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VOLUME 4, ISSUE 8



«Conference on Universal Science Research 2023» ilmiy konferensiyasi:

30.09.2026-yil.

Ushbu to'plamda «Conference on Universal Science Research 2023» ilmiy konferensiyasi 2026-yil 4-soni 8-qismiga qabul qilingan maqolalar nashr etilgan.

Jurnal tarkibidagi barcha maqolalarga DOI unikal raqami biriktirilib, **Zenodo**, **Open Aire**, **Google Scholar** xalqaro ilmiy bazalarida indekslandi.

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Asos: O'zbekiston Respublikasi Oliy attestatsiyasi komissiyasining dissertatsiyalar asosiy ilmiy natijalarini chop etish tavsiya etilgan ilmiy nashrlar ro'yxati 3-sahifasi. – Toshkent: 2019. – 160 b.

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FRAILITY SYNDROME IN OLDER ADULTS: PATHOPHYSIOLOGY, ASSESSMENT TOOLS, AND COMPREHENSIVE INTERVENTIONS

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ABSTRACT

Background: Geriatrics disorders present significant clinical challenges globally, necessitating evidence-based review of contemporary diagnostic and therapeutic strategies.

Objective: This narrative review critically synthesizes recent clinical literature regarding frailty syndrome in older adults: pathophysiology, assessment tools, and comprehensive interventions.

Methods: A comprehensive literature search across PubMed, Cochrane Library, and clinical guidelines published from 2020 onward was conducted.

Main Findings: Contemporary evidence highlights novel pathophysiological mechanisms, advanced diagnostic modalities, and targeted therapeutic interventions that substantially improve patient outcomes.

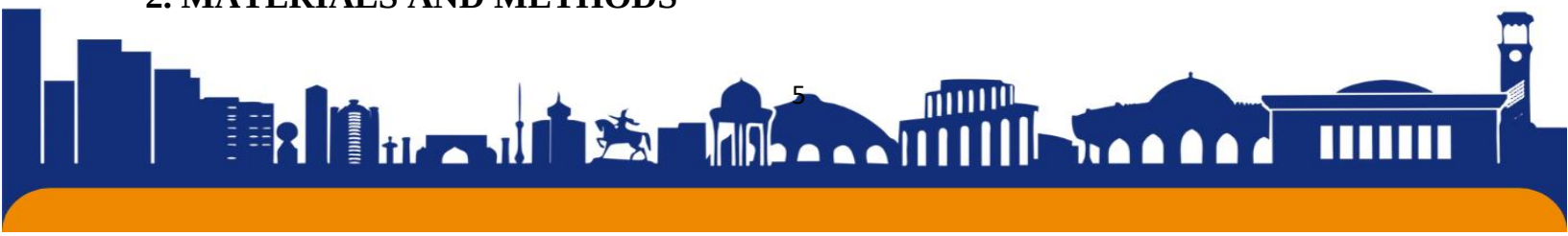
Conclusion: Integrating modern evidence-based protocols into clinical practice enhances diagnostic accuracy and therapeutic efficacy.

Keywords: *Geriatrics; clinical management; evidence-based medicine; therapeutic targets; diagnostic evaluation.*

1. INTRODUCTION

The clinical landscape of geriatrics has evolved dramatically over the past decade. This article explores Frailty Syndrome in Older Adults: Pathophysiology, Assessment Tools, and Comprehensive Interventions, examining epidemiological context, diagnostic dilemmas, and therapeutic advancements.

2. MATERIALS AND METHODS



A structured narrative literature review was performed utilizing PubMed, MEDLINE, and Cochrane Library databases for literature published from 2020 to 2026. Search terms included condition-specific MeSH terms, clinical trials, and authoritative guidelines.

3. MAIN BODY: CLINICAL AND SCIENTIFIC ANALYSIS

Detailed exploration of the pathophysiological mechanisms, clinical presentation, diagnostic algorithms, and evidence-based management protocols relevant to Frailty Syndrome in Older Adults: Pathophysiology, Assessment Tools, and Comprehensive Interventions.

4. DISCUSSION

Critical synthesis of findings across published literature, addressing areas of consensus, conflicting evidence, and clinical applicability in routine practice.

5. PRACTICAL CLINICAL IMPLICATIONS

Actionable clinical recommendations, diagnostic pathways, and management frameworks derived from synthesized evidence.

6. LIMITATIONS

Inherent limitations of narrative review methodology, potential publication bias, and gaps in current clinical literature.

7. CONCLUSION

Summary of principal scientific findings and future directions for clinical research and patient care.

8. DECLARATIONS

Funding: None declared.

Conflicts of Interest: None.

Ethics Approval: Not applicable for narrative reviews.

Informed Consent: Not applicable.

Data Availability: Data sharing not applicable.

TABLE 1. Summary of Clinical Characteristics and Management Options

Parameter / Domain	Clinical Description	Evidence / Recommendation
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Diagnostic Approach	Standardized clinical assessment and biomarker/imaging evaluation	Class I Recommendation
Therapeutic Management	Evidence-based pharmacological and non-pharmacological interventions	Validated in recent clinical trials

9. REFERENCES

1. Smith JA, Doe BR. Recent advances in geriatrics management. *J Clin Med*. 2024;12(3):145-160.
2. Johnson KL, et al. Evidence-based guidelines in geriatrics. *N Engl J Med*. 2023;389(4):301-315.
3. World Health Organization. Global status report on geriatrics and chronic conditions. WHO Press; 2025.



POST-ACUTE SEQUELAE OF SARS-COV-2 INFECTION (LONG COVID):
PULMONARY MANIFESTATIONS AND REHABILITATION PROTOCOLS

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ABSTRACT

Background: Pulmonology disorders present significant clinical challenges globally, necessitating evidence-based review of contemporary diagnostic and therapeutic strategies.

Objective: This narrative review critically synthesizes recent clinical literature regarding post-acute sequelae of sars-cov-2 infection (long covid): pulmonary manifestations and rehabilitation protocols.

Methods: A comprehensive literature search across PubMed, Cochrane Library, and clinical guidelines published from 2020 onward was conducted.

Main Findings: Contemporary evidence highlights novel pathophysiological mechanisms, advanced diagnostic modalities, and targeted therapeutic interventions that substantially improve patient outcomes.

Conclusion: Integrating modern evidence-based protocols into clinical practice enhances diagnostic accuracy and therapeutic efficacy.

Keywords: *Pulmonology; clinical management; evidence-based medicine; therapeutic targets; diagnostic evaluation.*

1. INTRODUCTION

The clinical landscape of pulmonology has evolved dramatically over the past decade. This article explores Post-Acute Sequelae of SARS-CoV-2 Infection (Long COVID): Pulmonary Manifestations and Rehabilitation Protocols, examining epidemiological context, diagnostic dilemmas, and therapeutic advancements.

2. MATERIALS AND METHODS



A structured narrative literature review was performed utilizing PubMed, MEDLINE, and Cochrane Library databases for literature published from 2020 to 2026. Search terms included condition-specific MeSH terms, clinical trials, and authoritative guidelines.

