etiladi

Hududiy boshqarmalar faoliyatiga oid tahliliy ko‘rsatkichlar Markaziy bank tizimining institutsional tuzilmasi va boshqaruv mexanizmlarini baholashda muhim

ahamiyat kasb etadi. Mazkur ko'rsatkichlar tahlili shuni ko'rsatadiki, amaldagi tizimda hududiy bo'linmalar mavjud bo'lsa-da, ularning real boshqaruvdagi o'zni va mustaqillik darajasi yetarli emas.

Avvalo, hududiy boshqarmalarning respublika bo'yicha shakllantirilgani Markaziy bank siyosatini joylarda amalga oshirish uchun zarur institutsional asos mavjudligini bildiradi. Biroq boshqaruvning yuqori darajada markazlashganligi sababli ushbu boshqarmalar ko'proq ijro etuvchi organ sifatida faoliyat yuritmoqda. Qaror qabul qilish jarayonlarining asosan markaziy apparat darajasida jamlangani hududiy organlarning tashabbuskorligini cheklaydi hamda mahalliy iqtisodiy sharoitlardan kelib chiqib tezkor choralar ko'rish imkoniyatini pasaytiradi. Natijada pul-kredit siyosatining hududlar kesimidagi samaradorligi to'liq namoyon bo'lmaydi.

Kreditlash jarayonlari ustidan monitoringning hududiy darajada olib borilishi amaliy jihatdan muhim vazifa hisoblanadi. Chunki aynan hududiy boshqarmalar real sektor subyektlari bilan bevosita aloqada bo'lib, iqtisodiy faollik darajasini aniqroq baholash imkoniga ega. Shunga qaramay, ularning vakolatlari cheklangani sababli aniqlangan muammolarni joyida hal etish emas, balki markaziy apparatga axborot uzatish bilan kifoyalanish holatlari kuzatiladi. Bu esa boshqaruv qarorlarining kechikishiga va ayrim hollarda ularning samaradorligi pasayishiga olib kelishi mumkin.

Bank nazorati masalasida ham asosiy vakolatlarning markazda jamlangani tizimning bir xil standartlar asosida ishlashini ta'minlashda, hududiy xususiyatlarni hisobga olish imkoniyatini cheklaydi. Ayniqsa, kichik va o'rta biznes subyektlari faol rivojlanayotgan hududlarda moliyaviy xizmatlarga bo'lgan talab o'ziga xos bo'lib, bu holat differensial yondashuvni talab qiladi. Shu nuqtai nazardan, hududiy boshqarmalarning nazorat va tartibga solish funksiyalarini kuchaytirish orqali bank tizimining hududiy moslashuvchanligini oshirish mumkin.

Xulosa

O'tkazilgan tahlillar O'zbekiston Respublikasida Markaziy bank tomonidan amalga oshirilayotgan pul-kredit siyosati makroiqtisodiy barqarorlikni ta'minlashda muhim o'rin egallayotganini ko'rsatadi. Inflyatsiya darajasi, asosiy stavka, oltin-valyuta zaxiralari hamda depozit siyosati bilan bog'liq ko'rsatkichlar umumiy moliyaviy muvozanatni saqlashga xizmat qilayotgan bo'lsa-da, ayrim parametrlar bo'yicha maqsadli indikatorlarga to'liq erishilmaganligi tizimda qo'shimcha institutsional chora-tadbirlar zarurligini anglatadi. Xususan, inflyatsiyaning target darajadan yuqoriligi pul-kredit instrumentlarining ta'sirchanligini oshirish va ularni iqtisodiyot real sektori bilan yanada uyg'unlashtirish masalasini dolzarb qilib qo'yadi.

Tadqiqot natijalari Markaziy bank faoliyatida markazlashgan boshqaruv modeli ustun ekanini, bu esa hududiy boshqarmalarning qaror qabul qilish jarayonidagi ishtirokini cheklayotganini ko'rsatadi. Amaldagi holat hududiy darajada iqtisodiy jarayonlarga tezkor javob qaytarish imkoniyatini kamaytirib, pul-kredit siyosatining differensial qo'llanilishiga to'sqinlik qilmoqda. Shu nuqtai nazardan, hududiy boshqarmalarning institutsional vakolatlarini qayta ko'rib chiqish, ularning nazorat va tahlil funksiyalarini kengaytirish zaruriyati yuzaga keladi.

Shuningdek, moliyaviy tizimda foiz siyosatining yuqori darajada shakllanishi kredit resurslarining qimmatlashuviga olib kelayotgani kuzatiladi. Bu holat iqtisodiyotning real sektoriga investitsion oqimlarning kirib kelishini ma'lum darajada cheklashi mumkin. Oltin-valyuta zaxiralarining barqarorligi ijobiy omil sifatida baholansa-da, ularning tarkibiy optimalligi va daromadlilik darajasi masalalari qo'shimcha tahlilni talab etadi.

Foydalanilgan adabiyotlar

1. O'zbekiston Respublikasi "Markaziy bank to'g'risida"gi Qonuni. – Toshkent, 2020 (o'zgartirish va qo'shimchalar bilan).
2. O'zbekiston Respublikasi "Banklar va bank faoliyati to'g'risida"gi Qonuni. – Toshkent, 2019.
3. O'zbekiston Respublikasi Prezidentining "Pul-kredit siyosatini takomillashtirish chora-tadbirlari to'g'risida"gi Farmoni. – Toshkent, 2023.
4. O'zbekiston Respublikasi Markaziy banki rasmiy statistik byulleteni. – Toshkent, 2026.
5. O'zbekiston Respublikasi Markaziy banki rasmiy veb-sayti: <https://cbu.uz>
6. O'zbekiston Respublikasi Davlat statistika qo'mitasi ma'lumotlari. – Toshkent, 2025–2026.
7. Mishkin F. S. *The Economics of Money, Banking and Financial Markets*. – Pearson, 2021.
8. Blanchard O. *Macroeconomics*. – Pearson, 2020.
9. Barro R., Gordon D. "Rules, Discretion and Reputation in a Model of Monetary Policy". – Journal of Monetary Economics, 1983.
10. Rogoff K. "The Optimal Degree of Commitment to an Intermediate Monetary Target". – Quarterly Journal of Economics, 1985.
11. Friedman M. *A Program for Monetary Stability*. – New York: Fordham University Press, 1960.
12. Walsh C. E. *Monetary Theory and Policy*. – MIT Press, 2017.

13. Xalqaro Valyuta Jamg'armasi (IMF) hisobotlari: Uzbekistan Country Report. – Washington D.C., 2024.
14. World Bank. *Uzbekistan Economic Update*. – Washington D.C., 2025.
15. Toshmatov Sh., Abdullayev A. "O'zbekistonda bank tizimi va pul-kredit siyosati rivojlanishi". – Toshkent: Iqtisodiyot nashriyoti, 2022.

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Аннотация

Ushbu tezis arterial gipertoniya kasalligining zamonaviy tibbiyotdagi o'rni, rivojlanish mexanizmlari, diagnostikasi va davolashning zamonaviy usullarini yoritishga bag'ishlangan. Arterial gipertoniya yurak-qon tomir kasalliklari, insult, yurak yetishmovchiligi va buyrak faoliyatining buzilishi kabi og'ir asoratlar xavfini oshiruvchi muhim surunkali holatlardan biridir. Zamonaviy yondashuvda arterial bosimni nazorat qilish faqat farmakologik davolash bilan cheklanmay, balki sog'lom turmush tarzini shakllantirish, yurak-qon tomir xavfini baholash, bemorning davolanishga rioya qilishini yaxshilash va muntazam monitoring olib borishni ham o'z ichiga oladi. Jahon sog'liqni saqlash tashkiloti arterial gipertoniyani davolashda tiazid yoki tiazidsimon diuretiklar, angiotenzin-konvertatsiya qiluvchi ferment ingibitorlari yoki angiotenzin II retseptorlari blokatorlari hamda uzoq ta'sir qiluvchi dihidropiridin kalsiy kanali blokatorlarini asosiy dori guruhlari sifatida tavsiya qiladi. 2024-yilgi Yevropa kardiologlar jamiyati tavsiyalarida esa arterial bosimni aniqlash, yurak-qon tomir xavfini baholash, hayot tarzi o'zgarishlari, farmakologik davolash va bemorga yo'naltirilgan kuzatuv kompleks yondashuv sifatida ko'rib chiqiladi.

Kalit so'zlar: arterial gipertoniya, arterial bosim, antihipertenziv terapiya, diuretiklar, ACE ingibitorlari, ARB, kalsiy kanali blokatorlari, yurak-qon tomir xavfi, farmakologik davolash, sog'lom turmush tarzi, kombinatsion terapiya, individual davolash, qon bosimi monitoringi, profilaktika.

Аннотация

Данный тезис посвящён изучению артериальной гипертензии, её значения в современной медицине и современных подходов к лечению заболевания. Артериальная гипертензия является одним из важнейших факторов риска сердечно-сосудистых заболеваний, инсульта, сердечной недостаточности и поражения почек. Современная стратегия лечения включает не только медикаментозную терапию, но и изменение образа жизни, оценку общего сердечно-сосудистого риска, повышение приверженности пациентов к лечению и регулярный контроль артериального давления. Всемирная организация

здравоохранения рекомендует в качестве основных классов антигипертензивных препаратов тиазидные и тиазидоподобные диуретики, ингибиторы АПФ или блокаторы рецепторов ангиотензина II, а также длительно действующие дигидропиридиновые блокаторы кальциевых каналов. Iris Современные европейские рекомендации также подчёркивают значение комплексного и индивидуализированного подхода к ведению пациентов с повышенным артериальным давлением и гипертензией.

Ключевые слова: артериальная гипертензия, артериальное давление, антигипертензивная терапия, диуретики, ингибиторы АПФ, блокаторы рецепторов ангиотензина II, блокаторы кальциевых каналов, сердечно-сосудистый риск, фармакологическое лечение, здоровый образ жизни, комбинированная терапия, индивидуальное лечение, мониторинг артериального давления, профилактика.

Abstract

This thesis focuses on arterial hypertension, its importance in modern medicine, and contemporary approaches to its treatment. Arterial hypertension is one of the major risk factors for cardiovascular disease, stroke, heart failure, and kidney damage. Modern management includes not only pharmacological therapy but also lifestyle modification, cardiovascular risk assessment, improvement of treatment adherence, and regular blood pressure monitoring. The World Health Organization recommends thiazide or thiazide-like diuretics, angiotensin-converting enzyme inhibitors or angiotensin receptor blockers, and long-acting dihydropyridine calcium channel blockers as major first-line antihypertensive drug classes. Iris Contemporary European recommendations emphasize a comprehensive and patient-centred approach that combines lifestyle interventions, pharmacological treatment, risk assessment, and long-term monitoring.

Keywords: arterial hypertension, blood pressure, antihypertensive therapy, diuretics, ACE inhibitors, angiotensin receptor blockers, calcium channel blockers, cardiovascular risk, pharmacological treatment, healthy lifestyle, combination therapy, individualized treatment, blood pressure monitoring, prevention.

Kirish

Arterial gipertoniya zamonaviy tibbiyotning eng muhim muammolaridan biri bo'lib, yurak-qon tomir kasalliklarining rivojlanishida asosiy o'zgartirilishi mumkin bo'lgan xavf omillaridan hisoblanadi. Qon bosimining uzoq muddat davomida yuqori bo'lishi yurak, miya, buyraklar va boshqa a'zolarga zarar yetkazishi mumkin. Jahon

sogʻliqni saqlash tashkiloti arterial gipertoniyaning yurak-qon tomir kasalliklari xavfini sezilarli oshiruvchi holat sifatida koʻrsatadi. Dunyo Sogʻliqni Saqlash Tashkiloti

Arterial gipertoniya koʻpincha uzoq vaqt davomida yaqqol klinik belgilarsiz kechishi mumkin. Shu sababli qon bosimini muntazam oʻlchash kasallikni erta aniqlashda muhim ahamiyatga ega. Tashxis qoʻyishda klinik koʻrik bilan bir qatorda, takroriy qon bosimi oʻlchovlari va zarur hollarda uy sharoitida yoki ambulator monitoringdan foydalanish muhimdir. 2024-yilgi ESC tavsiyalarida gipertoniyaning tasdiqlash, boshlangʻich baholash, yurak va buyrak holatini tekshirish hamda bemorning umumiy yurak-qon tomir xavfini aniqlashga alohida eʼtibor qaratilgan.

Mavzuning dolzarbligi shundan iboratki, arterial gipertoniyaning samarali nazorat qilish yurak-qon tomir asoratlarning oldini olishda muhim oʻrin tutadi. Zamonaviy davolash konsepsiyasi bemorning individual xususiyatlari, hamroh kasalliklari, yurak-qon tomir xavfi va davolanishga rioya qilish darajasini hisobga olishni talab qiladi.

Arterial gipertoniyaning davolashda farmakologik va nefarmakologik usullar bir-birini toʻldiradi. Tuz isteʼmolini kamaytirish, tana vaznini meʼyorlashtirish, muntazam jismoniy faollik, chekishni toʻxtatish va sogʻlom ovqatlanish qon bosimini kamaytirishga yordam beruvchi muhim choralar hisoblanadi. Dunyo Sogʻliqni Saqlash Tashkiloti

Shuningdek, zamonaviy tibbiyotda kombinatsion antihipertenziv terapiyaning oʻrni ortib bormoqda. WHO tavsiyalarida ayrim bemorlarda bir nechta antihipertenziv dori guruhlarini, imkon qadar bitta tabletkadagi kombinatsiyalar koʻrinishida qoʻllash davolanishga rioya qilishni yaxshilash maqsadida tavsiya etiladi.

Maqsadi

Ushbu tadqiqotning asosiy maqsadi — arterial gipertoniyaning klinik ahamiyati, rivojlanish mexanizmlari va zamonaviy davolash usullarini ilmiy manbalar asosida tahlil qilishdan iborat.

Tadqiqotdan koʻzlangan asosiy natija — arterial gipertoniyaning davolashda qoʻllaniladigan asosiy farmakologik va nefarmakologik yondashuvlarni tizimlashtirish, ularning zamonaviy tibbiyotdagi oʻrnini aniqlash hamda individual davolash strategiyasining ahamiyatini yoritishdir.

Bundan tashqari, arterial bosimni muntazam nazorat qilish, yurak-qon tomir xavfini baholash va bemorning davolanishga rioya qilishini taʼminlashning klinik ahamiyatini koʻrsatish ham tadqiqotning muhim vazifalaridan biri hisoblanadi.

Metodologiya

Ushbu tadqiqotda arterial gipertoniya va uning zamonaviy davolash usullarini oʻrganish maqsadida kompleks nazariy va tahliliy yondashuvdan foydalanildi.

Asosiy metod sifatida qiyosiy tahlil tanlandi. Ushbu usul yordamida arterial gipertoniya davolashda qo'llaniladigan turli farmakologik guruhlar, ularning ta'sir mexanizmlari va klinik qo'llanilish xususiyatlari umumlashtirildi.

Tadqiqot davomida quyidagi usullardan foydalanildi:

- **Adabiyotlar tahlili** — arterial gipertoniya bo'yicha xalqaro klinik tavsiyalar, ilmiy maqolalar va tibbiy adabiyotlar o'rganildi.
- **Tahliliy usul** — zamonaviy farmakologik va nefarmakologik davolash yondashuvlari ilmiy jihatdan umumlashtirildi.
- **Qiyosiy tahlil** — turli antihipertenziv dori guruhlarining qo'llanish xususiyatlari taqqoslandi.
- **Tizimli yondashuv** — arterial bosim, yurak-qon tomir xavfi, buyrak faoliyati, hayot tarzi va dori terapiyasi o'rtasidagi o'zaro bog'liqlik kompleks ravishda ko'rib chiqildi.

WHO tavsiyalariga ko'ra, farmakologik davolashni boshlashda hamroh kasalliklar va yurak-qon tomir xavfini baholash muhim bo'lib, tekshiruvlar davolashni asossiz kechiktirmasligi kerak.

Eksperimental va so'rovnoma usullari ushbu ishda qo'llanilmadi, chunki tadqiqot nazariy-tahliliy xarakterga ega bo'lib, mavjud ilmiy va klinik tavsiyalar asosida olib borildi.

Asosiy natijalar

Tadqiqot davomida arterial gipertoniya zamonaviy davolash bo'yicha bir qator muhim jihatlar aniqlandi.

Birinchidan, arterial gipertoniya davolash faqat qon bosimi ko'rsatkichlarini pasaytirish bilan cheklanmaydi. Davolashning asosiy maqsadlaridan biri yurak-qon tomir asoratlari xavfini kamaytirishdir. Shu sababli bemorning umumiy yurak-qon tomir xavfi, hamroh kasalliklari va a'zolarining zararlanish belgilari hisobga olinishi kerak. 2024-yilgi ESC tavsiyalari ham qon bosimini baholashni umumiy yurak-qon tomir xavfi bilan bog'liq holda olib borishni ta'kidlaydi.

Ikkinchidan, nefarmakologik davolash arterial gipertoniya boshqarishning ajralmas qismi hisoblanadi. Sog'lom ovqatlanish, tuz iste'molini kamaytirish, jismoniy faollikni oshirish, ortiqcha vaznni kamaytirish va chekishdan voz kechish qon bosimini nazorat qilishga yordam beradi. Dunyo Sog'liqni Saqlash Tashkiloti

Uchinchidan, zamonaviy farmakologik davolashda bir nechta asosiy dori guruhlari keng qo'llaniladi. WHO tavsiyalariga ko'ra, birinchi qator antihipertenziv preparatlar qatoriga tiazid va tiazidsimon diuretiklar, ACE ingibitorlari yoki angiotenzin II retseptorlari blokatorlari hamda uzoq ta'sir qiluvchi dihidropiridin kalsiy kanali blokatorlari kiradi.  Iris

Diuretiklar organizmdagi ortiqcha natriy va suyuqlik miqdorini kamaytirish orqali arterial bosimni pasaytirishga yordam beradi. ACE ingibitorlari va ARB guruhidagi preparatlar renin-angiotenzin-aldosteron tizimiga ta'sir ko'rsatib, tomirlarning kengayishiga va qon bosimining pasayishiga olib keladi. Kalsiy kanali blokatorlari esa tomir silliq mushaklarining bo'shashishini ta'minlab, periferik tomir qarshiligini kamaytiradi.

To'rtinchidan, kombinatsion terapiya zamonaviy davolashning muhim yo'nalishlaridan biri hisoblanadi. WHO bir nechta antihipertenziv preparatlarni kombinatsiyada, imkon qadar bitta tabletkali kombinatsiya shaklida qo'llashni davolanishga rioya qilishni yaxshilash maqsadida tavsiya qiladi.

Beshinchidan, davolash jarayonida arterial bosimni muntazam monitoring qilish muhim ahamiyatga ega. Bemorning dori vositalarini muntazam qabul qilishi, arterial bosim ko'rsatkichlarini kuzatishi va shifokor tavsiyalariga amal qilishi uzoq muddatli nazoratning muhim tarkibiy qismlaridir. 2024-yilgi ESC tavsiyalarida ham bemorga yo'naltirilgan yondashuv va o'z-o'zini monitoring qilish masalalariga alohida e'tibor berilgan.

Oltinchidan, arterial gipertoniya davolash strategiyasi individual bo'lishi kerak. Bemorning yoshi, yurak-qon tomir xavfi, buyrak faoliyati, diabet, yurak kasalliklari va boshqa klinik omillar dori tanlash hamda davolash maqsadlarini belgilashda hisobga olinadi. WHO tavsiyalarida ham davolash boshlanishi va maqsadli qon bosimi bemorning klinik holatiga qarab belgilanadi.

Umuman olganda, zamonaviy arterial gipertoniya terapiyasi kompleks yondashuvga asoslanadi. Farmakologik davolash, hayot tarzini o'zgartirish, muntazam monitoring va bemorning davolanishga rioya qilishi birgalikda kasallikni samarali nazorat qilishning asosiy komponentlarini tashkil etadi.

Xulosa

O'tkazilgan nazariy tahlil natijalari arterial gipertoniyaning zamonaviy tibbiyotdagi muhim muammolardan biri ekanligini ko'rsatdi. Kasallikning uzoq vaqt davomida klinik belgilersiz kechishi uning o'z vaqtida aniqlanishi va muntazam nazorat qilinishini muhim vazifaga aylantiradi.

Tadqiqot natijalariga ko'ra, arterial gipertoniyani davolashda kompleks yondashuv eng muhim tamoyillardan biridir. Bunda sog'lom turmush tarzini shakllantirish, arterial bosimni muntazam nazorat qilish, yurak-qon tomir xavfini baholash va zarur hollarda antihipertenziv preparatlardan foydalanish o'zaro bog'liq holda olib boriladi.

Zamonaviy farmakologik terapiyada tiazid va tiazidsimon diuretiklar, ACE ingibitorlari yoki ARB hamda uzoq ta'sir qiluvchi dihidropiridin kalsiy kanali

blokatorlari muhim o'rin tutadi. Ayrim bemorlarda kombinatsion terapiyadan foydalanish va bitta tabletkali kombinatsiyalarni qo'llash davolanishga rioya qilishni yaxshilashga yordam berishi mumkin.

Shuningdek, 2024-yilgi ESC tavsiyalarida arterial bosimni boshqarishda bemorga yo'naltirilgan yondashuv, yurak-qon tomir xavfini baholash, hayot tarzi o'zgarishlari, farmakologik davolash va uzoq muddatli monitoringning kompleks ravishda olib borilishi ta'kidlangan.

Kelgusida arterial gipertoniyani boshqarish yo'nalishida quyidagi tavsiyalarni ilgari surish mumkin:

- arterial bosimni muntazam ravishda nazorat qilish va erta diagnostika imkoniyatlarini kengaytirish;
- bemorlarga sog'lom ovqatlanish va muntazam jismoniy faollik bo'yicha tavsiyalar berish;
- antihipertenziv terapiyada bemorning individual klinik xususiyatlarini hisobga olish;
- kombinatsion va bitta tabletkali terapiyadan oqilona foydalanish;
- bemorlarning dori vositalarini muntazam qabul qilishiga ko'maklashish;
- yurak-qon tomir xavfi yuqori bo'lgan bemorlarni muntazam tibbiy kuzatuvga olish;
- arterial gipertoniya va uning asoratlarini oldini olish bo'yicha aholining tibbiy savodxonligini oshirish.

Shunday qilib, arterial gipertoniyani zamonaviy davolashning asosini kompleks, individual va uzoq muddatli yondashuv tashkil etadi. Farmakologik terapiyani hayot tarzini o'zgartirish va muntazam monitoring bilan birlashtirish arterial bosimni nazorat qilish hamda yurak-qon tomir xavfini kamaytirishga qaratilgan zamonaviy strategiyaning muhim qismidir.

Foydalanilgan adabiyotlar

1. World Health Organization. **Guideline for the Pharmacological Treatment of Hypertension in Adults.** — Geneva: WHO, 2021. Dunyo Sog'liqni Saqlash Tashkiloti
2. World Health Organization. **Guideline for the Pharmacological Treatment of Hypertension in Adults: Summary.** — Geneva: WHO, 2022. Dunyo Sog'liqni Saqlash Tashkiloti
3. European Society of Cardiology. **2024 ESC Guidelines for the Management of Elevated Blood Pressure and Hypertension.** — European Heart Journal, 2024. [E](#)Escardio

4. European Society of Cardiology. **2024 Pocket Guidelines on Elevated Blood Pressure and Hypertension.** — ESC, 2024. Escardio
5. World Health Organization. **Hypertension: Fact Sheet.** — WHO, 2025. Dunyo Sog'liqni Saqlash Tashkiloti
6. World Health Organization. **Global Report on Hypertension: The Race Against a Silent Killer.** — Geneva: WHO, 2023. Dunyo Sog'liqni Saqlash Tashkiloti
7. Williams B., Mancia G., Spiering W. et al. **2018 ESC/ESH Guidelines for the management of arterial hypertension.** — European Heart Journal, 2015
8. Whelton P.K., Carey R.M., Aronow W.S. et al. **2017 ACC/AHA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults.** — Hypertension, 2018.
9. Unger T., Borghi C., Charchar F. et al. **2020 International Society of Hypertension Global Hypertension Practice Guidelines.** — Hypertension, 2020.
10. European Society of Cardiology. **Focus on Elevated Blood Pressure and Hypertension.** — ESC, 2026.

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Аннотация

Ushbu tezis tibbiyotda hujayralar va to'qimalarning fundamental o'rni hamda ularning organizm faoliyatidagi ahamiyatini yoritishga bag'ishlangan. Hujayra — tirik organizmning asosiy strukturaviy va funksional birligi bo'lib, barcha fiziologik va patologik jarayonlarning markazida turadi. To'qimalar esa o'xshash tuzilish va funksiyaga ega bo'lgan hujayralar majmuasidan tashkil topib, organ va tizimlarning shakllanishida muhim rol o'ynaydi. Zamonaviy tibbiyotda hujayra va to'qima darajasida kechadigan o'zgarishlarni o'rganish kasalliklarning patogenezini aniqlash, diagnostika va davolash usullarini takomillashtirishda muhim ahamiyat kasb etadi.

Калит so'zlar

hujayra biologiyasi, to'qimalar tuzilishi, histologik tahlil, hujayra differensiasiyasi, regeneratsiya jarayonlari, hujayra patologiyasi, to'qima homeostazi, molekulyar mexanizmlar, klinik diagnostika, eksperimental tibbiyot, organogenez, sitologiya

Аннотация

Данный тезис посвящён изучению роли клеток и тканей в медицине, а также их значению в функционировании организма. Клетка является основной структурной и функциональной единицей живого организма, в которой протекают все физиологические и патологические процессы. Ткани представляют собой совокупность клеток, сходных по строению и функциям, и играют ключевую роль в формировании органов и систем. Исследование изменений на клеточном и тканевом уровнях в современной медицине имеет большое значение для понимания патогенеза заболеваний, а также для совершенствования методов диагностики и лечения.

Ключевые слова: клеточная биология, структура тканей, гистологический анализ, дифференцировка клеток, процессы регенерации, клеточная патология, тканевой гомеостаз, молекулярные механизмы, клиническая диагностика, экспериментальная медицина, органогенез, цитология

Abstract

This thesis is devoted to the study of the role of cells and tissues in medicine and their significance in the functioning of the human body. The cell is the basic structural and functional unit of living organisms, where all physiological and pathological processes occur. Tissues are composed of groups of cells with similar structure and function, playing a crucial role in the formation of organs and systems. In modern medicine, the study of cellular and tissue-level changes is essential for understanding disease pathogenesis and improving diagnostic and therapeutic approaches.

Keywords: cell biology, tissue structure, histological analysis, cell differentiation, regenerative processes, cellular pathology, tissue homeostasis, molecular mechanisms, clinical diagnostics, experimental medicine, organogenesis, cytology

Kirish

Zamonaviy tibbiyotning asosiy yo‘nalishlaridan biri — organizmda kechadigan jarayonlarni hujayra va to‘qima darajasida chuqur o‘rganishdir. Hujayra tirik tizimning eng kichik, ammo funksional jihatdan eng muhim birligi hisoblanib, barcha fiziologik va patologik o‘zgarishlar aynan shu darajada boshlanadi. To‘qimalar esa bir xil tuzilish va funksiyaga ega hujayralar majmuasi sifatida organlar va tizimlarning morfologik hamda funksional asosini tashkil etadi. Shu sababli hujayra va to‘qimalarning tuzilishi, funksiyasi va o‘zaro bog‘liqligini o‘rganish tibbiyot nazariyasi va amaliyotining fundamental asoslaridan biridir.

Mavzuning dolzarbligi shundan iboratki, hozirgi kunda ko‘plab kasalliklar, jumladan, yallig‘lanish, onkologik, degenerativ va irsiy patologiyalar aynan hujayra va to‘qima darajasidagi buzilishlar bilan bog‘liq holda rivojlanadi. Diagnostikaning zamonaviy usullari — gistologik, sitologik va molekulyar-biologik tahlillar — kasalliklarni erta aniqlash va ularning patogenezi tushunishda muhim o‘rin tutmoqda. Shuningdek, regenerativ tibbiyot, to‘qima muhandisligi va hujayra terapiyasi kabi ilg‘or yo‘nalishlarning rivojlanishi ushbu mavzuning ilmiy va amaliy ahamiyatini yanada oshirmoqda.

Ushbu tezisda ko‘rib chiqilayotgan asosiy muammo — hujayra va to‘qimalarda yuzaga keladigan strukturaviy va funksional o‘zgarishlarning organizm umumiy holatiga ta‘sirini aniqlash, hamda bu o‘zgarishlarni erta bosqichda aniqlash orqali samarali diagnostika va davolash strategiyalarini ishlab chiqishdir. Shu bilan birga, hujayra va to‘qima darajasidagi bilimlarni klinik amaliyotga integratsiya qilish masalasi ham dolzarb muammolardan biri sifatida yoritiladi. Mazkur mavzu tibbiyot talabalari, ilmiy tadqiqotchilar va amaliyotchi shifokorlar uchun muhim bo‘lib,

kasalliklarning kelib chiqish mexanizmlarini chuqur tushunish, to'g'ri tashxis qo'yish va samarali davolash choralarini belgilashda muhim nazariy va amaliy asos bo'lib xizmat qiladi.

Maqsadi

Ushbu tadqiqotning asosiy maqsadi — tibbiyotda hujayralar va to'qimalarning strukturaviy hamda funksional xususiyatlarini chuqur tahlil qilish, ularning organizmda kechadigan fiziologik va patologik jarayonlardagi o'rnini aniqlashdan iborat.

Tadqiqotdan ko'zlangan asosiy natija — hujayra va to'qima darajasida yuzaga keladigan o'zgarishlarning kasalliklar rivojlanishidagi (patogenezdagi) rolini ilmiy asosda yoritish, shuningdek, ushbu o'zgarishlarni erta aniqlash imkonini beruvchi diagnostik yondashuvlarni asoslashdir.

Bundan tashqari, tadqiqot natijasida hujayra va to'qimalar haqidagi nazariy bilimlarni klinik amaliyot bilan bog'lash, zamonaviy diagnostika va davolash usullarini takomillashtirishga xizmat qiluvchi ilmiy xulosalar ishlab chiqish ko'zda tutiladi.

Metodologiya

Ushbu tadqiqotda hujayra va to'qimalarning tibbiyotdagi o'rni va ahamiyatini o'rganish maqsadida kompleks yondashuv qo'llanildi. Tadqiqot jarayonida ilmiy ma'lumotlarni yig'ish, tizimlashtirish va tahlil qilishning bir qator zamonaviy usullaridan foydalanildi.

Asosiy metod sifatida **qiyosiy tahlil (komparativ analiz)** tanlandi. Ushbu usul orqali sog'lom va patologik holatdagi hujayra hamda to'qimalarning tuzilishi va funksional xususiyatlari o'zaro taqqoslandi. Bu esa kasalliklarning rivojlanish mexanizmlarini chuqurroq tushunish imkonini berdi.

Bundan tashqari, tadqiqotda:

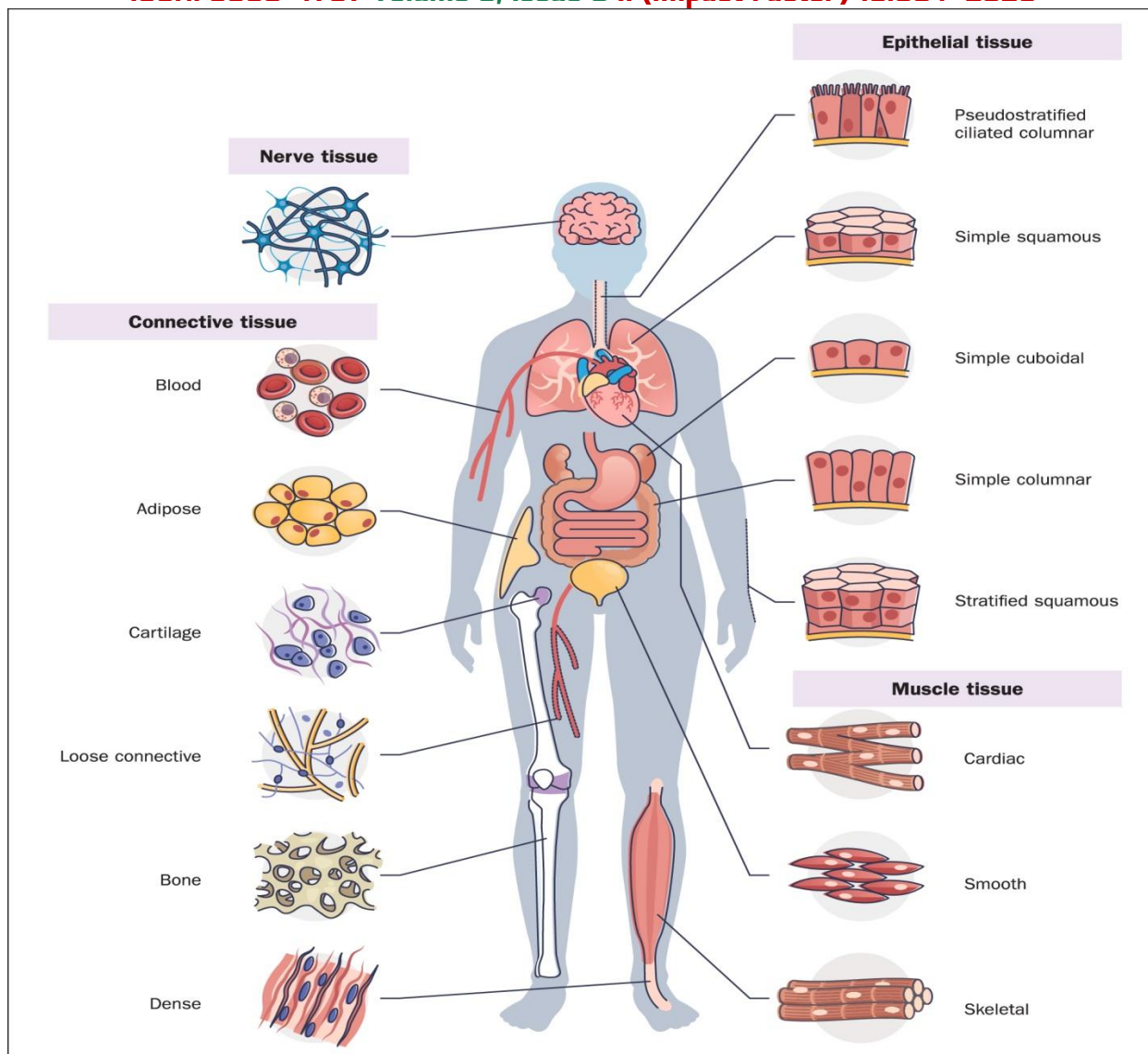
Adabiyotlar tahlili — zamonaviy ilmiy maqolalar, darsliklar va klinik tadqiqotlar asosida nazariy ma'lumotlar yig'ildi;

Tahliliy (analitik) usul — hujayra va to'qima darajasidagi jarayonlar ilmiy jihatdan umumlashtirildi;

Tizimli yondashuv — hujayra, to'qima, organ va tizimlar o'rtasidagi o'zaro bog'liqlik kompleks ravishda ko'rib chiqildi.

Eksperimental va so'rovnoma usullari ushbu ishda qo'llanilmadi, chunki tadqiqot asosan nazariy va tahliliy xarakterga ega bo'lib, mavjud ilmiy manbalar asosida olib borildi.

