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Insights from the Frontlines: An Expert Panel on Data Science, Medical Informatics, and Clinician Perspectives on AI in Telehealth

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ABSTARCT

This article provides a comprehensive report on the significant gathering of experts from diverse disciplines, including data science, medical informatics, clinical practice, health information technology, and medical engineering, held on February 16, 2025. The primary objectives of the meeting were to examine the latest advancements in artificial intelligence (AI) tools applicable to telehealth, explore the challenges of implementing AI in telehealth, analyze national experiences in telehealth implementation, and promote collaboration among healthcare professionals to support these innovations. The event attracted approximately 200 participants, with 60 individuals attending in person at the Smart University of Medical Sciences and approximately 140 connecting virtually from various regions across the nation. This report delineates the critical topics addressed during the meeting, highlighting expert recommendations based on national and international experience. By consolidating insights from distinguished participants, the report sought to underscore the pivotal role of AI in transforming telehealth services and improving patient care. These discussions reflected a consensus on the necessity of advancing AI implementation within healthcare frameworks, fostering innovative practices, and adapting to emerging technological trends in telehealth. The recommendations issued by the panel aim to inform and guide policymakers in enhancing the efficacy of telehealth systems on both the national and global scales.

Keywords: Telemedicine, Telehealth, Artificial Intelligence, Generative Artificial Intelligence

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Highlights:

On February 16, 2025, a multidisciplinary panel of 200 experts convened to explore the evolving role of artificial intelligence in telehealth. The discussions highlighted recent advancements, implementation challenges, and global experiences. The panel's consensus recommendations underscored the importance of integrating AI into healthcare systems to enhance telehealth delivery and guide evidence-informed health policy.

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1. Introduction

Telehealth, which employs digital technologies to deliver healthcare services remotely, has become increasingly important in modern healthcare systems. Its ability to overcome geographical barriers, reduce costs, and improve access to care has been well documented. However, the true potential of telehealth is only now being realized through the integration of Artificial Intelligence (AI), which promises to further enhance efficiency, personalize treatment, and improve patient outcomes. The integration of AI and telehealth represents not just a technological advancement, but a fundamental shift in the delivery and management of healthcare **(1)**.

AI can assist in the interpretation of patient data from remote monitoring devices such as wearable sensors, providing real-time alerts to healthcare providers about potential health issues before they escalate **(2)**. AI also enables more personalized and engaging patient care experiences in telehealth **(3)** analyzing vast amounts of patient data, including medical history, lifestyle factors, and genetic information, AI algorithms can identify individual patient needs and preferences, and tailor treatment plans and interventions accordingly **(3, 4)**.

AI empowers healthcare professionals to deliver more effective, efficient, and patient-centered care.

The exchange of experiences related to the implementation of AI in Iran and other countries has the potential to significantly influence the trajectory of advancement in this field. Furthermore, the introduction of AI tools, coupled with a thorough understanding of their associated benefits and risks, can provide valuable insights that are essential for developing an appropriate model for the application of artificial intelligence in telemedicine.

The primary objectives of the meeting are to examine the latest advancements in artificial intelligence (AI) tools applicable to telehealth, evaluate the integration of AI solutions within existing telehealth platforms to enhance operational efficiency, investigate strategies for utilizing AI to improve patient experience, analyze emerging trends in the intersection of AI and telehealth, and promote collaboration among healthcare professionals to facilitate these innovations.

2. Protocol

2.1 Role of AI in Self-Management of Chronic Diseases

Farhad Fatehi: Centre for Health Services Research, The University of Queensland, Brisbane, Australia

Fatehi presented several projects that integrated AI into health care. These include:

- **Mobile-based and cloud-based systems for diabetes care use** an FDA-approved AI-powered insulin titration system for healthcare providers **(5)**.
- **MiSmart Heart Project:** AI was applied to promote behavior change in heart attack patients, focusing on secondary prevention with a 42% adherence rate **(6-8)**.
- **Cory COVID-Bot:** An AI chatbot designed to engage minority and immigrant populations using behavior change techniques during the COVID-19 pandemic **(9, 10)**.
- **mindLAMP App:** A pilot study using mobile phone sensors for digital phenotyping to gain behavioral and psychological insights.
- **Ongoing Research:** Focuses on patient trust in AI, examining trustworthiness, usefulness, transparency, and explainability **(11)**.