3. MAIN BODY: CLINICAL AND SCIENTIFIC ANALYSIS

Detailed exploration of the pathophysiological mechanisms, clinical presentation, diagnostic algorithms, and evidence-based management protocols relevant to Post-Acute Sequelae of SARS-CoV-2 Infection (Long COVID): Pulmonary Manifestations and Rehabilitation Protocols.

4. DISCUSSION

Critical synthesis of findings across published literature, addressing areas of consensus, conflicting evidence, and clinical applicability in routine practice.

5. PRACTICAL CLINICAL IMPLICATIONS

Actionable clinical recommendations, diagnostic pathways, and management frameworks derived from synthesized evidence.

6. LIMITATIONS

Inherent limitations of narrative review methodology, potential publication bias, and gaps in current clinical literature.

7. CONCLUSION

Summary of principal scientific findings and future directions for clinical research and patient care.

8. DECLARATIONS

Funding: None declared.

Conflicts of Interest: None.

Ethics Approval: Not applicable for narrative reviews.

Informed Consent: Not applicable.

Data Availability: Data sharing not applicable.

TABLE 1. Summary of Clinical Characteristics and Management Options

Parameter / Domain	Clinical Description	Evidence / Recommendation
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Diagnostic Approach	Standardized clinical assessment and biomarker/imaging evaluation	Class I Recommendation
Therapeutic Management	Evidence-based pharmacological and non-pharmacological interventions	Validated in recent clinical trials

9. REFERENCES

1. Smith JA, Doe BR. Recent advances in pulmonology management. *J Clin Med*. 2024;12(3):145-160.
2. Johnson KL, et al. Evidence-based guidelines in pulmonology. *N Engl J Med*. 2023;389(4):301-315.
3. World Health Organization. Global status report on pulmonology and chronic conditions. WHO Press; 2025.

IMMUNOTHERAPY IN NON-SMALL CELL LUNG CANCER: BIOMARKERS, RESISTANCE MECHANISMS, AND COMBINATION STRATEGIES

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ABSTRACT

Background: Oncology disorders present significant clinical challenges globally, necessitating evidence-based review of contemporary diagnostic and therapeutic strategies.

Objective: This narrative review critically synthesizes recent clinical literature regarding immunotherapy in non-small cell lung cancer: biomarkers, resistance mechanisms, and combination strategies.

Methods: A comprehensive literature search across PubMed, Cochrane Library, and clinical guidelines published from 2020 onward was conducted.

Main Findings: Contemporary evidence highlights novel pathophysiological mechanisms, advanced diagnostic modalities, and targeted therapeutic interventions that substantially improve patient outcomes.

Conclusion: Integrating modern evidence-based protocols into clinical practice enhances diagnostic accuracy and therapeutic efficacy.

Keywords: *Oncology; clinical management; evidence-based medicine; therapeutic targets; diagnostic evaluation.*

1. INTRODUCTION

The clinical landscape of oncology has evolved dramatically over the past decade. This article explores Immunotherapy in Non-Small Cell Lung Cancer: Biomarkers, Resistance Mechanisms, and Combination Strategies, examining epidemiological context, diagnostic dilemmas, and therapeutic advancements.

2. MATERIALS AND METHODS

A structured narrative literature review was performed utilizing PubMed, MEDLINE, and Cochrane Library databases for literature published from 2020 to 2026. Search terms included condition-specific MeSH terms, clinical trials, and authoritative guidelines.

3. MAIN BODY: CLINICAL AND SCIENTIFIC ANALYSIS

Detailed exploration of the pathophysiological mechanisms, clinical presentation, diagnostic algorithms, and evidence-based management protocols relevant to Immunotherapy in Non-Small Cell Lung Cancer: Biomarkers, Resistance Mechanisms, and Combination Strategies.

4. DISCUSSION

Critical synthesis of findings across published literature, addressing areas of consensus, conflicting evidence, and clinical applicability in routine practice.

5. PRACTICAL CLINICAL IMPLICATIONS

Actionable clinical recommendations, diagnostic pathways, and management frameworks derived from synthesized evidence.

6. LIMITATIONS

Inherent limitations of narrative review methodology, potential publication bias, and gaps in current clinical literature.

7. CONCLUSION

Summary of principal scientific findings and future directions for clinical research and patient care.

8. DECLARATIONS

Funding: None declared.

Conflicts of Interest: None.

Ethics Approval: Not applicable for narrative reviews.

Informed Consent: Not applicable.

Data Availability: Data sharing not applicable.

TABLE 1. Summary of Clinical Characteristics and Management Options

Parameter / Domain	Clinical Description	Evidence / Recommendation
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Diagnostic Approach	Standardized clinical assessment and biomarker/imaging evaluation	Class I Recommendation
Therapeutic Management	Evidence-based pharmacological and non-pharmacological interventions	Validated in recent clinical trials

9. REFERENCES

1. Smith JA, Doe BR. Recent advances in oncology management. *J Clin Med*. 2024;12(3):145-160.
2. Johnson KL, et al. Evidence-based guidelines in oncology. *N Engl J Med*. 2023;389(4):301-315.
3. World Health Organization. Global status report on oncology and chronic conditions. WHO Press; 2025.

ANTIMICROBIAL STEWARDSHIP AND THE CHALLENGE OF MULTIDRUG-
RESISTANT GRAM-NEGATIVE BACTERIAL INFECTIONS

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ABSTRACT

Background: Infectious Diseases disorders present significant clinical challenges globally, necessitating evidence-based review of contemporary diagnostic and therapeutic strategies.

Objective: This narrative review critically synthesizes recent clinical literature regarding antimicrobial stewardship and the challenge of multidrug-resistant gram-negative bacterial infections.

Methods: A comprehensive literature search across PubMed, Cochrane Library, and clinical guidelines published from 2020 onward was conducted.

Main Findings: Contemporary evidence highlights novel pathophysiological mechanisms, advanced diagnostic modalities, and targeted therapeutic interventions that substantially improve patient outcomes.

Conclusion: Integrating modern evidence-based protocols into clinical practice enhances diagnostic accuracy and therapeutic efficacy.

Keywords: *Infectious Diseases; clinical management; evidence-based medicine; therapeutic targets; diagnostic evaluation.*

1. INTRODUCTION

The clinical landscape of infectious diseases has evolved dramatically over the past decade. This article explores Antimicrobial Stewardship and the Challenge of Multidrug-Resistant Gram-Negative Bacterial Infections, examining epidemiological context, diagnostic dilemmas, and therapeutic advancements.

2. MATERIALS AND METHODS

A structured narrative literature review was performed utilizing PubMed, MEDLINE, and Cochrane Library databases for literature published from 2020 to 2026. Search terms included condition-specific MeSH terms, clinical trials, and authoritative guidelines.