Natijada tanlangan metodlar hujayra va to'qimalarning tibbiyotdagi ahamiyatini chuqur va ishonchli yoritish imkonini berdi.



Asosiy natijalar

Tadqiqot davomida hujayra va to'qimalarning tibbiyotdagi o'rni hamda ularning patologik jarayonlardagi ahamiyatiga oid bir qator muhim natijalar aniqlandi.

Birinchidan, hujayra darajasida yuzaga keladigan strukturaviy va funksional o'zgarishlar kasalliklarning boshlanish bosqichida aniqlanishi mumkinligi asoslandi. Ayniqsa, hujayra differensiasiyasi, proliferatsiyasi va apoptoz jarayonlaridagi buzilishlar turli patologiyalarning rivojlanishida asosiy omil ekanligi tasdiqlandi.

Ikkinchidan, to'qima darajasidagi o'zgarishlar — masalan, yallig'lanish, degeneratsiya va regeneratsiya jarayonlari — kasallikning kechishi va og'irlik darajasini belgilovchi muhim mezonlar ekanligi aniqlashtirildi. Bu holat klinik diagnostikada gistologik tekshiruvlarning ahamiyatini yana bir bor tasdiqlaydi.

Uchinchidan, qiyosiy tahlil natijasida sog'lom va patologik to'qimalar o'rtasidagi farqlar tizimli ravishda umumlashtirildi va bu farqlar kasalliklarni erta bosqichda aniqlashda diagnostik marker sifatida xizmat qilishi mumkinligi ko'rsatildi.

Shuningdek, tadqiqot davomida hujayra va to'qimalar haqidagi nazariy bilimlarni klinik amaliyotga tatbiq etish diagnostika aniqligini oshirishi va davolash samaradorligini yaxshilashi mumkinligi ilmiy jihatdan asoslab berildi.

Umuman olganda, olingan natijalar hujayra va to'qima darajasidagi o'zgarishlarni chuqur o'rganish zamonaviy tibbiyotda kasalliklarni aniqlash va davolashning muhim yo'nalishlaridan biri ekanligini ko'rsatdi.

Xulosa

O'tkazilgan tadqiqot natijalari hujayra va to'qimalarning tibbiyotdagi fundamental ahamiyatini yana bir bor tasdiqladi. Aniqlanishicha, kasalliklarning aksariyati hujayra darajasida boshlanib, keyinchalik to'qima va organ darajasiga o'tadi. Shu bois hujayra va to'qima darajasidagi o'zgarishlarni erta aniqlash diagnostika aniqligini oshirish va kasalliklarning oldini olishda muhim ilmiy-amaliy ahamiyatga ega.

Olingan natijalar shuni ko'rsatdiki, qiyosiy tahlil asosida sog'lom va patologik holatlarni taqqoslash kasalliklarning patogenezi chuqurroq tushunishga, shuningdek, samarali davolash strategiyalarini ishlab chiqishga imkon beradi. Bu esa zamonaviy tibbiyotda individual yondashuv (personalizatsiyalangan tibbiyot)ni rivojlantirish uchun muhim asos bo'lib xizmat qiladi.

Kelgusida ushbu yo'nalishda quyidagi tavsiyalarni ilgari surish mumkin:

- hujayra va to'qima darajasidagi tadqiqotlarda molekulyar-biologik va genetik usullardan kengroq foydalanish;
- klinik diagnostikada gistologik va sitologik tekshiruvlarning qo'llanish doirasini kengaytirish;
- regenerativ tibbiyot va to'qima muhandisligi yo'nalishlarida ilmiy izlanishlarni chuqurlashtirish;
- nazariy bilimlarni amaliy tibbiyot bilan integratsiya qilish orqali davolash samaradorligini oshirish.

Shunday qilib, hujayra va to'qimalarni chuqur o'rganish nafaqat kasalliklarni tushunish, balki ularni samarali davolash va oldini olishda ham muhim ilmiy asos bo'lib xizmat qiladi.

Foydalanilgan adabiyotlar

1. Быков В.Л. **Гистология, цитология и эмбриология.** — Москва: ГЭОТАР-Медиа, 2020.
2. Афанасьев Ю.И., Юрина Н.А. **Гистология, эмбриология, цитология.** — Москва: ГЭОТАР-Медиа, 2019.
3. Сапин М.Р. **Анатомия человека.** — Москва: ГЭОТАР-Медиа, 2018.

4. Румянцев А.Г. **Общая патология.** — Москва: Медицина, 2017.
5. Лебедев К.А. **Клеточная биология.** — Санкт-Петербург: СпецЛит, 2019.
6. Кузнецов С.Л. **Гистология.** — Москва: Медицина, 2018.
7. Пальцев М.А., Иванов А.А. **Патологическая анатомия.** — Москва: ГЭОТАР-Медиа, 2021.
8. Чеснокова Н.П. **Физиология человека.** — Москва: Академия, 2019.
9. Зайчик А.Ш., Чурилов Л.П. **Общая патофизиология.** — Санкт-Петербург: СпецЛит, 2020.
10. Бочаров Е.В. **Основы молекулярной биологии клетки.** — Москва: Мир, 2018.

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Annotatsiya

Ushbu tezis ikki tomonlama ovarioektomiyadan keyin ayol organizmda yuzaga keladigan gormonal o'zgarishlarning tishlar va og'iz bo'shlig'i to'qimalariga ta'sirini o'rganishga bag'ishlangan. Ovarioektomiya natijasida tuxumdonlarning gormonal faoliyati to'xtashi va estrogen miqdorining keskin kamayishi organizmda bir qator metabolik hamda fiziologik o'zgarishlarni yuzaga keltiradi. Estrogen nafaqat reproduktiv tizim, balki suyak to'qimasi, periodontal to'qimalar, og'iz shilliq qavati va mineral almashinuv jarayonlarining fiziologik holatini saqlashda ham muhim ahamiyatga ega. Ikki tomonlama ovarioektomiyadan keyingi gipoestrogen holat suyak mineral zichligining kamayishi, periodontal to'qimalarning qayta tuzilishi, alveolyar suyak holatining o'zgarishi va og'iz bo'shlig'ida noqulay klinik belgilar yuzaga kelishi bilan bog'liq bo'lishi mumkin. Ushbu o'zgarishlar tishlarning periodontal to'qimalar bilan bog'lanishiga, tishlarning harakatchanligiga va og'iz bo'shlig'i umumiy salomatligiga ta'sir qilishi mumkin. Shu sababli ovarioektomiyadan keyingi bemorlarda stomatologik profilaktika va muntazam nazorat muhim ahamiyat kasb etadi.

Kalit so'zlar: ikki tomonlama ovarioektomiya, estrogen, gipoestrogenizm, tishlar, periodontal to'qimalar, alveolyar suyak, suyak mineral zichligi, osteoporoz, gingiva, og'iz bo'shlig'i, periodontal kasalliklar, gormonal o'zgarishlar, mineral almashinuv, stomatologik profilaktika.

Аннотация

Данный тезис посвящён изучению изменений в зубочелюстной системе и тканях полости рта после двусторонней овариэктомии. Удаление обоих яичников приводит к прекращению их гормональной функции и значительному снижению уровня эстрогенов, что сопровождается рядом метаболических и физиологических изменений в организме. Эстроген играет важную роль не

только в функционировании репродуктивной системы, но и в поддержании состояния костной ткани, периодонта, слизистой оболочки полости рта и минерального обмена. Возникающее после овариэктомии гипоестрогенное состояние может быть связано со снижением минеральной плотности костной ткани, изменениями альвеолярной кости и перестройкой тканей пародонта. Эти процессы могут влиять на устойчивость зубов, состояние десны и общее здоровье полости рта. Поэтому регулярное стоматологическое наблюдение и профилактические мероприятия имеют важное значение для пациенток после двусторонней овариэктомии.

Ключевые слова: двусторонняя овариэктомия, эстроген, гипоестрогенизм, зубы, ткани пародонта, альвеолярная кость, минеральная плотность костной ткани, остеопороз, десна, полость рта, заболевания пародонта, гормональные изменения, минеральный обмен, стоматологическая профилактика.

Abstract

This thesis is devoted to studying changes in the teeth and oral tissues following bilateral oophorectomy. Removal of both ovaries results in the cessation of ovarian hormone production and a significant decrease in estrogen levels, leading to various metabolic and physiological changes in the body. Estrogen plays an important role not only in reproductive function but also in maintaining bone tissue, periodontal tissues, oral mucosa, and mineral metabolism. The hypoestrogenic state following bilateral oophorectomy may be associated with reduced bone mineral density, changes in alveolar bone, and remodeling of periodontal tissues. These changes may affect tooth stability, periodontal health, and overall oral health. Therefore, regular dental examinations and preventive measures are important for patients following bilateral oophorectomy.

Keywords: bilateral oophorectomy, estrogen, hypoestrogenism, teeth, periodontal tissues, alveolar bone, bone mineral density, osteoporosis, gingiva, oral cavity, periodontal diseases, hormonal changes, mineral metabolism, dental prevention.

Kirish

Ayol organizmida reproduktiv tizim gormonlari ko'plab a'zolar va to'qimalarning normal faoliyatini ta'minlashda muhim ahamiyatga ega. Tuxumdonlar tomonidan ishlab chiqariladigan estrogenlar reproduktiv funksiyadan tashqari suyak to'qimasi, yurak-qon tomir tizimi, markaziy asab tizimi va boshqa ko'plab fiziologik jarayonlarga ta'sir ko'rsatadi. Shuningdek, estrogenlarning og'iz bo'shlig'i va periodontal to'qimalarning holatiga ham ta'siri mavjud.

Ikki tomonlama ovarioektomiya — ikkala tuxumdonning jarrohlik yo‘li bilan olib tashlanishi — tuxumdonlarning gormonal faoliyatining keskin to‘xtashiga olib keladi. Natijada organizmda estrogen darajasi sezilarli ravishda kamayib, gipoestrogen holat yuzaga keladi. Tabiiy menopauzadan farqli ravishda, ovarioektomiyadan keyin gormonal o‘zgarishlar qisqa vaqt ichida yuzaga kelishi mumkin. Shu sababli organizmning suyak va boshqa gormonga sezgir to‘qimalarida moslashuv jarayonlari ham muhim klinik ahamiyat kasb etadi.

Mavzuning dolzarbligi shundan iboratki, estrogenlarning kamayishi suyak to‘qimasidagi qayta qurilish jarayonlariga ta’sir qilishi mumkin. Estrogen yetishmovchiligi osteoklastlar faolligining ortishi va suyak rezorbsiyasining kuchayishi bilan bog‘liq bo‘lishi mumkin. Ushbu jarayon jag‘ suyaklari, xususan alveolyar suyakning holatiga ham ta’sir qilishi ehtimoli mavjud.

Alveolyar suyak tishlarni jag‘da ushlab turuvchi asosiy anatomik tuzilmalardan biri hisoblanadi. Periodontal boylam, sement va gingiva bilan birgalikda u tishning mustahkamligini ta’minlaydi. Shu sababli suyak mineral zichligi va periodontal to‘qimalardagi o‘zgarishlar tishlarning funksional holatiga ta’sir qilishi mumkin.

Bundan tashqari, gormonal o‘zgarishlar gingiva va og‘iz shilliq qavatining holatiga ta’sir ko‘rsatishi mumkin. Ayrim bemorlarda og‘iz qurishi, shilliq qavat sezgirligining ortishi yoki periodontal to‘qimalarning yallig‘lanishga moyilligi kabi belgilar kuzatilishi mumkin. Biroq bunday belgilar bevosita ovarioektomiyaning yagona oqibati sifatida baholanmasligi kerak, chunki og‘iz bo‘shlig‘i holatiga yosh, gigiyena, ovqatlanish, dori vositalari, umumiy kasalliklar va boshqa omillar ham ta’sir qiladi.

Shu sababli ikki tomonlama ovarioektomiyadan keyingi davrda tish va periodontal to‘qimalarning holatini muntazam nazorat qilish, umumiy metabolik holatni baholash va individual profilaktik yondashuvni shakllantirish zamonaviy stomatologiyaning muhim vazifalaridan biridir.

Maqsadi

Ushbu tadqiqotning asosiy maqsadi — ikki tomonlama ovarioektomiyadan keyin yuzaga keladigan gormonal o‘zgarishlarning tishlar, periodontal to‘qimalar va alveolyar suyak holatiga ta’sirini o‘rganishdan iborat.

Tadqiqotdan ko‘zlangan asosiy natija — estrogen yetishmovchiligi bilan bog‘liq metabolik va strukturaviy o‘zgarishlarning tish-jag‘ tizimiga ta’sirini ilmiy jihatdan yoritish hamda ovarioektomiyadan keyingi davrda stomatologik nazoratning ahamiyatini asoslashdir.

Bundan tashqari, tadqiqot natijasida gipoestrogenizmning periodontal to'qimalar, alveolyar suyak va og'iz bo'shlig'i shilliq qavatiga ehtimoliy ta'sirini baholash, shuningdek, bunday bemorlarda stomatologik kasalliklarning oldini olishga qaratilgan kompleks yondashuvlarni ko'rsatish ko'zda tutiladi.

Metodologiya

Ushbu tadqiqotda ikki tomonlama ovarioektomiyadan keyingi gormonal o'zgarishlarning tish va periodontal to'qimalarga ta'sirini o'rganish maqsadida kompleks nazariy-tahliliy yondashuv qo'llanildi. Tadqiqot jarayonida endokrinologiya, ginekologiya, stomatologiya, periodontologiya, fiziologiya va patologik anatomiya yo'nalishlariga oid ilmiy adabiyotlar tahlil qilindi.

Asosiy metod sifatida **qiyosiy tahlil** tanlandi. Ushbu usul orqali normal gormonal holat bilan ikki tomonlama ovarioektomiyadan keyingi gipoestrogen holat o'rtasidagi farqlar, shuningdek, ularning suyak va periodontal to'qimalarga ehtimoliy ta'siri o'rganildi.

Bundan tashqari, tadqiqotda:

- **Adabiyotlar tahlili** — estrogenlarning suyak va periodontal to'qimalardagi fiziologik roli hamda ovarioektomiyadan keyingi o'zgarishlarga oid ilmiy manbalar o'rganildi;
- **Tahliliy usul** — gormonal o'zgarishlar, suyak metabolizmi va periodontal to'qimalar o'rtasidagi bog'liqlik umumlashtirildi;
- **Tizimli yondashuv** — reproduktiv, endokrin va stomatologik tizimlar o'rtasidagi o'zaro aloqalar kompleks ravishda ko'rib chiqildi;
- **Qiyosiy yondashuv** — gormonal faoliyati saqlangan holat bilan ovarioektomiyadan keyingi gipoestrogen holatdagi o'zgarishlar taqqoslandi.

Eksperimental va so'rovnoma usullari ushbu ishda qo'llanilmadi, chunki tadqiqot nazariy va tahliliy xarakterga ega bo'lib, mavjud ilmiy ma'lumotlarni umumlashtirishga qaratilgan.

Natijada tanlangan metodlar ikki tomonlama ovarioektomiyaning tish-jag' tizimiga ta'sirini kompleks ravishda yoritish imkonini berdi.

Asosiy natijalar

Tadqiqot davomida ikki tomonlama ovarioektomiyadan keyingi gormonal o'zgarishlarning tishlar va periodontal to'qimalarga ta'siriga oid bir qator muhim jihatlar aniqlandi.

Birinchi dan, ikki tomonlama ovarioektomiyadan so'ng tuxumdonlarning estrogen ishlab chiqarishi keskin kamayishi aniqlandi. Estrogen yetishmovchiligi organizmda suyak metabolizmining o'zgarishiga olib kelishi mumkin. Estrogen suyak rezorbsiyasini cheklovchi muhim gormonal omillardan biri bo'lgani sababli uning kamayishi suyak qayta qurilish muvozanatining rezorbsiyaga tomon siljishiga sabab bo'lishi mumkin.

Ikkinchi dan, estrogen yetishmovchiligi umumiy suyak mineral zichligining pasayishi bilan bog'liq bo'lishi mumkin. Jag' suyaklari ham umumiy skelet tizimining bir qismi bo'lganligi sababli, ularning metabolik holati ham gormonal o'zgarishlarga ma'lum darajada bog'liq. Ayniqsa, alveolyar suyakning holati tishlarning jag'dagi barqarorligini ta'minlashda muhim ahamiyatga ega.

Uchinchidan, ovarioektomiyadan keyingi gormonal o'zgarishlar periodontal to'qimalarning holatiga ta'sir qilishi mumkin. Estrogen retseptorlari periodontal to'qimalarda mavjud bo'lib, gormonal o'zgarishlar ushbu to'qimalarning metabolizmi va yallig'lanish jarayonlariga javobini o'zgartirishi mumkin.

To'rtinchidan, estrogen yetishmovchiligi mavjud bo'lgan bemorlarda periodontal to'qimalarning yallig'lanishga moyilligi ortishi mumkin. Biroq periodontal kasalliklarning rivojlanishi faqat estrogen yetishmovchiligi bilan belgilanmaydi. Og'iz bo'shlig'i gigiyenasi, bakterial biofilm, chekish, diabet, ovqatlanish, yosh va boshqa tizimli omillar ham muhim rol o'ynaydi.

Beshinchidan, ikki tomonlama ovarioektomiyadan keyingi bemorlarda og'iz shilliq qavati va so'lak ajralishi bilan bog'liq noqulayliklar ham kuzatilishi mumkin. Ayrim bemorlarda og'iz qurishi yoki shilliq qavat sezgirligining oshishi kabi belgilar uchrashi mumkin. So'lak miqdori va tarkibining o'zgarishi esa kariyes rivojlanish xavfiga ta'sir qiluvchi omillardan biri bo'lishi mumkin.

Shuningdek, ovarioektomiyadan keyingi davrda tishlarning bevosita strukturaviy o'zgarishi bilan periodontal va suyak to'qimalaridagi o'zgarishlarni farqlash muhimligi aniqlandi. Estrogenning kamayishi tish emali yoki dentinini bevosita yemiruvchi omil sifatida baholanmasligi kerak. Buning o'rniga, gormonal o'zgarishlar mineral almashinuv, suyak metabolizmi, periodontal to'qimalar va og'iz muhitiga bilvosita ta'sir ko'rsatishi mumkin.

Tadqiqot natijalari shuni ko'rsatdiki, ikki tomonlama ovarioektomiyadan keyin tishlarning harakatchanligi, periodontal cho'ntaklarning chuqurligi, gingiva holati va alveolyar suyakning mineral holatini muntazam nazorat qilish klinik jihatdan muhim bo'lishi mumkin.

Bunday bemorlarda stomatologik tekshiruvni umumiy tibbiy nazorat bilan birgalikda olib borish maqsadga muvofiq. Zarur holatlarda suyak mineral zichligi, kalsiy-fosfor almashinuvi va boshqa metabolik ko'rsatkichlarni baholash orqali bemorning umumiy holati haqida qo'shimcha ma'lumot olish mumkin.

Umuman olganda, olingan natijalar ikki tomonlama ovarioektomiyadan keyingi gipoestrogen holat tish-jag' tizimiga bevosita emas, balki asosan suyak metabolizmi, periodontal to'qimalar va og'iz bo'shlig'i muhitidagi o'zgarishlar orqali ta'sir qilishi mumkinligini ko'rsatdi.

Xulosa

O'tkazilgan tadqiqot natijalari ikki tomonlama ovarioektomiyadan keyingi gormonal o'zgarishlarning tish-jag' tizimi uchun muhim klinik ahamiyatga ega ekanligini ko'rsatdi. Tuxumdonlarning olib tashlanishi natijasida estrogen ishlab chiqarilishining keskin kamayishi organizmda gipoestrogen holatni yuzaga keltiradi. Ushbu holat suyak metabolizmi va periodontal to'qimalarning fiziologik holatiga ta'sir qilishi mumkin.

Aniqlanishicha, estrogen yetishmovchiligi suyak rezorbsiyasining kuchayishi va suyak mineral zichligining kamayishi bilan bog'liq bo'lishi mumkin. Bu jarayon jag' suyaklariga, xususan alveolyar suyakning holatiga ham ta'sir ko'rsatishi ehtimoli mavjud. Alveolyar suyak tishlarni ushlab turuvchi muhim tuzilma bo'lganligi sababli, uning metabolik o'zgarishlari periodontal to'qimalar va tishlarning barqarorligiga ta'sir qilishi mumkin.

Shuningdek, gormonal o'zgarishlar periodontal to'qimalarning yallig'lanish jarayonlariga javobini o'zgartirishi va ayrim bemorlarda og'iz bo'shlig'i shilliq qavatida noqulayliklar yuzaga kelishiga sabab bo'lishi mumkin. Biroq bunday o'zgarishlarning rivojlanishida mahalliy stomatologik omillar va umumiy sog'liq holati ham muhim rol o'ynaydi.

Kelgusida ushbu yo'nalishda quyidagi tavsiyalarni ilgari surish mumkin:

- ikki tomonlama ovarioektomiyadan keyingi bemorlarni muntazam stomatologik ko'rikdan o'tkazish;
- periodontal to'qimalarning klinik holatini muntazam baholash;

- alveolyar suyak va umumiy suyak mineral zichligidagi o'zgarishlarni nazorat qilish;
- og'iz bo'shlig'i gigiyenasiga alohida e'tibor qaratish;
- kariyes va periodontal kasalliklarning individual profilaktikasini kuchaytirish;
- stomatolog, ginekolog va endokrinolog o'rtasidagi hamkorlikni rivojlantirish;
- estrogen yetishmovchiligi, suyak metabolizmi va periodontal kasalliklar o'rtasidagi bog'liqlikni yanada chuqurroq o'rganish.

Shunday qilib, ikki tomonlama ovarioektomiyadan keyingi gormonal o'zgarishlarni tish va periodontal to'qimalar holati bilan birgalikda baholash ayollar stomatologik salomatligini saqlashda muhim ahamiyatga ega. Kompleks yondashuv orqali periodontal kasalliklar va boshqa og'iz bo'shlig'i muammolarini erta aniqlash hamda profilaktik choralarni o'z vaqtida amalga oshirish imkoniyati oshadi.

Foydalanilgan adabiyotlar

1. Melmed S., Auchus R.J., Goldfine A.B., Koenig R.J., Rosen C.J. **Williams Textbook of Endocrinology**. — Philadelphia: Elsevier, 2020.
2. Hall J.E. **Guyton and Hall Textbook of Medical Physiology**. — Philadelphia: Elsevier, 2021.
3. Ferrier D.R. **Lippincott Illustrated Reviews: Biochemistry**. — Philadelphia: Wolters Kluwer, 2017.
4. Ross M.H., Pawlina W. **Histology: A Text and Atlas**. — Philadelphia: Wolters Kluwer, 2020.
5. Newman M.G., Takei H.H., Klokkevold P.R., Carranza F.A. **Newman and Carranza's Clinical Periodontology**. — St. Louis: Elsevier 2025.
6. Nanci A. **Ten Cate's Oral Histology: Development, Structure, and Function**. — St. Louis: Elsevier, 2025.
7. Kumar V., Abbas A.K., Aster J.C. **Robbins and Cotran Pathologic Basis of Disease**. — Philadelphia: Elsevier, 2026.
8. Berek J.S. **Berek & Novak's Gynecology**. — Philadelphia: Wolters Kluwer, 2025.
9. Compston J.E., McClung M.R., Leslie W.D. **Osteoporosis**. — Lancet, 2026.

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**Termiz iqtisodiyot va servis universiteti Buxgalteriya va statistika kafedrası
o'qituvchisi PhD.**

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Bank ishi va audit yo'nalishi 123-guruh talabasi

Annotatsiya

Ushbu maqolada zamonaviy iqtisodiy sharoitda korxonalarda buxgalteriya hisobini takomillashtirishning asosiy yo'nalishlari, raqamli texnologiyalarni hisob jarayonlariga joriy etish, moliyaviy hisobotlarning ishonchliligini oshirish, ichki nazorat tizimini rivojlantirish hamda xalqaro moliyaviy hisobot standartlaridan foydalanish masalalari yoritilgan. Tadqiqotda tizimli yondashuv, qiyosiy tahlil, umumlashtirish va ilmiy abstraksiyalash usullaridan foydalanilgan. O'rganish natijasida buxgalteriya hisobini avtomatlashtirish, elektron hujjat aylanishini kengaytirish, hisob siyosatini takomillashtirish va xodimlarning kasbiy malakasini oshirish korxonalarda hisob samaradorligini yaxshilashning muhim omillari sifatida asoslangan. Maqolada korxonalarda buxgalteriya hisobini takomillashtirishga qaratilgan amaliy tavsiyalar ishlab chiqilgan.

Kalit so'zlar: buxgalteriya hisobi, raqamli iqtisodiyot, avtomatlashtirish, moliyaviy hisobot, xalqaro moliyaviy hisobot standartlari, elektron hujjat aylanishi, ichki nazorat, hisob siyosati, axborot texnologiyalari.

Abstract

This article examines the main directions for improving accounting in enterprises under modern economic conditions. It focuses on the implementation of digital technologies, improving the reliability of financial reporting, strengthening internal control systems, and applying International Financial Reporting Standards. The study uses systematic analysis, comparative analysis, generalization, and scientific abstraction. The findings identify accounting automation, electronic document management, improved accounting policies, and professional development of accounting staff as important factors in enhancing accounting efficiency. Practical recommendations for improving accounting systems in enterprises are also presented.

Keywords: accounting, digital economy, automation, financial reporting, International Financial Reporting Standards, electronic document management, internal control, accounting policy, information technology.

1. KIRISH

Zamonaviy iqtisodiyot sharoitida korxonalar faoliyatining samaradorligini ta'minlash, moliyaviy barqarorligini mustahkamlash va raqobatbardoshligini oshirishda buxgalteriya hisobi muhim o'rin tutadi. Buxgalteriya hisobi korxonaning moliyaviy-xo'jalik faoliyatiga oid ma'lumotlarni shakllantirish, qayd etish, umumlashtirish va manfaatdor foydalanuvchilarga taqdim etishning asosiy axborot tizimi hisoblanadi.

Bozor munosabatlarining rivojlanishi, raqamli texnologiyalarning keng joriy etilishi va moliyaviy axborotga bo'lgan talabning ortishi korxonalarda buxgalteriya hisobini tashkil etishning zamonaviy usullarini ishlab chiqishni taqozo etmoqda. An'anaviy hisob yuritish usullari ayrim hollarda ma'lumotlarni qayta ishlash tezligi, axborot almashinuvi va boshqaruv qarorlarini tezkor qabul qilish imkoniyatlari jihatidan cheklovlariga ega bo'lishi mumkin.

Shu sababli buxgalteriya hisobini avtomatlashtirish, elektron hujjat aylanishini rivojlantirish, moliyaviy hisobotlarning shaffofligini oshirish va ichki nazorat mexanizmlarini takomillashtirish dolzarb masalalardan biri hisoblanadi.

Buxgalteriya hisobining takomillashuvi nafaqat hisob-kitob jarayonlarini tezlashtirish, balki korxonaning moliyaviy holati to'g'risidagi ma'lumotlarning aniqligi, ishonchliligi va o'z vaqtida shakllanishini ta'minlashga ham xizmat qiladi.

Tadqiqotning maqsadi — korxonalarda buxgalteriya hisobini takomillashtirishning zamonaviy yo'nalishlarini o'rganish, mavjud muammolarni aniqlash va hisob tizimining samaradorligini oshirish bo'yicha ilmiy-amaliy tavsiyalar ishlab chiqish.

Tadqiqotning vazifalari:

- Buxgalteriya hisobini takomillashtirishning nazariy asoslarini o'rganish.
- Hisob jarayonlariga raqamli texnologiyalarni joriy etish imkoniyatlarini tahlil qilish.
- Moliyaviy hisobotlarning ishonchliligini oshirish yo'llarini aniqlash.
- Ichki nazorat va elektron hujjat aylanishining ahamiyatini yoritish.
- Korxonalarda buxgalteriya hisobini rivojlantirish bo'yicha amaliy tavsiyalar ishlab chiqish.

Tadqiqot obyekti — korxonalarda buxgalteriya hisobini tashkil etish va yuritish jarayonlari.

Tadqiqot predmeti — buxgalteriya hisobini takomillashtirishga ta'sir etuvchi tashkiliy, iqtisodiy va texnologik munosabatlar.

Tadqiqotning ilmiy-amaliy ahamiyati shundan iboratki, ishlab chiqilgan tavsiyalardan korxonalarda hisob jarayonlarini tashkil etish, moliyaviy axborot sifatini yaxshilash va boshqaruv samaradorligini oshirishda foydalanish mumkin.

2. TADQIQOT METODOLOGIYASI

Mazkur tadqiqotda korxonalarda buxgalteriya hisobini takomillashtirishning zamonaviy yo'nalishlarini aniqlash maqsadida nazariy va tahliliy yondashuvlardan foydalanildi¹.

Tadqiqotning metodologik asosini buxgalteriya hisobi nazariyasi, moliyaviy hisobot tamoyillari, korporativ boshqaruv va raqamli iqtisodiyotga oid ilmiy qarashlar tashkil etadi.

Tadqiqot jarayonida quyidagi usullar qo'llanildi:

Tizimli yondashuv. Buxgalteriya hisobi korxonaning moliyaviy, ishlab chiqarish va boshqaruv jarayonlari bilan uzviy bog'liq yagona tizim sifatida o'rganildi.

Qiyosiy tahlil. An'anaviy hisob yuritish usullari va raqamli texnologiyalarga asoslangan zamonaviy hisob tizimlarining xususiyatlari qiyoslandi.

Mantiqiy tahlil va umumlashtirish. Buxgalteriya hisobini takomillashtirishga ta'sir etuvchi omillar o'rganilib, umumiy xulosalar shakllantirildi.

Ilmiy abstraksiyalash. Hisob jarayonlarini rivojlantirishga oid nazariy qarashlar umumlashtirilib, asosiy takomillashtirish yo'nalishlari ajratib ko'rsatildi.

¹ O'zbekiston Respublikasining "Buxgalteriya hisobi to'g'risida"gi Qonuni. O'RQ-404-son, 2016-yil 13-aprel

Me'yoriy-huquqiy tahlil. Buxgalteriya hisobi va moliyaviy hisobotga oid milliy qonunchilik hamda xalqaro standartlarning asosiy talablari tadqiqotning nazariy asoslari sifatida ko'rib chiqildi.

Tadqiqot konseptual-tahliliy xususiyatga ega bo'lib, unda muayyan korxonaning birlamchi moliyaviy hisobotlari asosida empirik hisob-kitoblar amalga oshirilmagan. Shu sababli maqolada keltirilgan natijalar nazariy tahlil va ilmiy umumlashtirishga asoslanadi.

3. TADQIQOT NATIJALARI

Tadqiqot natijasida korxonalarda buxgalteriya hisobini takomillashtirishning o'zaro bog'liq bo'lgan bir nechta asosiy yo'nalishlari aniqlandi. Ular hisob jarayonlarini avtomatlashtirish, elektron hujjat aylanishini rivojlantirish, moliyaviy hisobotlar sifatini oshirish, ichki nazoratni kuchaytirish va kadrlar malakasini rivojlantirishni qamrab oladi².

3.1. Buxgalteriya hisobini avtomatlashtirish

Buxgalteriya hisobini avtomatlashtirish zamonaviy hisob tizimining muhim yo'nalishlaridan biridir. Maxsus dasturiy ta'minotlardan foydalanish hisob ma'lumotlarini qayta ishlash, xo'jalik operatsiyalarini qayd etish, hisobotlarni shakllantirish va ma'lumotlarni saqlash jarayonlarini soddalashtirish imkonini beradi.

Avtomatlashtirilgan tizimlar takroriy amallarni kamaytirish, hisob-kitoblarni tezlashtirish va inson omili bilan bog'liq ayrim xatolar xavfini pasaytirishga yordam beradi. Biroq bunday tizimlarning samaradorligi dasturiy ta'minotning to'g'ri sozlanishi, ma'lumotlarning to'g'ri kiritilishi va xodimlarning malakasiga bog'liq.

Shu sababli korxonalarda avtomatlashtirish jarayonini amalga oshirishda mavjud hisob tizimini tahlil qilish, tegishli dasturiy yechimni tanlash va xodimlarni o'qitish zarur.

3.2. Elektron hujjat aylanishini takomillashtirish

Elektron hujjat aylanishi buxgalteriya hisobining tezkorligi va tartibli yuritilishini ta'minlashga xizmat qiladi. Elektron shaklda yaratilgan, imzolangan va saqlangan hujjatlar bilan ishlash hujjatlarni izlash, qayta ishlash va nazorat qilish jarayonlarini yengillashtiradi.

Elektron hujjat aylanishini joriy etish quyidagi imkoniyatlarni yaratadi:

- Hujjatlarni qayta ishlash vaqtini qisqartirish.
- Hujjatlarning saqlanishi va ulardan foydalanish tartibini yaxshilash.
- Mas'ul xodimlar o'rtasida axborot almashinuvini tezlashtirish.
- Hujjatlarni tasdiqlash va nazorat qilish jarayonlarini tizimlashtirish.
- Qog'oz hujjatlarga bog'liq ayrim xarajatlarni kamaytirish.

Shu bilan birga, elektron hujjatlarning yuridik kuchi, elektron imzo, ma'lumotlarni himoyalash va arxivlash talablariga rioya etilishi muhim hisoblanadi.

3.3. Moliyaviy hisobotlarning sifati va shaffofligini oshirish

Moliyaviy hisobotlar korxonaning moliyaviy holati, faoliyat natijalari va pul oqimlari to'g'risida axborot beruvchi muhim vositadir. Hisobotlarning sifati boshqaruv qarorlarining asoslanganligi va tashqi foydalanuvchilarning ishonchiga ta'sir ko'rsatadi³.

² O'zbekiston Respublikasining "Elektron hujjat aylanishi to'g'risida"gi Qonuni. 611-II-son, 2004-yil 29-aprel

³ O'zbekiston Respublikasining "Elektron raqamli imzo to'g'risida"gi Qonuni. O'RQ-793-son, 2022-yil 12-oktabr

Moliyaviy hisobotlarning sifatini oshirish uchun hisob siyosatini aniq belgilash, xo'jalik operatsiyalarini o'z vaqtida qayd etish, aktiv va majburiyatlarni to'g'ri baholash hamda hisobot ma'lumotlarini muntazam tekshirib borish zarur.

Xalqaro moliyaviy hisobot standartlarini qo'llash tegishli talablar doirasida moliyaviy axborotni taqqoslash imkoniyatini oshirishi mumkin. Bunda korxonaning faoliyat turi, qonunchilik talablari va hisobotdan foydalanuvchilarning ehtiyojlari hisobga olinishi lozim.

3.4. Ichki nazorat va audit tizimini kuchaytirish

Ichki nazorat buxgalteriya hisobi ma'lumotlarining ishonchliligini ta'minlash, aktivlarni saqlash va moliyaviy xatolar xavfini kamaytirishda muhim ahamiyatga ega.

Korxonalarda samarali ichki nazorat tizimini tashkil etish uchun vazifalarni xodimlar o'rtasida to'g'ri taqsimlash, hujjatlarni tasdiqlash tartibini belgilash, inventarizatsiya o'tkazish va hisob ma'lumotlarini muntazam solishtirish talab etiladi.