2.2 AI application in Telemedicine

Asghar Ehteshami: Health Information Technology Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

Ehteshami highlighted that over 60% of US healthcare facilities use telemedicine, and AI can significantly improve it. AI enhances patient care, accelerates disease screening, personalizes diagnoses, reduces in-person visits, optimizes care, improves outcomes, and expands access to integrated care. He mentioned the role of AI in the telemedicine market, specifically in software and services. The forecasted market size for 2033 is USD 138.2 billion.

Some specific AI applications include medical image analysis in teleradiology, telepathology, teledermatology, and teleophthalmology; telemonitoring; ankle rehabilitation; faster data exchange; rapid vital sign assessment; chatbot triage; dementia prediction; ocular condition screening; and quick identification of ischemic infarction in stroke patients were introduced **(12-14)**.

2.3 Practical Implementation of Telemedicine and Simultaneous Provision of Digital Health Services and Digital Education

Seyed Farzin Mircharaghi: The Head of Educational Affairs at Gonabad University of Medical Sciences, Gonabad, Iran

Mircheraghi discussed the implementation of telemedicine and digital health services, highlighting a university-based virtual clinic developed in 2015 that expanded to eight centers in Gonabad and Bojestan. Key initiatives included online morning reports with specialists from the University of Maryland and Kerman University of Medical Sciences, a virtual clinic for patients with diabetes (diabetes and ophthalmology specialists), and the GMUe-HME project offering telemedicine services across three tiers. Ethical considerations and human resource training were integral to the project, and were commended by the relevant authorities.

2.4 Redefining Healthcare Work Models A Foundation for AI and Telehealth Integration

Manuel Gonzalez: Department of Epidemiology and Global Health at the University of Umeå, Sweden & Honorary Senior Lecturer University of Queensland, Brisbane, Australia

Gonzalez discussed the Swedish experience with telemedicine, advocating equal reimbursement rates and EHR documentation comparable to in-person visits (without audio/video recordings). He highlighted the global disparities in treatment access and healthcare professional burnout, suggesting that telemedicine and AI are potential solutions. A motivated workforce with flexible workflow, training, and interdisciplinary collaboration is crucial. The VuG project (2019-2023) aimed to recruit and retain geographically independent physicians for telehealth, enhance equity, and promote technology adoption based on clinical needs. Successful implementation requires strong collaboration, user-centric solutions, revised perspectives from leaders/policymakers, cross-regional collaboration, regulatory frameworks, and the testing of innovative models **(15, 16)**.

2.5 The Future of Telehealth: Exploring Generative AI innovations

Azam Aslani: PhD (Medical Informatics), Smart University of Medical Sciences, Tehran, Iran

Aslani emphasized AI's revolutionary role of AI in telemedicine, starting with a timeline highlighting the introduction of deep learning in 2012. Generative AI improves predictive analytics of patient outcomes. Key statistics show that it enhances imaging accuracy by up to 30%, accelerates drug discovery by 30-50% while reduces costs by up to 60%, and improves treatment outcomes by 20% with AI-assisted customized plans. The challenges of AI implementation in telehealth include:

Compliance: Adhering to regulations like HIPAA (Health Insurance Portability and Accountability Act).

Interoperability: Ensuring AI systems work seamlessly with current electronic health records (EHR) and other healthcare technologies.

Data Quality: AI algorithms require high-quality, diverse datasets for accurate predictions and recommendations.

Efficacy: AI tools must be clinically validated to ensure they improve patient outcomes.

Personalization: AI must be able to provide personalized care without compromising the human touch.

Implementation Costs: Initial investment in AI technology can be high, which may deter smaller practices.

Approval Processes: Navigating the regulatory landscape for AI medical devices can be complex and time-consuming.

Resistance to Change: Healthcare providers may be hesitant to adopt new technologies due to comfort with existing practices **(17)**.