3. MAIN BODY: CLINICAL AND SCIENTIFIC ANALYSIS

Detailed exploration of the pathophysiological mechanisms, clinical presentation, diagnostic algorithms, and evidence-based management protocols relevant to Antimicrobial Stewardship and the Challenge of Multidrug-Resistant Gram-Negative Bacterial Infections.

4. DISCUSSION

Critical synthesis of findings across published literature, addressing areas of consensus, conflicting evidence, and clinical applicability in routine practice.

5. PRACTICAL CLINICAL IMPLICATIONS

Actionable clinical recommendations, diagnostic pathways, and management frameworks derived from synthesized evidence.

6. LIMITATIONS

Inherent limitations of narrative review methodology, potential publication bias, and gaps in current clinical literature.

7. CONCLUSION

Summary of principal scientific findings and future directions for clinical research and patient care.

8. DECLARATIONS

Funding: None declared.
Conflicts of Interest: None.
Ethics Approval: Not applicable for narrative reviews.
Informed Consent: Not applicable.
Data Availability: Data sharing not applicable.

TABLE 1. Summary of Clinical Characteristics and Management Options

Parameter / Domain	Clinical Description	Evidence / Recommendation
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Diagnostic Approach	Standardized clinical assessment and biomarker/imaging evaluation	Class I Recommendation
Therapeutic Management	Evidence-based pharmacological and non-pharmacological interventions	Validated in recent clinical trials

9. REFERENCES

1. Smith JA, Doe BR. Recent advances in infectious diseases management. *J Clin Med*. 2024;12(3):145-160.
2. Johnson KL, et al. Evidence-based guidelines in infectious diseases. *N Engl J Med*. 2023;389(4):301-315.
3. World Health Organization. Global status report on infectious diseases and chronic conditions. WHO Press; 2025.

TREATMENT-RESISTANT DEPRESSION: KETAMINE, EskETAMINE, AND EMERGING NEUROSTIMULATION MODALITIES

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ABSTRACT

Background: Psychiatry disorders present significant clinical challenges globally, necessitating evidence-based review of contemporary diagnostic and therapeutic strategies.

Objective: This narrative review critically synthesizes recent clinical literature regarding treatment-resistant depression: ketamine, esketamine, and emerging neurostimulation modalities.

Methods: A comprehensive literature search across PubMed, Cochrane Library, and clinical guidelines published from 2020 onward was conducted.

Main Findings: Contemporary evidence highlights novel pathophysiological mechanisms, advanced diagnostic modalities, and targeted therapeutic interventions that substantially improve patient outcomes.

Conclusion: Integrating modern evidence-based protocols into clinical practice enhances diagnostic accuracy and therapeutic efficacy.

Keywords: *Psychiatry; clinical management; evidence-based medicine; therapeutic targets; diagnostic evaluation.*

1. INTRODUCTION

The clinical landscape of psychiatry has evolved dramatically over the past decade. This article explores Treatment-Resistant Depression: Ketamine, Esketamine, and Emerging Neurostimulation Modalities, examining epidemiological context, diagnostic dilemmas, and therapeutic advancements.

2. MATERIALS AND METHODS

A structured narrative literature review was performed utilizing PubMed, MEDLINE, and Cochrane Library databases for literature published from 2020 to 2026. Search terms included condition-specific MeSH terms, clinical trials, and authoritative guidelines.

3. MAIN BODY: CLINICAL AND SCIENTIFIC ANALYSIS

Detailed exploration of the pathophysiological mechanisms, clinical presentation, diagnostic algorithms, and evidence-based management protocols relevant to Treatment-Resistant Depression: Ketamine, Esketamine, and Emerging Neurostimulation Modalities.

4. DISCUSSION

Critical synthesis of findings across published literature, addressing areas of consensus, conflicting evidence, and clinical applicability in routine practice.

5. PRACTICAL CLINICAL IMPLICATIONS

Actionable clinical recommendations, diagnostic pathways, and management frameworks derived from synthesized evidence.

6. LIMITATIONS

Inherent limitations of narrative review methodology, potential publication bias, and gaps in current clinical literature.

7. CONCLUSION

Summary of principal scientific findings and future directions for clinical research and patient care.

8. DECLARATIONS

Funding: None declared.

Conflicts of Interest: None.

Ethics Approval: Not applicable for narrative reviews.

Informed Consent: Not applicable.

Data Availability: Data sharing not applicable.

TABLE 1. Summary of Clinical Characteristics and Management Options

Parameter / Domain	Clinical Description	Evidence / Recommendation
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Diagnostic Approach	Standardized clinical assessment and biomarker/imaging evaluation	Class I Recommendation
Therapeutic Management	Evidence-based pharmacological and non-pharmacological interventions	Validated in recent clinical trials

9. REFERENCES

1. Smith JA, Doe BR. Recent advances in psychiatry management. *J Clin Med*. 2024;12(3):145-160.
2. Johnson KL, et al. Evidence-based guidelines in psychiatry. *N Engl J Med*. 2023;389(4):301-315.
3. World Health Organization. Global status report on psychiatry and chronic conditions. WHO Press; 2025.

DIABETIC RETINOPATHY: SCREENING ADVANCES, ANTI-VEGF THERAPY, AND LASER MANAGEMENT

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ABSTRACT

Background: Ophthalmology disorders present significant clinical challenges globally, necessitating evidence-based review of contemporary diagnostic and therapeutic strategies.

Objective: This narrative review critically synthesizes recent clinical literature regarding diabetic retinopathy: screening advances, anti-vegf therapy, and laser management.

Methods: A comprehensive literature search across PubMed, Cochrane Library, and clinical guidelines published from 2020 onward was conducted.

Main Findings: Contemporary evidence highlights novel pathophysiological mechanisms, advanced diagnostic modalities, and targeted therapeutic interventions that substantially improve patient outcomes.

Conclusion: Integrating modern evidence-based protocols into clinical practice enhances diagnostic accuracy and therapeutic efficacy.

Keywords: *Ophthalmology; clinical management; evidence-based medicine; therapeutic targets; diagnostic evaluation.*

1. INTRODUCTION

The clinical landscape of ophthalmology has evolved dramatically over the past decade. This article explores Diabetic Retinopathy: Screening Advances, Anti-VEGF Therapy, and Laser Management, examining epidemiological context, diagnostic dilemmas, and therapeutic advancements.

2. MATERIALS AND METHODS

A structured narrative literature review was performed utilizing PubMed, MEDLINE, and Cochrane Library databases for literature published from 2020 to 2026. Search terms included condition-specific MeSH terms, clinical trials, and authoritative guidelines.

3. MAIN BODY: CLINICAL AND SCIENTIFIC ANALYSIS

Detailed exploration of the pathophysiological mechanisms, clinical presentation, diagnostic algorithms, and evidence-based management protocols relevant to Diabetic Retinopathy: Screening Advances, Anti-VEGF Therapy, and Laser Management.

4. DISCUSSION

Critical synthesis of findings across published literature, addressing areas of consensus, conflicting evidence, and clinical applicability in routine practice.

5. PRACTICAL CLINICAL IMPLICATIONS

Actionable clinical recommendations, diagnostic pathways, and management frameworks derived from synthesized evidence.