Shuningdek, hisob tizimida foydalanuvchilarning huquqlarini cheklash, tizimdagi o'zgarishlarni qayd etish va axborot xavfsizligini ta'minlash orqali nazorat mexanizmlarini kuchaytirish mumkin.

3.5. Buxgalteriya hisobida zamonaviy axborot texnologiyalaridan foydalanish

Raqamli iqtisodiyot sharoitida bulutli texnologiyalar, ma'lumotlarni tahlil qilish vositalari va sun'iy intellektga asoslangan yechimlar buxgalteriya hisobini tashkil etishda yangi imkoniyatlarni yaratmoqda.

Bulutli texnologiyalar hisob ma'lumotlaridan masofadan foydalanish, ularni markazlashgan holda saqlash va turli bo'limlar o'rtasida axborot almashinuvini tashkil etishga yordam beradi.

Ma'lumotlarni tahlil qilish vositalari esa daromadlar, xarajatlar, debitorlik va kreditorlik qarzlari bo'yicha ma'lumotlarni tezkor tahlil qilish imkonini beradi.

Sun'iy intellektga asoslangan vositalardan ayrim takroriy amallarni avtomatlashtirish va ma'lumotlardagi nomuvofiqliklarni aniqlashda foydalanish mumkin. Biroq bunday vositalar tomonidan shakllantirilgan natijalar buxgalter yoki mas'ul mutaxassis tomonidan tekshirilishi lozim.

3.6. Buxgalteriya hisobi xodimlarining malakasini oshirish

Buxgalteriya hisobini takomillashtirish faqat texnologiyalarni joriy etish bilan cheklanmaydi. Hisob tizimining samaradorligi, avvalo, uni yurituvchi mutaxassislarning kasbiy bilimlari va amaliy ko'nikmalariga bog'liq.

Buxgalteriya hisobi xodimlari milliy qonunchilik, soliq talablari, moliyaviy hisobot standartlari, zamonaviy dasturiy ta'minot va axborot xavfsizligi bo'yicha muntazam bilimlarini oshirib borishlari zarur.

Malakali kadrlar hisob jarayonlarini to'g'ri tashkil etish, xatolarni kamaytirish va rahbariyatga sifatli moliyaviy axborot taqdim etishda muhim rol o'ynaydi.

3.7. Buxgalteriya hisobini takomillashtirish yo'nalishlarining umumlashtirilgan natijalari

Takomillashtirish yo'nalishi	Kutilayotgan natija
Hisobni avtomatlashtirish	Hisob-kitoblarni tezlashtirish va takroriy amallarni kamaytirish.
Elektron hujjat aylanishi	Hujjatlarni qayta ishlash va nazorat qilishni yengillashtirish.

Moliyaviy hisobotlarni takomillashtirish	Axborotning ishonchliligi va taqqoslanuvchanligini oshirish.
Ichki nazoratni kuchaytirish	Xatolar va moliyaviy xavflarni kamaytirish.
Raqamli texnologiyalarni joriy etish	Ma'lumotlarni tahlil qilish va boshqaruv qarorlarini qo'llab-quvvatlash.
Kadrlar malakasini oshirish	Hisobning sifati va kasbiy mas'uliyatni yaxshilash.

Ushbu umumlashtirishdan ko'rinadiki, buxgalteriya hisobini takomillashtirish alohida bir texnologiyani joriy etish bilan emas, balki hisob jarayonlari, ichki nazorat, axborot xavfsizligi va kadrlar salohiyatini birgalikda rivojlantirish orqali amalga oshirilishi lozim.

4. MUHOKAMA (DISCUSSION)

Tadqiqot natijalari korxonalarda buxgalteriya hisobini takomillashtirishning zamonaviy yo'nalishlari o'zaro uzviy bog'liqligini ko'rsatadi. Hisob jarayonlarini avtomatlashtirish va elektron hujjat aylanishini joriy etish hisob ma'lumotlarini qayta ishlashni yengillashtiradi. Biroq texnologik yangilanishlar tegishli nazorat mexanizmlari va malakali mutaxassislar bilan ta'minlanmasa, kutilgan natijaga erishish qiyinlashadi.

Buxgalteriya hisobini raqamlashtirishda korxonaning moliyaviy imkoniyatlari, faoliyat ko'lam va mavjud axborot tizimlari hisobga olinishi kerak. Kichik korxonalar uchun sodda va iqtisodiy jihatdan maqbul dasturiy yechimlar yetarli bo'lishi mumkin. Yirik korxonalarda esa turli bo'limlar faoliyatini birlashtiruvchi kompleks boshqaruv tizimlariga ehtiyoj yuqoriroq bo'ladi.

Xalqaro moliyaviy hisobot standartlarini qo'llash masalasida ham korxonaning faoliyat xususiyatlari va amaldagi me'yoriy talablar muhim ahamiyat kasb etadi. Hisobot standartlarini joriy etish jarayoni xodimlarni tayyorlash, hisob siyosatini qayta ko'rib chiqish va axborot tizimlarini moslashtirishni talab qilishi mumkin.

Tadqiqotning muhim jihatlaridan biri shundaki, buxgalteriya hisobini takomillashtirishning samaradorligi faqat texnologik yangilanishlar bilan emas, balki ma'lumotlarning ishonchliligi, hisob jarayonlarining shaffofligi va boshqaruv qarorlarini axborot bilan ta'minlash sifati orqali ham baholanishi lozim.

Shu bilan birga, mazkur maqola nazariy-tahliliy xususiyatga ega bo'lgani sababli undagi xulosalar muayyan korxonada amaliy sinovdan o'tkazilgan natijalar sifatida talqin qilinmasligi kerak. Kelgusidagi tadqiqotlarda turli tarmoq korxonalarining moliyaviy hisobotlari, hisob jarayonlariga sarflanadigan vaqt va avtomatlashtirish xarajatlari asosida empirik tahlil o'tkazish maqsadga muvofiq.

5. XULOSA

O'tkazilgan nazariy-tahliliy tadqiqot natijasida korxonalarda buxgalteriya hisobini takomillashtirish zamonaviy iqtisodiy sharoitda moliyaviy axborotning sifati va boshqaruv samaradorligini oshirishning muhim sharti ekanligi aniqlandi.

Buxgalteriya hisobini rivojlantirishning asosiy yo'nalishlari sifatida hisob jarayonlarini avtomatlashtirish, elektron hujjat aylanishini takomillashtirish, moliyaviy hisobotlarning ishonchliligini oshirish, ichki nazorat tizimini kuchaytirish, raqamli texnologiyalardan foydalanish va mutaxassislarning kasbiy malakasini rivojlantirish belgilandi.

Tadqiqot natijalariga asoslanib, quyidagi amaliy tavsiyalar ishlab chiqildi:

1. Korxonalarda mavjud buxgalteriya hisobi tizimini muntazam tahlil qilib, avtomatlashtirishga ehtiyoj yuqori bo'lgan jarayonlarni aniqlash.
2. Elektron hujjat aylanishi va axborot almashinuvining yagona tartibini shakllantirish.
3. Hisob siyosatini amaldagi qonunchilik va korxona faoliyatining xususiyatlariga muvofiq takomillashtirish.
4. Ichki nazorat, inventarizatsiya va moliyaviy ma'lumotlarni solishtirish mexanizmlarini kuchaytirish.
5. Buxgalteriya hisobi xodimlarining raqamli ko'nikmalari va kasbiy malakasini muntazam oshirib borish.
6. Axborot xavfsizligi va ma'lumotlarni zaxiralash tizimini rivojlantirish.
7. Buxgalteriya hisobini takomillashtirish natijalarini hisob ma'lumotlarining aniqligi, hisobotlarni tayyorlash vaqti va xarajatlar dinamikasi orqali baholab borish.

Umuman olganda, korxonalarda buxgalteriya hisobini takomillashtirish kompleks yondashuvni talab etadi. Raqamli texnologiyalar, samarali ichki nazorat, sifatli moliyaviy hisobot va malakali kadrlarning uyg'unligi korxonalarda hisob tizimini yanada samarali tashkil etishga xizmat qiladi.

FOYDALANILGAN ADABIYOTLAR

1. O'zbekiston Respublikasining "Buxgalteriya hisobi to'g'risida"gi Qonuni. O'RQ-404-son, 2016-yil 13-aprel.
2. O'zbekiston Respublikasining "Elektron hujjat aylanishi to'g'risida"gi Qonuni. 611-II-son, 2004-yil 29-aprel.
3. O'zbekiston Respublikasining "Elektron raqamli imzo to'g'risida"gi Qonuni. O'RQ-793-son, 2022-yil 12-oktabr.
4. IFRS Foundation. Conceptual Framework for Financial Reporting. London: IFRS Foundation.
5. IFRS Foundation. IAS 1: Presentation of Financial Statements. International Financial Reporting Standards.
6. Romney, M. B., Steinbart, P. J. Accounting Information Systems. Pearson.
7. Hall, J. A. Accounting Information Systems. Cengage Learning.
8. Gelinas, U. J., Dull, R. B., Wheeler, P. R. Accounting Information Systems. Cengage Learning

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Annotatsiya

Mazkur maqolada Sovet hokimiyati tomonidan XX asrning 20-yillari oxiri – 30-yillari boshlarida O‘zbekistonda amalga oshirilgan kollektivlashtirish siyosatining mazmun-mohiyati, amalga oshirilish mexanizmlari va uning ijtimoiy-iqtisodiy oqibatlari tahlil qilinadi. Tadqiqotda yakka dehqon xo‘jaliklarini kolxozlarga birlashtirish, “quloqlarni sinf sifatida tugatish”, dehqon xo‘jaliklarini musodara qilish, surgun va qatag‘on siyosati, qishloq aholisining qarshilik harakatlari hamda paxtachilikning ustuvor yo‘nalishga aylantirilishi masalalariga alohida e‘tibor qaratilgan. Tadqiqot tarixiylik, tizimlilik, qiyosiy-tarixiy va manbashunoslik yondashuvlari asosida olib borildi. Tahlil natijalari kollektivlashtirish O‘zbekiston qishloq xo‘jaligi tizimini tubdan o‘zgartirganini, biroq mazkur jarayonning ma‘muriy-buyruqbozlik va majburiy usullar bilan amalga oshirilishi qishloq aholisining mulkiy ahvoli, ijtimoiy tarkibi va an‘anaviy xo‘jalik yuritish tizimiga jiddiy ta‘sir ko‘rsatganini ko‘rsatadi.

Kalit so‘zlar: kollektivlashtirish, jamoalashtirish, kolxoz, sovxoz, quloqlashtirish, dehqon xo‘jaligi, surgun, qatag‘on, paxtachilik, O‘zbekiston SSR.

THE COLLECTIVIZATION POLICY AND ITS CONSEQUENCES

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Abstract

This article analyzes the essence and content of the collectivization policy implemented by the Soviet authorities in Uzbekistan in the late 1920s and early 1930s, as well as the mechanisms of its implementation and its socio-economic consequences. Particular attention is paid to the consolidation of individual peasant farms into collective farms (kolkhozes), the policy of “eliminating the kulaks as a class,” the confiscation of peasant property, deportation and repression, resistance movements among the rural population, and the transformation of cotton production into a priority

sector. The study was conducted using historical, systematic, comparative-historical, and source-studies approaches. The results of the analysis demonstrate that collectivization fundamentally transformed the agricultural system of Uzbekistan; however, its implementation through administrative-command and coercive methods had a profound impact on the property status, social structure, and traditional farming practices of the rural population.

Keywords: collectivization, collectivization of agriculture, collective farm, state farm, dekulakization, peasant farm, deportation, repression, cotton production, Uzbek SSR.

ПОЛИТИКА КОЛЛЕКТИВИЗАЦИИ И ЕЁ ПОСЛЕДСТВИЯ

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Аннотация

В данной статье анализируются сущность и содержание политики коллективизации, осуществлявшейся советской властью в Узбекистане в конце 1920-х — начале 1930-х годов, механизмы её реализации, а также её социально-экономические последствия. Особое внимание уделяется объединению единоличных крестьянских хозяйств в колхозы, политике «ликвидации кулачества как класса», конфискации крестьянских хозяйств, политике высылки и репрессий, движениям сопротивления сельского населения, а также превращению хлопководства в приоритетное направление сельского хозяйства. Исследование проведено на основе исторического, системного, сравнительно-исторического и источниковедческого подходов. Результаты анализа показывают, что коллективизация коренным образом изменила систему сельского хозяйства Узбекистана, однако осуществление данного процесса административно-командными и принудительными методами оказало серьёзное воздействие на имущественное положение, социальную структуру сельского населения и традиционную систему ведения хозяйства.

Ключевые слова: коллективизация, коллективизация сельского хозяйства, колхоз, совхоз, раскулачивание, крестьянское хозяйство, высылка, репрессии, хлопководство, Узбекская ССР.

KIRISH

XX asrning 20-yillari oxiriga kelib Sovet Ittifoqida iqtisodiyotni markazlashgan boshqaruv asosida qayta qurish jarayoni kuchaydi. Sanoatlashtirish bilan bir qatorda qishloq xo'jaligini ham davlat nazoratiga olish Sovet hukumatining asosiy vazifalaridan biriga aylandi. Qishloq xo'jaligidagi kollektivlashtirish siyosatining mohiyati yakka dehqon xo'jaliklarini kolxozlarga birlashtirish, ishlab chiqarish vositalarini jamoa mulkiga o'tkazish va qishloq xo'jaligi mahsulotlarini davlat tomonidan rejalashtirilgan tartibda tayyorlashdan iborat edi [1, 267–268-b.].

O'zbekistonda mazkur siyosat o'ziga xos tarixiy va iqtisodiy sharoitda amalga oshirildi. Respublikada aholining katta qismi qishloqlarda yashagan, dehqonchilik esa asosan sug'orma yerlar asosida olib borilgan. Yakka dehqon xo'jaligi qishloq iqtisodiyotining asosiy bo'g'ini bo'lib, yer, chorva, mehnat qurollari va oilaviy mehnat xo'jalikning asosiy resurslari hisoblangan [2, 83–86-b.].

1929-yil oxiridan boshlab O'zbekistonda kollektivlashtirish keskin jadallashdi. Ilmiy tadqiqotlarda 1929-yil oktabrida O'zbekistondagi dehqon xo'jaliklarining atigi 3,4 foizi kolxozlarga birlashtirilgani, 1930-yil martiga kelib esa bu ko'rsatkich 47 foizga yetgani qayd etiladi [3, 3-b.]. Bu qisqa vaqt ichida jamoalashtirish sur'atining nihoyatda tezlashganini ko'rsatadi.

Kollektivlashtirish jarayoni faqat xo'jaliklarni tashkiliy jihatdan birlashtirish bilan cheklanib qolmadi. U qishloqdagi mulkiy munosabatlarni o'zgartirish, "quloq" deb topilgan xo'jaliklarni tugatish, mol-mulkni musodara qilish va aholining bir qismini boshqa hududlarga ko'chirish bilan ham bog'liq bo'ldi [4, 18–24-b.].

Maqolaning asosiy maqsadi O'zbekistonda kollektivlashtirish siyosatining amalga oshirilish jarayoni va uning ijtimoiy-iqtisodiy oqibatlarini tarixiy manbalar hamda ilmiy tadqiqotlar asosida tahlil qilishdan iborat.

METODOLOGIYA

Tadqiqotda tarixiylik, tizimlilik, qiyosiy-tarixiy tahlil va manbashunoslik metodlaridan foydalanildi. Kollektivlashtirish jarayonining turli bosqichlari tarixiy hujjatlar, O'zbekiston tarixi bo'yicha fundamental tadqiqotlar va zamonaviy ilmiy maqolalar asosida o'rganildi.

Tadqiqot uchun, avvalo, O'zbekistonning sovet davri tarixiga oid ilmiy adabiyotlardan foydalanildi. R. Shamsutdinov va Sh. Karimovning Vatan tarixi asarida kollektivlashtirish, quloqlashtirish, surgun va qishloq aholisining qarshiliklari bo'yicha muhim tarixiy ma'lumotlar berilgan [1, 267–279-b.].

Shuningdek, zamonaviy tadqiqotlarda O'zbekistonda kollektivlashtirishning ijtimoiy va iqtisodiy oqibatlari, xususan, qishloq xo'jaligining davlat nazoratiga

o'tkazilishi, quloqlashtirish, repressiya, surgun va paxtachilikka ixtisoslashuv jarayonlari tahlil qilingan [5, 644–652-b.].

Tadqiqotda kollektivlashtirishning faqat siyosiy jihatlari emas, balki uning dehqonlarning kundalik hayoti, mulkiy munosabatlari, chorvachilik, mehnat tizimi va qishloq jamiyatining ijtimoiy tuzilishiga ta'siri ham o'rganildi. M. Kampning 2024-yilda nashr etilgan tadqiqotida ham O'zbekiston kollektivlashtirishining kundalik hayotga ta'siri og'zaki tarix materiallari asosida tahlil qilingan [6, 1–20-b.].

NATIJALAR

O'zbekistonda kollektivlashtirish siyosatining keskin bosqichi 1929-yil oxirida boshlandi. Sovet rahbariyati qishloq xo'jaligini jamoalashtirishni mamlakat iqtisodiy taraqqiyotining muhim sharti sifatida ko'rdi. O'zbekiston ham ushbu siyosatning umumittifoq rejasi doirasiga kiritildi.

1929-yil oktabr oyida respublikadagi dehqon xo'jaliklarining atigi 3,4 foizi kolxozlarga birlashtirilgan edi. Biroq 1930-yil martiga kelib jamoalashtirilgan xo'jaliklar ulushi 47 foizga yetdi [3, 3-b.]. Demak, taxminan besh oy davomida kollektivlashtirish darajasi qariyb 14 baravar oshgan.

1930-yil 17-fevralda O'zbekiston Kompartiyasi Markaziy Qo'mitasi "Kollektivlashtirish va quloq xo'jaliklarini tugatish to'g'risida" qaror qabul qildi. Mazkur qaror kollektivlashtirishni jadallashtirish va bir qator hududlarda yalpi jamoalashtirishni amalga oshirish uchun siyosiy asos yaratdi [1, 268-b.].

Kollektivlashtirishning bunday tezlashtirilishi joylardagi iqtisodiy va ijtimoiy sharoit bilan ziddiyatga keldi. Zamonaviy tadqiqotlarda ham Sovet davlatining qishloq xo'jaligini tezkor qayta tashkil etish siyosati mahalliy sharoit va an'anaviy xo'jalik yuritish usullari bilan ko'p hollarda mos kelmaganligi ta'kidlanadi [5, 644–652-b.].

Kollektivlashtirish rasmiy jihatdan jamoa xo'jaliklariga birlashish sifatida talqin qilingan bo'lsa-da, amaliyotda jarayon ko'plab hududlarda ma'muriy bosim ostida olib borildi. Dehqonlarni kolxozlarga jalb qilishda turli iqtisodiy va ma'muriy choralar qo'llanildi.

1930-yil mart oyida O'zbekistonda kollektivlashtirish darajasi 47 foizga yetgan bo'lsa-da, keyinchalik ko'plab xo'jaliklar kolxozlardan chiqib ketdi va may oyiga kelib jamoalashtirish ko'rsatkichi 29 foizgacha pasaydi [1, 269–270-b.]. Bu hol qishloq aholisi orasida majburiy jamoalashtirishga nisbatan norozilik mavjud bo'lganini ko'rsatadi.

M. Kampning tadqiqotida ham O'zbekistonda kolxozlarga kirish tajribasi turlicha bo'lgani ko'rsatiladi. Ayrim oilalar kolxozga kirishni yangi imkoniyat sifatida qabul qilgan bo'lsa, boshqalar urug'lik krediti yoki boshqa resurslardan mahrum qilish,

“quloq” deb e’lon qilish kabi tahdidlar tufayli kolxozga kirishga majbur bo’lganini eslagan [7, 83–103-b.].

Shunday qilib, kollektivlashtirishni faqat yuqoridan berilgan qarorlarning bajarilishi sifatida emas, balki davlat va qishloq aholisi o’rtasidagi murakkab ijtimoiy munosabatlar jarayoni sifatida ko’rish lozim.

Kollektivlashtirish siyosatining eng muhim va ziddiyatli yo’nalishlaridan biri “quloqlarni sinf sifatida tugatish” siyosati bo’ldi. 1930-yil 30-yanvarda VKP(b) Markaziy Qo’mitasi “Yalpi kollektivlashtirish rayonlarida quloq xo’jaliklarini tugatish tadbirlari to’g’risida” qaror qabul qildi [8, 30–34-b.].

Ushbu siyosat doirasida “quloq” deb topilgan xo’jaliklarning mol-mulki musodara qilindi, ayrim oilalar hibsga olindi yoki maxsus posyolkalarga surgun qilindi. O’zbekistonda 1930–1931-yillarda surgun qilingan xo’jaliklarni joylashtirish uchun 17 ta “quloq posyolkasi” tashkil etilgani zamonaviy tadqiqotlarda qayd etiladi [4, 18–24-b.].

Bu siyosat qishloq jamiyatining ijtimoiy tarkibiga sezilarli ta’sir ko’rsatdi. Chunki “quloq” sifatida belgilangan shaxslar orasida iqtisodiy jihatdan badavlat xo’jaliklar bilan bir qatorda davlat siyosatiga qarshi chiqqan yoki kolxozlashtirishga rozi bo’lmagan dehqonlar ham bo’lgan.

Natijada “quloq” tushunchasi iqtisodiy maqomdan tashqari siyosiy-ma’muriy mazmun ham kasb etdi.

Kollektivlashtirishning majburiy shakllari qishloq aholisining qarshiligini yuzaga keltirdi. Qarshilikning turli shakllari mavjud bo’lib, ular ochiq norozilik, kolxozga kirishni rad etish, kolxozdan chiqish, chorva mollarini sotish yoki so’yish kabi ko’rinishlarda namoyon bo’ldi [1, 270–274-b.].

1930-yilda Farg’ona vodiysi, Samarqand, Buxoro, Toshkent va boshqa hududlarda kollektivlashtirishga qarshi chiqishlar kuzatildi [1, 271–274-b.]. Samarqand okrugi misolida olib borilgan tadqiqotlarda ham kollektivlashtirishga qarshi ommaviy noroziliklarning sabablaridan biri dehqonlarning mulkiy manfaatlari va an’anaviy xo’jalik yuritish tizimining buzilishi bo’lganligi ko’rsatiladi [9, 1–8-b.].

Qarshilik harakatlari Sovet hokimiyati tomonidan siyosiy xavf sifatida qabul qilindi. Natijada norozilik ishtirokchilariga nisbatan hibsga olish, surgun va boshqa repressiv choralar qo’llanildi.

Kollektivlashtirishning muhim iqtisodiy oqibatlaridan biri chorvachilikdagi o’zgarishlar bo’ldi. Dehqonlar o’z chorvasini kolxozga topshirishni istamagan hollarda mollarini sotish yoki so’yishga harakat qildilar. Natijada chorva sonining qisqarishi kuzatildi [1, 270-b.].

Bu hol kollektivlashtirishning faqat yer va ekin maydonlariga emas, balki dehqon xo'jaligining barcha tarkibiy qismlariga ta'sir qilganini ko'rsatadi. Chorva dehqon xo'jaligining muhim ishlab chiqarish vositasi bo'lganligi sababli uning kamayishi qishloq oilalarining iqtisodiy imkoniyatlariga ham ta'sir ko'rsatdi.

O'zbekistonda kollektivlashtirish siyosati paxtachilikni rivojlantirish siyosati bilan chambarchas bog'liq edi. Sovet iqtisodiy tizimi O'zbekistonni paxta xomashyosi yetkazib beruvchi asosiy hududlardan biriga aylantirishga intildi.

Kollektiv xo'jaliklarning tashkil etilishi davlatga paxta yetishtirish va topshirish jarayonlarini markazlashtirilgan holda boshqarish imkonini berdi. Shu sababli kollektivlashtirish qishloq xo'jaligining davlat rejalashtirish tizimiga yanada chuqurroq kiritilishiga xizmat qildi.

1930-yillarda paxtachilikning ustuvorligi kuchaydi va O'zbekiston iqtisodiyotida paxta yetishtirishning salmog'i ortib bordi [1, 278–279-b.]. Zamonaviy tadqiqotlarda ham kollektivlashtirish jarayoni O'zbekistonda paxta yakkahokimligi shakllanishining muhim bosqichlaridan biri sifatida baholanadi [5, 644–652-b.].

Biroq paxtachilikka haddan tashqari ixtisoslashuv qishloq xo'jaligi tarkibining bir tomonlama rivojlanishiga olib keldi. Natijada qishloq xo'jaligining boshqa tarmoqlari, ayniqsa oziq-ovqat ishlab chiqarishi va chorvachilik bilan bog'liq muammolar ham yuzaga keldi.

Kollektivlashtirish yakunida O'zbekistonda yakka dehqon xo'jaligi qishloq xo'jaligining asosiy shakli bo'lib qolmadi. Uning o'rnini kolxoz va sovxozlar egallay boshladi.

Kolxoz tizimi orqali yer va ishlab chiqarish vositalari ustidan davlat nazorati kuchaydi. Qishloq xo'jaligi mahsulotlarini yetishtirish, topshirish va taqsimlash jarayonlari davlat rejalari asosida amalga oshirildi.

Marianne Kampning tadqiqotida kolxozlar keyinchalik O'zbekiston qishloq aholisi uchun nafaqat iqtisodiy, balki ijtimoiy va siyosiy hayotning asosiy muhiti bo'lib qolganligi ko'rsatiladi [6, 1–20-b.].

Shunday qilib, kollektivlashtirish qisqa muddatli siyosiy kampaniya bo'lib qolmasdan, O'zbekiston qishlog'ining keyingi o'n yilliklardagi ijtimoiy-iqtisodiy tuzilishini belgilab bergan uzoq muddatli jarayonga aylandi.

MUHOKAMA

O'zbekistonda kollektivlashtirish siyosatini tahlil qilishda uning ikki xil natijasini ajratib ko'rsatish mumkin. Birinchi jihat — qishloq xo'jaligini tashkiliy jihatdan qayta qurish va davlat rejalashtirish tizimiga kiritish. Ikkinchi jihat esa ushbu qayta qurishning amalga oshirilish usullari va uning aholiga ta'siridir.

Kollektivlashtirish natijasida kolxoz va sovxozlar tizimi shakllandi, qishloq xo'jaligini mexanizatsiyalashtirish va davlat tomonidan rejalashtirish uchun yangi tashkiliy imkoniyatlar paydo bo'ldi. Shu bilan birga, mazkur jarayon dehqonlarning xo'jalik yuritish mustaqilligini sezilarli darajada chekladi.

Ayniqsa, kollektivlashtirishning juda tez sur'atlarda amalga oshirilishi jiddiy muammolarni yuzaga keltirdi. 1929-yil oktabridagi 3,4 foizlik ko'rsatkichning 1930-yil martiga kelib 47 foizga chiqishi jarayonning nihoyatda keskin kechganini ko'rsatadi [3, 3-b.].

Qolaversa, kollektivlashtirish va quloqlashtirish bir-biri bilan chambarchas bog'langan. "Quloq" deb topilgan xo'jaliklarning tugatilishi va surgun qilinishi qishloqning ijtimoiy qatlamlariga ta'sir ko'rsatdi. 1930–1931-yillarda O'zbekiston hududida 17 ta quloq posyolkasining tashkil etilgani bu siyosatning tashkiliy jihatdan ham tizimli amalga oshirilganini ko'rsatadi [4, 18–24-b.].

Biroq kollektivlashtirish tarixini faqat zo'ravonlik va qarshiliklar orqali izohlash ham to'liq tasavvur bermaydi. Yangi tadqiqotlarda qishloq aholisining ushbu jarayonga munosabati turlicha bo'lganligi ko'rsatilmogda. Ayrim guruhlar kolxozlarni yangi ijtimoiy va iqtisodiy imkoniyat sifatida qabul qilgan bo'lsa, boshqa guruhlar mulk va xo'jalik mustaqilligidan ayrilish jarayoni sifatida boshdan kechirgan [6, 1–20-b.].

Shu nuqtayi nazardan, kollektivlashtirishni O'zbekiston qishlog'ining iqtisodiy va ijtimoiy transformatsiyasi sifatida ko'rish mumkin. Bu transformatsiya davlat tomonidan yuqoridan boshqarilgan va majburiy usullar bilan amalga oshirilgani uning eng muhim xususiyatlaridan biri bo'ldi.

XULOSA

O'zbekistonda kollektivlashtirish siyosati XX asrning 20-yillari oxiri va 30-yillari boshlarida Sovet davlatining qishloq xo'jaligini qayta tashkil etishga qaratilgan eng yirik siyosiy-iqtisodiy kampaniyalaridan biri bo'ldi.

Tadqiqot natijalari shuni ko'rsatadiki, kollektivlashtirish O'zbekistonda nihoyatda tez sur'atlarda amalga oshirilgan. 1929-yil oktabrida dehqon xo'jaliklarining 3,4 foizi kolxozlarga birlashtirilgan bo'lsa, 1930-yil martiga kelib bu ko'rsatkich 47 foizga yetgan.

Kollektivlashtirish natijasida O'zbekiston qishlog'ining iqtisodiy va ijtimoiy tuzilishi tubdan o'zgardi. Yakka dehqon xo'jaligi o'rniga kolxoz-sovxoz tizimi shakllandi, qishloq xo'jaligi davlat rejalashtirish tizimiga bo'ysundirildi va paxtachilikning ustuvorligi kuchaydi.

Shunday qilib, kollektivlashtirish O'zbekiston tarixida faqat qishloq xo'jaligini tashkiliy qayta qurish jarayoni emas, balki mulkiy munosabatlar, qishloq aholisi ijtimoiy tarkibi, mehnat munosabatlari va iqtisodiy ixtisoslashuvni o'zgartirgan keng

ko‘lamli tarixiy jarayon bo‘ldi. Uning oqibatlarini o‘rganishda iqtisodiy o‘zgarishlar bilan bir qatorda quloqlashtirish, surgun, dehqonlar qarshiligi va davlat nazoratining kuchayishini ham hisobga olish muhimdir.

FOYDALANILGAN ADABIYOTLAR

1. Shamsutdinov R., Karimov Sh. Vatan tarixi. III kitob. – Toshkent: Sharq, 2010.
2. Kamp M. Collectivization Generation: Oral Histories of a Social Revolution in Uzbekistan. – Ithaca: Cornell University Press, 2024. – 300 p.
3. Насильственная коллективизация в Узбекистане и её последствия. 1929–1938 гг. (на примере Самаркандской, Навоийской и Бухарской областей). – Автореферат диссертации. – В. 3.
4. Abdullayev M. O‘zbekistonda surgun qilingan “quloq” xo‘jaliklari mehnat faoliyatini tashkil etish masalalari // TISU ilmiy tadqiqotlari xabarnomasi. – 2023. – №2. – B. 18–24.
5. Turaeva E. The Collectivization Policy in Uzbekistan and Its Consequences // Oriental Journal of History, Politics and Law. – 2026. – Vol. 6, №5. – P. 644–652.
6. Kamp M. Collectivization Generation: Oral Histories of a Social Revolution in Uzbekistan. – Ithaca: Cornell University Press, 2024. – P. 1–20.
7. Kamp M. “Agitating for the Kolkhoz” // Collectivization Generation: Oral Histories of a Social Revolution in Uzbekistan. – Ithaca: Cornell University Press, 2024. – P. 83–103.
8. Трагедия советской деревни. Коллективизация и раскулачивание. 1927–1939: Документы и материалы. – Москва: РОССПЭН.
9. Абдуллаев Ш. А. Политика коллективизации советского правительства в Узбекистане и ее последствия // Взгляд в прошлое.
10. Rashidov S. “SOBIQ ITTIFOQ DAVRIDA KATTAQO‘RG‘ON TUMANI AHOLISI TURMUSH TARZI”. Barqaror Taraqqiyot Va Rivojlanish Tamoyillari , jild. 2, yo‘q. 8-sentabr, 2024-yil, 79-84-betlar, <https://www.uzresearchers.com/index.php/BTRT/article/view/4047> .
11. Yaxshiyev A. O‘zbekistonda kollektivlashtirish siyosati: ijtimoiy va iqtisodiy oqibatlar // O‘zMU xabarlar. – 2025. – Vol. 1, №1.12.
12. Yusupov A. On the Repressive Nature of Collectivization and Collective Building in Uzbekistan // Scientific Research Results in Pandemic Conditions.
13. Galdini F. “Rise of the Surplus Population? Land Decollectivization, Class Stratification, and Labor Precarization in Uzbekistan” // International Labor and Working-Class History. – 2023.

**ПРЕДУПРЕЖДЕНИЕ И ПРЕДОТВРАЩЕНИЕ ПОЖАРОВ В
РЕЗЕРВУАРАХ ДЛЯ ХРАНЕНИЯ НЕФТЕПРОДУКТОВ ПРИ
ЧРЕЗВЫЧАЙНЫХ СИТУАЦИЯХ**

Д.М. Рахматова

***Аннотация.** Рассматривается проблема предупреждения и предотвращения пожаров в резервуарах для хранения нефтепродуктов при чрезвычайных ситуациях техногенного характера. Цель исследования — научное обоснование последовательности организационно-технических мероприятий по раннему выявлению опасного состояния, локализации аварийного процесса и предотвращению развития пожара. Используются методы системного анализа, структурно-функционального моделирования и причинно-следственного анализа. Установлена последовательность формирования опасного состояния: нарушение герметичности — выход нефтепродукта — образование паровоздушной среды — воспламенение — тепловое воздействие на соседние резервуары. Разработана структурная модель предупреждения и предотвращения пожара, включающая мониторинг, выявление опасных отклонений, оценку обстановки, локализацию и противопожарное воздействие. Сформулированы рекомендации по совершенствованию противопожарной защиты резервуарных парков.*

***Ключевые слова:** чрезвычайная ситуация, резервуарный парк, нефтепродукты, пожарная опасность, пожар, взрыв, предупреждение пожара, предотвращение пожара, противопожарная защита.*

***Abstract.** The paper considers the problem of preventing and mitigating fires in petroleum product storage tanks during man-made emergencies. The aim of the study is to provide a scientific basis for a sequence of organizational and technical measures for early detection of hazardous conditions, localization of an emergency process, and prevention of fire development. System analysis, structural-functional modeling, and cause-and-effect analysis were used. The sequence of hazardous condition development was established as follows: loss of tightness — petroleum product release — formation of a vapor-air mixture — ignition — thermal exposure of adjacent tanks. A structural model for fire prevention and mitigation was developed, including monitoring, detection of hazardous deviations, situation assessment, localization, and*

firefighting measures. Recommendations for improving fire protection of tank farms are proposed.

Keywords: *emergency situation, tank farm, petroleum products, fire hazard, fire, explosion, fire prevention, fire mitigation, fire protection.*

Введение. Резервуары для хранения нефти и нефтепродуктов относятся к объектам, на которых сочетание значительных объёмов горючих веществ, технологического оборудования и потенциальных источников зажигания формирует условия для возникновения и развития пожароопасных процессов.

Особенность чрезвычайных ситуаций на резервуарных объектах заключается в возможности перехода первоначального повреждения в более масштабный процесс [2]. Нарушение герметичности может сопровождаться выходом нефтепродукта, образованием горючих паров (в том числе при рисках самовозгорания пирофорных отложений [5]), их распространением в окружающем пространстве и последующим воспламенением. При возникновении пожара дополнительно появляется угроза теплового воздействия на соседние резервуары, а также вскипания и выброса продукта [6], что создаёт предпосылки для дальнейшего распространения аварии.