She also discussed the knowledge gaps in applying LLMs in telehealth and reported a decline in Iran's Government AI Readiness Index score from 63.46 to 31.5 between 2022 and 2023. The research institute Oxford Insights, in its 2023 report on governments' readiness to implement artificial intelligence, ranked Iran 94th out of 193 countries. This ranking assessed indicators related to government, technology, data and infrastructure, with Iran receiving an overall score of 42.07 across these categories (Table 1) **(18)**.

Table 1. Material properties assigned to components of the finite element model.

Pillars	Score	Dimensions
Government	31.56	Strategic vision, digital capacity, adaptability, ethics
Technology	38.77	Maturity, innovation capacity, human capital
Data & Infrastructure	55.88	Data availability, data representativeness, infrastructure
	42.07	

2.6 Artificial Intelligence-Based Diagnostic Tools in Telemedicine

Mohammadreza Momenzadeh: Department of Artificial Intelligence, Smart University of Medical Sciences, Tehran, Iran

Momenzadeh discussed various AI techniques and algorithms used for processing medical data, including artificial neural networks, deep learning, regression models, clustering models, genetic algorithms, fuzzy models, large-language models, and probabilistic statistical models. He highlighted AI applications in diagnostic areas, such as medical imaging, skin, eye, heart, neurological, mental, and genetic diseases, as well as remote health monitoring and clinical decision support. Finally, he introduced relevant software, such as IBM Watson Health, Aidoc, Skin Vision, IDx-DR, Cardiologs AI, Current Health, Woebot Health, Neurotrack, and Deep Genomics.

2.7 Use of Telespeech Therapy and Artificial Intelligence in the Treatment of Speech Disorders

Mohammad Reza Afrash: Department of Artificial Intelligence, Smart University of Medical Sciences, Tehran, Iran

Afrash presented a review of telespeech therapy for speech disorders, highlighting its use in treating conditions like aphasia, stuttering, and Parkinson's-related speech issues. The review, encompassing 52 studies, found that video conferencing is the primary delivery method, with services provided mainly synchronously. He emphasized the role of AI in analyzing speech, personalizing treatment through machine learning, and continuously monitoring patient progress. The talk concluded that integrating telespeech and AI offers a flexible and cost-effective solution, particularly for remote areas, and that further AI advancements and training will enhance its effectiveness **(19)**.

3. Results and Discussion

A recent discussion explored the multifaceted role of AI in reshaping healthcare, encompassing self-management of chronic diseases, advancements in telemedicine, and diagnostic tools. Experts like Dr. Fatehi showcased AI's potential in empowering patients through mobile health systems and behavior change interventions, while emphasizing the critical need for patient trust via transparency and explainability. Dr. Ehteshami highlighted AI's transformative impact on telemedicine, citing improvements in diagnostics, personalized care, and accessibility. Dr. Mircharaghi shared practical insights on telemedicine implementation, underscoring ethical considerations and workforce training. Dr. Gonzalez stressed the importance of a motivated workforce and user-centric solutions for successful integration, advocating for policy changes to support telemedicine. Dr. Aslani focused on generative AI's revolutionary potential in enhancing telehealth, while also pointing out existing knowledge gaps and readiness challenges. Finally, Dr. Momenzadeh detailed AI's diagnostic capabilities and introduced related software. The discussion underscored the vast opportunities and critical considerations for AI's integration into healthcare, including ethical concerns, accessibility, workforce evolution, and regulatory frameworks. Recommendations for AI implementation in telehealth include: enhancing government engagement, increasing investment in AI initiatives, promoting public awareness and education, strengthening technological infrastructure, leveraging data for AI projects, and developing monitoring and evaluation mechanisms.

In Conclusion, AI is revolutionizing the future of telemedicine. Artificial intelligence is poised to transform healthcare through telemedicine, enabling personalized treatments tailored to individual patient needs and proactive disease prevention via early detection. To address workforce shortages and rising healthcare demands, it's vital to redesign workforce models. Successful implementation of telehealth and AI hinges on strong collaboration among healthcare professionals and the cultivation of a supportive peer community to ensure long-term sustainability.

4. Declarations

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Ethical Considerations

Not applicable.

Conflict of Interest

The authors declare that they have no competing interests.

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