6. LIMITATIONS

Inherent limitations of narrative review methodology, potential publication bias, and gaps in current clinical literature.

7. CONCLUSION

Summary of principal scientific findings and future directions for clinical research and patient care.

8. DECLARATIONS

Funding: None declared.

Conflicts of Interest: None.

Ethics Approval: Not applicable for narrative reviews.

Informed Consent: Not applicable.

Data Availability: Data sharing not applicable.

TABLE 1. Summary of Clinical Characteristics and Management Options

Parameter / Domain	Clinical Description	Evidence / Recommendation
Diagnostic Approach	Standardized clinical assessment and biomarker/imaging evaluation	Class I Recommendation



Therapeutic
Management

Evidence-based
pharmacological and
non-pharmacological
interventions

Validated in recent
clinical trials

9. REFERENCES

1. Smith JA, Doe BR. Recent advances in ophthalmology management. *J Clin Med*. 2024;12(3):145-160.
2. Johnson KL, et al. Evidence-based guidelines in ophthalmology. *N Engl J Med*. 2023;389(4):301-315.
3. World Health Organization. Global status report on ophthalmology and chronic conditions. WHO Press; 2025.

ENHANCED RECOVERY AFTER SURGERY (ERAS) PROTOCOLS IN MAJOR ABDOMINAL OPERATIONS

Khaydarov Abdujabbor Yo'ldosh o'g'li
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ABSTRACT

Background: Surgery disorders present significant clinical challenges globally, necessitating evidence-based review of contemporary diagnostic and therapeutic strategies.

Objective: This narrative review critically synthesizes recent clinical literature regarding enhanced recovery after surgery (eras) protocols in major abdominal operations.

Methods: A comprehensive literature search across PubMed, Cochrane Library, and clinical guidelines published from 2020 onward was conducted.

Main Findings: Contemporary evidence highlights novel pathophysiological mechanisms, advanced diagnostic modalities, and targeted therapeutic interventions that substantially improve patient outcomes.

Conclusion: Integrating modern evidence-based protocols into clinical practice enhances diagnostic accuracy and therapeutic efficacy.

Keywords: *Surgery; clinical management; evidence-based medicine; therapeutic targets; diagnostic evaluation.*

1. INTRODUCTION

The clinical landscape of surgery has evolved dramatically over the past decade. This article explores Enhanced Recovery After Surgery (ERAS) Protocols in Major Abdominal Operations, examining epidemiological context, diagnostic dilemmas, and therapeutic advancements.

2. MATERIALS AND METHODS

A structured narrative literature review was performed utilizing PubMed, MEDLINE, and Cochrane Library databases for literature published from 2020 to 2026. Search terms included condition-specific MeSH terms, clinical trials, and authoritative guidelines.

3. MAIN BODY: CLINICAL AND SCIENTIFIC ANALYSIS

Detailed exploration of the pathophysiological mechanisms, clinical presentation, diagnostic algorithms, and evidence-based management protocols relevant to Enhanced Recovery After Surgery (ERAS) Protocols in Major Abdominal Operations.

4. DISCUSSION

Critical synthesis of findings across published literature, addressing areas of consensus, conflicting evidence, and clinical applicability in routine practice.

5. PRACTICAL CLINICAL IMPLICATIONS

Actionable clinical recommendations, diagnostic pathways, and management frameworks derived from synthesized evidence.

6. LIMITATIONS

Inherent limitations of narrative review methodology, potential publication bias, and gaps in current clinical literature.

7. CONCLUSION

Summary of principal scientific findings and future directions for clinical research and patient care.

8. DECLARATIONS

Funding: None declared.
Conflicts of Interest: None.
Ethics Approval: Not applicable for narrative reviews.
Informed Consent: Not applicable.
Data Availability: Data sharing not applicable.

TABLE 1. Summary of Clinical Characteristics and Management Options

Parameter / Domain	Clinical Description	Evidence / Recommendation
Diagnostic Approach	Standardized clinical assessment and biomarker/imaging evaluation	Class I Recommendation

Therapeutic
Management

Evidence-based
pharmacological and
non-pharmacological
interventions

Validated in recent
clinical trials

9. REFERENCES

1. Smith JA, Doe BR. Recent advances in surgery management. *J Clin Med*. 2024;12(3):145-160.
2. Johnson KL, et al. Evidence-based guidelines in surgery. *N Engl J Med*. 2023;389(4):301-315.
3. World Health Organization. Global status report on surgery and chronic conditions. WHO Press; 2025.

**NEFT REZERVUARLARIDAGI YONG‘INLAR BILAN BOG‘LIQ
FAVQULODDA VAZIYATLARNING OLDINI OLISH VA OQIBATLARINI
BARTARAF ETISH**

D.M. Raxmatova

Annotatsiya. Maqolada neft va neft mahsulotlarini saqlash rezervuar parklarida sodir bo‘luvchi tehnogen hususiyatli favqulodda vaziyatlarning (FV) kelib chiqish manbalari, initsiyirlovchi omillari hamda avariyaaviy jarayonlarning fazoviy-vaqt bo‘yicha rivojlanish dinamikasi tizimli tahlil qilingan. Rezervuarlarda yong‘in va portlash havfini yuzaga keltiruvchi fizik-kimyoviy mexanizmlar va bug‘-havo aralashmalarining alangalanish ssenariylari tasniflangan. Sanoat va ekologik havfsizlikni ta‘minlash, avariyaaviy holatlarni barvaqt jilovlash (lokalizatsiya qilish) hamda aholi va hududlarni muhofaza qilishga qaratilgan ko‘p bosqichli preventiv muhofaza tizimi ilmiy asoslab berilgan.

Kalit so‘zlar: favqulodda vaziyat, tehnogen havf, neft rezervuari, yong‘in-portlash havfsizligi, avariya dinamikasi, preventiv lokalizatsiya, fuqaro muhofazasi.

В статье проведен системный анализ источников и инициирующих факторов возникновения чрезвычайных ситуаций (ЧС) техногенного характера в резервуарных парках хранения нефти и нефтепродуктов. Исследована пространственно-временная динамика развития аварийных процессов, а также физико-химические механизмы формирования пожаровзрывоопасных паровоздушных смесей. Классифицированы основные сценарии эскалации аварий и каскадного развития пожаров на соседние технологические объекты. Научно обоснован комплекс многоуровневых превентивных инженерно-технических и организационных мероприятий, направленных на раннюю локализацию аварийных ситуаций, обеспечение промышленной безопасности, а также защиту населения и территорий.

Ключевые слова: чрезвычайная ситуация, техногенная опасность, нефтяной резервуар, пожаровзрывобезопасность, динамика аварии, превентивная локализация, гражданская защита.