Современные исследования показывают необходимость учёта прогрессирующего и каскадного характера развития пожароопасной ситуации на объектах хранения нефтепродуктов. В частности, Бруслиновским А.Ю. в 2023 г. исследовано моделирование прогрессирующего развития пожароопасной ситуации при хранении нефтепродуктов в стальных резервуарах [1]. Самигуллин Г.Х. и Захаров А.Е. в 2024 г. рассматривали возможность эскалации пожара и вопросы предупреждения прогрессирующего развития негативных событий. Для тушения и парирования угроз также рассматриваются газовые [4] и автоматизированные противопожарные системы [3].

Вместе с тем для повышения эффективности защиты требуется рассматривать предупреждение пожара не как отдельную техническую операцию, а как управляемую последовательность действий, начинающуюся с выявления опасного состояния и завершающуюся оценкой результата защитного воздействия.

Цель исследования — научное обоснование организационно-технической последовательности предупреждения и предотвращения пожаров в резервуарах для хранения нефтепродуктов при чрезвычайных ситуациях.

Для достижения поставленной цели решались следующие **задачи**:

1. систематизация основных факторов, способствующих формированию пожарной опасности;

2. установление причинно-следственной последовательности развития опасного процесса;
3. определение контролируемых признаков аварийного состояния резервуара;
4. разработка структурной модели предупреждения пожара;
5. определение приоритетных направлений локализации и предотвращения развития пожара;
6. разработка практических рекомендаций по совершенствованию противопожарной защиты резервуарных парков.

Материалы и методы исследования

В качестве методологической основы исследования использованы методы системного анализа техногенного риска, теории надежности технических систем, структурно-функционального моделирования процессов противопожарной защиты, а также причинно-следственного анализа аварийных ситуаций.

Для формализации процесса предупреждения и оценки динамики эскалации чрезвычайной ситуации введена система динамических показателей:

1. **Интегральный пожарный риск $R(t)$** — определяющий совокупную вероятность возникновения горения и масштаба возможного ущерба смежному технологическому оборудованию в момент времени t .
2. **Уровень технико-организационной контролируемости аварии $K(t)$** — интегральный показатель, характеризующий полноту, точность и оперативность срабатывания систем раннего обнаружения, локализации и противопожарной защиты ($0 \leq K(t) \leq 1$).

Математическая модель изменения пожарного риска основывается на экспоненциальном затухании опасности при условии эффективного выполнения управляющих действий структурной модели:

$$R(t) = R_0 \cdot e^{-\alpha \cdot t}$$

где R_0 — начальный уровень пожарного риска в момент разгерметизации/аварии; α — коэффициент интенсивности парирования угрозы элементами противопожарной системы.

Рост контролируемости процесса $K(t)$ описывается сигмоидальной (логистической) функцией, отражающей временной лаг между обнаружением первичного отклонения и выходом противопожарных средств на максимальную мощность:

$$K(t) = \frac{1}{1 + e^{-k(t-t_0)}}$$

где k — параметр крутизны срабатывания системы; t_0 — время достижения половинной мощности управляющего воздействия.

На рисунке 1 представлена динамика изменения интегрального пожарного риска $R(t)$ и эффективности системы контроля $K(t)$ при реализации предлагаемой структурной модели.

Risk $R(t)$, Control $K(t)$.

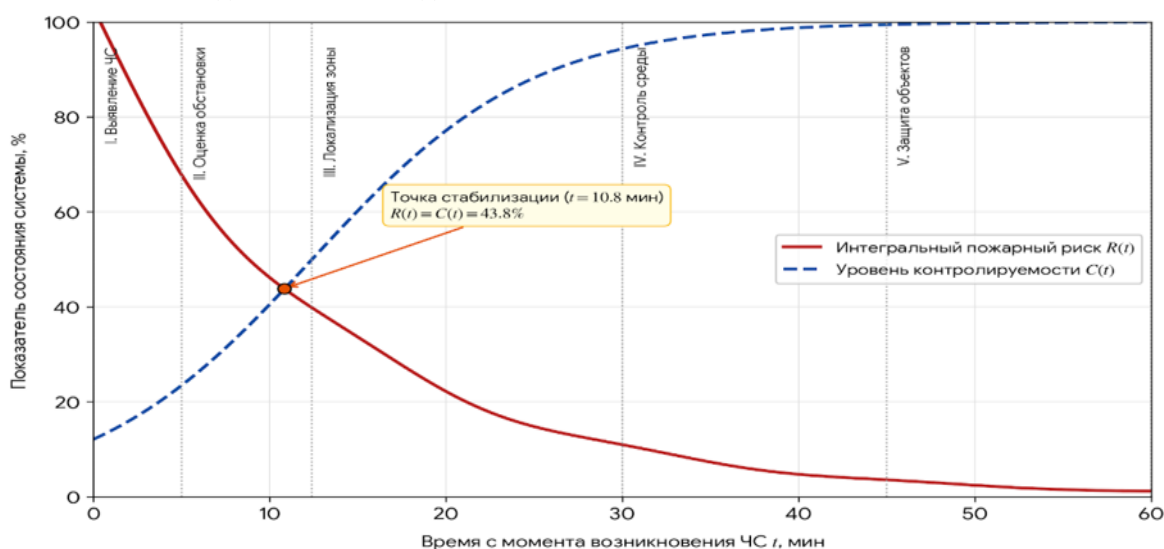


График -1. Динамика изменения интегрального пожарного риска $R(t)$ и эффективности системы контроля $C(t)$ при реализации структурной модели

Анализ динамических характеристик (рис. 1) показывает, что в процессе выполнения этапов структурной модели функция интегрального пожарного риска $R(t)$ экспоненциально снижается, в то время как уровень технико-организационной контролируемости аварии $K(t)$ демонстрирует сигмоидальный рост.

Ключевым показателем эффективности разработанных решений является точка стабилизации ($t_{\text{стаб}}$, $R_{\text{стаб}}$), обозначающая момент времени, при котором управляющее воздействие противопожарных систем превышает динамику развития аварийной ситуации, что предотвращает эскалацию горения на смежное резервуарное оборудование [1, 6].

Обсуждение результатов. Полученные результаты позволяют сделать вывод, что предупреждение пожара на резервуарных объектах должно строиться на принципе опережающего воздействия на опасный процесс.

При этом недостаточно контролировать только конечное состояние — наличие пламени. Более эффективным является выявление ранних признаков формирования опасности: нарушения герметичности, изменения

технологических параметров, выхода продукта и формирования пожароопасной среды [2, 5].

Такой подход соответствует общей логике систем пожарной безопасности, согласно которой необходимо одновременно обеспечивать предотвращение возникновения пожара и ограничение воздействия его опасных факторов.

Особое значение приобретает защита соседних резервуаров. При развитии пожара необходимо учитывать возможность теплового воздействия на окружающее оборудование. Поэтому противопожарная система резервуарного парка должна функционировать не только относительно отдельного резервуара, но и с учётом взаимного влияния объектов [1].

Современные исследования также показывают перспективность применения автоматизированных и роботизированных средств противопожарной защиты на складах нефти и нефтепродуктов [3, 4]. В частности, в 2026 г. опубликовано исследование применения роботизированных установок пожаротушения для защиты резервуарных парков [3].

Заключение. Проведённое исследование позволило сформировать научно обоснованную последовательность предупреждения и предотвращения пожаров в резервуарах для хранения нефтепродуктов при чрезвычайных ситуациях.

Установлено, что развитие пожарной опасности представляет собой последовательный процесс, включающий нарушение герметичности, выход нефтепродукта, образование пожароопасной среды, возникновение источника зажигания и последующее тепловое воздействие на технологическое оборудование.

Научная значимость предлагаемого подхода заключается в систематизации взаимосвязи между ранними признаками аварийного состояния и последующими противопожарными мероприятиями. Практическая значимость состоит в возможности использования разработанной последовательности при совершенствовании организационно-технических мероприятий по пожарной безопасности резервуарных парков.

Дальнейшее развитие исследования целесообразно направить на разработку количественных критериев оценки опасного состояния резервуаров, математическое моделирование теплового воздействия на соседние резервуары и определение времени перехода между последовательными стадиями развития чрезвычайной ситуации.

Анализ динамических характеристик (гр. 1) показывает, что в процессе выполнения этапов структурной модели функция интегрального пожарного риска $R(t)$ экспоненциально снижается, в то время как уровень технико-

организационной контролируемости аварии $C(t)$ демонстрирует сигмоидальный рост.

Ключевым показателем эффективности разработанных решений является точка стабилизации ($t \approx 10.8$ мин, $R(t) = C(t) \approx 43.8\%$),

Список литературы:

1. Бруслиновский А.Ю., Самигуллин Г.Х., Нефедьев С.А. Моделирование прогрессирующего развития пожароопасной ситуации при хранении нефтепродуктов в стальных резервуарах // *Вестник Санкт-Петербургского университета ГПС МЧС России*. 2023. № 2. Очень подходит для вашей темы: рассматривается аварийная разгерметизация резервуара при пожаре, прочность резервуара и возможность каскадного развития пожара.
2. Кожевин Д.Ф., Радова Е.В. Анализ статистических данных о пожарах на объектах, входящих в инфраструктуру нефтяной промышленности // *Проблемы управления рисками в техносфере*. 2025. № 3. С. 99–110. DOI: 10.61260/1998-8990-2025-3-99-110.
Это особенно хороший источник для раздела о причинах, условиях возникновения и статистической основе пожарного риска.
3. Красильников А.В., Немчинов М.С. Применение роботизированных установок пожаротушения на складах нефтепродуктов // *Природные и техногенные риски (физико-математические и прикладные аспекты)*. 2026. № 1. С. 29–36. DOI: 10.61260/2307-7476-2026-1-29-36.
4. Аксенов С.Г., Семенов В.А. Газовое пожаротушение для защиты резервуарных парков нефти и нефтепродуктов // *Наука и образование*. 2025. Т. 8. № 1. Работа посвящена применению CO_2 для защиты резервуарных парков, включая вопросы оперативного подавления пламени и снижения вторичного ущерба.
5. Азовцев А.Г., Сырбу С.А., Таратанов Н.А. Моделирование повторяемости возникновения пожаров на резервуарах с нефтью и нефтепродуктами от самовозгорания пирофорных отложений // *Вестник Санкт-Петербургского университета ГПС МЧС России*. 2018. Подходит для раздела о причинах возникновения пожаров в вертикальных стальных резервуарах и пирофорных отложениях.
6. Клубань В.С., Федосеева Е.В. О возможности предотвращения выбросов нефти из горящих вертикальных стальных резервуаров. Очень близко к вашей теме: рассматриваются вскипание, выброс горячей нефти, гомотермический слой, необходимость быстрого тушения и предотвращения эскалации пожара.

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Annotatsiya

Arterial gipertenziya yurak-qon tomir kasalliklari, insult, surunkali buyrak kasalligi va yurak yetishmovchiligining muhim modifikatsiyalanadigan xavf omillaridan biri hisoblanadi. Zamonaviy klinik yondashuvda arterial gipertenziya tashxisi faqat shifokor qabulidagi qon bosimi ko'rsatkichlariga asoslanmay, balki takroriy standartlashtirilgan o'lchovlar, uy sharoitidagi qon bosimi monitoringi (HBPM), 24 soatlik ambulator qon bosimi monitoringi (ABPM), yurak-qon tomir xavfini stratifikatsiya qilish hamda gipertenziya vositasidagi nishon-a'zolar zararlanishini aniqlashni o'z ichiga oladi. 2024-yilgi Yevropa kardiologiya jamiyati tavsiyalarida qon bosimi ko'rsatkichlarini klinik va klinikadan tashqari sharoitlarda baholash diagnostik jarayonning muhim qismi sifatida ko'rsatilgan. Oq xalat gipertenziyasi, yashirin gipertenziya va tungi gipertenziya kabi fenotiplarni aniqlash noto'g'ri tashxis va ortiqcha yoki yetarli bo'lmagan davolash xavfini kamaytiradi. Zamonaviy diagnostikaning yana bir muhim yo'nalishi yurak, buyrak va qon tomirlarida subklinik zararlanishni aniqlashdir. Ushbu maqolada arterial gipertenziyaning zamonaviy diagnostik algoritmi, qon bosimini o'lchash texnologiyalari, ABPM va HBPMning klinik ahamiyati, ikkilamchi gipertenziyani izlash hamda nishon-a'zolar zararlanishini baholash masalalari tahlil qilinadi.

Kalit so'zlar: arterial gipertenziya, qon bosimi, ABPM, HBPM, yashirin gipertenziya, oq xalat gipertenziyasi, tungi gipertenziya, nishon-a'zolar zararlanishi, yurak-qon tomir xavfi, diagnostika.

СОВРЕМЕННАЯ ДИАГНОСТИКА АРТЕРИАЛЬНОЙ ГИПЕРТЕНЗИИ

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Артериальная гипертензия является одним из наиболее значимых модифицируемых факторов риска сердечно-сосудистых заболеваний, инсульта, хронической болезни почек и сердечной недостаточности. В современном клиническом подходе диагностика артериальной гипертензии основывается не только на показателях артериального давления, измеренных в кабинете врача, но и включает повторные стандартизированные измерения, домашний мониторинг артериального давления (НВРМ), суточное амбулаторное мониторирование артериального давления (АВРМ), стратификацию сердечно-сосудистого риска, а также выявление поражения органов-мишеней, обусловленного гипертензией. В рекомендациях Европейского общества кардиологов 2024 года оценка показателей артериального давления в клинических и внеклинических условиях рассматривается как важная составляющая диагностического процесса. Выявление таких фенотипов, как гипертензия «белого халата», маскированная гипертензия и ночная гипертензия, позволяет снизить риск ошибочной диагностики, а также чрезмерного или недостаточного лечения. Другим важным направлением современной диагностики является выявление субклинического поражения сердца, почек и сосудов. В данной статье анализируются современный диагностический алгоритм артериальной гипертензии, технологии измерения артериального давления, клиническое значение АВРМ и НВРМ, подходы к выявлению вторичной гипертензии, а также методы оценки поражения органов-мишеней.

Ключевые слова: артериальная гипертензия, артериальное давление, АВРМ, НВРМ, маскированная гипертензия, гипертензия «белого халата», ночная гипертензия, поражение органов-мишеней, сердечно-сосудистый риск, диагностика.

Kirish

Arterial gipertenziya klinik amaliyotda eng ko‘p uchraydigan yurak-qon tomir holatlaridan biri bo‘lib, uning uzoq davom etishi yurak, miya, buyrak va periferik arteriyalarda strukturaviy hamda funksional o‘zgarishlarni shakllantiradi. Shu sababli zamonaviy diagnostika konsepsiyasi “qon bosimi yuqorimi yoki yo‘qmi?” degan oddiy savoldan ko‘ra kengroq bo‘lib, individual qon bosimi fenotipi va umumiy yurak-qon tomir xavfini aniqlashga qaratilgan.

2024-yilgi ESC tavsiyalarida qon bosimini o'lchash, uy sharoitida monitoring va 24 soatlik ambulator monitoring arterial gipertenziyani tasdiqlash hamda uning turli fenotiplarini aniqlashda muhim o'rin tutadi. Shuningdek, gipertenziya tashxisida yurak-qon tomir xavfi va gipertenziya vositasidagi nishon-a'zolar zararlanishini aniqlashga alohida e'tibor qaratiladi.

Muammoning klinik ahamiyati shundaki, bir martalik kabinet o'lchovi bemorning sutkalik qon bosimi profilini to'liq aks ettirmasligi mumkin. Qon bosimi shifokor huzurida yuqori, ammo uyda normal bo'lishi yoki aksincha, kabinetda normal bo'lsa-da, kundalik hayotda yuqori bo'lishi mumkin. Bunday holatlar oq xalat va yashirin gipertenziya fenotiplari sifatida qaraladi.

Materiallar va usullar

Ushbu maqola zamonaviy klinik tavsiyalar va PubMed bazasida e'lon qilingan ilmiy sharhlar asosida tayyorlangan narrativ ilmiy tahlil hisoblanadi. Tahlilga arterial gipertenziya diagnostikasi, ABPM, HBPM, yashirin va oq xalat gipertenziiyasi, nishon-a'zolar zararlanishi hamda zamonaviy qon bosimini o'lchash texnologiyalariga bag'ishlangan ilmiy manbalar kiritildi. Asosiy e'tibor 2022–2026-yillarda e'lon qilingan ma'lumotlar va 2024-yil ESC tavsiyalariga qaratildi.

Asosiy qism

Qon bosimini standartlashtirilgan o'lchash

Arterial gipertenziya diagnostikasining boshlang'ich bosqichi qon bosimini texnik jihatdan to'g'ri o'lchashdir. Noto'g'ri manjetka tanlovi, bemorning o'lchash vaqtida gaplashishi, oyoqlarni chalishtirib o'tirishi, jismoniy faollikdan darhol keyin o'lchash yoki yetarli dam olmaslik natijani sezilarli o'zgartirishi mumkin.

Zamonaviy tavsiyalarda validatsiyadan o'tgan avtomatik yuqori qo'l tonometrlari afzal ko'riladi. 2024-yilgi metodologik sharhda qon bosimini aniq baholash diagnostika va davolashning asosiy sharti ekani, ayniqsa avtomatlashtirilgan o'lchovlarda standartlashtirish zarurligi ta'kidlangan.

Bir martalik yuqori ko'rsatkichning o'zi barcha klinik vaziyatlarda doimiy arterial gipertenziyani anglatmaydi. Shu sababli takroriy o'lchovlar va klinikadan tashqari monitoring diagnostik aniqlikni oshiradi.

Ambulator qon bosimi monitoringi

24 soatlik ABPM arterial bosimning sutkalik dinamikasini baholash imkonini beradi. U kunduzgi, tungi, ertalabki va umumiy 24 soatlik ko'rsatkichlarni aniqlash orqali oddiy kabinet o'lchovidan ancha keng ma'lumot beradi.

ABPMning alohida ustunligi — tungi gipertenziyani va sutkalik ritm buzilishlarini aniqlashdir. Bundan tashqari, u oq xalat gipertenziiyasi va yashirin gipertenziya kabi klinik fenotiplarni aniqlashda muhimdir. Zamonaviy sharhlarda

ABPM gipertenziyani dastlabki tasdiqlash, qon bosimi fenotiplarini aniqlash va rezistent gipertenziyada psevdorezistent holatlarni ajratish uchun muhim usul sifatida qayd etilgan.

Uy sharoitidagi qon bosimi monitoringi

HBPM bemorga o'z qon bosimini standartlashtirilgan sharoitda muntazam kuzatish imkonini beradi. Bu usul uzoq muddatli nazoratda, davolash samaradorligini baholashda va oq xalat hamda yashirin gipertenziya ehtimolini aniqlashda foydalidir.

Biroq HBPM bemorning o'lchash texnikasiga rioya qilishiga va tonometrning validatsiyasiga kuchli bog'liq. Shu sababli bemorga to'g'ri o'lchash texnikasini o'rgatish diagnostikaning ajralmas qismi hisoblanadi.

Oq xalat va yashirin gipertenziya

Oq xalat gipertenziyasida shifokor qabulida qon bosimi yuqori, klinikadan tashqari sharoitda esa pastroq bo'lishi mumkin. Aksincha, yashirin gipertenziyada kabinetdagi qon bosimi normal ko'rinishi, ammo uyda yoki ABPMda yuqori bo'lishi mumkin.

Yashirin gipertenziya ayniqsa muhim, chunki oddiy kabinet o'lchovi bunday bemorni "gipertenziyasi yo'q" deb baholashga olib kelishi mumkin. Tadqiqotlarda yashirin gipertenziya gipertenziya vositasidagi nishon-a'zolar zararlanishi, jumladan chap qorincha gipertrofiyasi va arterial qattqlik bilan bog'langan.

Shuning uchun klinik qon bosimi normal bo'lgan, ammo yurak-qon tomir xavfi yuqori bemorlarda klinikadan tashqari monitoringning diagnostik qiymati ortadi.

Nishon-a'zolar zararlanishini aniqlash

Arterial gipertenziyaning klinik xavfi faqat qon bosimi raqamlariga bog'liq emas. Uzoq muddatli bosim yuklamasi yurak, buyrak, miya va qon tomirlarida strukturaviy o'zgarishlar hosil qiladi.

Yurakni baholashda elektrokardiografiya va exokardiografiya muhim. Chap qorincha massasining oshishi, konsentrik remodelanish va diastolik disfunktsiya gipertenziyaning yurakka ta'sirini ko'rsatishi mumkin.

Buyrak zararlanishini baholashda kreatinin, eGFR va siydikdagi albumin ekskretsiyasi muhim. Albuminuriya glomerulyar shikastlanishning klinik jihatdan ahamiyatli belgilaridan biri hisoblanadi.

Qon tomirlarni baholashda arterial qattqlik, karotid arteriyalar holati va aterosklerotik o'zgarishlar haqida ma'lumot beruvchi instrumental usullar qo'llanilishi mumkin. 2026-yilgi ESC ilmiy sharhida gipertenziya vositasidagi nishon-a'zolar zararlanishining mavjudligi yurak-qon tomir xavfining sezilarli oshishi bilan bog'liqligi qayd etilgan.

Ikkilamchi arterial gipertenziyani aniqlash

Yosh bemorda gipertenziyaning juda erta boshlanishi, og‘ir yoki rezistent kechishi, gipertenziyaning to‘satdan rivojlanishi yoki ayrim klinik belgilar ikkilamchi sabablarni izlashni talab qilishi mumkin.

Bunday holatlarda buyrak kasalliklari, renovaskulyar gipertenziya, birlamchi aldosteronizm, feoxromotsitoma, Kushing sindromi, qalqonsimon bez kasalliklari va uyqu apnoesi kabi sabablar klinik vaziyatga qarab tekshiriladi. 2024-yil ESC tavsiyalarida ikkilamchi gipertenziyani qachon izlash va diagnostik tekshiruvlarni individual klinik holatga moslashtirishga alohida bo‘lim ajratilgan.

Zamonaviy texnologiyalar va kelajak diagnostikasi

Qon bosimini manjetkasiz o‘lchaydigan qurilmalar, aqlli soatlar va uzluksiz monitoring texnologiyalari klinik amaliyot uchun katta istiqbolga ega. Biroq ularning klinik qaror qabul qilishdagi o‘rni hali to‘liq shakllanmagan.

2026-yilgi ESC ilmiy bayonotida manjetkasiz qurilmalar istiqbolli bo‘lsa-da, hozirgi texnologiyalarda aniqlik, standartlashtirish va klinik validatsiya bilan bog‘liq muammolar mavjudligi sababli ularni klinik qarorlar uchun umumiy tarzda tavsiya qilishga hali yetarli asos yo‘qligi qayd etilgan.

Muhokama

Arterial gipertenziyaning zamonaviy diagnostikasi ko‘p bosqichli jarayon bo‘lib, faqat qon bosimi sonini aniqlash bilan cheklanmaydi. Eng muhim konseptual o‘zgarishlardan biri qon bosimini vaqt va muhitga bog‘liq dinamik biomarker sifatida ko‘rishdir.

ABPM bemorning sutkalik profilini aniqlashda yuqori diagnostik qiymatga ega bo‘lsa, HBPM uzoq muddatli monitoring uchun qulay va amaliy usuldir. Klinik qon bosimi va klinikadan tashqari qon bosimi o‘rtasidagi tafovutni aniqlash noto‘g‘ri tashxisning oldini olishga yordam beradi.

Shu bilan birga, gipertenziya tashxisini bemorning umumiy yurak-qon tomir xavfidan ajratib bo‘lmaydi. Bir xil qon bosimi ko‘rsatkichiga ega ikki bemorda nishon-a’zolar zararlanishi, diabet, buyrak kasalligi yoki yurak-qon tomir kasalligining mavjudligi sababli klinik xavf turlicha bo‘lishi mumkin.

Xulosa

Arterial gipertenziyaning zamonaviy diagnostikasi standartlashtirilgan kabinet o‘lchovi, takroriy baholash, ABPM yoki HBPM yordamida klinikadan tashqari monitoring, yurak-qon tomir xavfini stratifikatsiya qilish va gipertenziya vositasidagi nishon-a’zolar zararlanishini aniqlashga asoslanishi kerak.

ABPM ayniqsa yashirin, oq xalat va tungi gipertenziya fenotiplarini aniqlashda muhim diagnostik vosita bo‘lib qolmoqda. HBPM esa uzoq muddatli nazorat va bemorni diagnostik jarayonga jalb qilish imkonini beradi. Kelajakda raqamli

monitoring, sun'iy intellekt va manjetkasiz qurilmalar diagnostik imkoniyatlarni kengaytirishi mumkin, biroq ularning klinik qo'llanilishi yetarli texnik va klinik validatsiyaga asoslanishi lozim.

Amaliy xulosa: gipertenziyani zamonaviy diagnostika qilishda “bir marta o'lchash — tashxis qo'yish” modeli o'rniga “standartlashtirilgan o'lchash → klinikadan tashqari tasdiqlash → fenotiplash → nishon-a'zolar zararlanishini baholash → umumiy xavfni stratifikatsiya qilish” algoritmi ustuvor bo'lishi kerak.

Foydalanilgan adabiyotlar

- 1.McEvoy J.W., et al. 2024 ESC Guidelines for the Management of Elevated Blood Pressure and Hypertension. European Heart Journal. 2024.
- 2.McEvoy J.W., et al. 2024 ESC Pocket Guidelines on Elevated Blood Pressure and Hypertension. European Society of Cardiology, 2024.
- 3.Stergiou G.S., et al. How to screen and diagnose hypertension. European Journal of Preventive Cardiology. 2025.
- 4.Shimbo D., et al. Status of ambulatory blood pressure monitoring and home blood pressure monitoring for the diagnosis and management of hypertension. Hypertension Research. 2023.
- 5.Kario K., et al. When and how to use ambulatory blood pressure monitoring and home blood pressure monitoring for managing hypertension. 2024.
- 6.Cuff-based blood pressure measurement: challenges and solutions. 2024.
- 7.Misovic-Dedinje D., et al. Targeting Hypertensive Response to Exercise and the Association of Masked Hypertension With Subclinical Organ Damage. 2023.
- 8.Masked phenomenon: renal and cardiovascular complications; review and updates.2024.
- 9.Dal Pont C.S., et al. Cutoffs for white-coat and masked blood pressure effects. Journal of Human Hypertension. 2024.
- 10.European Society of Cardiology. Selecting the optimal method for assessment of hypertension-mediated organ damage: a personalized approach. European Journal of Preventive Cardiology. 2026.

UYQU BRUKSIZMINI TASHXISLASHDA ZAMONAVIY RAQAMLI VA TAQILADIGAN SENSOR TEXNOLOGIYALARINING IMKONIYATLARI

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ANNOTATSIYA

Ushbu maqolada uyqu bruksizmini (sleep bruxism) obyektiv baholashda polisomnografiya, sirt elektromiografiyasi (sEMG), elektromiografiya-elektrokardiografiya (EMG/EKG) kombinatsiyasi va portativ taqiladigan sensorlarning diagnostik imkoniyatlari qiyosiy o'rganildi. Ish birlamchi bemorlar tajribasi emas, balki 2014–2025-yillardagi konsensus hujjatlari, sistematik sharhlar va PSGga qiyoslangan klinik validatsiya ishlarining ikkilamchi dalillar sintezidir. 2024-yilgi 10 klinik tadqiqotni qamrab olgan sharhning besh tadqiqotli meta-tahlilida portativ EMG uchun umumlashtirilgan sezgirlik 0,707 va spetsifiklik 0,872 bo'lgan; dalil aniqligi juda past va heterojenlik yuqori deb baholangan. 2023-yilgi 49 ishtirokchili sinovda Bruxoff qurilmasi sezgirlik 83,3%, spetsifikligi 72% bo'lgan. Tarixiy BiteStrip tadqiqotlarida sezgirlik 71–84,2% oralig'ida qayd etilgan. Sensorlar ko'p kechali tabiiy monitoring imkonini yaratsa-da, artefakt, bir kecha bilan cheklanish, harakat va uyg'oqlik epizodlarini noto'g'ri belgilash hamda uyqu apnoesi bilan birga kechishi muhim cheklovlardir. Natijalarga ko'ra, validatsiyalangan portativ sEMG klinik baholashni to'ldiradi, murakkab va differensial tashxis talab qiladigan holatlarda esa audio-video PSG ahamiyatini saqlaydi.

Kalit so'zlar: uyqu bruksizmi, sirt elektromiografiyasi, polisomnografiya, taqiladigan sensor, Bruxoff, BiteStrip, real vaqt monitoringi, diagnostik sezgirlik, masofaviy stomatologiya.

АННОТАЦИЯ

В статье проанализированы современные цифровые и носимые сенсорные технологии для объективной оценки бруксизма сна: полисомнография, поверхностная электромиография (sEMG), комбинированная регистрация ЭМГ/ЭКГ и портативные устройства. Работа представляет собой вторичный

синтез доказательств, а не оригинальное клиническое исследование. Систематический обзор 2024 года включил 10 клинических исследований; метаанализ пяти исследований показал объединённую чувствительность 0,707 и специфичность 0,872 портативных ЭМГ-устройств при очень низкой достоверности доказательств. В исследовании 2023 года с участием 49 человек устройство Bruxoff показало чувствительность 83,3% и специфичность 72%. В более ранних работах чувствительность BiteStrip составляла 71–84,2%. Носимые датчики обеспечивают многосуточное домашнее наблюдение, однако не устраняют проблемы артефактов, ложноположительных мышечных эпизодов, отсутствия точных стадий сна и сопутствующих расстройств. При сложных случаях предпочтительна комплексная оценка с видео-полисомнографией.

Ключевые слова: бруксизм сна, поверхностная электромиография, полисомнография, носимые сенсоры, Bruxoff, BiteStrip, домашний мониторинг, диагностическая точность.

ABSTRACT

This article assesses modern digital and wearable technologies for objective sleep bruxism assessment, including polysomnography, surface electromyography (sEMG), combined EMG/ECG systems and portable devices. It is a secondary synthesis of consensus documents, systematic reviews and PSG-comparator validation studies rather than a new clinical experiment. A 2024 systematic review included ten clinical studies, with five included in its diagnostic meta-analysis; pooled sensitivity and specificity of portable EMG were 0.707 and 0.872, respectively, although certainty of evidence was very low. A 2023 validation study involving 49 participants found 83.3% sensitivity and 72% specificity for Bruxoff at the specified threshold. Historical BiteStrip studies reported sensitivity between 71% and 84.2%. Wearable sensors enable repeated home recordings and individualized follow-up, but artefacts, false-positive contractions, missing sleep-stage information, night-to-night variability and possible coexisting sleep disorders limit stand-alone interpretation. Validated ambulatory sEMG can complement clinical assessment, while audio-video polysomnography remains important for selected complex or differential-diagnostic cases.

Keywords: sleep bruxism, surface electromyography, polysomnography, wearable sensor, Bruxoff, BiteStrip, home monitoring, diagnostic accuracy.

Uyqu bruksizmi uyqu paytida yuz beradigan ritmik yoki noritmik chaynov mushaklari faolligidir. Xalqaro konsensusga ko'ra, aksariyat sog'lom shaxslarda ushbu holatni avtomatik ravishda kasallik sifatida emas, balki muayyan klinik oqibatlar bilan bog'lanishi mumkin bo'lgan xulqiy-fiziologik faoliyat sifatida baholash kerak. Aynan shuning uchun tashxisdan ko'ra faoliyatni obyektiv o'lchash, uning oqibatlari va bemor shikoyatlari bilan bog'lash ilmiy jihatdan muhimdir [1].

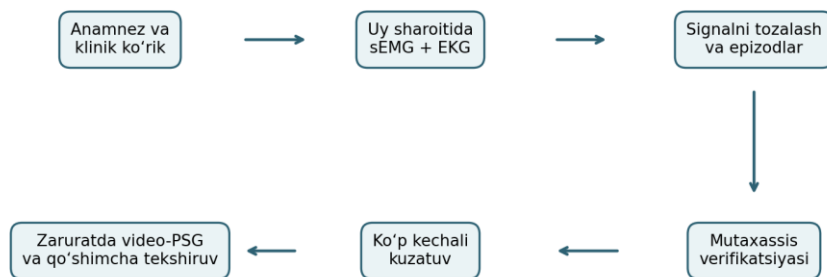
An'anaviy anamnez va klinik ko'rikda tish yeyilishi, chaynov mushaklaridagi charchoq, ertalabki og'riq yoki yaqinlarning tish g'ijirlatilishi haqidagi ma'lumoti qayd etiladi. Biroq tishdagi eski yeyilish izi bruksizm ayni paytda davom etayotganini isbotlamaydi, ertalabki noqulaylik esa boshqa uyqu va og'riq sindromlarida ham uchrashi mumkin. Demak, subyektiv va klinik belgilar joriy tungi mushak faolligining bevosita ekvivalenti emas [1, 2].

Polisomnografiya (PSG), ayniqsa audio-video yozuv va masseter/temporalis EMG bilan birga o'tkazilganda, uyqu bruksizmi uchun eng batafsil instrumental taqqoslash usulidir. EEG orqali uyqu holatini, EMG orqali mushak portlashlarini va audio-video orqali tish g'ijirlatish hamda tana harakatlari artefaktlarini farqlash mumkin. Shu bilan birga PSG qimmat, ko'p resurs talab qiladi va laboratoriya sharoitida uyqu tabiiyligini qisman o'zgartirishi mumkin.

Taqiladigan sensorlarning rivojlanishi kichik sEMG elektrodleri, yurak urishini yozuvchi EKG kanallari, akselerometrlar va mobil ilovalarni uy sharoitida foydalanishga yaqinlashtirdi. Bunday qurilmalar bir kechalik laboratoriya o'lchovidan tashqari, bir necha kecha davomida faollikning individual o'zgarishini kuzatish imkonini beradi [3, 4].

Portativ qurilmalarning texnologik soddaligi ularning diagnostik natijasini avtomatik ravishda PSG bilan tenglashtirmaydi. Qisqa yoki past amplitudali mushak qisqarishlari, yutish, gapirish, yuzdagi harakat, elektrod siljishi va uyquga oid boshqa voqealar noto'g'ri signal keltirib chiqarishi mumkin. Shu bois har bir qurilma uchun algoritm, threshold, referens usul va klinik populyatsiyani alohida ko'rsatish zarur.

Ushbu maqolaning maqsadi portativ va taqiladigan sensorlarning uyqu bruksizmi diagnostikasidagi sezgirligi, spetsifikligi va klinik foydasini nashr etilgan tadqiqotlar asosida tahlil qilish, mavjud cheklovlarni aniqlash va stomatologik amaliyot uchun ehtiyotkor gibrid baholash algoritmini taklif etishdan iborat.



1-rasm. Klinik ko'rik, uy monitoringi va PSGni integratsiyalashning konseptual sxemasi (mualliflar tomonidan dalillar asosida ishlab chiqilgan).

METODOLOGIYA VA ADABIYOTLAR TAHLILI

Tadqiqot turi – ikkilamchi dalillar sintezi. 2014–2025-yillarda e'lon qilingan uyqu bruksizmi bo'yicha xalqaro konsensus, PSG bilan validatsiya qilingan portativ uskunalar sharhlari, mustaqil klinik sinovlar va O'zbekiston stomatologlarining bruksizmga oid materiallari qiyosiy ko'rib chiqildi. Maqolada o'z klinik kohortimiz, yangi laboratoriya o'lchovlari yoki birlamchi eksperiment natijalari bor deb da'vo qilinmaydi.