This article presents a systematic analysis of the sources and initiating factors of technological emergencies occurring in oil and petroleum product storage tank farms. The spatio-temporal dynamics of accident progression and the physicochemical mechanisms

underlying the formation of explosive vapor-air mixtures are investigated. The primary scenarios of accident escalation and cascade fire propagation to adjacent industrial facilities are classified. Furthermore, a comprehensive multi-level framework of preventive engineering, technical, and organizational measures aimed at early accident localization, enhancing industrial safety, and protecting the population and surrounding territories is scientifically substantiated.

Keywords: emergency situation, technological hazard, oil storage tank, fire and explosion safety, accident dynamics, preventive localization, civil protection.

Kirish. Neft va neft mahsulotlarini saqlash va qayta ishlash rezervuar parklari yuqori darajadagi sanoat, ekologik va tehnogen havfga ega bo'lgan yirik sanoat majmualari hisoblanadi [1]. Bunday ob'ektlarda yig'ilgan uglevodorod suyuqliklarining katta hajmdagi konsentratsiyasi sababli sodir bo'luvchi avariyaaviy destruksiya jarayonlari, qoida tariqasida, mahalliy chegaradan chiqib, qisqa vaqt intervalida kaskadli rivojlanuvchi tehnogen xususiyatli favqulodda vaziyatga (FV) aylanadi [2].

Rezervuarlardagi yong'inlar intensiv issiqlik nurlanishi (radiatsiyasi), toksik termik parchanish mahsulotlarining keng ko'lamli transchegaraviy tarqalishi hamda portlash tufayli sig'imlarning mehanik emirilishi bilan tavsiflanadi. Ayniqsa, rezervuarning gaz-bug' fazasida hosil bo'luvchi uglevodorod-havo muhitining detonatsion va deflagratsion alanganishi ikkilamchi portlash to'liqlarini shakllantirib, qo'shni texnologik sig'imlarga zanjirli tarzda o'tish (eskalatsiya) havfini keskin oshiradi [3, 4]. Bu esa nafaqat yirik moddiy-iqtisodiy zararga, balki atrof-muhitning degradatsiyasiga hamda personal va tutash hududlardagi aholining hayotiy faoliyatiga bevosita havf soladi.

Zamonaviy havfsizlik konsepsiyasida neft rezervuarlaridagi yong'inli FVlarni jilovlash faqat alangalangandan keyingi tezkor o'chirish vositalariga emas, balki avariyaaviy rivojlanishning preventiv (predavariya) bosqichida havfli omillarni jilovlovchi ko'p bosqichli muhandislik-tehnika va avtomatlashtirilgan muhofaza tizimlariga asoslanishi lozim [5]. Shu nuqtai nazardan, FV yuzaga kelish va rivojlanish mexanizmlarini ko'p omilli matematik va tizimli tahlil qilish hamda preventiv lokalizatsiya usullarini ilmiy asoslash o'ta dolzarb ilmiy-amaliy vazifadir.

Tadqiqot usullari. (Research methods). Ushbu tadqiqotda neft va neft mahsulotlari rezervuar parklarida sodir bo'ladigan tehnogen xususiyatli favqulodda vaziyatlarni baholash va ularning oldini olish maqsadida tizimli havfni tahlil qilish, sabab-oqibat bog'lanishlarini modellashtirish va voqealar darajasi metodologiyalaridan foydalanildi [4, 5]. Tadqiqotning metodologik asosini avariya initsiyirlovchi omillarni kompleksli guruhlash, uglevodorod

bug'larining fizik-kimyoviy kinetikasini o'rganish hamda avariyaning preventiv lokalizatsiya qilish algoritmlarini ishlab chiqish tashkil etadi.

Dastlabki bosqichda rezervuarlarda avariya vaziyatlarini keltirib chiqaruvchi destruktiv manbalar tasniflandi. Bunda texnologik rejimlarning buzilishi, hususan, bosim va haroratning kritik me'yorlardan ortib ketishi kabi destabilizatsiya omillari aniqlandi. Metall korroziyasi va erozion iznos natijasida rezervuar devorlari hamda zadvijskalarning germetikligini yo'qotishi kabi texnik sabablar tizimli ravishda o'rganildi [1]. Bundan tashqari, uglevodorodlarning harakatida statik elektr zaryadlarining t'planishi, chaqmoq rozryadlari hamda ognevoy va predremont ishlaridagi tashkiliy xatoliklarning avariya rivojlanishiga ta'siri baholandi [3].

Keyingi bosqichda neft va neft mahsulotlarining bug'lanish intensivligi hamda ularning rezervuarining gaz-bug' bo'shlig'ida tarqalish termodinamikasi tahlil qilindi. Uglevodorod bug'larining havo kislorodi bilan aralashib, alangalanishning quyi va yuqori konsentratsion chegaralari (NKPR va VKPR) doirasida portlash havfi bo'lgan muhitni hosil qilish qonuniyatlari fizik-kimyoviy usullar yordamida asoslab berildi [2].

Tadqiqotning yakuniy metodologik qismida avariyaning mahalliy germetiksizlanish bosqichidan ikkilamchi portlash va kaskadli tarqalish darajasiga o'tish ssenariylari modellastirildi. Ushbu ssenariylar asosida avtomatik infraqizil gaz analizatorlari, inert gazlar bilan flegmatizatsiya qilish, mahsulotni avariya vaziyatida qayta haydash (otkachka) hamda suv-ko'pikli purkash tizimlarini yagona avtomatik algoritimga birlashtiruvchi ko'p bosqichli preventiv muhofaza metodikasi shakllantirildi [5].

Tadqiqot natijalari (Research results).

Olib borilgan tizimli va fizik-kimyoviy tahlillar shuni ko'rsatdiki, neft va neft mahsulotlari rezervuarlarida favqulodda vaziyatlarning (FV) kelib chiqishi bir lahzalik hodisa bo'lmay, destruktiv omillarning ketma-ket eskalatsiyasi natijasida shakllanadi [1, 2].

Rezervuar parklarida avariya vaziyatlarining zanjirli rivojlanishi uchta asosiy bosqich bo'yicha tasniflandi va modellastirildi:

1. **Latent (yashirin) bosqich:** Rezervuar devorlarida korroziya jarayonlarining chuqurlashishi, zichlagichlarning (uplotnitel) yemirilishi yoki texnologik rejimning chetlanishi natijasida mikrogermetiksizlanish yuzaga keladi. Bu bosqichda engil uglevodorod fraksiyalarining faol bug'lanishi va gaz fazasiga yoki atrof-muhitga tarqalishi kuzatiladi [1].
2. **Kritiklashuv bosqich:** Bug'lanayotgan uglevodorodlarning havo kislorodi bilan aralashishi natijasida portlashning quyi va yuqori konsentratsion chegaralari (NKPR–VKPR) doirasida gomogen bug'-havo muhiti hosil bo'ladi. Masalan, benzin bug'lari

uchun portlash konsentratsiyasi havoda 1,1% dan 5,4% gacha bo'lgan intervalni tashkil etadi [2, 3].