Birlamchi samaradorlik ko'rsatkichlari sezgirlik (haqiqiy bruksizimli shaxslardan qurilma to'g'ri ajratganlar ulushi), spetsifiklik (bruksizmsiz shaxslardan to'g'ri ajratilganlar ulushi), ROC egri chizig'i ostidagi maydon (AUC) va voqealar/soat ko'rsatkichidir. Barcha sonlar o'z tadqiqotining alohida thresholdi va tekshirilgan populyatsiyasiga tegishli sifatida berildi; ularni umumiy qurilma reytingi ko'rinishida qo'shish mumkin emas.

Cid-Verdejo va hammualliflar (2024) 10 klinik ishni sistematik sharhga, beshta tadqiqotni diagnostik meta-tahlilga kiritgan. Turli thresholdlar bo'yicha optimal nuqtaning taxminiy qiymati 7 epizod/soat bo'lib, umumlashtirilgan sezgirlik 0,707 (95% ishonch oralig'i 0,369–0,974) va spetsifiklik 0,872 (0,550–0,974) qayd etilgan. Geterojenlik va bias sabab GRADE bo'yicha ishonchlilik juda past deb baholangan [3].

Yanez-Regonesi va hammualliflarning 2023-yilgi tadqiqotida 49 ishtirokchida Bruxoff va PSG bir vaqtning o'zida qayd etilgan. Soatiga ikki epizod chegarasida qurilma sezgirligi 83,3%, spetsifikligi 72% bo'lgan. PSG va Bruxoff o'rtasida RMMA indeksi

bo'yicha korrelyatsiya $r = 0,282$ ($p = 0,071$), jami epizodlar bo'yicha $r = 0,295$ ($p = 0,058$); bu qiymatlar sezgirlikdan tashqari epizod soni darajasidagi kelishuv ham muhimligini ko'rsatadi [4].

Manfredini va hammualliflarning 2014-yilgi sharhi to'rtta PSGga qiyoslangan klinik ishni qamrab olgan. BiteStrip sezgirligi 71–84,2%, PPV 59–100% oralig'ida bo'lgan; eski EMG telemetriya tizimida esa 98,8% sezgirlikka qaramay 76,9% noto'g'ri musbat holat qayd etilgan. Bruxoff uchun avvalgi ayrim tekshiruvlarda manual scoring AUC 0,98, avtomatik scoring AUC 0,96 kuzatilgan. Ushbu tarixiy natijalarni 2023-yilgi yangi sinov bilan birlashtirish to'g'ri emas [5].

Yangi taqiladigan tizimlar baholanishida qo'shimcha mezonlar ham zarur: elektrod joylashuvining qulayligi, teri bilan kontaktning davomiyligi, signalning avtomatik tozalanishi, qurilma batareyasining butun tun ishlashi, data privacy va shifokorga tushunarli avtomatlashtirilgan hisobot. Bularning aksariyati bo'yicha bir xil klinik standart yoki keng ko'lamli tashqi validatsiya mavjud emas [6].

O'zbekistonlik Mirxayotova va Mirsalixova (2022) bolalarda bruksizm mavzusida klinik skrining hamda EMG/PSGning obyektiv baholashdagi rolini yoritgan. Ramazanova va hammualliflar (2023) bruksizmning ortopedik stomatologik jihatlari va kapplar qo'llanilishini muhokama qilgan. Ularning natijalari xalqaro PSG-validatsiya ishlariga almashtirilmadi, balki mahalliy klinik kontekst sifatida ishlatildi [8, 9].

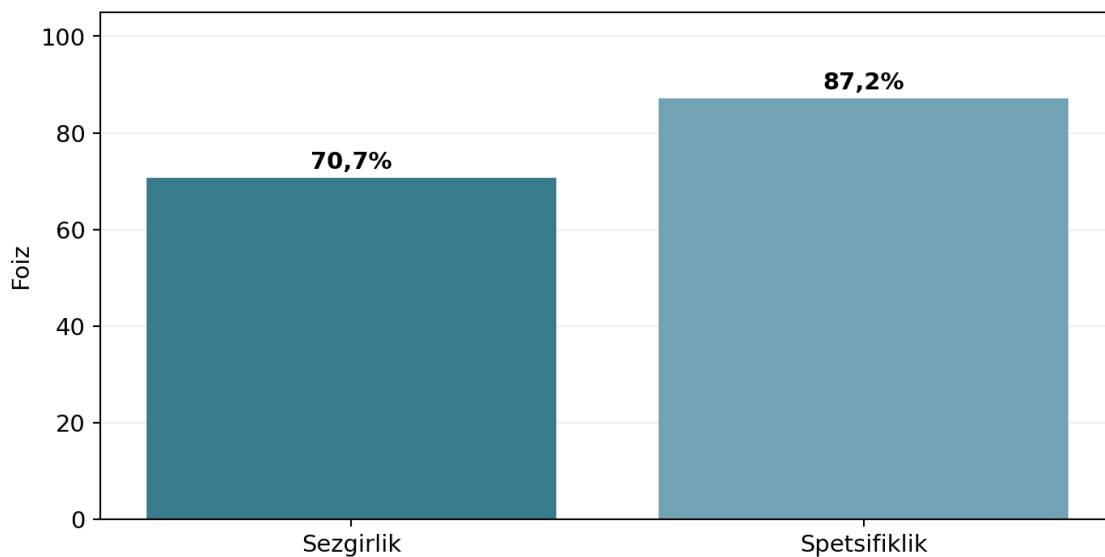
Manba yoki mezon	Izoh
2024 meta-tahlil	10 klinik ish ko'rib chiqilgan; beshtasi meta-tahlilda. Portativ EMG PSG bilan qiyoslangan.
2023 Bruxoff sinovi	49 bemor; bir vaqtning o'zida Bruxoff va PSG yozuvlari.
2014 portativ qurilmalar sharhi	To'rtta PSG qiyosiy sinovi; apparat va thresholdlar turlicha.
Asosiy metrikalar	Sezgirlik, spetsifiklik, AUC, epizod/soat, korrelyatsiya va klinik moslik.
Muhim cheklov	Turli sensorlar va thresholdlardan olingan statistiklarni bitta umumiy bahoga qo'shib bo'lmaydi.

1-jadval. Tadqiqotda qo'llangan dalillar va hisoblash mezonlari.

NATIJALAR

Zamonaviy dalillarda portativ EMGning diagnostik imkoniyati tasdiqlanayotgan bo'lsa-da, tadqiqotlar orasidagi katta farqlar amaliyotga joriy etishda ehtiyotkorlikni talab qiladi. 2024-yilgi meta-tahlilda birlashtirilgan sezgirlik 70,7%, spetsifiklik 87,2% bo'lgani uy sharoitidagi EMG musbat va salbiy natijalarini shifokor talqini bilan tekshirish zarurligini bildiradi [3].

Portativ EMG: 2024-yil meta-tahlili



2-rasm. 2024-yilgi portativ EMG meta-tahlilining birlashtirilgan sezgirlik va spetsifikligi [3].

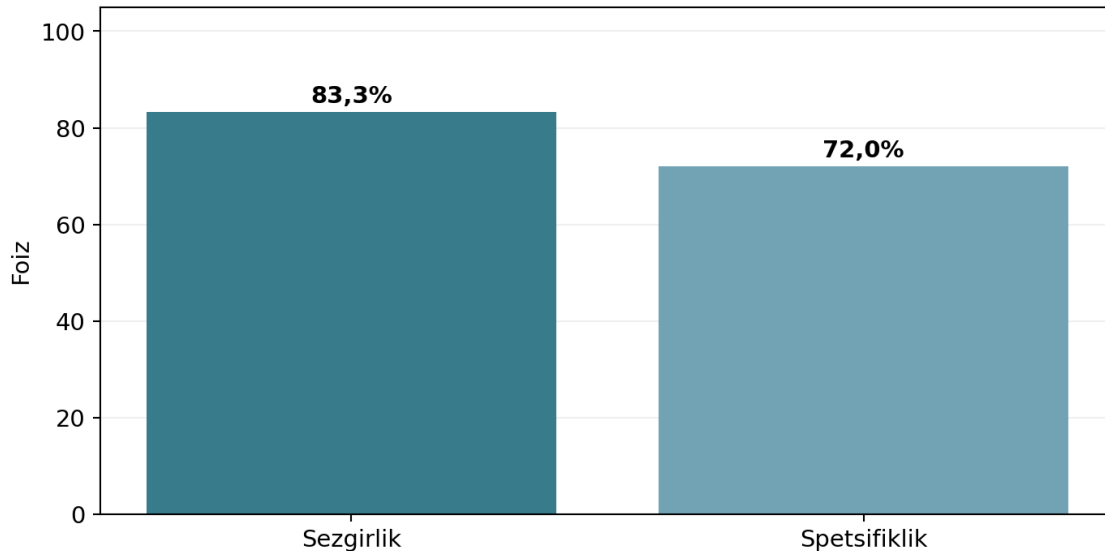
Statistik ko'rsatkich	Miqdor va talqin
Tadqiqotlar soni	10 ta sistematik sharhda; 5 ta meta-tahlilda.
Sezgirlik	0,707; 95% CI 0,369–0,974.
Spetsifiklik	0,872; 95% CI 0,550–0,974.
Taxminiy optimal threshold	7 epizod/soat: tadqiqotdagi statistik nuqta, universal tashxis mezonini emas.
Dalil ishonchliligi	Juda past: yuqori heterojenlik, bias va keng CI.

2-jadval. Portativ EMGning 2024-yilgi umumlashtirilgan aniqligi.

Portativ EMG/EKG kombinatsiyasiga ega Bruxoff qurilmasining PSG bilan to'g'ridan-to'g'ri qiyosi alohida diqqatga sazovor. 2023-yilgi tadqiqotda 49 ishtirokchi uchun soatiga ikki epizod thresholdida sezgirlik 83,3%, spetsifiklik 72% qayd etilgan.

Diagnostik guruhlashdagi bu natija voqealar sonini aniq takrorlash bilan teng emas: Bland–Altman tahlilida tizimli o‘lchov farqlari kuzatilgan [4].

Bruxoff: PSGga nisbatan klinik tekshiruv (2023)



3-rasm. Bruxoffning 2023-yildagi alohida klinik tekshiruv natijalari; 2 epizod/soat threshold [4].

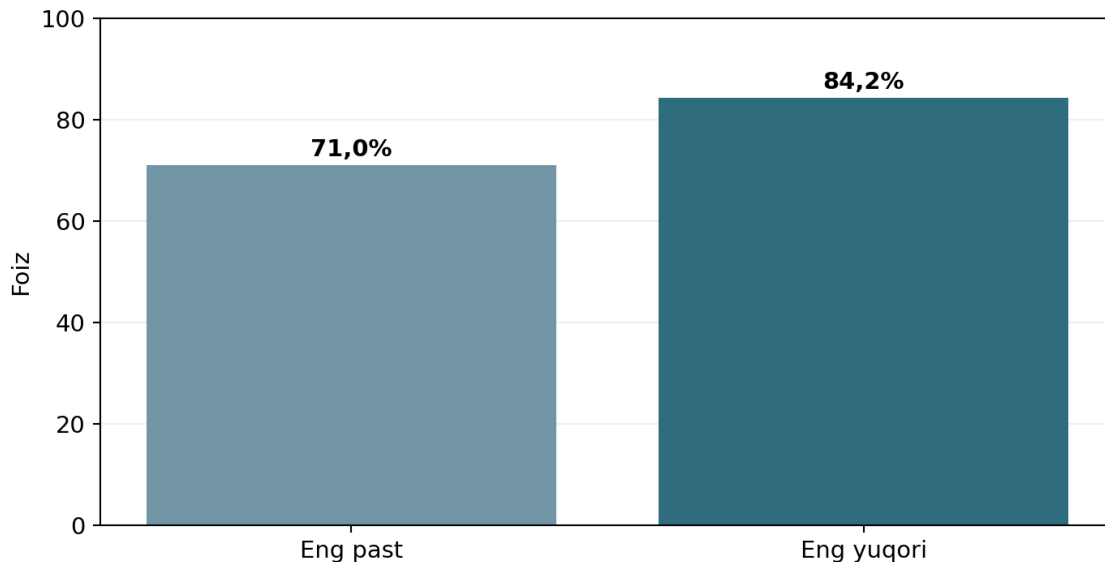
Parametr	2023-yilgi natija
Ishtirokchilar	49 kishi; bir vaqtda PSG va portativ sensor.
Sezgirlik	83,3% (2 epizod/soat threshold).
Spetsifiklik	72,0% (xuddi shu threshold).
RMMA indeks korrelyatsiyasi	$r = 0,282$; $p = 0,071$.
Jami epizodlar korrelyatsiyasi	$r = 0,295$; $p = 0,058$.
Talqin	Vaziyatga mos skrining imkoniyati; PSG bilan epizod soni mutlaq bir xil emas.

3-jadval. Bruxoffning mustaqil klinik validatsiyasi.

Oldingi validatsiya dalillari uskunaning versiyasi va algoritmi o‘zgarganida diagnostik natijalar ham o‘zgarishini ko‘rsatadi. 2014-yilgi sharhda BiteStrip sezgirliги 71–84,2% diapazonda bo‘lgan. O‘sha davr telemetriya tizimining 98,8% sezgirlik ko‘rsatishi diagnostik ustunlikni isbotlamagan, chunki noto‘g‘ri musbat topilmalar ulushi 76,9%

bo'lgan. Juda sezgir sensor kamroq klinik foyda keltirishi mumkin, agar u oddiy mushak harakatlarini ko'p holatda bruksizm deb belgilasa [5].

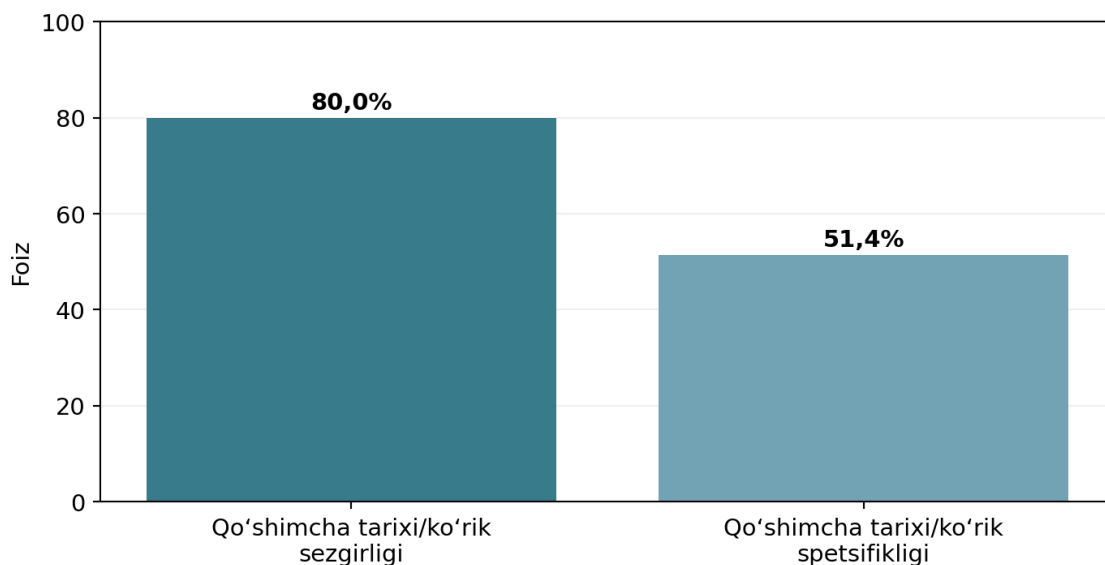
BiteStrip: tarixiy tadqiqotlardagi sezgirlik



4-rasm. BiteStrip bo'yicha tarixiy sharhda qayd etilgan sezgirlik diapazoni; ikki chekka nuqta alohida o'lchovlar hisoblanadi [5].

Faqat anamnez va klinik belgilarni asbobiy mezon bilan solishtirgan 2024-yilgi tadqiqotda asosiy simptomlar bo'limining sezgirligi 80%, spetsifikligi esa 51,4% bo'lgan. Bu ko'rsatkich non-instrumental skriningda musbat natijalar ko'p bo'lishini va obyektiv tekshiruv sababini yaratishini anglatadi; ko'rsatkich portativ EMG va PSG qiyosidagi meta-tahlilga to'g'ridan-to'g'ri tenglashtirilmaydi [7].

Alomatlar: asbobiy mezonga qiyos (2024)



5-rasm. 2024-yilgi simptomlarga asoslangan skringning asbobiy moslama bilan qiyosiy ko'rsatkichlari [7].

Nashr va usul	Ko'rsatkich hamda izoh
2024 meta-tahlil, portativ EMG	Se 70,7%, Sp 87,2%; besh tadqiqot; juda past dalil aniqligi.
2023 Bruxoff/PSG	Se 83,3%, Sp 72%; 49 ishtirokchi; 2 epizod/soat.
2014 BiteStrip/PSG	Se 71–84,2%; tarixiy qurilmalar va turlicha threshold.
2014 EMG telemetriya	Se 98,8%, noto'g'ri musbat 76,9%; skringda cheklov.
2024 simptomlar/portativ mezon	Se 80%, Sp 51,4%; self-report/ko'rik usuli boshqa referensga nisbatan.

4-jadval. Turli nashrlardagi statistik natijalarni talqin qilish chegaralari.

Klinik qo'llanish nuqtayi nazaridan eng muhim natija faqat “bruksizm mavjud” yoki “mavjud emas” degan binar javobni olish emas, balki epizodlar soni, davomiyligi, ritmikligi va individual kechalararo o'zgarishni takroran kuzatishdir. Portativ sensor shifokorning vaqt bo'yicha bahosini kengaytiradi, biroq fiziologik chegaralar doim bemor simptomlari va tish-jag' oqibatlari bilan bog'lab talqin qilinishi zarur.

Diagnostik bosqich	Amaliy vazifa
Dastlabki ko'rik	Shikoyat, tish yeyilishi tarixi, og'riq, uyqu apnoesi xavfi va qo'shimcha kasalliklarni aniqlash.
Taqiladigan sEMG	Kamida bir necha kechalik mushak faolligini qayd etish; sensor holati va artefaktlarni tekshirish.
EMG/EKG kombinatsiyasi	Mushak va yurak signalini muvofiqlashtirib avtomatik aniqlashning klinik talqinini yaxshilash.
Video-PSGga yo'llash	Uyqu apnoesi, boshqa parasomniya, davolashga qaramay simptomlar yoki natijalar zid bo'lganda.
Raqamli hisobot	Epizod/soat, kechalararo tafovut, algoritm/threshold va monitoring sifatini qayd etish.

5-jadval. Raqamli va taqiladigan qurilmalarni klinik ishga integratsiya qilish.

MUHOKAMA

Raqamli baholashga o'tishning bosh ilmiy afzalligi "bemor tishini g'ijirlatadi" degan subyektiv hukmdan o'lchanadigan masticatory muscle activity vaqt qatoriga o'tishdir. Ko'p kechali sEMG monitoring individual uyqu muhitiga yaqin sharoit yaratadi, shu bilan birga elektr signal sifatini saqlash va qurilmani to'g'ri joylashtirish ko'nikmasini talab qiladi.

2024-yilgi meta-tahlil portativ elektromiografiya uchun qoniqarli diagnostik salohiyatni ko'rsatgan bo'lsa-da, sezgirlik ishonch oraliq'i nihoyatda keng, dalil sifati esa juda past. Qurilmadan olingan 7 epizod/soat statistik optimal thresholdini har bir yoshdagi va klinik vaziyatdagi bemorlarga "kasallik chegarasi" sifatida tatbiq etib bo'lmaydi. Xalqaro konsensus bruksizm faolligini uzluksiz spektr sifatida ko'rishni tavsiya etadi [1, 3].

Bruxoff misolida 2023-yilgi yangi sinovdagi sezgirlik va spetsifiklik avvalgi AUC natijalaridan farq qiladi. Buning sababi ishtirokchilar tarkibi, algoritmi, hisoblash qoidasi, referens yozuv va threshold bo'lishi mumkin. Shu sababli eski natijani yangi qurilma uchun universal pasport raqami sifatida ishlatish noto'g'ri [4, 5].

sEMG faqat mushak faoliyatini qayd etadi. Agar yuqori amplitudali epizod uyg'oq holatda, yutish yoki tana harakati paytida yuz bersa, sensor uni fiziologik jihatdan uyqu bruksizmi deb tasniflab yuborishi mumkin. EKG, akselerometriya va audio qayd

kanallari false-positive epizodlarni ajratishda yordam berishi mumkin, ammo ko'p kanallilikning o'zi klinik referensni to'liq almashtirmaydi.

Video-PSGning ustunligi uyqu bosqichi va mikro-uyg'onishlarni aniqlash, nafas voqealari va chaynov mushaklari faolligi o'rtasidagi munosabatni ko'rsatishidir. Uyqu apnoesi, parasomniya yoki boshqa differensial tashxis shubhasida portativ bir kanalli sEMGni yagona diagnostik usul sifatida ishlatish xavfli.

Algoritmik taraqqiyot istiqbollari signalni avtomatik segmentatsiyalash, individual bazal mushak faolligiga moslashgan threshold, sensor kontaktini tekshirish, shovqin filtrlash va ko'p kanalli vaqt qatorini birlashtirishdan iborat. Shu bilan birga "AI-enabled" belgisi ilmiy validatsiya o'rnini bosmaydi: model real bemorlarda, turli apparatlarda va mustaqil klinik markazlarda sinovdan o'tishi kerak.

Maxfiylik ham muhim masala. Sensor ilovasi xom EMG, uyqu va boshqa sog'liq ma'lumotlarini uzatsa, rozilik, shifrlash, ma'lumotlarni saqlash muddati va mutaxassis tomonidan audit qilinadigan hisobot aniq belgilanishi lozim. Klinik qaror uchun zarur bo'lmagan shaxsiy uyqu yozuvlarini yig'ishni cheklash maqsadga muvofiq.

O'zbekiston sharoitida arzon sEMG qurilmalarini mahalliy sinovdan o'tkazish imkoniyatlari mavjud. Biroq xalqaro qurilmalarning tarixiy Se/Sp natijalarini mahalliy bemorlarga ko'chirib qo'llash o'rniga PSG bilan qiyosiy validatsiya, uyqu apnoesi skriningi, bemor qulayligi va uch-besh kechalik takroriylikni baholash zarur. Mahalliy stomatologik ishlar klinik muammoning dolzarbligini tasdiqlaydi, ammo universal sensor diagnostik standart yaratmaydi [8, 9].

XULOSA

Portativ sEMG, EMG/EKG va boshqa taqiladigan sensorlar uyqu bruksizmini tabiiy sharoitda qayta-qayta o'lchash va uzoq muddat kuzatish imkoniyatini kengaytiradi.

2024-yilgi meta-tahlilda portativ EMG uchun pooled sezgirlik 70,7% va spetsifiklik 87,2% bo'lgan. Natijalarning yuqori heterojenligi va juda past dalil sifati yakka usul sifatida ishonchlilikni cheklaydi.

2023-yilgi Bruxoff tekshiruvida 49 ishtirokchi uchun sezgirlik 83,3%, spetsifiklik 72% bo'lgan. Bu natija alohida qurilma, protokol va thresholddan tashqariga avtomatik umumlashtirilmasligi kerak.

Klinik anamnez va tish yeyilish belgilari skrining uchun foydali bo'lsa-da, ayni kundagi tungi mushak faolligining yetarli instrumental isboti emas. Uyquga oid

qo'shimcha kasalliklar va murakkab holatlarda audio-video PSG muhim ahamiyatga ega.

Istiqboldagi amaliy model – standartlashtirilgan klinik baholash, mahalliy validatsiyalangan ko'p kechali taqiladigan EMG, shifokor verifikatsiyasi va aniq ko'rsatmalar bo'yicha PSGni birlashtiradigan gibridd tizim.

Mahalliy klinikalarda portativ sensorlarni joriy etishdan oldin mustaqil klinik validatsiya, turli yosh va komorbid holatlardagi diagnostik tekshiruvlar hamda bemor ma'lumotlari xavfsizligi tizimi zarur.

FOYDALANILGAN ADABIYOTLAR (APA)

1. Lobbezoo, F., Ahlberg, J., Raphael, K. G., et al. (2018). International consensus on the assessment of bruxism: Report of a work in progress. *Journal of Oral Rehabilitation*, 45(11), 837–844. <https://doi.org/10.1111/joor.12663>
2. Manfredini, D., Ahlberg, J., Castroflorio, T., Poggio, C. E., Guarda-Nardini, L., & Lobbezoo, F. (2014). Diagnostic accuracy of portable instrumental devices to measure sleep bruxism: A systematic literature review of polysomnographic studies. *Journal of Oral Rehabilitation*. <https://doi.org/10.1111/joor.12207>
3. Cid-Verdejo, R., Chávez Farías, C., Martínez-Pozas, O., Meléndez Oliva, E., Cuenca-Zaldívar, J. N., Ardizzone García, I., Martínez Orozco, F. J., & Sánchez Romero, E. A. (2024). Instrumental assessment of sleep bruxism: A systematic review and meta-analysis. *Sleep Medicine Reviews*, 74, 101906. <https://doi.org/10.1016/j.smrv.2024.101906>
4. Yanez-Regonesi, F., Eisa, E., Judge, S., Carlson, C., Okeson, J., & Moreno-Hay, I. (2023). Diagnostic accuracy of a portable device (Bruxoff) to measure sleep bruxism. *Journal of Oral Rehabilitation*, 50, 258–266. <https://doi.org/10.1111/joor.13416>
5. Colonna, A., et al. (2022). Signal acquisition and analysis of ambulatory electromyographic recordings for the assessment of sleep bruxism: A scoping review. *Journal of Oral Rehabilitation*. <https://pmc.ncbi.nlm.nih.gov/articles/PMC9292505/>
6. Australian and international investigators. (2025). Ambulatory devices to detect sleep bruxism: A narrative review. *Journal of Oral Rehabilitation*. <https://pmc.ncbi.nlm.nih.gov/articles/PMC11937739/>
7. Validity between signs and symptoms of sleep bruxism against a validated portable electromyographic device. (2024). *Clinical study*. <https://pmc.ncbi.nlm.nih.gov/articles/PMC11632731/>

8. Mirxayotova, X., & Mirsalixova, F. (2022). Бруксизм у детей [Bolalarda bruksizm]. Дни молодых учёных, 274–275. <https://doi.org/10.71337/inlibrary.uz.young-scientists.15320>
9. Ramazanova, G. E., Mun, T. O., Mirxusanova, R. S., & Dadabayeva, M. U. (2023). Бруксизм. Применение ортопедических капп [Bruksizm: ortopedik kapplarni qo'llash]. Актуальные проблемы стоматологии и челюстно-лицевой хирургии, 1(02), 124–127. <https://inlibrary.uz/index.php/problems-dentistry/article/view/16182>
10. Tursunboyeva, I., & Rasulova, Sh. (2023). Анализ электромиографических показателей височных и жевательных мышц у пациентов с дистальной окклюзией, осложненной скученностью зубов. Актуальные проблемы стоматологии и челюстно-лицевой хирургии, 1(02), 149–150. <https://doi.org/10.71337/inlibrary.uz.problems-dentistry.16174>

ИСКУССТВЕННЫЙ ИНТЕЛЛЕКТ В НАЧАЛЬНОМ ОБРАЗОВАНИИ: ВОЗМОЖНОСТИ ИСПОЛЬЗОВАНИЯ ДЛЯ РАЗВИТИЯ ПОЗНАВАТЕЛЬНОГО ИНТЕРЕСА МЛАДШИХ ШКОЛЬНИКОВ

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Аннотация: В статье рассматриваются возможности использования искусственного интеллекта в начальном образовании как средства развития познавательного интереса младших школьников. Раскрывается потенциал ИИ-инструментов в персонализации учебных заданий, создании интерактивной образовательной среды и поддержке самостоятельной познавательной активности учащихся. Особое внимание уделяется педагогически обоснованному применению технологий искусственного интеллекта с учётом возрастных особенностей детей и сохранением ведущей роли учителя в образовательном процессе.

Ключевые слова: искусственный интеллект, начальное образование, младшие школьники, познавательный интерес, персонализация обучения, цифровые технологии, учебная мотивация, интерактивное обучение.

Annotatsiya: Maqolada boshlang'ich ta'limda sun'iy intellektdan kichik yoshdagi o'quvchilarning bilishga bo'lgan qiziqishini rivojlantirish vositasi sifatida foydalanish imkoniyatlari tahlil qilinadi. Sun'iy intellekt vositalarining o'quv topshiriqlarini individuallashtirish, interaktiv ta'lim muhitini yaratish hamda o'quvchilarning mustaqil bilish faoliyatini qo'llab-quvvatlashdagi imkoniyatlari yoritiladi. Shuningdek, ushbu texnologiyalarni bolalarning yosh xususiyatlarini hisobga olgan holda pedagogik maqsadga muvofiq qo'llash va ta'lim jarayonida o'qituvchining yetakchi rolini saqlab qolish masalalariga e'tibor qaratiladi.

Kalit so'zlar: sun'iy intellekt, boshlang'ich ta'lim, kichik yoshdagi o'quvchilar, bilishga qiziqish, ta'limni individuallashtirish, raqamli texnologiyalar, o'quv motivatsiyasi, interaktiv ta'lim.

Abstract: The article examines the potential of artificial intelligence in primary education as a means of fostering young learners' cognitive interest. It explores the role of AI-based tools in personalizing learning tasks, creating interactive educational environments, and supporting pupils' independent cognitive activity. Particular attention is given to the pedagogically appropriate integration of AI with consideration

of children's age-related characteristics and the preservation of the teacher's guiding role in the learning process.

Keywords: *artificial intelligence, primary education, young learners, cognitive interest, personalized learning, digital technologies, learning motivation, interactive learning.*

Введение

Искусственный интеллект постепенно становится частью образовательной реальности, изменяя не только способы получения информации, но и характер взаимодействия ученика с учебным материалом. В начальной школе этот процесс приобретает особое значение: именно в младшем школьном возрасте формируются любознательность, привычка задавать вопросы, стремление самостоятельно искать объяснения и эмоциональное отношение к познанию. Поэтому педагогическая ценность искусственного интеллекта определяется прежде всего тем, способен ли он поддерживать естественный интерес ребёнка к исследованию окружающего мира. Возможности ИИ выходят за рамки быстрого поиска готового ответа. Интеллектуальные образовательные инструменты позволяют адаптировать задания к уровню подготовки ученика, создавать интерактивные упражнения, предлагать дополнительные объяснения, моделировать проблемные ситуации и обеспечивать оперативную обратную связь. Благодаря этому один и тот же учебный материал может быть представлен в различных формах и с разной степенью сложности. Для младшего школьника такая вариативность особенно важна, поскольку познавательный интерес часто возникает там, где учебная задача одновременно понятна, посильна и содержит элемент открытия. Вместе с тем доступность технологий искусственного интеллекта не означает их автоматической педагогической эффективности. Если цифровой инструмент преимущественно предлагает готовые решения, он может ограничивать самостоятельный поиск и снижать интеллектуальную активность ребёнка. Иная ситуация складывается тогда, когда ИИ побуждает ученика сравнивать, предполагать, объяснять, задавать дополнительные вопросы и проверять собственные выводы. В этом случае технология выполняет функцию познавательного партнёра, а не заменяет мыслительную деятельность школьника. Особая роль при такой организации обучения принадлежит учителю. Именно педагог определяет цель обращения к ИИ, отбирает содержание, учитывает возрастные особенности детей и превращает технологическое взаимодействие в осмысленную учебную деятельность. Следовательно, изучение возможностей искусственного интеллекта в начальном образовании требует внимания не столько к самой технологии, сколько к педагогическим

условиям, при которых она способна усиливать любознательность, самостоятельность и устойчивый интерес младших школьников к познанию.

Основная часть

Познавательный интерес младшего школьника развивается через активное взаимодействие с учебной задачей. Ребёнку недостаточно только получить новую информацию: значительно важнее увидеть в ней вопрос, противоречие или проблему, требующую собственного решения. В этом отношении инструменты искусственного интеллекта могут расширить традиционный формат урока, предлагая учащемуся не статичный материал, а изменяющуюся в зависимости от его действий образовательную ситуацию. Одно из наиболее значимых свойств ИИ связано с возможностью адаптации учебных заданий. В обычном классе дети различаются по темпу работы, уровню подготовки и способам восприятия информации. Интеллектуальная система может варьировать сложность упражнений, предлагать дополнительные пояснения или, напротив, усложнять задачу после успешного выполнения предыдущего этапа. Ученик при этом получает возможность двигаться в индивидуальном темпе, не теряя интереса из-за чрезмерной сложности или однообразия материала. Особенно продуктивным представляется использование ИИ при организации исследовательских заданий. Вместо прямого вопроса, предполагающего единственный готовый ответ, ребёнку можно предложить небольшую познавательную проблему. Например, на уроке окружающего мира учащийся выдвигает предположение о том, почему одни растения лучше развиваются при определённых условиях, после чего с помощью ИИ формулирует дополнительные вопросы, сравнивает объяснения и уточняет первоначальную гипотезу. В такой модели технология не сообщает окончательный вывод, а помогает выстроить путь к нему. На уроках русского языка искусственный интеллект может использоваться для создания небольших текстов, языковых ситуаций, загадок и заданий на поиск ошибок. Ученик способен не только выполнять предложенное упражнение, но и анализировать ответ цифрового инструмента: находить неточности, предлагать более подходящие слова, изменять структуру предложения или объяснять собственный вариант. Такая работа формирует важную для современного образования установку: результат, созданный технологией, не следует воспринимать как безусловно правильный. На уроках математики возможности ИИ могут проявляться в генерации задач различной сложности и изменении их условий. После решения стандартной задачи школьнику можно предложить изменить один из параметров и определить, как это повлияет на результат. Ещё более содержательным становится задание, при котором ребёнок самостоятельно

составляет задачу, а ИИ помогает проверить логическую согласованность её условий. В этом случае ученик переходит от выполнения готового алгоритма к конструированию учебного материала. Существенное значение имеет и характер обратной связи. Для младшего школьника простого указания на ошибку часто недостаточно. Более полезна подсказка, которая направляет рассуждение, но не раскрывает ответ полностью. Вопросы типа «Как ты получил этот результат?», «Что изменится, если выбрать другой способ?» или «Проверь ещё раз второй шаг» сохраняют интеллектуальное усилие самого ребёнка. Именно такая форма взаимодействия способна поддерживать интерес к поиску решения и постепенно формировать навыки самоконтроля. Однако высокая интерактивность сама по себе ещё не свидетельствует о развитии познавательного интереса. Яркий интерфейс, игровые элементы и мгновенные ответы способны вызвать кратковременное внимание, которое не всегда переходит в устойчивую потребность узнавать новое. Поэтому важно различать интерес к цифровому инструменту и интерес к содержанию учебной деятельности. Педагогически результативной можно считать такую работу с ИИ, после которой ребёнок продолжает задавать вопросы, сравнивать факты, искать объяснения и обсуждать полученные результаты даже без обращения к технологии. Необходимо учитывать и возрастные ограничения. Младшие школьники ещё формируют способность критически оценивать информацию и не всегда могут определить, является ли полученный ответ достоверным. Искусственный интеллект способен создавать убедительно сформулированные, но неточные сведения. По этой причине работа с ним должна сопровождаться элементарной проверкой информации: сравнением с учебником, наблюдением, обсуждением с учителем или обращением к другим надёжным источникам. Такая практика постепенно развивает информационную грамотность и привычку не принимать любой цифровой ответ без осмысления. Учитель при этом сохраняет центральную педагогическую функцию. ИИ может предложить упражнение, объяснение или вариант решения, но он не определяет самостоятельно образовательную ценность конкретной деятельности для ребёнка. Педагог выбирает момент использования технологии, формулирует задачу и организует обсуждение полученных результатов. В начальной школе особенно важно, чтобы взаимодействие с искусственным интеллектом не вытесняло живое общение, совместную деятельность, чтение, письмо, наблюдение и практический опыт. Таким образом, наиболее перспективная модель применения ИИ строится не вокруг принципа «технология вместо учителя», а вокруг расширения способов познания. Если искусственный интеллект используется для постановки

вопросов, создания проблемных ситуаций, индивидуализации заданий и организации осмысленной обратной связи, ребёнок получает больше возможностей проявлять инициативу в учебном процессе. Познавательный интерес в такой среде поддерживается не эффектом технологической новизны, а ощущением самостоятельного открытия, когда ученик видит, что его вопрос, предположение и поиск действительно становятся частью обучения.

Заключение

Искусственный интеллект способен расширить познавательные возможности младшего школьника, если используется не как источник готовых решений, а как средство организации поиска, анализа и самостоятельного рассуждения. Его образовательная ценность проявляется в возможности адаптировать задания, поддерживать исследовательскую активность и создавать условия для осмысленной обратной связи. При этом эффективность ИИ определяется педагогическим сценарием его применения и направляющей ролью учителя. В начальном образовании технология должна не сокращать путь ребёнка к ответу, а делать сам процесс поиска более содержательным, самостоятельным и увлекательным.

СПИСОК ИСПОЛЬЗОВАННОЙ ЛИТЕРАТУРЫ

1. Зимняя И. А. Педагогическая психология. — М.: Логос, 2004. — 384 с.
2. Выготский Л. С. Педагогическая психология. — М.: Педагогика-Пресс, 1999. — 536 с.
3. Полат Е. С. Новые педагогические и информационные технологии в системе образования. — М.: Академия, 2009. — 272 с.
4. Holmes W., Bialik M., Fadel C. Artificial Intelligence in Education: Promises and Implications for Teaching and Learning. — Boston: Center for Curriculum Redesign, 2019.
5. Luckin R., Holmes W., Griffiths M., Forcier L. B. Intelligence Unleashed: An Argument for AI in Education. — London: Pearson, 2016.
6. UNESCO. Guidance for Generative AI in Education and Research. — Paris: UNESCO, 2023.
7. Miao F., Holmes W. Guidance for Generative AI in Education and Research. — Paris: UNESCO, 2023.

METAPHORS OF NATURE IN ENGLISH AND UZBEK: A LINGUACULTURAL PERSPECTIVE – ANALYZING HOW NATURAL ELEMENTS ARE CONCEPTUALIZED IN IDIOMS AND PROVERBS

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Abstract: This thesis presents a comparative linguacultural and cognitive analysis of nature metaphors in the English and Uzbek languages, focusing on idioms, proverbs, hydronyms, and place names. Grounded in Conceptual Metaphor Theory (Lakoff & Johnson, 1980), the study investigates how elemental forces (water, fire, earth, sky, and color symbolism) serve as cognitive source domains for structuring human experience, morality, and emotion. The findings reveal that while both languages share universal cognitive mappings (e.g., LIFE IS A JOURNEY, EMOTION IS FIRE), their cultural manifestations differ significantly: English nature metaphors embody individualistic, pragmatic, and functional worldviews, whereas Uzbek metaphors emphasize collectivism, traditional agrarian heritage, family values, and spiritual-moral harmony with nature.

Keywords: Conceptual metaphor, linguaculturology, nature imagery, hydronyms, English and Uzbek proverbs, cognitive linguistics.

1. Introduction

Language serves as a cultural mirror reflecting the collective experience, historical development, and national worldview of a linguistic community. According to cognitive linguistics, metaphor is not merely an ornamental or stylistic device, but a fundamental cognitive mechanism through which human beings structure thought, perception, and action. Abstract concepts such as time, emotion, morality, and social relationships are systematically mapped onto concrete physical domains.

Among concrete source domains, natural elements—specifically water, fire, earth, sky, and geographical features—occupy a primordial position in human cognition. As ancient communities interacted with their physical environment, elemental forces became deeply ingrained in folk wisdom, giving rise to rich paremiological and phraseological traditions. In both English and Uzbek, idioms and proverbs preserve these conceptual mappings across generations.

While universal human physiology and environmental exposure create shared metaphorical foundations, distinct historical trajectories, geographical settings, and socio-cultural values shape how these metaphors are actualized. Therefore, a

comparative linguacultural study of nature metaphors in English and Uzbek provides crucial insights into how different societies conceptualize existence, human character, and societal harmony.

2. Research Methodology and Results

This study employs a multi-dimensional framework combining contrastive-cognitive analysis, linguocultural classification, componential analysis, and comparative-typological methods. Primary data was extracted from phraseological dictionaries, folklore corpora, paremiological collections, and recent linguistic research in English and Uzbek linguistics.

2.1. Conceptualization of Water and Hydronyms: Water and hydronymic features serve as versatile cognitive source domains. In English phraseology, water imagery frequently addresses the passage of time (A river never looks back, water under the bridge), hidden character (Still waters run deep), and situational or financial hardship (be in deep water, keep head above water). In Uzbek culture, water conceptualization is deeply rooted in an agrarian and riverine lifestyle, symbolizing life, survival, social harmony, and environmental comfort.

2.2. Conceptualization of Fire: Fire represents a dynamic, dualistic element symbolizing passion, danger, destruction, and inner motivation. In English, fire is predominantly mapped onto risk, ambition, and emotional intensity (Playing with fire, Where there's smoke, there's fire, To have a fire in one's belly). In Uzbek, fire embodies emotional volatility, unyielding determination, as well as spiritual purification.

2.3. Conceptualization of Earth, Vegetation, and Toponyms: Earth and botanical metaphors convey human productivity and morality. Toponymic analysis reveals distinct cultural orientations: English place names reflect functional and descriptive naming patterns (Oxford, Cambridge, Greenwich), whereas Uzbek place names embody poetic, environmental, and spiritual harmony.

Elemental Domain	English Conceptual Focus	Uzbek Conceptual Focus
Water / Hydronyms	Time flow, financial hardship, hidden depth (Still waters run deep)	Life necessity, agrarian survival, communal harmony
Fire	Risk, passion, ambition (Playing with fire, Fire in belly)	Character strength, volatility, purification
Earth & Toponyms	Functional, anthropocentric naming (Oxford, Cambridge)	Poetic, spiritual harmony

3 Conclusion

The comparative linguacultural and cognitive study of nature metaphors in English and Uzbek leads to the following conclusions: 1) In both languages, natural elements operate as universal cognitive source domains grounded in human experience. 2) Distinct cultural priorities structure their conceptual manifestations: English nature metaphors reflect an individualistic, pragmatic, and anthropocentric worldview, whereas Uzbek nature metaphors strongly embody a collectivist, traditional, and agrarian mindset emphasizing social harmony, family values, and spiritual resonance. 3) Understanding these conceptual nuances enriches paremiology, cognitive linguistics, and translation studies while facilitating clearer intercultural communication.

References

1. Axmedov, J. G'n. (2025). Linguistic Landscape of Fire and Water: Analyzing Idioms and Proverbs in Uzbek and English. *Xorazm Ma'mun Akademiyasi Axborotnomasi*, 4/4, 50–52.
2. Kayumova, Sh. K. (2024). Linguopoetic Features of Proverbs with Hydronym Components in English and Uzbek Languages. *Web of Scientist: International Scientific Research Journal*, 5(12), 246–250.
3. Kobilova, A. B., & Rakhmatova, A. K. (2024). Cognitive Metaphors and Linguacultural Symbols in Toponyms (A Comparative Study of English and Uzbek Languages). *International Scientific Online Conferences*, Bukhara State University, 1–5.
4. Lakoff, G., & Johnson, M. (1980). *Metaphors We Live By*. Chicago: University of Chicago Press, 242 p.

FOOD HYGIENE AND FOODBORNE DISEASES: A COMPREHENSIVE REVIEW

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Abstract

Food safety remains one of the most persistent public health challenges of the twenty-first century. Every year, hundreds of millions of people across the globe fall ill after consuming contaminated food, and a substantial proportion of these cases could be prevented through the consistent application of sound food hygiene practices. This review article examines the fundamental concepts of food hygiene, explores the major categories of foodborne diseases and their causative agents, and discusses the burden these illnesses place on individuals, healthcare systems, and economies. Particular attention is given to bacterial, viral, parasitic, and chemical hazards, the pathways through which food becomes contaminated, and the preventive frameworks — from personal hygiene and the "clean, separate, cook, chill" approach to Hazard Analysis and Critical Control Points (HACCP) — that are used to interrupt the contamination chain. The article concludes that while foodborne disease cannot be eliminated entirely, a combination of consumer education, robust regulation, and science-based management systems can reduce its incidence dramatically. Food hygiene, in short, is not merely a technical discipline; it is a shared responsibility that begins in the home kitchen and extends to the farthest reaches of the global food supply chain.

Keywords: food hygiene; foodborne disease; food safety; contamination; HACCP; foodborne pathogens

1. Introduction

Food is essential to life, yet the very act of eating carries risk when hygiene is neglected. Food hygiene refers to the set of conditions and measures necessary to ensure the safety and suitability of food at every stage of the food chain — from production and harvesting through processing, storage, distribution, preparation, and finally consumption. When these measures fail, the result is foodborne disease: illness

caused by consuming food or water contaminated with pathogenic microorganisms, their toxins, or harmful chemical substances.

The scale of the problem is striking. The World Health Organization estimates that unsafe food causes hundreds of millions of illnesses annually worldwide, with diarrheal diseases alone accounting for a large share of the global burden, and children under five years of age being disproportionately affected. Beyond human suffering, foodborne outbreaks generate enormous economic losses through medical costs, lost productivity, product recalls, and trade restrictions.

What makes foodborne disease especially frustrating from a public health perspective is that most cases are preventable. The hazards are well understood, the transmission routes have been mapped, and effective control measures — many of them remarkably simple, such as washing hands and cooking food thoroughly — have been known for decades. The gap lies in consistent implementation. This review therefore aims to synthesize current understanding of food hygiene principles, survey the landscape of foodborne diseases, and evaluate the strategies available for their prevention and control.

2. Understanding Food Hygiene

2.1 Definition and Scope

Food hygiene encompasses all practices that preserve the wholesomeness of food and prevent it from becoming a vehicle for disease. It is broader than cleanliness alone: while cleaning and sanitizing are central, food hygiene also includes temperature control, cross-contamination prevention, personal hygiene of food handlers, pest management, safe water supply, and the structural design of food premises. International guidance, notably the Codex Alimentarius General Principles of Food Hygiene, frames hygiene as a continuum that stretches across the entire food chain, often summarized as the principle "from farm to fork."

2.2 The Core Pillars of Food Hygiene

Although national regulations differ in detail, they converge on a common set of hygiene pillars. Table 1 summarizes the principal pillars and the risks each one addresses.

Hygiene Pillar	Key Practices	Risks Addressed
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Personal hygiene	Handwashing, clean clothing, exclusion of ill workers, no bare-hand contact with ready-to-eat food	Transfer of pathogens from handlers to food
Cleaning and sanitizing	Scheduled cleaning of surfaces, utensils and equipment; correct sanitizer concentration	Build-up of bacteria on food-contact surfaces
Temperature control	Cooking to safe internal temperatures; cold storage at or below 4 °C; rapid cooling of cooked food	Survival and multiplication of pathogens and toxin formation
Cross-contamination prevention	Separate raw and cooked foods; dedicated cutting boards and knives; correct storage order	Spread of pathogens from raw ingredients to ready-to-eat items
Safe water and raw materials	Potable water only; approved suppliers; inspection of incoming ingredients	Chemical and microbial contamination at source
Pest control	Sealing entry points, proper waste management, regular inspection	Pathogen carriage by insects and rodents

Table 1. Core pillars of food hygiene and the risks they mitigate.

2.3 Why Hygiene Failures Occur

In practice, contamination rarely results from a single dramatic failure. More often it accumulates through small lapses: a refrigerator door left open, a knife reused without washing, a worker who comes in despite feeling unwell. Behavioral studies of food handlers repeatedly show that knowledge of hygiene rules is often adequate while

compliance is not — a reminder that food safety is as much a matter of culture, training, and supervision as it is of regulation.

3. Foodborne Diseases: An Overview

3.1 Definition and Classification

Foodborne diseases are illnesses acquired through the ingestion of contaminated food or water. They fall into two broad clinical patterns: foodborne infection, in which live pathogens multiply in the body and cause illness (for example, salmonellosis), and foodborne intoxication, in which a toxin pre-formed in the food damages the host (for example, staphylococcal or botulinum poisoning). Some organisms, such as certain strains of *Escherichia coli*, can cause both, depending on the circumstances.

By causative agent, foodborne diseases are conventionally grouped into four categories:

Bacterial diseases form the largest and best-studied group. *Salmonella*, *Campylobacter*, pathogenic *E. coli*, *Listeria monocytogenes*, *Staphylococcus aureus*, *Clostridium perfringens*, and *Clostridium botulinum* are among the most important agents. Bacterial disease typically follows consumption of undercooked meat, poultry, eggs, unpasteurized dairy products, or food that has been held at unsafe temperatures.

Viral diseases are frequently underdiagnosed because they seldom trigger the dramatic outbreaks associated with bacteria, yet viruses such as norovirus and hepatitis A are estimated to cause a very large share of foodborne illness globally. Infected food handlers are a major transmission route, which underlines why personal hygiene and exclusion of symptomatic workers are so critical.

Parasitic diseases include infections with protozoa such as *Giardia*, *Cryptosporidium*, and *Toxoplasma gondii*, as well as helminths such as *Trichinella spiralis* and tapeworms. These agents are often linked to contaminated water, undercooked meat, or unwashed produce grown in contaminated soil.

Chemical and toxin hazards round out the picture. These include heavy metals (lead, mercury, cadmium), pesticide residues, mycotoxins such as aflatoxins produced by molds on grains and nuts, marine biotoxins in seafood, and adulterants. Although less common than microbial illness, chemical hazards can cause chronic disease, including cancer, after long-term exposure.



Figure 1. Artistic rendering of Salmonella bacteria, one of the leading bacterial causes of foodborne illness worldwide.

3.2 Major Foodborne Pathogens and Their Sources

Table 2 profiles some of the most significant foodborne pathogens, their typical food vehicles, and characteristic illness features.

Pathogen	Common Food Sources	Typical Incubation	Characteristic Illness
Salmonella spp.	Poultry, eggs, raw milk, contaminated produce	6–72 hours	Diarrhea, fever, abdominal cramps; can invade bloodstream
Campylobacter jejuni	Undercooked poultry, unpasteurized milk	2–5 days	Bloody diarrhea, fever; linked to Guillain-Barré syndrome
Pathogenic E. coli (e.g., O157:H7)	Undercooked beef, contaminated leafy greens, raw milk	1–10 days	Severe cramps, bloody diarrhea; risk of hemolytic uremic syndrome

Listeria monocytogenes	Ready-to-eat meats, soft cheeses, smoked seafood	3–70 days	Mild flu-like illness in healthy people; severe in pregnancy and elderly
Norovirus	Contaminated shellfish, ready-to-eat food handled by infected persons	12–48 hours	Sudden vomiting and diarrhea; highly contagious
Hepatitis A virus	Contaminated water, produce, shellfish; infected handlers	15–50 days	Jaundice, fatigue, nausea; prolonged illness
Staphylococcus aureus	Cream-filled pastries, salads, cooked meats handled improperly	1–6 hours	Rapid-onset vomiting and nausea; usually self-limiting
Clostridium botulinum	Improperly canned foods, garlic-in-oil, fermented fish	12–36 hours	Descending paralysis; a medical emergency

Table 2. Selected major foodborne pathogens, their typical vehicles, and clinical features.

3.3 The Global Burden of Foodborne Disease

Quantifying the burden of foodborne disease is difficult because surveillance systems vary enormously between countries and many cases are never reported. Nevertheless, WHO's landmark 2015 estimates, updated since, indicated that contaminated food causes roughly 600 million illnesses and hundreds of thousands of deaths each year worldwide. Diarrheal pathogens account for the majority of this burden. Children under five bear a disproportionate share of deaths, and the highest per-capita burden falls on

low- and middle-income countries in Africa and Southeast Asia, where unsafe water, limited refrigeration, and weak regulatory capacity intersect.

Even in high-income countries with mature surveillance, the numbers are sobering. In the United States, the Centers for Disease Control and Prevention estimates that foodborne pathogens cause tens of millions of illnesses annually. The true figures everywhere are almost certainly higher than reported figures, because mild cases go unreported and laboratory confirmation is required for most surveillance systems. Nor can the burden be measured in health statistics alone: foodborne outbreaks erode consumer confidence, trigger costly recalls, and can destroy businesses and livelihoods overnight.

4. How Food Becomes Contaminated

Food contamination can occur at any point in the food chain, and understanding the pathways is essential to interrupting them. Hazards arrive through three principal routes.

First, primary contamination occurs at the source — in the field or on the farm. Pathogens in irrigation water or manure used as fertilizer can settle on fresh produce; animals can carry *Salmonella* or *Campylobacter* without appearing sick; and seafood can accumulate marine toxins from the waters in which it grows. Second, secondary contamination takes place during processing, transport, storage, or preparation. This is where cross-contamination between raw and ready-to-eat foods, lapses in refrigeration, and transmission from infected handlers typically occur. Third, contamination can arise from the environment itself: unclean utensils, pest droppings, or chemical residues from cleaning agents used improperly.

A useful way to visualize the risk is the contamination chain shown in everyday kitchens: raw chicken juices drip onto a salad in the refrigerator; a knife used to cut raw meat is wiped, not washed, before slicing bread; cooked rice is left out overnight and reheated briefly. Each link is a small failure of hygiene, and each is preventable.



Figure 2. Washing fresh produce under running water — a basic but powerful food hygiene practice.

5. Prevention and Control Strategies

5.1 The Consumer Level: Clean, Separate, Cook, Chill

At the household level, food safety guidance worldwide converges on four simple verbs. Clean means washing hands with soap before and during food preparation, washing produce under running water, and keeping utensils and surfaces sanitized. Separate means keeping raw meat, poultry, seafood, and eggs away from ready-to-eat foods, using separate cutting boards and plates. Cook means heating food to temperatures sufficient to kill pathogens — for poultry, that means an internal temperature of about 74 °C, verified with a food thermometer rather than guesswork. Chill means refrigerating perishables promptly, keeping the refrigerator at or below about 4 °C, and never leaving perishable food in the "danger zone" (roughly 4–60 °C) for extended periods.

These rules sound elementary, and they are — but outbreak investigations repeatedly trace major events back to their neglect. In this domain, simplicity is a strength: advice that people actually follow saves more lives than sophisticated protocols that remain on paper.



Figure 3. Handwashing remains the single most effective barrier against the spread of foodborne pathogens.

5.2 The Industry Level: HACCP and Food Safety Management

For food businesses, prevention is formalized through structured management systems, the most influential of which is the Hazard Analysis and Critical Control Points (HACCP) system. Developed originally for astronaut food in the 1960s and now embedded in Codex Alimentarius guidance, HACCP requires a food operation to identify hazards, determine where in the process each hazard can be controlled (the critical control points), set limits, monitor compliance, and correct deviations. Applied correctly, HACCP shifts food safety from reactive inspection of finished products to proactive control of the process itself.

HACCP is typically complemented by prerequisite programs: supplier approval schemes, sanitation standard operating procedures, pest control contracts, employee training, and traceability systems that allow contaminated products to be traced forward to retailers and backward to their source within hours. In many jurisdictions, third-party certification against standards such as ISO 22000 or the Global Food Safety Initiative benchmarked schemes provides additional assurance to buyers and regulators.

5.3 The Regulatory and Public Health Level

Governments contribute through food safety legislation, licensing and inspection of food premises, laboratory surveillance, outbreak investigation, and public education

campaigns. Effective systems combine risk-based inspection (focusing enforcement effort where hazard is greatest) with rapid communication to the public when hazards are identified — for instance, through recall notices and alerts. International cooperation matters too, because the modern food trade means a contaminated ingredient produced in one country can cause illness in dozens of others within days.

6. Contemporary Challenges in Food Hygiene

Several trends are reshaping the food safety landscape. The globalization of the food supply has lengthened supply chains and multiplied the number of handoffs at which contamination can occur, while also complicating traceability. Changing dietary patterns — greater consumption of fresh and minimally processed produce, which is often eaten raw — have increased exposure to hazards that cooking would otherwise eliminate. Climate change influences the picture in subtle ways, from the expansion of pathogen habitats to the greater frequency of extreme weather events that overwhelm sanitation infrastructure.

Antimicrobial resistance adds a further dimension: some foodborne bacteria are increasingly resistant to the antibiotics used to treat severe infections, meaning that a preventable kitchen lapse can evolve into an untreatable illness. Finally, the rise of e-commerce and informal food vending — street food, home-based producers selling through social media — creates large sectors that traditional inspection models struggle to reach. Addressing these challenges will require not only better technology but also sustained investment in training, infrastructure, and consumer education, particularly in the regions carrying the heaviest burden.

7. Conclusion

Foodborne disease is as old as eating itself, but it is not an inevitability. The evidence reviewed here points to a consistent conclusion: the hazards are known, the transmission pathways are understood, and the control measures are effective — where they are applied. Food hygiene operates at three interlocking levels: the habits of individual consumers and food handlers, the management systems of food businesses, and the regulatory frameworks of states and international bodies. Weakness at any one level undermines the others.

The practical implications are clear. Consumers should internalize the simple disciplines of cleaning, separating, cooking, and chilling. Food businesses should treat HACCP not as paperwork but as a living system embedded in daily operations. Policymakers should invest in surveillance, in risk-based inspection, and above all in the regions where the burden is greatest. Most fundamentally, food safety must be

recognized as a shared responsibility — one that begins at the farm, passes through every kitchen and factory, and ends at the dinner table. With that shared commitment, the heavy and largely preventable toll of foodborne disease can be dramatically reduced.

References

- [1] World Health Organization. WHO Estimates of the Global Burden of Foodborne Diseases: Foodborne Disease Burden Epidemiology Reference Group 2007–2015. Geneva: WHO Press, 2015.
- [2] World Health Organization. Food Safety — Key Facts. Geneva: WHO, 2022 (updated periodically).
- [3] Centers for Disease Control and Prevention. Burden of Foodborne Illness: Findings. Atlanta, GA: CDC, 2024.
- [4] Codex Alimentarius Commission. General Principles of Food Hygiene (CXC 1-1969, revised). Rome: FAO/WHO, latest revision.
- [5] Adams, M., Moss, M., & McClure, P. Food Microbiology (5th ed.). London: Royal Society of Chemistry, 2022.
- [6] Havelaar, A. H., et al. World Health Organization global estimates and regional comparisons of the burden of foodborne disease in 2010. PLoS Medicine, 2015; 12(12): e1001923.
- [7] Newell, D. G., et al. Food-borne diseases — the challenges of 20 years ago still persist while new ones continue to emerge. International Journal of Food Microbiology, 2010; 139(Suppl 1): S3–S15.
- [8] U.S. Department of Agriculture, Food Safety and Inspection Service. Four Steps to Food Safety: Clean, Separate, Cook, Chill. Washington, DC: USDA, 2024.
- [9] Scharff, R. L. State estimates for the annual cost of foodborne illness. Journal of Food Protection, 2015; 78(6): 1064–1071.
- [10] Motarjemi, Y., & Lelieveld, H. (Eds.). Food Safety Management: A Practical Guide for the Food Industry. Amsterdam: Elsevier, 2014.

DAVLAT BOSHQARUVIDA SUN'IY INTELLEKTNI QO'LLASHDA INSON HUQUQLARINI HIMOYA QILISHNING XALQARO STANDARTLARI

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Annotatsiya: Maqolada davlat boshqaruvida sun'iy intellekt texnologiyalaridan foydalanishda inson huquqlarining konstitutsiyaviy-huquqiy kafolatlari xalqaro tajriba asosida tahlil qilinadi. Yevropa Kengashi Konventsiyasi, Yevropa Ittifoqi Akti, OECD prinsiplari va UNESCO Tavsiyanomasi asosida inson nazorati, tenglik, shaxsiy hayot daxlsizligi, shaffoflik va hisobdorlik kabi asosiy kafolatlar ochib beriladi. Tadqiqot natijalariga ko'ra, xalqaro standartlarni milliy huquqiy tizimga integratsiya qilish orqali texnologik taraqqiyot bilan inson huquqlarini himoya qilish o'rtasidagi muvozanatni ta'minlash mumkinligi asoslab beriladi.

Kalit so'zlar: sun'iy intellekt, davlat boshqaruvi, inson huquqlari, konstitutsiyaviy kafolatlar, xalqaro tajriba, inson nazorati, shaffoflik

Аннотация: В статье анализируются конституционно-правовые гарантии прав человека при использовании технологий искусственного интеллекта в государственном управлении на основе международного опыта. На основе Конвенции Совета Европы, Акта Европейского Союза, принципов ОЭСР и Рекомендации ЮНЕСКО раскрываются основные гарантии, такие как человеческий контроль, равенство, неприкосновенность частной жизни, прозрачность и подотчетность. По результатам исследования обосновывается возможность обеспечения баланса между технологическим прогрессом и защитой прав человека путем интеграции международных стандартов в национальную правовую систему.

Ключевые слова: искусственный интеллект, государственное управление, права человека, конституционные гарантии, международный опыт, человеческий контроль, прозрачность

Abstract: The article analyzes the constitutional and legal guarantees of human rights in the use of artificial intelligence technologies in public administration based on international experience. Drawing on the Council of Europe Convention, the European Union AI Act, OECD principles and the UNESCO Recommendation, it examines key guarantees such as human oversight, equality, privacy, transparency and accountability. The study concludes that integrating international standards into the

national legal system can help maintain a balance between technological progress and the protection of human rights.

Keywords: artificial intelligence, public administration, human rights, constitutional guarantees, international experience, human oversight, transparency

Kirish. Zamonaviy davlat boshqaruvida sun'iy intellekt texnologiyalaridan keng foydalanish jamiyat hayotining turli sohalariga chuqur ta'sir ko'rsatmoqda. Ushbu texnologiyalar xizmat ko'rsatish sifatini oshirish, qaror qabul qilish jarayonlarini optimallashtirish va davlat organlari faoliyatining samaradorligini kuchaytirish imkoniyatini yaratadi. Shu bilan birga, sun'iy intellekt tizimlarining avtomatlashtirilgan qarorlar qabul qilish, biometrik identifikatsiya, xavf baholash va ijtimoiy xizmatlar taqsimotida qo'llanilishi inson huquqlariga jiddiy xavf tug'dirishi mumkin. Ayniqsa, tenglik, shaxsiy hayot daxlsizligi, adolatli sudlov, inson qadr-qimmati va erkin rivojlanish huquqi kabi asosiy konstitutsiyaviy qadriyatlar raqamli muhitda yangicha himoya mexanizmlarini talab qilmoqda.

Xalqaro hamjamiyat bu muammoni e'tirof etgan holda sun'iy intellekt faoliyatini inson huquqlari, demokratiya va qonun ustuvorligi prinsiplariga muvofiqlashtirishga qaratilgan maxsus huquqiy asoslarni ishlab chiqishga kirishdi. Yevropa Kengashining Doiraviy konventsiyasi, Yevropa Ittifoqining Sun'iy intellekt to'g'risidagi Akti, OECD prinsiplari va UNESCO Tavsiyanomasi ushbu sohadagi eng muhim xalqaro hujjatlar hisoblanadi. Ular davlat boshqaruvida sun'iy intellektdan foydalanishda inson huquqlarining konstitutsiyaviy-huquqiy kafolatlarini mustahkamlash uchun muhim orientir bo'lib xizmat qilmoqda.

Asosiy qism. Davlat boshqaruvida sun'iy intellekt texnologiyalaridan foydalanish zamonaviy jamiyatning ajralmas qismiga aylanib bormoqda. Ushbu jarayon xizmat ko'rsatish samaradorligini sezilarli darajada oshirishi, qaror qabul qilish jarayonlarini tezlashtirishi, byurokratik to'siqlarni kamaytirishi va cheklangan resurslarni oqilona taqsimlashga yordam berishi mumkin. Shu bilan birga, algoritmik tizimlarning inson huquqlariga ta'siri tobora ko'proq e'tibor markaziga chiqmoqda, chunki ularning qo'llanilishi an'anaviy huquqiy munosabatlarni tubdan o'zgartirmoqda. Ayniqsa, avtomatlashtirilgan qarorlar, biometrik identifikatsiya, xavf baholash, ijtimoiy xizmatlar taqsimoti va huquqni muhofaza qilish sohalarida qo'llaniladigan tizimlar tenglik, shaxsiy hayot daxlsizligi, adolatli sudlov, inson qadr-qimmati va erkin rivojlanish huquqi kabi asosiy konstitutsiyaviy qadriyatlarga jiddiy xavf tug'dirishi mumkin.

Xalqaro ekspertlar bu borada aniq pozitsiyani bildirib, "Davlat organlari tomonidan qo'llaniladigan sun'iy intellekt tizimlari inson qadr-qimmati, asosiy huquqlar va qonun ustuvorligiga to'liq rioya etgan holda loyihalashtirilishi va joriy

etilishi kerak” deb ta’kidlaydilar.¹ Ushbu fikr Yevropa Kengashi Konventsiasining asosiy ruhini ifodalaydi va sun’iy intellekt tizimlarini davlat boshqaruvida qo’llashda inson qadr-qimmatini birinchi o’ringa qo’yishni talab qiladi. Iqtibos texnologiyaning o’zi emas, balki uni qo’llash usuli muhim ekanligini ko’rsatadi. Bu yondashuv konstitutsiyaviy huquqlarning bevosita amal qilish prinsipiga to’liq mos keladi. Davlat organlari uchun bu majburiyat nafaqat axloqiy, balki huquqiy xarakterga ega bo’lib, milliy qonunchilikni isloh qilishda muhim mezon sifatida xizmat qilishi mumkin. U shuningdek, texnologik innovatsiyalarni inson huquqlari bilan uyg’unlashtirish zarurligini ta’kidlaydi va davlat boshqaruvida sun’iy intellektdan foydalanishning qonuniy chegaralarini belgilaydi.

Xalqaro hamjamiyat bu xavflarni e’tirof etgan holda sun’iy intellekt faoliyatini inson huquqlari, demokratiya va qonun ustuvorligi prinsiplariga muvofiqlashtirishga qaratilgan maxsus huquqiy asoslarni ishlab chiqishga kirishdi. Ushbu asoslar milliy konstitutsiyaviy tizimlar uchun muhim orientir bo’lib xizmat qilmoqda, chunki ular texnologik taraqqiyot bilan inson huquqlarini himoya qilish o’rtasidagi muvozanatni saqlashga yordam beradi. Sun’iy intellekt tizimlarining davlat organlari tomonidan qo’llanilishi an’anaviy huquqiy munosabatlarni o’zgartirib, yangi himoya mexanizmlarini talab qilmoqda. Shu bois xalqaro standartlar milliy qonunchilikni isloh qilish va konstitutsiyaviy kafolatlarni raqamli muhitga moslashtirishda muhim manba hisoblanadi.

Yevropa Kengashining «Sun’iy intellekt, inson huquqlari, demokratiya va qonun ustuvorligi to’g’risida»gi Doiraviy konventsiasini bu boradagi birinchi universal xalqaro shartnoma sifatida alohida ahamiyat kasb etadi. Konventsia sun’iy intellekt tizimlarining butun hayot sikli davomida — loyihalash, ishlab chiqish, joriy etish, qo’llash va o’chirib tashlash bosqichlarida — inson huquqlari bilan to’liq muvofiqligini ta’minlashni maqsad qiladi. U davlat organlari hamda ular nomidan faoliyat yurituvchi xususiy subyektlar uchun majburiy qoidalarini belgilaydi va shu orqali davlat boshqaruvida sun’iy intellekt qo’llanilganda inson huquqlarining buzilishini oldini olishga qaratilgan aniq mexanizmlarni yaratadi.

Konventsiyada ta’kidlanishicha, “Har bir Tomon sun’iy intellekt tizimlarining hayot sikli doirasidagi faoliyat inson huquqlarini himoya qilish majburiyatlariga muvofiq bo’lishini ta’minlash uchun choralar ko’radi yoki saqlab qoladi.”² Bu mulohaza Konventsianing amaliy majburiyatlarini ochib beradi va faqat umumiy prinsiplarni emas, balki aniq choralar ko’rish majburiyatini yuklaydi. “Hayot sikli”

¹ Council of Europe. Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law. – Strasbourg. Council of Europe Publishing. 2024. 7 p.

² Council of Europe. Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law. – Strasbourg. Council of Europe Publishing. 2024. 12 p.

tushunchasi tizimning barcha bosqichlarini qamrab olishini anglatadi. Bu yondashuv oldindan xavflarni baholash va doimiy monitoringni talab qiladi. Iqtibos davlatlarning pozitiv majburiyatini mustahkamlaydi, milliy konstitutsiyaviy mexanizmlarni kuchaytirishga turtki beradi hamda xalqaro va milliy huquq o'rtasidagi bog'liqlikni ta'minlaydi. Natijada, ushbu norma sun'iy intellektni tartibga solishda tizimli yondashuvni shakllantiradi.

Konventsiyada inson qadr-qimmati va individual avtonomiya, shaffoflik va nazorat, hisobdorlik, tenglik va kamsitmaslik, shaxsiy hayot daxlsizligi, ishonchlilik hamda xavfsiz innovatsiya kabi asosiy prinsiplar mustahkamlangan. Bu prinsiplar davlat boshqaruvida sun'iy intellekt qo'llanilganda inson huquqlarining buzilishini oldini olishga qaratilgan bo'lib, ularning har biri o'zaro bog'liq holda amal qiladi. Ayniqsa, inson nazoratisiz avtomatlashtirilgan qarorlar qabul qilinishiga yo'l qo'ymaslik talabi konstitutsiyaviy mas'uliyat prinsipini mustahkamlaydi va davlat organlarining yakuniy javobgarligini saqlab qolishga xizmat qiladi.

Yevropa Ittifoqining Sun'iy intellekt to'g'risidagi Akti esa xavf asosidagi yondashuvni joriy etgan eng batafsil huquqiy hujjat hisoblanadi. Aktga ko'ra, davlat boshqaruvida qo'llaniladigan ko'plab tizimlar yuqori xavfli toifaga kiritilgan. Bunga ijtimoiy nafaqalar taqsimoti, huquqni muhofaza qilish, migratsiya, sud ishlari, ta'lim sohasidagi tizimlar hamda muhim davlat xizmatlarini ko'rsatish bilan bog'liq boshqa sohalar kiradi. Ushbu yondashuv tizimlarning potensial zarari darajasiga qarab turli darajadagi talablarni belgilash imkonini beradi.