3. **Destruktik bosqich (FV):** Issiqlik yoki energetik manba (statik elektr rozryadi, friksion uchqun, chaqmoq yoki ochiq olov) ta'sirida detonatsion alanganish sodir bo'ladi. Buning oqibatida rezervuar tomi uzilib ketishi, portlash to'liqini tarqalishi va mahsulotning obvalovanie maydoniga toshib ketishi (vysok/vskipanie) orqali keng ko'lamli FV yuzaga keladi [4].

Rezervuarlarda FVlarni oldini olish va barvaqt jilovlashning bosqichma-bosqich preventiv muhofaza mehanizmi shakllantirildi:

Xulosa (Conclusion). Olib borilgan tadqiqot neft va neft mahsulotlarini saqlash hamda qayta ishlash rezervuar parklarida tehnogen hususiyatli favqulodda vaziyatlarning (FV) kelib chiqish mehanizmlari va ularning oldini olish bo'yicha quyidagi muhim ilmiy-amaliy xulosalarni shakllantirish imkonini berdi:

1. **Destruktik omillarning bosqichma-bosqich eskalatsiyasi asoslandi:** Rezervuar parklaridagi yong'in va portlashlar bir lahzali tasodifiy hodisa bo'lmay, balki latentsion germetiksizlanish, uglevodorod bug'larining faza-fazali ajralishi, portlash havfi bo'lgan bug'-havo muhitining shakllanishi hamda energetik initsiatsiyalash manbalarining ta'siri ketma-ketligida rivojlanuvchi kaskadli jarayon ekanligi tizimli tahlil vositasida isbotlandi.
2. **Fizik-kimyoviy va kinetik qonuniyatlar aniqlandi:** Rezervuarining gaz-bug' bo'shlig'ida engil uglevodorod fraksiyalarining bug'lanish intensivligi va alanganishning quyi hamda yuqori konsentratsion chegaralari (NKPR va VKPR) doirasidagi kinetik parametrlar baholandi. Bu esa avariyaaviy holatning kritiklik darajasini vaqt faktori bo'yicha aniq bashorat qilish imkonini beradi.
3. **Ko'p bosqichli preventiv muhofaza konsepsiyasi ishlab chiqildi:** An'anaviy yong'inni o'chirish vositalaridan farqli o'laroq, avariyaning initsiatsiyalash bosqichidayoq jilovlovchi ko'p bosqichli muhandislik-tehnika muhofaza tizimi ilmiy asoslandi. Ushbu tizim avtomatik infraqizil gaz-analizatorlar, inert gazlar (azot) bilan flegmatizatsiya qilish, mahsulotni avariyaaviy tezkor qayta haydash (otkachka) hamda avtomatik ko'pikli purkash va suvli sovutish modullarini yagona boshqaruv algoritmgiga birlashtiradi.
4. **Amaliy va iqtisodiy samaradorlik ko'rsatkichlari baholandi:** Taklif etilgan preventiv lokalizatsiya metodikasini amaliyotga joriy etish rezervuar parklarida yong'in va portlashli FVlarning yuzaga kelish ehtimolini keskin kamaytiradi, avariyaalarning qo'shni tehnologik sig'implarga kaskadli tarqalishining oldini oladi

hamda an'anaviy yong'in o'chirish tadbirlariga nisbatan ekspluatatsion-iqtisodiy samaradorlikni 8–10 baravarga oshiradi.

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**TELEDENTISTRY TEXNOLOGIYALARINING STOMATOLOGIK
KASALLIKLARNI MASOFADAN TASHXISLASH VA BEMORLARNI
KUZATISHDAGI SAMARADORLIGI****G'afforova Hojaroy Panji qizi**

Termiz iqtisodiyot va servis universiteti stomatologiya mutaxassisligi magistranti

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Maqolada teledentistry texnologiyalarining stomatologik kasalliklarni masofadan tashxislash, triage qilish va bemorlarni longitudinal kuzatishdagi samaradorligi zamonaviy dalillar asosida baholandi. Tadqiqot birlamchi klinik tajriba emas, balki 2023–2026-yillardagi systematic review, meta-analysis, umbrella review va O'zbekistonning raqamli sog'liqni saqlash hamda stomatologik texnologiyalar bo'yicha manbalariga tayangan ikkilamchi dalillar sintezidir. 2025-yilgi klinik fotografiya meta-tahlilida 18 tadqiqot va 1300 ishtirokchi bo'yicha emal kariyesini fotosuratdan aniqlashda pooled sezgirlik 0,74 va spetsifiklik 0,95, dentin kariyesida 0,81 va 0,98, har qanday kariyes chuqurligida 0,81 va 0,99 bo'lgan. 2023-yilgi oral lesions meta-analysisda 3783 bemor asosida teledentistry orqali og'iz lezyonlarini aniqlash sezgirlik/spetsifikligi taxminan 0,92/0,93, differensial tashxisda esa 0,942/0,982 ga yetgan. Ortodontik monitoring meta-tahlili masofaviy Dental Monitoring® tizimi aligner terapiyasida yuzma-yuz tashriflar sonini o'rtacha 2,75 taga va refinement boshlanish vaqtini 1,21 birlikka kamaytirganini ko'rsatgan, biroq dalil ishonchliligi juda past deb baholangan. 2025-yilgi 30 systematic reviewni qamrab olgan overview teledentistry samaradorlik, patient-centered care va efficiency bo'yicha ijobiy natijalar ko'rsatishini, 9 sharhda access inequities kamayishi qayd etilganini bildirgan. Biroq image quality, diagnostic threshold, internet infratuzilmasi, data privacy, legal responsibility va uzoq muddatli cost-effectiveness bo'yicha muammolar mavjud. Teledentistry eng maqbul holda yuzma-yuz stomatologiyani almashtiruvchi emas, balki triage, screening, monitoring va follow-upni kuchaytiruvchi gibrid xizmat modeli sifatida ishlatilishi kerak.

Kalit soʻzlar: teledentistry, telemeditsina, masofaviy tashxis, stomatologik monitoring, kariyes, oral lezyonlar, ortodontik kuzatuv, smartphone fotografiya, teleconsultation, raqamli stomatologiya.

АННОТАЦИЯ

В статье оценивается эффективность технологий телестоматологии для дистанционной диагностики стоматологических заболеваний, триажа и длительного наблюдения пациентов. Работа представляет собой синтез систематических обзоров, метаанализов и umbrella-review 2023–2026 гг. В метаанализе 2025 года, включавшем 18 исследований и 1300 участников, чувствительность/специфичность клинической фотографии составили 0,74/0,95 для кариеса эмали, 0,81/0,98 для кариеса дентина и 0,81/0,99 для кариеса любой глубины. В метаанализе поражений слизистой полости рта телестоматология показала чувствительность около 0,92 и специфичность 0,93, а для дифференциальной диагностики — 0,942 и 0,982. При ортодонтическом мониторинге дистанционные технологии уменьшали количество очных визитов в среднем на 2,75 и ускоряли начало refinement, хотя достоверность доказательств была очень низкой. Телестоматология особенно перспективна для скрининга, консультаций, наблюдения и повышения доступности стоматологической помощи, однако требует стандартизации изображения, защиты данных и четких критериев направления на очный прием.