Aktida aniq qayd etilganidek, "Yuqori xavfli sun'iy intellekt tizimlari ular ishlatilayotgan davrda tabiiy shaxslar tomonidan samarali nazorat qilinishi mumkin bo'ladigan tarzda loyihalashtirilishi va ishlab chiqilishi kerak."³ Ushbu qarash Yevropa Ittifoqi Aktining markaziy talablaridan birini ifodalaydi va "samarali nazorat" tushunchasini ta'kidlab, formal yondashuvni rad etadi. Nazorat tizimning butun ishlash davrida amalga oshirilishi lozim. Bu talab inson mas'uliyatini saqlab qolishga qaratilgan bo'lib, konstitutsiyaviy adolatli sudlov huquqi bilan chambarchas bog'liq. U davlat organlarini texnik va tashkiliy sharoitlarni yaratishga majbur qiladi hamda fuqarolarning huquqlarini himoya qilish mexanizmini kuchaytiradi. Natijada, ushbu norma avtomatlashtirilgan qarorlar ustidan inson nazoratini ta'minlaydi.

Yuqori xavfli tizimlarni joriy etishdan oldin davlat organlari fundamental huquqlar ta'siri baholashini o'tkazishi shart. Ushbu baholash tizimning real qo'llanilish sharoitlarini, ta'sir qilinishi mumkin bo'lgan shaxslar doirasini, zarar xavfini, inson nazorati mexanizmlarini va xavflarni kamaytirish choralari qamrab oladi. Bu talab

³ European Union. Regulation (EU) 2024/1689 laying down harmonised rules on artificial intelligence (AI Act). – Brussels. Official Journal of the European Union. 2024. 60 p.

konstitutsiyaviy mutanosiblik prinsipini amaliyotga tatbiq etishning muhim vositasi bo'lib, davlat organlarini oldindan xavflarni aniqlash va ularni bartaraf etishga majbur qiladi.

Akt shuningdek, ba'zi amaliyotlarni butunlay taqiqlaydi. Ijtimoiy reyting tizimlari, ish joyida yoki ta'lim muassasalarida emotsiya aniqlash, real vaqtda biometrik identifikatsiya, zaif guruhlarini manipulyatsiya qilishga qaratilgan tizimlar kabi qo'llanishlar inson qadr-qimmati va erkinligiga zid deb topilgan. Bunday taqiqlar davlatning inson huquqlarini himoya qilish bo'yicha pozitiv majburiyatini mustahkamlaydi va texnologiyaning insonparvarlik chegaralarini aniq belgilab beradi.

Samarali inson nazorati Aktning markaziy talablaridan biridir. Nazorat faqat formal imzo qo'yish bilan cheklanmasligi, balki haqiqiy aralashuv imkoniyatini ta'minlashi kerak. Bu talab nazoratchining yetarli malakaga, vakolatga va texnik yordamga ega bo'lishini, shuningdek, tizim xulosalarini tanqidiy baholash va zarur hollarda ularni o'zgartirish yoki bekor qilish huquqiga ega ekanligini nazarda tutadi. Shunday yondashuv avtomatlashtirilgan qarorlar ustidan inson mas'uliyatini saqlab qolishga xizmat qiladi va konstitutsiyaviy adolatli sudlov huquqini mustahkamlaydi.

OECD ning sun'iy intellekt bo'yicha prinsiplari ham xalqaro standartlar tizimida muhim o'rin tutadi. Ular inson huquqlari va demokratik qadriyatlarga hurmat, shaffoflik va tushuntiriluvchanlik, ishonchlilik, xavfsizlik hamda hisobdorlikni talab qiladi. Ushbu prinsiplar milliy qonunchilikni ishlab chiqishda orientir sifatida keng qo'llanilmoqda va davlat organlariga sun'iy intellekt tizimlarini joriy etishda inson manfaatlarini ustuvor qilishni eslatib turadi.

OECD hujjatlarida ta'kidlanishicha, "Sun'iy intellekt ishtirokchilari qonun ustuvorligi, inson huquqlari va demokratik qadriyatlarga, jumladan, adolatlilik va shaxsiy hayotni himoya qilishga rioya etishlari kerak."⁴ Bu fikr OECD prinsiplarining asosiy g'oyasini aks ettiradi va sun'iy intellekt ishtirokchilariga keng doiradagi majburiyatlarni yuklaydi. "Adolatlilik" va "shaxsiy hayotni himoya qilish" alohida ta'kidlangan bo'lib, iqtibos texnologik taraqqiyotni demokratik qadriyatlar bilan bog'laydi. U milliy qonunchilikni ishlab chiqishda orientir bo'lib xizmat qiladi. Shuningdek, xususiy va davlat subyektlari uchun bir xil talablarni belgilaydi. Iqtibos konstitutsiyaviy tenglik va daxlsizlik prinsiplarini mustahkamlaydi. Natijada, ushbu norma sun'iy intellektni mas'uliyatli qo'llash madaniyatini shakllantiradi.

UNESCO ning sun'iy intellekt etikasi bo'yicha Tavsiyanomasi esa texnologiyani insonparvarlik, adolatlilik, barqarorlik va mas'uliyat asosida rivojlantirishni urg'ulaydi. Tavsiyanoma sun'iy intellekt tizimlarining jamiyatga ta'sirini baholash, kamsitish xavfini kamaytirish choralari ko'rish va zaif guruhlar

⁴ OECD. Recommendation of the Council on Artificial Intelligence. – Paris. OECD Publishing, 2024.9

huquqlarini alohida himoya qilishni nazarda tutadi. Bu yondashuv konstitutsiyaviy tenglik prinsipini raqamli muhitga moslashtirishga yordam beradi va texnologik innovatsiyalarni insonparvar qadriyatlar bilan uyg'unlashtirishga xizmat qiladi.

UNESCO hujjatida qayd etilganidek, "Sun'iy intellekt tizimlari inson huquqlari va asosiy erkinliklarga hurmat, himoya va rag'batlantirish tarzida loyihalashtirilishi va qo'llanilishi kerak."⁵ Ushbu mulohaza UNESCO Tavsiyanomasining asosiy prinsiplaridan birini ifodalaydi va "hurmat, himoya va rag'batlantirish" kabi uch bosqichli yondashuvni belgilaydi. Bu yondashuv faqat zarar yetkazmaslikni emas, balki ijobiy ta'sir ko'rsatishni ham talab qiladi. Iqtibos texnologiyani insonparvar qadriyatlar bilan uyg'unlashtirishga chaqiradi. U zaif guruhlar huquqlarini alohida himoya qilishni nazarda tutadi. Shuningdek, milliy siyosatni shakllantirishda muhim mezon bo'lib xizmat qiladi. Iqtibos konstitutsiyaviy inson huquqlari ustuvorligi prinsipiga to'liq mos keladi. Natijada, ushbu norma sun'iy intellektni axloqiy asosda rivojlantirishga turtki beradi.

Xalqaro standartlar yig'indisidan kelib chiqadigan asosiy kafolatlardan biri — inson nazoratisiz huquqiy ahamiyatga ega qarorlar qabul qilinishining taqiqlanishidir. Bu qoida Yevropa Kengashi Konventsiyasi va Yevropa Ittifoqi Aktida aniq ifodalangan. U davlat organlarining yakuniy mas'uliyatini saqlab qolishga qaratilgan bo'lib, sun'iy intellekt tizimlarini faqat yordamchi vosita sifatida qo'llashni talab qiladi. Shu orqali inson huquqlariga ta'sir qiluvchi qarorlar ustidan demokratik nazorat saqlanib qoladi.

Ikkinchi muhim kafolat — tenglik va kamsitmaslikdir. Algoritmik nohaqlik ma'lumotlar to'plamidagi muvozanatsizlik, tarixiy diskriminatsiyaning aks etishi yoki proxy o'zgaruvchilar orqali yuzaga kelishi mumkin. Xalqaro hujjatlar tizimlarni loyihalash bosqichidayoq diskriminatsiyaga qarshi choralar ko'rishni, ma'lumotlar sifatini nazorat qilishni va tizimlarning ta'sirini doimiy monitoring qilishni talab qiladi. Bu talab konstitutsiyaviy tenglik prinsipining raqamli muhitdagi ifodasidir.

Uchinchi kafolat shaxsiy hayot daxlsizligi va ma'lumotlarni himoya qilish bilan bog'liq. Sun'iy intellekt tizimlari katta hajmdagi shaxsiy ma'lumotlarni qayta ishlaydi, ularni tahlil qiladi va ba'zan yangi xulosalar chiqaradi. Shuning uchun ma'lumotlarni himoya qilish qoidalari bilan sun'iy intellekt tartibga solish mexanizmlari o'zaro bog'liq holda amal qilishi lozim. Xalqaro standartlar ma'lumotlarni qayta ishlashning qonuniyligi, maqsadga muvofiqligi va mutanosibligini ta'minlashni talab qiladi.

To'rtinchi kafolat shaffoflik, tushuntirish huquqi va bahs qilish imkoniyatidir. Fuqaro sun'iy intellekt asosida qabul qilingan qaror haqida xabardor qilinishi, uning asoslarini bilishi, tizimning ishlash mantiqini tushunishi va e'tiroz bildirish huquqiga

⁵ UNESCO. Recommendation on the Ethics of Artificial Intelligence. – Paris. UNESCO Publishing. 2021. 18.

ega bo'lishi kerak. Bu talab konstitutsiyaviy sud himoyasi huquqining zamonaviy ifodasi bo'lib, fuqaroga o'z huquqlarini himoya qilish uchun yetarli ma'lumot berishni nazarda tutadi.

Beshinchi kafolat hisobdorlik va samarali himoya vositalaridir. Zarar yetkazilganda javobgarlik aniq taqsimlanishi, mustaqil nazorat organlari faoliyati ta'minlanishi va sud himoyasidan foydalanish imkoniyati mavjud bo'lishi zarur. Xalqaro standartlar aynan shu mexanizmlarni mustahkamlashga qaratilgan bo'lib, ular fuqaroga yetkazilgan zararning o'rnini qoplash va tizimdagi xatolarni tuzatish imkoniyatini yaratadi.

Umuman olganda, xalqaro tajriba shuni ko'rsatadiki, davlat boshqaruvida sun'iy intellektdan foydalanish inson huquqlarining konstitutsiyaviy kafolatlarini zaiflashtirmasligi, balki ularni mustahkamlashi kerak. Texnologik taraqqiyot faqat inson qadr-qimmati, tenglik, shaffoflik va mas'uliyat prinsiplari bilan uyg'unlashganda haqiqiy taraqqiyot hisoblanadi. Shu bois xalqaro standartlarni milliy huquqiy tizimga izchil integratsiya qilish, ularni konstitutsiyaviy qadriyatlar bilan bog'lash va amaliyotda samarali qo'llash bugungi kunning muhim vazifasidir.

Xulosa. Xalqaro tajriba shuni ko'rsatadiki, davlat boshqaruvida sun'iy intellekt texnologiyalaridan foydalanish inson huquqlarining konstitutsiyaviy kafolatlarini zaiflashtirmasligi, balki ularni mustahkamlashi lozim. Yevropa Kengashining Doiraviy konventsiyasi, Yevropa Ittifoqining Sun'iy intellekt to'g'risidagi Akti, OECD prinsiplari va UNESCO Tavsiyanomasi bu borada muhim huquqiy asoslarni yaratgan. Ular sun'iy intellekt tizimlarini inson qadr-qimmati, tenglik, shaxsiy hayot daxlsizligi va qonun ustuvorligi prinsiplariga muvofiq holda qo'llashni talab qiladi.

Tadqiqot natijalariga ko'ra, xalqaro standartlar asosida shakllangan asosiy kafolatlar qatoriga inson nazorati, kamsitmaslik, ma'lumotlarni himoya qilish, shaffoflik va hisobdorlik kiradi. Ayniqsa, huquqiy ahamiyatga ega qarorlarni faqat sun'iy intellekt xulosalariga asoslanib qabul qilishning taqiqlanishi davlat organlarining yakuniy mas'uliyatini saqlab qolishga xizmat qiladi. Bu yondashuv konstitutsiyaviy adolatli sudlov va inson huquqlarining bevosita amal qilish prinsiplarini raqamli muhitga moslashtirish imkonini beradi.

Shu bilan birga, xalqaro tajriba milliy huquqiy tizimlarga xalqaro normalarni izchil integratsiya qilish zarurligini ko'rsatadi. Fundamental huquqlar ta'siri baholashi, samarali inson nazorati mexanizmlari va mustaqil nazorat organlarining faoliyati davlat boshqaruvida sun'iy intellektdan foydalanishning qonuniy va axloqiy asoslarini mustahkamlaydi. Bunday yondashuv texnologik taraqqiyot bilan inson huquqlarini himoya qilish o'rtasidagi muvozanatni ta'minlashga yordam beradi.

Umuman olganda, sun'iy intellekt texnologiyalaridan foydalanish faqat insonparvar qadriyatlar, shaffoflik va mas'uliyat prinsiplari asosida amalga oshirilganda haqiqiy taraqqiyot hisoblanadi. Shu bois xalqaro standartlarni milliy qonunchilikka moslashtirish, konstitutsiyaviy kafolatlarni raqamli muhitga moslashtirish va amaliyotda samarali qo'llash bugungi kunning muhim vazifasi bo'lib qolmoqda.

Foydalanilgan adabiyotlar

1. Council of Europe. Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law. – Strasbourg. Council of Europe Publishing. 2024. 12.
2. European Union. Regulation (EU) 2024/1689 laying down harmonised rules on artificial intelligence (AI Act). – Brussels. Official Journal of the European Union. 2024. P. 144.
3. OECD. Recommendation of the Council on Artificial Intelligence. – Paris. OECD Publishing. 2024. P. 12.
4. UNESCO. Recommendation on the Ethics of Artificial Intelligence. – Paris. UNESCO Publishing. 2021. P. 48.

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Abstract

Every day, thousands of people around the world wait for a phone call that may never come — the call telling them that a compatible donor organ has been found. Others live tethered to machines that perform, hour by hour, the work a failed kidney or heart can no longer do. Artificial organs and, more recently, 3D bioprinting represent humanity's two great answers to this crisis: one mechanical, one biological. This article traces the story of both fields — from the first clunky dialysis machines and the parachute-silk artificial hearts of the 1980s to today's laboratories where living cells are printed into beating cardiac tissue. Along the way, it examines how bioprinting actually works, why blood vessels remain the stubborn bottleneck of the field, where the technology already saves lives, and what the coming decade may hold for patients, clinicians, and society.

1. The Waiting List: Where Our Story Begins

Imagine being told that your heart — the organ that has beaten without pause since before you were born — is failing, and that the only cure is a transplant. Now imagine being told that you are one of over one hundred thousand people waiting, that roughly seventeen of them will die each day waiting, and that your survival may depend on a stranger's tragedy. This is not a rare scenario. It is the quiet arithmetic of modern medicine, and it is the reason scientists began asking a radical question decades ago: what if we could simply build the organ instead?

The answers that emerged split into two streams. The first stream is mechanical: devices made of titanium, polyurethane, and microelectronics that stand in for a failing organ, at least for a while. The second stream is biological: using a patient's own cells as raw material to grow, layer by layer, living replacement tissue. That second stream — 3D bioprinting — is young enough that many of its pioneers are still alive to watch

it mature, yet old enough that it has already changed lives. To understand where it is going, it helps to first appreciate how far the mechanical era carried us.

2. Artificial Organs: The Mechanical Era

An artificial organ, broadly defined, is any man-made device implanted or worn on the body that replaces or augments the function of a natural organ. Some are so familiar we barely think of them as artificial organs at all: the pacemaker that keeps a slow heart in rhythm, the cochlear implant that returns hearing, the mechanical heart valve that clicks softly inside a chest. Others are unmistakably extraordinary. The total artificial heart — a device that takes over for both failing ventricles — is essentially a small, precision-engineered pump that must move roughly five litres of blood every minute without damaging a single cell, clotting, or wearing out, all while sitting inside one of the harshest environments in engineering: the human chest.

The modern artificial heart traces its lineage to 1982, when Barney Clark, a retired dentist from Seattle, lived 112 days with the Jarvik-7 device implanted in his chest. The newspapers of the day called it a miracle and a controversy in equal measure; ethicists debated whether a life dependent on an external air compressor was a life worth extending. Four decades later, the debate has largely settled: devices such as SynCardia's total artificial heart and CARMAT's bioprosthetic heart have kept patients alive for months and years as bridges to transplant, and in 2024 a new generation magnetically levitated total artificial heart was implanted in the United States for the first time at Duke University — a design with no mechanical bearings to wear down, because the rotor floats in a magnetic field like a miniature maglev train.

Yet for all their brilliance, purely mechanical organs share three stubborn limitations. They are prone to clotting and infection where synthetic material meets blood. They need power — batteries, drivelines, or external compressors — which creates openings for bacteria and constant anxiety for patients. And they imitate only the pump function of an organ, never its hormonal, metabolic, or regenerative duties. A mechanical kidney filters blood, but it cannot produce vitamin D or erythropoietin; a mechanical heart pushes blood, but it cannot respond to adrenaline the way living muscle does. Biology, it turns out, is hard to fake with metal and plastic. That recognition pushed researchers toward a bolder idea: rather than imitating tissue, why not print it?



Figure 1. A next-generation total artificial heart being prepared for implantation — mechanical organ replacement at its most advanced (Duke University School of Medicine).

3. 3D Bioprinting: Printing With Living Ink

Traditional 3D printing builds objects layer by layer from plastics, metals, or ceramics. Bioprinting does the same thing, but its ink is alive. A typical bioink is a hydrogel — a water-rich gel such as alginate, gelatin, or hyaluronic acid — mixed with living cells and, often, growth factors that coax those cells toward their final identity. The printer deposits this mixture according to a digital blueprint, usually derived from a CT or MRI scan of the patient, so that the finished construct matches the patient's own anatomy down to the millimetre.

The elegance of the approach lies in what happens after printing. The printed construct is transferred to a bioreactor — an incubator that mimics the warmth, oxygenation, and chemical environment of the body — where the cells do what cells have done for billions of years: they talk to each other, attach, reorganise, and mature. Over days and weeks, a shapeless printed lattice becomes functional tissue. The scaffold, if it was designed to be temporary, gradually dissolves, leaving only the patient's own living cells. Because the cells come from the patient in the first place — typically converted from a simple blood sample into induced pluripotent stem cells, then specialised into heart, liver, or kidney cells — the finished organ carries the patient's own DNA. Rejection, the scourge of transplant medicine, simply never enters the picture, and neither do decades of immunosuppressant drugs and their side effects.

Three printing technologies dominate the field, each with its own temperament. Extrusion bioprinting squeezes bioink through a nozzle like frosting from a piping bag; it is fast, versatile, and currently the workhorse of the industry. Inkjet bioprinting sprays tiny droplets with remarkable precision and speed, ideal for drug testing but limited by the viscosity of the inks it can handle. Laser-assisted bioprinting uses focused laser pulses to propel cell droplets onto a collector plate, offering exceptional resolution — thin enough to print a single cell layer — at the cost of slower speed and higher complexity.

Technique	How it works	Strengths	Main limitation
Extrusion	Bioink pushed through a nozzle by pressure or screw	High cell density; many materials; scalable	Lower resolution; shear stress can stress cells
Inkjet	Piezoelectric actuator ejects micro-droplets of bioink	Fast; precise droplet placement; low cost per run	Only low-viscosity inks; droplets need substrates
Laser-assisted	Laser pulse propels cell-laden droplets from a ribbon	Very high resolution; gentle on cell viability	Slow; expensive; complex optics

Table 1. The three principal bioprinting modalities compared.

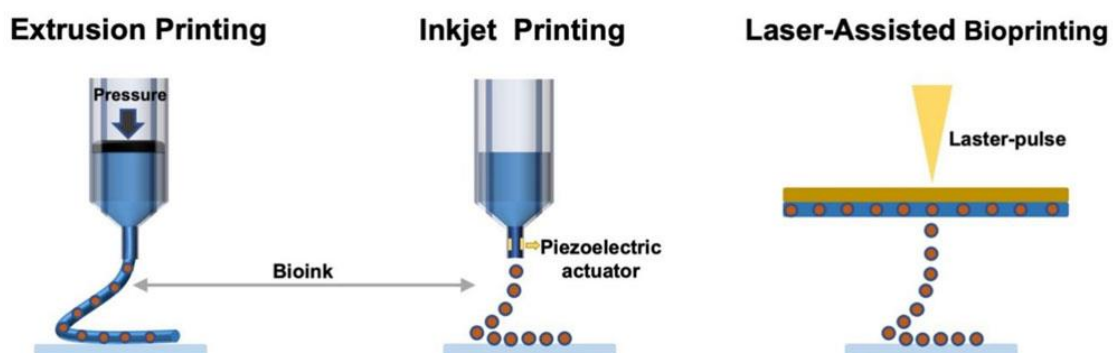


Figure 2. Schematic of the three dominant bioprinting approaches: extrusion, inkjet, and laser-assisted deposition (Frontiers in Materials).

4. A Short History of Engineered Organs

Progress in this field rarely arrives as a single thunderclap; it accumulates in quiet laboratory breakthroughs, regulatory milestones, and the courage of first patients. Still, certain moments stand out as turning points where an entire research community — and sometimes the public — paused to take notice. The timeline below gathers some of the most consequential.

Year	Milestone	Why it mattered
1943–45	First successful dialysis treatments (Kolff)	Proof that a machine could substitute for a failed organ
1952	First mechanical heart valve (Hufnagel)	The beginning of durable implantable organ components
1967	First human heart transplant (Barnard)	Established transplantation — and exposed the donor shortage
1982	Jarvik-7 total artificial heart implanted in Barney Clark	Showed a machine could fully replace the heart, if only for a time
1999	First tissue-engineered bladder scaffold implanted (Wake Forest)	Living tissue grown in a lab entered urological surgery
2003	3D printing of a human ear-shaped scaffold (Van Cleynenbreugel / later Atala work)	Demonstrated that complex anatomical shapes could be printed
2011	First synthetic windpipe transplant (Macchiarini)	A lab-made airway gave a patient a new trachea — and taught hard lessons too

2016	CARMAT artificial heart European trials; 3D-printed organ-on-chip adoption	Bioprosthetic hearts and printed tissue models moved toward the clinic
2019	3D bioprinting of vascularised tissue with perfusable channels	Solved, in part, the blood-supply problem inside thick constructs
2022–24	Bioprinted skin grafts in burn care; bioprinted ear cartilage clinical work	Printed living products reached early human application
2024	Magnetically levitated total artificial heart implanted at Duke (first in U.S.)	Mechanical hearts took a leap in durability and biocompatibility
2025–26	Wearable artificial kidney trials; 4D and ice-templated vascular printing	Ambulatory organ support and printed vessels advanced in parallel

Table 2. Selected milestones in artificial organs and bioprinting, 1943–2026.

5. The Vascular Bottleneck

Ask any bioprinting researcher to name the field's hardest problem and you will almost always hear the same answer: blood vessels. The logic is brutal and simple. Cells cannot survive more than roughly a millimetre or two from the nearest capillary, because oxygen and nutrients diffuse only so far through tissue. A printed ear or a patch of skin is thin enough that the body's own vessels can grow in after implantation. But a solid organ — a kidney, a liver, a heart — is several centimetres thick and contains billions of cells, every one of them hungry and oxygen-hungry. Without a built-in circulatory network, the inside of a thick printed organ simply dies.

Nature builds this network with astonishing economy: in a human body, capillaries sit close enough that almost no cell is more than about a hair's width from a blood supply. Reproducing that geometry with a printer nozzle is a different matter entirely. Researchers have tried coaxing cells to self-assemble vessels (a strategy called vascular sprouting), printing sacrificial inks that are dissolved afterwards to leave hollow channels, and even 3D ice printing, in which ice templates are printed and then coated

with cells before being melted away — leaving behind vessel-like tubes. Each approach has won partial victories: perfusable channels, branching networks a few millimetres deep, even printed constructs that survive implantation in animals. Printing a full, human-scale vascular tree remains unsolved, but the gap is closing year by year, and many in the field quietly regard it as a when, not an if.



Figure 3. A bioprinted ear scaffold in culture medium — an early, emblematic demonstration that complex anatomy can be fabricated layer by layer.

6. Where the Technology Already Saves Lives

For all the attention given to whole-organ printing, the quiet truth is that bioprinting and tissue engineering have already entered medicine through narrower doors — and have already changed outcomes. Three areas deserve special mention.

First, engineered skin. Burns that once meant months of grafting and scarring can now be treated with bioprinted skin constructs that deliver both the upper and deeper layers of skin, sometimes printed directly onto the wound. Second, cartilage and bone. Printed ear and nose cartilage, built from a patient's own cells, is in early clinical use for children born with microtia, and printed scaffolds seeded with stem cells are being tested in jaw and skull reconstruction. Third, and perhaps most consequentially for ordinary patients, tissue models for drug testing. Pharmaceutical companies now use bioprinted liver and cardiac tissue to screen compounds for toxicity before human trials, replacing some animal testing and catching dangerous side effects earlier.

Beyond these, the frontier keeps advancing. In 2024 and 2025, a wearable artificial kidney moved through human trials, freeing dialysis patients from clinic chairs for

hours at a time; bioprinted corneal tissue entered early clinical study; and researchers printed functional cardiac patches that, in animal studies, restored some contractile force to damaged hearts. The full printed heart for transplant remains on the horizon — most serious estimates place viable thick-organ printing at least a decade away — but the horizon is no longer a rhetorical device. It has a timetable.



Figure 4. Artistic rendering of a bioprinter depositing living tissue layer by layer — the manufacturing paradigm at the heart of regenerative medicine.

7. A Growing Industry With a Waiting-List Tailwind

The commercial significance of these technologies follows the same curve as their medical one. Market analyses vary in scope and method — some count only implantable devices, others fold in bionics and prosthetics — but they agree on direction and roughly on scale. Estimates of the broader artificial organs and bionics market cluster in the mid-30 to mid-40 billion US dollar range for 2025, with forecasts generally exceeding 100 billion dollars by the mid-2030s and compound annual growth rates of roughly 8 to 10 percent. Artificial kidneys dominate revenue, reflecting the enormous dialysis population, while the fastest growth belongs to wearable, electronic, and bioprinted categories.

Indicator (selected industry estimates)	Value	Source / year
Artificial organs & bionics market, 2025	≈ USD 34.5–46.5 billion	Wissen Research; Fact.MR, 2025–26
Projected market by 2034–2036	USD 91–117 billion	GMI; Fact.MR, 2025–26

Typical forecast CAGR	$\approx 8\text{--}10\%$	Multiple analysts, 2025–26
Artificial kidney share of organ segment	$\approx 56\%$	Mordor Intelligence, 2025
Fully implantable fixation share	$\approx 73\%$	Mordor Intelligence, 2025
North America regional share	$\approx 44\text{--}47\%$	Mordor; Precedence Research, 2025
Wearable kidney / externally worn growth	$\approx 13\text{--}15\%$ CAGR	Mordor Intelligence, 2025

Table 3. Market snapshot for artificial organs and bionics (figures vary by report scope and methodology).

Two structural forces guarantee sustained demand. The first is demography: ageing populations in every major economy mean more heart failure, more chronic kidney disease, more diabetes — and therefore more organ failure. The second is arithmetic: donor supply is essentially flat while waiting lists grow, and no public campaign has ever closed the gap. Every statistic in Table 3 is, at bottom, a measure of unmet biological need.

8. Challenges, Costs, and Hard Questions

Scepticism has its place in this field, and honest advocates will name the obstacles before the promises. Scientifically, the vascular problem looms largest, followed closely by maturation — coaxing printed immature cells to behave like decade-old adult tissue — and by sterility, since a printed organ grown over weeks in a bioreactor must be utterly free of contamination. Economically, the price of a fully personalised printed organ will be formidable, at least initially; a single bioprinter run for one patient cannot borrow the economies of scale that make pills cheap. Regulatorily, agencies such as the FDA have frameworks for devices and for biologics, but a printed living organ is simultaneously both, and the approval pathway for such hybrids is still being written in practice.

The ethics run deeper than cost. Who receives a printed heart first when supply is scarce? What happens to the economics of organ donation — one of the most generous institutions in modern medicine — if printed organs become available? And there is a cautionary tale the field itself tells: the synthetic trachea transplants of the early 2010s,

celebrated as triumphs, collapsed amid patient deaths and a research scandal, and are now studied in ethics courses as a warning about hype outpacing evidence. Bioprinting's advocates learned from that episode. Today's clinical claims are more modest, trials more rigorous, and the word “breakthrough” more carefully budgeted.

None of these challenges negates the endeavour; they define its tempo. Progress will likely continue the pattern of the past two decades: thin tissues first, then patches and conduits, then hollow organs, and finally — last and hardest — solid organs with full vascular trees.

9. Conclusion: The Machine and the Garden

Artificial organs and 3D bioprinting are sometimes framed as rivals — the mechanical old guard versus the biological newcomers. The reality is more complementary, and more interesting. Mechanical devices rescue patients today and will keep doing so for decades; they are the bridges, quite literally, on which the bioprinting future drives. Bioprinting, in turn, promises something no titanium pump ever can: a replacement that is truly alive, that heals, that adapts, and that the body recognises as its own.

The history of medicine offers a useful analogy. Prosthetic limbs did not end when transplants began; both simply found their proper places. In the same way, the waiting list that opens this article will probably not be abolished by any single invention. It will shrink the way such problems always do — through a portfolio of solutions, each improving on the last, each carrying a patient a little further from despair. Somewhere in a laboratory tonight, a printer is laying down a line of living cells with a precision no surgeon's hand can match. It is a small thing, a line of ink. But line by line, layer by layer, that is how the future of organ replacement is being written.

References

- Wissen Research. Artificial Organs and Bionics Market to Hit US\$ 50.7 Billion by 2030. PR Newswire, 2026.
- Global Market Insights. Artificial Organs Market Outlook 2034, 2025.
- Mordor Intelligence. Artificial Organ Market Size & Share Analysis, 2026.
- Precedence Research. Artificial Organs and Bionics Market 2026–2035, 2026.
- Fact.MR. Artificial Organs and Bionics Market Report, 2026.
- Duke University School of Medicine. New-Generation Artificial Heart Implanted in Patient at Duke — First in U.S., 2024.
- Frontiers in Materials. 3D Bioprinted Scaffolds for Tissue Repair and Regeneration, 2022.

U.S. SEC filing (bioprinted organ replacement process overview), 2023.

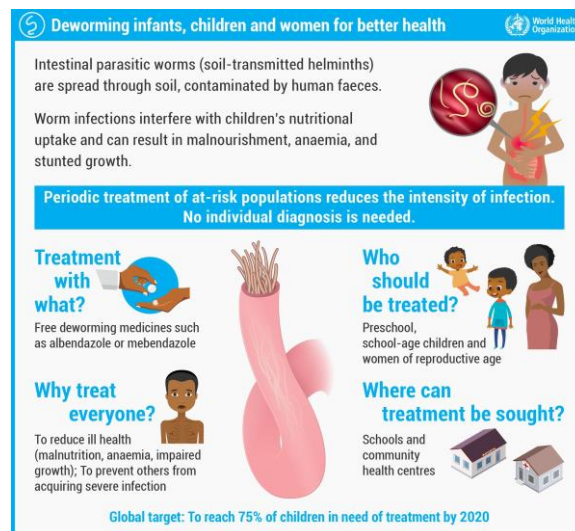
STAT News. The dream of 3-D-printed organs rests on keeping cells alive, 2016.

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Periodic deworming of at-risk groups, combined with better hygiene, breaks the cycle of worm infection. (WHO infographic, editorial use)

A Story to Begin With

In a village where the river bends around the maize fields, seven-year-old Amina wakes with a stomachache that has become as routine as the sunrise. She is small for her age — her classmates call her “little sister” though some are younger — and by mid-morning her energy has drained away like water through sand. Her mother gives her herbs and waits. Nobody in the village has ever told her that the worms stealing her daughter’s growth arrived through bare feet on the path to the well, through unwashed hands, through lettuce rinsed in river water. They are, in truth, unwelcome guests invited in by the simplest gaps in daily hygiene.

Amina's story, a composite drawn from villages across three continents, is the story of more than a billion people worldwide who carry soil-transmitted intestinal worms at this very moment. The remarkable thing about helminthic diseases is not that they are mysterious — they are among the best understood infections on earth — but that they persist almost entirely because of preventable failures of cleanliness. This article follows Amina's village through those failures and their fixes: the handwashing, safe water, sanitation, food hygiene, and deworming that together can erase this ancient burden.

What Are Helminthic Diseases?

Helminths are parasitic worms, and the diseases they cause are called helminthic infections. The most common are the soil-transmitted helminths: the large roundworm (*Ascaris lumbricoides*), the whipworm (*Trichuris trichiura*), and the hookworms (*Necator americanus* and *Ancylostoma duodenale*). Alongside them travel schistosomiasis, spread by freshwater snails; the tapeworms, often acquired from undercooked pork, beef, or fish; and strongyloidiasis, a stealthy roundworm of warm climates. Most of these worms share a strategy: their eggs or larvae leave the human body in feces, mature in soil or water, and wait patiently for the next pair of bare feet, unwashed hands, or contaminated food to carry them home.

Infection	Main Worm	How It Reaches People
Soil-transmitted helminthiasis	Roundworm, whipworm, hookworm	Eggs in soil contaminate hands, food, or bare feet; hookworm larvae pierce the skin
Schistosomiasis (bilharzia)	Schistosoma blood flukes	Larvae released by freshwater snails penetrate the skin during bathing, washing, or fishing
Taeniasis (tapeworm)	Pork, beef, and fish tapeworms	Eating undercooked meat or fish containing larval cysts
Strongyloidiasis	Strongyloides stercoralis	Larvae in soil penetrate bare skin, often of farmworkers

Table 1. The major helminthic diseases and the routes by which they infect human hosts.

The Hidden Toll

A worm infection is rarely dramatic. No fever, no rash, no warning — just a slow, quiet tax on the body. The worms rob the host of nutrients, blood, and appetite. In children,

the consequences compound over years: anemia, stunted growth, impaired memory and school performance, and a stubborn cycle of poverty in which sick children become less educated and less productive adults. Hookworms alone can drain enough blood to cause profound iron-deficiency anemia, while heavy roundworm burdens can twist the intestine into a surgical emergency. The global cost is staggering: hundreds of millions of children needing treatment, and billions of dollars in lost productivity each year. Yet because the damage accumulates invisibly, these diseases rarely make headlines. They are, in the words of one public health worker, “the silent harvest” — reaped quietly, season after season.

Breaking the Transmission Cycle

Every helminth story is, at bottom, a story about feces. Break the journey from one person’s stool to another person’s mouth or skin, and the worms’ life cycle collapses. That is why hygiene and sanitation — not hospitals, not miracles — are the true front line. Health workers speak of a handful of high-impact habits: washing hands with soap at critical moments, using toilets and keeping them clean, treating drinking water, washing and cooking food properly, wearing shoes, and periodic deworming as a safety net. None of these requires wealth. All of them require habit, education, and infrastructure working together.