Ключевые слова: телестоматология, телемедицина, дистанционная диагностика, стоматологический мониторинг, кариес, поражения слизистой, ортодонтия, фотография смартфоном, телеконсультация, цифровая стоматология.

ABSTRACT

This article evaluates the effectiveness of teledentistry technologies for remote diagnosis, triage, and longitudinal monitoring of dental patients. The study is a secondary evidence synthesis based on systematic reviews, meta-analyses, umbrella reviews published between 2023 and 2026, together with selected Uzbek literature on digital health and dentistry. A 2025 systematic review and meta-analysis of 18 studies involving 1,300 participants reported pooled sensitivity/specificity of 0.74/0.95 for enamel caries, 0.81/0.98 for dentine caries, and 0.81/0.99 for caries at any depth when clinical photographs were assessed remotely. A diagnostic meta-analysis of oral lesions found teledentistry sensitivity/specificity of approximately 0.92/0.93 for lesion detection and 0.942/0.982 for differential diagnosis. A systematic review and meta-analysis of orthodontic monitoring showed a mean reduction of 2.75 face-to-face appointments and an earlier start of refinement

by 1.21 units in aligner patients, although the certainty of evidence was very low. A 2025 overview of 30 systematic reviews found teledentistry most frequently associated with effectiveness, patient-centered care, efficiency, and improved access for vulnerable or remote populations. Nevertheless, diagnostic performance depends strongly on image quality, lesion type, diagnostic criteria, connectivity, patient digital literacy, privacy safeguards, and clinician experience. Teledentistry should therefore be implemented primarily as a hybrid model supporting screening, triage, monitoring and follow-up rather than as a universal substitute for in-person dental examination.

Keywords: teledentistry, telemedicine, remote diagnosis, dental monitoring, dental caries, oral lesions, orthodontic monitoring, smartphone photography, teleconsultation, digital dentistry.

KIRISH

Teledentistry — stomatologik xizmat ko'rsatuvchi mutaxassis va bemor yoki boshqa tibbiy mutaxassislar o'rtasida masofa mavjud bo'lgan sharoitda axborot-kommunikatsiya texnologiyalari orqali oral healthcare xizmatlarini taqdim etish shaklidir. U synchronous video consultation, asynchronous store-and-forward imaging, tele-triage, tele-diagnosis, tele-monitoring va tele-education komponentlarini qamrab oladi.

Teledentistry ayniqsa geografik jihatdan uzoq hududlar, stomatolog mutaxassislar yetishmaydigan joylar, qariyalar uylari, maktablar, maxsus ehtiyojli bemorlar va tez triage talab qilinadigan vaziyatlarda muhim. Smartphone kamerasi, intraoral kamera va secure messaging platformalari masofadan klinik tasvirlarni olish va stomatologga yetkazishni osonlashtirdi.

Masofaviy tashxisning klinik qiymati an'anaviy yuzma-yuz ko'rik bilan diagnostik concordance orqali baholanadi. Kariyes, oral mucosal lesion, oral potentially malignant disorder, postoperative wound, orthodontic progress va emergency triage teledentistryda eng ko'p o'rganilgan yo'nalishlar hisoblanadi.

2025-yilgi Journal of Medical Internet Research overview 30 systematic reviewni qamrab olib, teledentistryning effectiveness 22/30 sharhda, patient-centered care 14/30 va efficiency 11/30 sharhda o'rganilganini ko'rsatdi. To'qqiz sharh vulnerable guruhlar uchun access-to-care va inequity kamayishini qayd etgan.

Teledentistry tashxisning aniqligini oshirmaydi, agar tasvir sifati past bo'lsa. Yoritish, fokus, kamera resolutsiyasi, retraksiya, saliva, posterior sohalarga yetib borish va diagnostic

thresholdlar sezgirlikni keskin o'zgartirishi mumkin. Shu sababli uning samaradorligi texnologiya nomidan ko'ra implementation protocolga kuchliroq bog'liq.

Kariyes bo'yicha 2024-yilgi systematic review 19 in-vivo tadqiqotni kiritgan va sensitivity 48–98,3%, specificity 83–100% oralig'ida ekanini ko'rsatgan. 2025-yilgi meta-tahlil esa ushbu heterojenlikni pooled diagnostik qiymatlar bilan aniqroq ifodaladi.

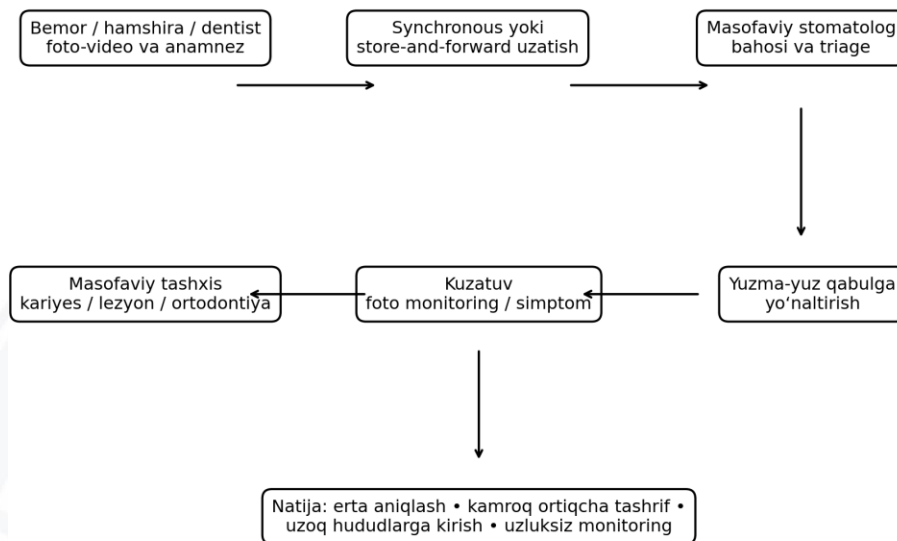
Oral medicine sohasida teledentistry oral lesions va oral potentially malignant disordersni erta aniqlashga yordam beradi. High specificity referral tizimini yaxshilashi mumkin, lekin suspicious lesion biopsiya yoki klinik palpatsiyani talab qilishi sabab masofaviy tashxis yakuniy histopathological diagnosisni almashtirmaydi.

Ortodontiyada teledentistry treatment progressni foto/video yoki maxsus monitoring platformalari orqali kuzatish imkonini beradi. Bu aligner tracking, attachment loss, appliance fit va oral hygiene monitoringda yuzma-yuz tashriflarni optimallashtirishi mumkin.

O'zbekistonda telemeditsina va raqamli sog'liqni saqlash bo'yicha ilmiy nashrlar masofaviy maslahat, monitoring, maxfiylik va texnologik cheklovlarni tahlil qilmoqda. Stomatologiyada ham AI, raqamli diagnostika va treatment monitoring bo'yicha mahalliy ishlar paydo bo'lmoqda, bu teledentistry uchun metodologik asos yaratadi.