Handwashing: The Twenty-Second Shield

If public health had to crown a single intervention, handwashing with soap would wear the crown. The critical moments are well known: after using the toilet, after cleaning a child, before preparing food, and before eating. Twenty seconds of lathering — long enough to sing “Happy Birthday” twice — removes eggs before they can reach the mouth. The barrier is cost barely at all: where soap exists, studies show people often rinse with water alone, which removes far fewer eggs. In Amina’s village, the schoolteacher now leads the children in a handwashing song at lunch; within a year, the clinic nurse reports fewer stomach complaints and better-attended classes. Soap, water, and habit: it is almost embarrassingly simple, and it works.



Teaching children to wash with soap at critical moments is among the most cost-effective health interventions known. (Photo: editorial use)

Safe Water and the Dignity of a Toilet

Handwashing needs water that people can trust. Protected wells, boreholes, and piped supplies keep human waste away from drinking sources; where water must be carried, storing it in narrow-mouthed, covered containers stops contamination at home. Boiling, chlorination, filtration, or solar disinfection finish the job where the source is doubtful. Equally decisive is what happens on the other end of digestion. A latrine that safely contains feces — ventilated, covered, and cleaned — is the single biggest blow a community can strike against soil-transmitted worms. Open defecation, by contrast, scatters eggs across fields, paths, and play areas, turning the entire village into a transmission site. The mathematics are blunt: every household that adopts a safe toilet breaks one link in the chain, and when coverage passes a tipping point, transmission collapses across the whole community. Health programs have learned that toilets only get built and used when communities lead the effort themselves — when a latrine is a source of pride, not just a hole in the ground.



A safe, covered latrine keeps worm eggs out of soil and water — the foundation of community-wide prevention. (Photo: editorial use)

Food Hygiene: The Last Line of Defense

Even careful households can be undone at the kitchen garden. Vegetables fertilized with untreated night soil or irrigated with contaminated water carry eggs to the plate; salads and raw produce are the classic culprits. Thorough washing with clean running water, peeling root vegetables, and cooking food to safe temperatures destroy the danger. Fish and meat deserve special respect: pork and freshwater fish must be cooked through, since tapeworm larvae die only with heat. In practice, this means simple kitchen disciplines — separate boards for raw and cooked food, covered dishes against flies, and the refusal to serve raw greens washed in river water. Food hygiene is the final checkpoint between the contaminated world and the human body.

Barrier	Practical Action	Infections Blocked
Hands carry eggs to the mouth	Wash with soap after toileting, before food, after handling soil or children	All soil-transmitted helminths
Bare feet meet larvae in soil	Wear shoes or sandals outdoors; keep play areas free of fecal contamination	Hookworm, strongyloidiasis
Contaminated water and produce	Treat drinking water; wash, peel, and cook vegetables; cook meat and fish thoroughly	Roundworm, whipworm, tapeworm
Skin contact with infested freshwater	Avoid bathing or washing in snail-infested water; use safe sources for laundry	Schistosomiasis
Untreated human waste in the open	Use and maintain latrines; end open defecation community-wide	All fecal-orally transmitted worms

Table 2. Five barriers in the worms' path — and the everyday habits that close them.

Deworming: The Safety Net Beneath It All

Hygiene and sanitation are the walls; deworming is the safety net beneath. Because habits change slowly and infrastructure takes years, the World Health Organization recommends periodic treatment with safe, inexpensive drugs — principally albendazole and mebendazole — for children, women of reproductive age, and other high-risk groups, often delivered through schools. A single tablet, swallowed twice a year in endemic areas, sharply reduces the worm burden, reverses anemia, and buys children the growth and schooling that long-term prevention will then protect. Mass deworming days have become celebrated fixtures on national health calendars, and their logic is deliberately modest: treat everyone at risk, because testing each child costs more than treating them all. Deworming alone is not a solution — without sanitation, reinfection follows within months — but combined with hygiene education and latrine coverage, it has helped entire regions drive infection rates down for good.



Washing produce with clean water — and cooking food thoroughly — closes the final route worms use to reach the body. (Photo: FDA, editorial use)

Myths That Keep Worms Alive

Myth	Reality
“Worms are a normal part of childhood.”	They are common in poor settings, but never harmless or inevitable — they cause anemia, stunting, and lost schooling.
“Rinsing hands with water is enough.”	Water alone removes few eggs; soap and friction are what make handwashing protective.
“Only dirty places have worms.”	Infection follows contamination, not appearance — well-kept homes can harbor eggs in soil and produce.
“Deworming once cures you forever.”	Medication clears current worms, but reinfection returns within months where sanitation gaps remain.
“Latrines are a luxury.”	A safe toilet is among the cheapest health technologies per life improved — cheaper than the worms it prevents.

Table 3. Persistent myths about worm infections — and the facts that retire them.

A Closing Note: The Harvest We Can Refuse

Amina is ten now. The clinic’s deworming day found her two years ago, and the village now counts a score of new latrines along the path to the well. Her mother washes the lettuce in water from the covered barrel, and Amina owns her first pair of shoes. She has grown nine centimeters and no longer sleeps through the afternoon lessons. None of this required a hospital, a laboratory, or great wealth — only the slow, stubborn work of clean habits and shared infrastructure.

Helminthic diseases are sometimes called diseases of poverty, but they are more precisely diseases of broken cycles — cycles that handwashing, safe water, sanitation, food hygiene, and deworming can mend at astonishingly low cost. The worms have survived for millennia on one simple strategy: waiting for us to forget. The answer has always been equally simple, and entirely human: soap, shoes, toilets, clean water, cooked food, and communities that refuse, together, to be harvested.

References and Further Reading

World Health Organization. Soil-Transmitted Helminth Infections: Fact Sheet.

Geneva: WHO, 2024. www.who.int

World Health Organization. Guideline: Preventive Chemotherapy to Control Soil-Transmitted Helminth Infections in At-Risk Population Groups. Geneva: WHO, 2017.

Centers for Disease Control and Prevention (CDC). Parasites – Soil-Transmitted Helminths. www.cdc.gov

Prüss-Ustün, A., et al. Burden of disease from inadequate water, sanitation and hygiene for selected adverse health outcomes. Geneva: WHO, 2019.

Curtis, V., Cairncross, S., & Yonli, R. Domestic hygiene and diarrhoea – pinpointing the problem. *Tropical Medicine & International Health*, 2000; 5(1): 22–32.

Note: This article is an original narrative work written for educational purposes. The vignette of “Amina” is a composite and describes no real individual. Images are reproduced for editorial purposes with source attribution in captions.

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Abstract

Modern life has quietly engineered movement out of the day. The average working adult now spends the majority of waking hours seated — at desks, in vehicles, and before screens — and a large body of evidence suggests this sedentary behavior carries a cardiovascular bill that exercise alone may not fully pay. This narrative review examines the relationship between prolonged sitting and the major risk factors for cardiovascular disease, including hypertension, dyslipidemia, insulin resistance, obesity, and endothelial dysfunction. Synthesizing landmark systematic reviews, meta-analyses of cohort studies, experimental interruption trials, and the World Health Organization's 2020 guidelines on physical activity and sedentary behaviour, the article traces the epidemiological association between sitting time and cardiovascular morbidity and mortality, explores the physiological mechanisms linking sedentary hours to metabolic harm, and evaluates evidence that regular physical activity attenuates — though may not wholly eliminate — this risk. Finally, it outlines practical, evidence-aligned strategies for individuals and workplaces to displace sitting with movement of any intensity. The central message is at once cautionary and hopeful: the chair is a modifiable risk factor, and the remedy begins with simply standing up.

Keywords: *sedentary behavior; prolonged sitting; cardiovascular disease; physical inactivity; hypertension; insulin resistance; metabolic health; public health*

1. Introduction

Daniel is fifty-two, a project manager who has never smoked, drinks little, and walks the dog most evenings. At his annual checkup he learns his blood pressure is 148 over 92, his fasting glucose is drifting upward, and his triglycerides have climbed into the borderline range. His doctor asks about exercise; Daniel lists the dog walks, indignant.

What neither man fully articulates is what fills the rest of Daniel's day: eleven hours, nearly every day, spent seated — the commute, the desk, the conference calls, the couch. His evenings of virtue cannot, it turns out, entirely redeem his days of stillness.

Daniel is a composite, but his pattern is now the statistical norm. Across industrialized and increasingly urbanizing societies, time spent sitting has risen steadily while occupational and domestic physical activity has declined. In 2020, for the first time, the World Health Organization issued guidelines that formally addressed sedentary behavior alongside physical activity, recommending that adults limit time spent sedentary and replace it with activity of any intensity. The shift marked a conceptual turning point in preventive cardiology: not exercising is one risk factor, but sitting itself — independent of exercise — appears to be another. This article traces the evidence linking the chair to the heart, from population studies to the physiology of an unmoving body, and asks what can be done about it.



*The modern working day: desk workers accumulate months of seated time each year.
(Photo: editorial use)*

2. Literature Review

2.1 Defining the exposure. Sedentary behavior is defined as any waking activity performed while sitting or reclining with energy expenditure at or below 1.5 metabolic equivalents — essentially, the body at rest. This definition matters because it separates “not exercising” from “sitting”: a person can meet the weekly exercise guideline and still accumulate nine sedentary hours daily, a pattern researchers call the “active couch potato.” Television time, screen time, commuting, and occupational sitting are the most commonly measured domains, and each has been independently associated with cardiometabolic harm.

2.2 The epidemiological signal. Systematic reviews have converted a suspicion into a consistent statistical signal. A landmark meta-analysis in *Diabetologia* pooling eighteen studies found that prolonged sedentary time was significantly associated with type 2 diabetes, cardiovascular events, and cardiovascular and all-cause mortality. A later analysis in the *Annals of Internal Medicine* encompassing dozens of studies reported

dose-response relationships: the greater the daily sitting time, the higher the incidence of cardiovascular disease and death, even after adjustment for physical activity in many models. Most influentially, a harmonized meta-analysis of more than one million adults, published in *The Lancet*, found that high volumes of moderate-to-vigorous physical activity — around sixty to seventy-five minutes daily — substantially attenuated the mortality risk associated with long sitting time, though the association was not eliminated at the very highest sitting durations.

Study (Year)	Design	Key Finding
Wilmot et al., <i>Diabetologia</i> (2012)	Meta-analysis of 18 studies, ~800,000 participants	Prolonged sitting associated with ~2-fold higher risk of diabetes, and higher risk of CVD events and death
Biswas et al., <i>Ann. Intern. Med.</i> (2015)	Meta-analysis of 47 studies	Sedentary time dose-dependently associated with CVD incidence, CVD mortality, and all-cause mortality
Ekelund et al., <i>The Lancet</i> (2016)	Harmonized meta-analysis, >1 million adults	60–75 min/day of moderate activity attenuated, but at highest sitting levels did not fully remove, mortality risk
Dunstan et al., <i>Diabetes Care</i> (2012)	Experimental crossover trial	Interrupting sitting with 2-min light-activity breaks lowered post-meal glucose and insulin
WHO Guidelines (2020)	Expert evidence review	First global recommendation to limit sedentary time and replace it with activity of any intensity

Table 1. Landmark studies linking sedentary behavior to cardiovascular outcomes.

2.3 How sitting hurts the heart. The mechanisms are best understood as the consequences of switched-off muscles. Skeletal muscle is the body's largest consumer of glucose and triglycerides; when large muscle groups fall silent for hours, post-meal glucose and lipid particles linger in the bloodstream longer than they should, feeding insulin resistance and atherogenic dyslipidemia. Endothelial function suffers as well: intermittent muscle activity normally creates pulses of blood-flow shear stress that signal blood vessels to dilate and stay healthy, and continuous sitting silences that signal, promoting endothelial dysfunction — the earliest step toward atherosclerosis. Chronic low-grade inflammation rises, sympathetic tone creeps upward nudging blood

pressure, and leg muscle's ability to clear fats from circulation declines. Crucially, experimental studies show these changes begin within hours, not years: a single bout of prolonged sitting measurably worsens postprandial metabolism in otherwise healthy young adults.

Risk Factor	Effect of Prolonged Sitting	Underlying Mechanism
Hypertension	Modest acute BP elevation; association with chronic hypertension	Reduced shear stress, sympathetic activation, impaired vascular tone
Dyslipidemia	Lower HDL, raised triglycerides	Reduced lipoprotein lipase activity in inactive muscle
Insulin resistance / diabetes	Higher post-meal glucose and insulin; elevated T2DM risk	Muscle silence blunts glucose uptake; lipid spillover
Obesity	Weight gain independent of exercise in some studies	Reduced total daily energy expenditure
Endothelial dysfunction	Impaired flow-mediated dilation after sitting bouts	Loss of pulsatile shear stress on vessel walls
Inflammation / thrombosis	Raised inflammatory markers; sluggish venous flow	Chronic low-grade inflammation; venous stasis

Table 2. Major cardiovascular risk factors and the pathways through which prolonged sitting worsens them.



*The heart and vessels respond to what the muscles do — or fail to do — hour by hour.
(Illustration: editorial use)*

2.4 Breaking up the day. If continuous sitting is the toxin, interruption may be part of the antidote. Experimental work led by Dunstan and colleagues showed that in adults

with overweight or obesity, simply standing and walking lightly for two minutes every twenty minutes reduced post-meal glucose and insulin responses by roughly twenty to thirty percent compared with uninterrupted sitting. Subsequent trials and review-level evidence support the same theme: total sedentary time matters, but the pattern of that time — broken or unbroken — matters too. This finding reframes prevention: the goal is not merely more exercise, but a different architecture of the entire day, dotted with standing, strolling, stair-climbing, and household movement.



Active workstations — sit-stand desks, desk cycles, walking pads — restructure the sedentary day from within. (Photo: editorial use)

3. Methodology

This article is a narrative review synthesizing published evidence on sedentary behavior and cardiovascular risk. Literature was identified through structured searches of PubMed and the WHO publication database using combinations of the terms “sedentary behavior,” “prolonged sitting,” “sitting time,” “cardiovascular disease,” and “metabolic risk,” supplemented by citation chaining from retrieved papers. Priority was given to the highest tiers of evidence: systematic reviews and meta-analyses of prospective cohort studies, large harmonized pooled analyses, experimental crossover trials examining sitting interruption, and the WHO’s 2020 evidence review underpinning its first sedentary behavior recommendations. Eligible sources addressed adult populations, reported cardiovascular outcomes or intermediate risk factors (blood pressure, glucose homeostasis, lipids, endothelial function, adiposity), and were published in peer-reviewed journals or as WHO technical guidance between 2009 and 2025. Findings were synthesized thematically into three strands — epidemiological association, physiological mechanism, and intervention evidence — and interpreted alongside a composite clinical vignette constructed for illustrative purposes. As a

narrative rather than systematic review, no formal risk-of-bias scoring or quantitative pooling was performed, and conclusions should be read accordingly.

4. Discussion and Conclusion

The evidence assembled here carries a deceptively simple message: the human body was negotiated, over millennia, as a machine that moves, and hours of uninterrupted stillness violate the contract. The epidemiology links sitting to the full cluster of cardiovascular risk factors; the physiology explains how silence in the muscles becomes stress in the vessels; the interruption trials hint that the damage is partly reversible in real time. Yet the science also counsels proportion. The Lancet analysis found that people who exercise enough — an hour or more of moderate activity daily — largely blunt the mortality risk of their seated hours, and the WHO's central principle remains that some activity is better than none. Sitting is a dose, not a destiny.

For Daniel, the prescription was disarmingly practical, and it did not begin with a gym membership. He took phone calls standing, moved the printer across the office so every page became a short walk, set a quiet timer to stand for two minutes each half-hour, and traded thirty evening minutes of television for a brisk loop of the neighborhood with the dog — walk kept, stakes raised. His blood pressure six months later: 132 over 84. Anecdote, yes — but an anecdote that now stands on an empirical foundation.

Strategy	How to Implement	Evidence Note
Interrupt sitting regularly	Stand or walk 2–3 min every 30 min; set reminders	Improves post-meal glucose and insulin in trials
Adopt a sit-stand desk	Alternate sitting and standing across the day	Reduces total sitting time in workplace studies
Walk more, drive less	Brisk 10-min walks; stairs; park farther away	Any-intensity movement counts toward WHO targets
Meet and call on your feet	Stand for phone calls and walking meetings	Light activity accumulates across the day
Reach 150–300 min weekly	Moderate activity (brisk walking counts) most days	Attenuates sitting-associated CVD and mortality risk

Table 3. Practical countermeasures for restructuring a sedentary day.

At population scale, the implications run through urban planning, workplace policy, and school design — cities built for cars and offices built for chairs are, in effect,

cardiovascular risk factors poured in concrete. The remedy is equally architectural: walkable streets, active transit, standing-friendly workplaces, and a cultural permission slip to move. The chair, after all, is the most used piece of medical equipment nobody prescribed. The evidence now suggests it is time to discharge it — or at least, to keep getting up.



The antidote is humble: regular brisk walking and a day punctuated by movement of any intensity. (Photo: editorial use)

References

1. World Health Organization. WHO Guidelines on Physical Activity and Sedentary Behaviour. Geneva: WHO, 2020.
2. Bull FC, Al-Ansari SS, Biddle S, et al. World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *British Journal of Sports Medicine*. 2020;54(24):1451–1462.
3. Wilmot EG, Edwardson CL, Achana FA, et al. Sedentary time in adults and the association with diabetes, cardiovascular disease and death: systematic review and meta-analysis. *Diabetologia*. 2012;55(11):2895–2905.
4. Biswas A, Oh PI, Faulkner GE, et al. Sedentary time and its association with risk for disease incidence, mortality, and hospitalization in adults: a systematic review and meta-analysis. *Annals of Internal Medicine*. 2015;162(2):123–132.
5. Ekelund U, Steene-Johannessen J, Brown WJ, et al. Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonised meta-analysis of data from more than 1 million men and women. *The Lancet*. 2016;388(10051):1302–1310.
6. Dunstan DW, Kingwell BA, Larsen R, et al. Breaking up prolonged sitting reduces postprandial glucose and insulin responses. *Diabetes Care*. 2012;35(5):976–983.
7. Owen N, Bauman A, Brown W. Too much sitting: a novel and important predictor of chronic disease risk? *British Journal of Sports Medicine*. 2009;43(2):81–83.

8. Young DR, Hivert MF, Alhassan S, et al. Sedentary behavior and cardiovascular morbidity and mortality: a science advisory from the American Heart Association. *Circulation*. 2016;134(13):e262–e279.

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Abstract

Few medical interventions have saved more lives than vaccination, and few have been asked to defend themselves more often. Adverse events following immunization (AEFIs) are real, sometimes serious, and always emotionally charged; yet the gap between what is reported after a vaccine and what is caused by a vaccine remains one of the most misunderstood distinctions in public health. This narrative review examines how vaccine adverse effects are defined, classified, detected, and communicated, drawing on the World Health Organization's revised AEFI causality framework, passive and active surveillance systems such as VAERS and the Vaccine Safety Datalink, and the published literature on the most discussed vaccine safety controversies of the past five decades. We outline the true frequency of common and serious reactions, explain why raw reports of adverse events cannot be read as proof of causation, and analyse the psychological and social mechanisms that convert coincidence into conviction. We argue that honest acknowledgement of genuine risks, transparent surveillance, and empathetic communication are not the enemies of vaccine confidence but its foundations. The evidence supports a clear conclusion: vaccines are among the most closely monitored medical products in existence, their serious adverse effects are rare, measurable, and—critically—knowable, and fear thrives only where facts are withheld.

Keywords: vaccine safety; adverse events following immunization (AEFI); pharmacovigilance; VAERS; causality assessment; vaccine hesitancy; nocebo effect

1. Introduction

In the first month of the American COVID-19 vaccination campaign, 13.8 million doses were administered. More than thirteen million people woke the next morning with a sore arm; some had fever, chills, or a day in bed. A small number—roughly five per million vaccinated—experienced anaphylaxis, a severe allergic reaction that demands immediate treatment and, in nearly every case, resolves completely. Meanwhile, on public reporting dashboards, every death that occurred after vaccination was visible to anyone with an internet connection: a heart attack in a care home resident three weeks after her second dose, a stroke in a man whose vaccine had nothing to do with his platelets. To the epidemiologist, these entries are signals to be investigated, most destined to be explained by time and coincidence. To the frightened parent scrolling at midnight, each one reads as a confession.

This asymmetry—between how adverse events are recorded and how they are perceived—is the subject of this article. Vaccines are given to healthy people, often to healthy children, which makes any subsequent misfortune feel like an accusation. And vaccines are given precisely when disease is absent, which guarantees that some recipients will fall ill shortly after injection for reasons unrelated to it. A child who develops leukaemia months after her measles shot, an elderly man whose cancer announces itself the week after his influenza vaccine—these tragedies are real, but their timing is a statistical certainty, not a pharmaceutical crime. Understanding that distinction, and learning to hold both truths at once—that vaccines can cause genuine harm in rare individuals and that the overwhelming majority of reported harms are coincidental—is the intellectual core of vaccine safety.

2. Defining the Problem: What an AEFI Is—and What It Is Not

The World Health Organization defines an adverse event following immunization as any untoward medical occurrence that follows immunization, which does not necessarily have a causal relationship with the vaccine. That final clause is the entire game. An AEFI is a temporal observation: something happened after a shot. Whether the vaccine caused it, contributed to it, or merely kept company with it is a separate question that demands investigation, not assumption. The WHO's revised causality assessment manual, introduced after review by the Global Advisory Committee on Vaccine Safety, recognises four broad possibilities. First, the event may be consistent with a causal association to immunization—either a vaccine product-related reaction (an inherent property, such as fever from an immune response), a quality defect (a manufacturing problem with a specific lot), an immunization error (preventable mishandling, such as reconstitution with the wrong diluent), or an anxiety-related

reaction, now termed an immunization-triggered stress response—the fainting and hyperventilation that fear itself produces. Second, the association may be indeterminate: the timing fits but the evidence does not yet. Third—and most commonly for dramatic events—the association may be inconsistent, meaning coincidental: the person would have become ill anyway, and the vaccine simply provided a memorable date. Fourth, the case may be unclassifiable for lack of information. Table 1 summarises this framework.

Category	Meaning and examples
A1 — Vaccine product-related reaction	Caused by an inherent property of the vaccine even when correctly prepared and given. Examples: fever, injection-site swelling, malaise; live-vaccine rash after varicella; vaccine-associated paralytic poliomyelitis after oral polio vaccine (~1 case per 2–3 million doses).
A2 — Vaccine quality defect-related reaction	Caused by a manufacturing defect in a lot or batch (e.g., contamination, potency failure). Trigger for lot recall and international alert.
A3 — Immunization error-related reaction	Preventable mishandling, prescribing, or administration: wrong diluent, unsterile technique, wrong route or site. Managed by training and protocol, not by distrust of the vaccine itself.
A4 — Immunization anxiety-related reaction (ITSR)	Stress response to the act of immunization: vasovagal fainting, breath-holding, hyperventilation. Common in adolescents; clusters are usually driven by social contagion of fear.
B — Indeterminate	Timing is consistent but evidence is insufficient (B1) or conflicting (B2). These cases feed signal-detection systems and may prompt further study.

C — Coincidental event	Caused by something other than vaccine, error, or anxiety. A seizure from an underlying seizure disorder, a cardiac event from pre-existing disease. Statistically the largest category for serious events.
D — Unclassifiable	Inadequate information to judge causality at all.

Table 1. The WHO revised AEFI causality classification (categories A–D).

3. What Reactions Actually Occur—and How Often

Honesty begins with numbers. Mild, short-lived reactions are common and are, in fact, the visible signature of an immune system doing its job: local pain, redness, and swelling at the injection site, with systemic symptoms such as low-grade fever, headache, fatigue, and muscle ache. In the CDC's first-month analysis of mRNA COVID-19 vaccines, headache (22.4%), fatigue (16.5%), and dizziness (16.5%) were the most frequently reported symptoms—and 90.8% of all reports were classified as non-serious. These events are expected, self-limiting, and far preferable to the diseases they signal protection against.

Serious events are a different order of rarity. Anaphylaxis—the event that dominates public imagination—occurs after roughly 1 to 5 doses per million administered for most vaccines; a Vaccine Safety Datalink study found rates ranging from 1.53 per million for influenza to 6.58 per million for live zoster vaccine. To put that in perspective, a person is more likely to be struck by lightning in a given year than to suffer vaccine anaphylaxis in a given dose. Other genuinely causal serious events are equally exceptional: febrile seizures after measles-containing vaccines occur in roughly 1 in 3,000 to 4,000 vaccinated children and carry an excellent prognosis; Guillain–Barré syndrome after influenza vaccination, when it occurs at all, adds on the order of one to two excess cases per million doses—a risk dwarfed by the neurological complications of influenza itself. Table 2 assembles the best available figures for commonly discussed reactions.

Context, not the bare number, is what separates fact from fear. Myocarditis after mRNA COVID-19 vaccination is real: it occurs predominantly in young males after the second dose, at rates peaking around 50 to 70 per million in the highest-risk group, and almost

all cases are mild and recover fully. But COVID-19 infection itself causes myocarditis at roughly six times that rate, in addition to its other dangers. Fear isolates a numerator; medicine weighs it against the denominator of disease risk that vaccination exists to prevent.

Event	Approximate frequency	Interpretation
Pain, redness, swelling at injection site; low-grade fever, fatigue	Very common (roughly 10–80% by vaccine)	Expected immune response; self-limiting within 1–3 days.
Fainting (vasovagal), especially in adolescents	Common; minutes after injection	Anxiety/stress response (A4), not a vaccine toxicity; observe 15 minutes post-vaccination.
Febrile seizure after measles-containing vaccine	~1 per 3,000–4,000 vaccinated children	Causal (A1), frightening but benign; risk from measles infection is far higher.
Anaphylaxis	~1.5–6.6 per million doses (varies by vaccine)	Causal (A1), treatable; contraindicates future doses of that vaccine.
Guillain–Barré syndrome after influenza vaccine	~1–2 excess cases per million doses in at-risk seasons	Causal in some seasons; influenza infection itself carries higher GBS risk.
Vaccine-associated paralytic polio (oral polio vaccine)	~1 per 2–3 million doses	Reason wealthy nations switched to inactivated vaccine; a live-vaccine property, not an error.
mRNA COVID-19 vaccine myocarditis	Up to ~50–70 per million in young males after dose 2	Causal (A1); mostly mild; COVID-19 infection confers several-fold higher myocarditis risk.
Thrombosis with thrombocytopenia	~1–2 per 100,000 first doses (product-specific)	Rare causal signal detected by surveillance and acted on: product

(adenovirus COVID-19 vaccines)		restricted/withdrawn in many countries—proof the system works.
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Table 2. Frequently discussed adverse events following immunization: frequency and correct interpretation.

4. How We Know: Surveillance Systems and the Discipline of "Maybe"

Modern vaccine safety rests on a two-storey architecture of surveillance. The ground floor is passive: systems like the Vaccine Adverse Event Reporting System in the United States, or the WHO's global database, accept reports from anyone—physicians, nurses, patients, lawyers—about anything that happened after vaccination. Their strength is sensitivity and speed; their weakness is noise. A famous illustration: among the first 1,266 reports after the Moderna COVID-19 vaccine, reviewers flagged 108 for scrutiny and confirmed 10 true cases of anaphylaxis—each one valuable, but none discoverable without wading through a thousand-plus reports of unrelated events. Studies of VAERS capture for serious outcomes show it detects between 13% and 76% of true anaphylaxis cases and 12% to 64% of Guillain–Barré cases—useful for finding signals, useless for measuring rates, and categorically unable, by itself, to prove causation.

The upper storey is active surveillance: systems like the Vaccine Safety Datalink, which follows more than ten million vaccinated people in electronic health records, compares event rates in the days after vaccination with background rates in the same population, and can detect a signal of roughly one extra case per hundred thousand doses within weeks. It was this machinery that identified intussusception after the first rotavirus vaccine in 1999 (prompting its withdrawal within months), confirmed the safety of the replacement, and later quantified the rare clotting disorder linked to adenoviral COVID-19 vaccines. The record deserves emphasis: when vaccines have caused genuine harm, surveillance found it—measurably, publicly, and fast. The same cannot yet be said for every drug in the pharmacy. In pharmacovigilance, "maybe" is not evasion; it is the working hypothesis from which every confirmed finding and every cleared suspicion is born.



Figure 1. Proper vaccine preparation by a trained healthcare worker—technique, cold chain, and protocol adherence are the controllable determinants of injection safety. (Image: Salud America.)

5. Lessons from the Fear Archives

History offers a syllabus of instructive errors. The 1976 swine-flu campaign vaccinated 45 million Americans against a pandemic that never arrived, and recorded an excess of Guillain–Barré syndrome of roughly one case per 100,000 recipients—real, acknowledged, and still debated in its exact magnitude. The episode taught both humility and method: rare risks can hide in millions of doses, and surveillance must be ready before campaigns begin. The thiomersal controversy of the 1990s—alleged mercury poisoning from a preservative—led to its precautionary removal from most childhood vaccines despite no evidence of harm, and years of subsequent research found no link to neurodevelopmental disorders; autism rates did not fall where thiomersal was removed, because it was never the cause. And then there is the deepest scar: the 1998 Wakefield paper claiming an MMR–autism link, based on twelve children, later shown to be fraudulent, fully retracted in 2010, and its author struck from the medical register—yet the paper still measurably depresses MMR uptake a quarter-century later, and measles, declared eliminated in the Americas in 2016, has returned. One false fact, endlessly replicated, can outlive the corrections by decades.

The pandemic added new chapters. The adenovirus-vector clotting syndrome—detected, characterised, and communicated within weeks of first reports, with products withdrawn or restricted across Europe and North America—demonstrated surveillance functioning in real time, though public communication initially fumbled the trade-off between speed and clarity. Meanwhile, claims circulating online that millions were dying from COVID-19 vaccines collapsed under basic arithmetic: vaccinated

populations include everyone, including people who will die of other causes in a given month, and large cohort studies consistently found vaccinated people died less often of every cause, not more. Fear offers vivid anecdotes; epidemiology answers with denominators.



Figure 2. Childhood immunization with parental support—trust between families and vaccinators is built in moments like this, one honest conversation at a time. (Image: CHRISTUS Health.)

6. The Psychology of the Sore Arm: Why Fear Outruns Fact

None of this makes vaccine fear stupid; it makes it human. Adverse events are processed through cognitive machinery that systematically distorts risk. The availability heuristic ensures that a single vivid story of harm—"my cousin's friend's baby"—outweighs an abstract million-dose statistic. Negativity bias and loss aversion mean a rare harm looms larger than a common prevented one, even when the arithmetic favours vaccination overwhelmingly. Confirmation bias then seals the loop: believers of harm collect confirming anecdotes, doubters collect reassuring studies, and neither group reads the other's evidence. Layered on top is the nocebo effect—the dark twin of the placebo—expectation itself producing symptoms. In blinded crossover studies of COVID-19 vaccines, a striking proportion of reported "side effects" after the real vaccine also appeared after the saline placebo dose; expectation, not adjuvant, made those arms ache. Finally, social media monetises outrage: fear spreads faster than correction, and the algorithm does not distinguish between a pharmacovigilance signal and a conspiracy theory. Understanding these mechanisms is not condescension; it is the necessary foundation for communication that works.

7. The Clinical Conversation: Acknowledge, Quantify, Compare

The evidence converges on a communicative trilogy. Acknowledge: begin with what is true—"Yes, this vaccine can cause a fever, and very rarely something serious. Let me tell you exactly how rare, and what we do about it." Dismissing risk corrodes trust; naming it builds it. Quantify: translate abstractions into concrete comparisons—"about one in a million, roughly the chance of being struck by lightning"—because people, reasonably, do not reason in per-million units. Compare: every vaccine risk must be weighed against the risk of the disease, which for measles includes pneumonia, encephalitis, and death at rates hundreds or thousands of times higher than any vaccine harm. Practically, clinicians should also observe patients for fifteen minutes after injection (catching the rare anaphylaxis and the common faint), keep adrenaline accessible, report every serious event through national systems, and treat hesitancy as a clinical encounter rather than a character flaw. The research is consistent that the most trusted messenger is still the family physician or nurse who listens first, and prescribes second.

8. Conclusion

The question in this article's title resolves into a quiet, defensible position. Facts: vaccines cause adverse effects—common and mild in most recipients, rare and serious in a few per million—and these effects are among the most intensively measured phenomena in medicine, tracked by passive systems that listen to everyone and active systems that count everything. Fear: thrives on the confusion between after and because, on anecdotes that outrun denominators, on retracted papers that refuse to die, and on communicators who either hide risks or exaggerate them. Separating the two requires no special courage—only the discipline to ask "how many, out of how many, compared with what?" of every alarming claim. Vaccination will always involve a needle, a moment of trust, and a small, honest discomfort. What it should never involve is fear of the unknown, for in vaccine safety, remarkably little is unknown. The facts, patiently told, are the strongest antidote we possess.

References

1. World Health Organization. Causality assessment of an adverse event following immunization (AEFI): user manual for the revised WHO classification. 2nd ed. Geneva: WHO; 2018.
2. Miller ER, McNeil MM, Moro PL, Broder KR, Hibbs B. The reporting sensitivity of the Vaccine Adverse Event Reporting System (VAERS) for anaphylaxis and for Guillain-Barré syndrome. *Vaccine*. 2020;38(46):7458–7465.

3. Gargano LM, Wallace M, Hadler SC, et al. Use of mRNA COVID-19 vaccine after reports of myocarditis among vaccine recipients: update from ACIP—United States, June 2021. *MMWR Morb Mortal Wkly Rep.* 2021;70(27):977–982.
4. Goss AL, Samudralwar RD, Das RR, Nath A. ANA investigates: neurological complications of COVID-19 vaccines. *Ann Neurol.* 2021;89(5):856–857.
5. Krishnamoorthy S, Shukla S, Paul MJ, Saravanan S. Vaccine hesitancy: a major challenge in COVID-19 vaccination program. *Community Med Health Educ.* 2021;11(8):695.
6. Ross AG, Olds GR, Cripps AW, Farrar JJ, McMillan NAJ. Herd protection against *Haemophilus influenzae* type b. *Vaccine.* 2023;41(1):1–5.
7. Institute of Medicine. Adverse events associated with childhood vaccines: evidence bearing on causality. Washington, DC: National Academies Press; 1994.
8. Orenstein WA, Ahmed R. Simply put: vaccination saves lives. *Proc Natl Acad Sci USA.* 2017;114(16):4031–4033.
9. Public Health Agency of Canada. Canadian immunization guide—adverse events following immunization. Ottawa; 2021.
10. Johns Hopkins Bloomberg School of Public Health. What VAERS is (and isn't). 2022.
11. CDC COVID-19 Response Team. First month of COVID-19 vaccine safety monitoring—United States, December 14, 2020–January 13, 2021. *MMWR Morb Mortal Wkly Rep.* 2021;70(8):283–288.
12. Gay N. The theory of measles elimination: implications for the design of elimination strategies. *J Infect Dis.* 2004;189(Suppl 1):S27–S35.
13. Cascini F, Pantovic A, Al-Ajlouni Y, et al. Social media and attitudes towards COVID-19 vaccination: systematic review and meta-analysis. *Front Public Health.* 2022;10:990839.
14. Hornsey MJ, Harris EA, Fielding KS. The psychological roots of anti-vaccination attitudes: a 24-nation investigation. *Health Psychol.* 2018;37(4):307–315.
15. Shimabukuro TT, Cole M, Su JR. Reports of anaphylaxis after receipt of mRNA COVID-19 vaccines in the US—December 2020–January 2021. *JAMA.* 2021;325(11):1101–1102.

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