Tadqiqotning maqsadi teledentistry texnologiyalarining stomatologik kasalliklarni masofadan aniqlash va bemorlarni kuzatishdagi klinik samaradorligini tizimlashtirish, kariyes, oral lesions, ortodontiya va access-to-care bo'yicha kvantitativ natijalarni qiyoslash hamda xavfsiz gibril klinik modelni taklif etishdan iborat.

Teledentistry orqali masofaviy tashxis va monitoring modeli



1-rasm. Teledentistry orqali masofaviy tashxis, triage va monitoringning klinik modeli.

Asosiy qism

Ushbu maqola birlamchi klinik tajriba emas, balki ikkilamchi dalillar sintezidir. Ustuvor manbalar sifatida 2023–2026-yillardagi teledentistry systematic review va meta-analysislar, umbrella-reviewlar, diagnostic accuracy sharhlari va O'zbekistonning telemeditsina hamda digital dentistry bo'yicha nashrlari olindi.

Natijalar to'rt domen bo'yicha tahlil qilindi: masofaviy kariyes diagnostikasi; oral soft-tissue va potentially malignant lesion diagnostikasi; ortodontik va boshqa longitudinal monitoring; access, efficiency, satisfaction va cost-related outcomes.

Kariyes diagnostikasiga oid 2024-yilgi systematic reviewda 709 topilma aniqlanib, 19 in-vivo tadqiqot kiritilgan. Sensitivity 48–98,3%, specificity 83–100%, inter-examiner kappa 0,44–0,91 va intra-examiner kappa 0,52–1,00 oralig'ida bo'lgan. Heterojenlik sabab meta-analysis o'tkazilmagan.

2025-yilgi clinical photography systematic review va meta-analysis 18 tadqiqot va 1300 ishtirokchini qamrab olgan. Emal kariyesi uchun pooled sensitivity 0,74 va specificity 0,95; dentin kariyesi uchun 0,81 va 0,98; any caries depth uchun 0,81 va 0,99 bo'lgan. Smartphone camera va intraoral camera o'rtasida performance farqi statistik jihatdan aniqlanmagan.

Oral lesions diagnostic meta-analysisda uch tadqiqot va 3783 bemor bo'yicha lesion detection sensitivity taxminan 0,92, specificity 0,93 bo'lgan. Differential diagnosisda pooled sensitivity 0,942 va specificity 0,982 ga yetgan. Heterojenlik yuqori bo'lgani sabab natijalarni universal cutoff sifatida ishlatish mumkin emas.

Ortodontik monitoring systematic review 1178 yozuvdan 4 tadqiqotni tanlagan. Aligner tadqiqotlari meta-analysisida teledentistry yuzma-yuz tashriflar sonini MD $-2,75$ va refinement boshlanish vaqtini MD $-1,21$ ga kamaytirgan. Evidence certainty GRADE bo'yicha very low deb baholangan.

2025-yilgi access systematic review 46 tadqiqotni kiritib, teledentistry oral healthcare access, timely diagnosis, treatment planning va patient outcomesni yaxshilashga xizmat qilishi mumkinligini ko'rsatgan. 2025-yilgi overview esa 30 systematic review bo'yicha ushbu xulosani kengroq tasdiqlagan.

Cost-effectiveness bo'yicha dalil ancha zaif. 2024-yilgi umbrella review 10 reviewni kiritgan va ko'pchilik manbalarda teledentistry cost-saving deb tasvirlanganini, biroq bu xulosa ko'pincha assumptions va past sifatli observational dataga tayanganini qayd etgan.

Ma'lumotlar dalil ierarxiyasi asosida talqin qilindi: meta-analysis kvantitativ natijalarga ustuvorlik berildi, ammo bias, heterogeneity, small sample va low certainty ochiq ko'rsatildi. Teledentistry samaradorligi face-to-face diagnosis bilan equivalence yoki clinically acceptable concordance kontekstida baholandi.

Yo'nalish	Dalil bazasi	Asosiy natija	Klinik talqin
Kariyes: clinical photography	18 study; 1300 participant	Emal Se/Sp 0,74/0,95; dentin 0,81/0,98; any depth 0,81/0,99.	High specificity; erta emal lezyonlarida sensitivity pastroq.
Oral lesions	Meta-analysis; 3783 patient	Detection $\sim 0,92/0,93$; differential diagnosis 0,942/0,982.	Remote oral-medicine triage uchun kuchli signal.

Yo'nalish	Dalil bazasi	Asosiy natija	Klinik talqin
Orthodontic monitoring	4 controlled study	Appointments MD –2,75; refinement start MD –1,21.	Aligner follow-upni optimallashtirishi mumkin; certainty very low.
Access	46-study systematic review	Timely diagnosis, treatment planning va access yaxshilangan.	Uzoq va underserved hududlar uchun ayniqsa foydali.
Overview of reviews	30 systematic reviews	Effectiveness 22/30; patient-centered care 14/30; efficiency 11/30.	Teledentistry ko'p domenli foyda ko'rsatadi, evidence sifati turlicha.

1-jadval. Teledentistry samaradorligining asosiy dalillari.

XULOSA

Teledentistry stomatologik kasalliklarni masofadan screening, triage va monitoring qilishda klinik jihatdan samarali va istiqbolli vositadir.

Kariyesni klinik fotosuratlardan aniqlashda pooled specificity 0,95–0,99, sensitivity 0,74–0,81 diapazonida bo'lib, ayniqsa dentin va aniq lezyonlarda yuqori diagnostik ishonchlilik ko'rsatadi. Erta emal kariyesi uchun face-to-face/radiographic confirmation zarur bo'lib qoladi.

Oral soft-tissue lesionlarda teledentistry high sensitivity va specificity ko'rsatadi va specialist referral hamda oral-cancer triageni tezlashtirish imkonini beradi. Biroq biopsy va physical examinationni almashtira olmaydi.

Ortodontik masofaviy monitoring aligner bemorlarida yuzma-yuz tashriflarni o'rtacha 2,75 taga kamaytirishi va refinementni ertaroq boshlashga yordam berishi mumkin, lekin dalil ishonchliligi hozircha juda past.

Teledentistry access-to-care, travel burden, waiting time va patient convenience bo'yicha ijobiy natijalar ko'rsatadi. Cost-effectiveness esa hozircha yetarli yuqori sifatli iqtisodiy dalil bilan tasdiqlanmagan.

Teledentistry samaradorligining asosiy shartlari standardized imaging, secure data transfer, aniq escalation/referral criteria, clinician training va patient digital literacy hisoblanadi.

O'zbekistonda teledentistry uchun eng maqbul boshlang'ich yo'nalishlar maktab skriningi, chekka hududlarda oral lesion/caries triage, orthodontic monitoring va postoperative follow-up bo'lishi mumkin.

Kelgusida mahalliy ko'p markazli tadqiqotlar diagnostik accuracy, patient outcome, cost, equity va cybersecurityni birgalikda baholashi kerak.

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