



TELEHEALTH READINESS AND ITS RELATED FACTORS AMONG HEALTH CARE PROVIDERS AT SAUDI ARABIA: SYSTEMATIC REVIEW

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ABSTRACT

Introduction: Telemedicine and telehealth have revolutionized the healthcare industry by offering remote treatment services using telecommunications technology. While many nations have integrated these technologies to improve healthcare quality, many deployments encounter considerable challenges. Despite advances in telemedicine acceptability, significant gaps exist in understanding healthcare professionals' preparedness to utilize new technologies, notably in Saudi Arabia.

Objective: The purpose of this systematic review was to analyze and map the current literature on telehealth readiness among Saudi healthcare practitioners, focusing on the factors that influence their willingness to use telehealth services.

Methodology: A comprehensive search was carried out across numerous academic databases, including PubMed, Scopus, and Google Scholar, using preset keywords relevant to telehealth readiness. The inclusion criteria centered on peer-reviewed empirical research published between 2022 and 2024 that particularly evaluated telehealth preparation among Saudi healthcare practitioners.

Results: Five relevant studies were discovered and evaluated. The findings revealed a general excitement for telehealth services among healthcare professionals; nevertheless, there were considerable knowledge gaps and impediments to effective implementation. Issues such as a lack of knowledge, insufficient training resources, and systemic issues hampered comprehensive telehealth integration. Notably, while pharmacists exhibited a high desire to participate in telepharmacy practices, other healthcare workers showed significant diversity in their comprehension and preparedness to utilize telehealth technology.

Conclusion: The analysis reveals the potential for telehealth services among Saudi healthcare practitioners, as well as significant knowledge and infrastructure shortages. To ensure effective adoption, specific educational programs, supporting policies, and training resources are required to connect healthcare practitioners' skills with their favorable attitudes regarding telehealth. Addressing these problems is critical to attaining the healthcare goals established in Saudi Vision 2030, which will eventually improve patient care and accessibility across the region.

Keywords: Telehealth Readiness, Related Factors Among, Health Care, Providers.

Introduction

Telemedicine is the use of computer software and telecommunications technology to provide



therapeutic services remotely (Albarrak et al., 2021). Telehealth and telemedicine have profoundly revolutionized the healthcare sector, creating novel platforms for delivering medical treatments remotely (Al-Wathinani, et al., 2024).

Telemedicine is the use of electronic information and communication technology to offer and assist clinical treatment remotely, whereas patient support and professional health-related education, public health, and health administration when distance separates the participants is called telehealth (Albarrak et al., 2021). Various nations throughout the world incorporated telemedicine into their health systems to enhance the health quality of their populations and modernize their health systems, however many of them were not effectively implemented (Wubante et al., 2022). Over 75% of telemedicine system proposals failed to make major contributions to the global health system (Sagaro et al., 2020).

Successfully implementing a telemedicine system readiness assessment is an important factor in the adoption and utilization of telemedicine systems in health institutions (Mauco et al., 2018). Currently, the conventional health care system aims to improve the efficiency, equity, and contribution to cost-effectiveness in healthcare by means of particular telemedicine applications like remote patient monitoring and remote healthcare delivery (Bashir et al., 2023).

The telemedicine Guide for Evaluating Health Care Telecommunication Systems defined telemedicine use as the provision and support of health care made possible by electronic and telecommunications technology when distance separates the participants (Barnawi et al., 2024).

It involves using tools, services, knowledge, and communication technology combined online or remotely into diagnosis, treatment, rehabilitation, and medical decision-making (Barnawi et al., 2024). Overcoming physical distances, the technology enables remote picture analysis and consultation with medical specialists (Nigatu et al., 2024). Implementing teleradiology has many benefits, including enabling healthcare providers to provide timely diagnosis, to avoid patient travel, to reduce out-of-pocket travel expenses, to decrease radiology report waiting time, to avail the service at all the times and to minimize patient transfer (Nigatu et al., 2024). Telehealth, according to the evidence, also makes it easier to provide tailored healthcare (Sayed et al., 2025). The term "personomics" describes aspects of personalized healthcare based on understanding the patient's health beliefs, personalities, social networks, economic resources, and other life circumstances that have notable effects on how and when a specified health condition will manifest and how it will react to treatments (Sayed et al., 2025).

Personalized healthcare is a popular concept that offers a tailored approach to improve the patient's health and prevent sickness, using a consistent method for individual patients can diminish success rates and result in costly and laborious follow-up visits (Record et al., 2021). To obtain the greatest health results, personalized healthcare makes use of predictive technology to identify specific health concerns and encourages people's involvement in their health (Record et al., 2021).

Saudi Arabia's Ministry of Health developed the programs to boost information communication technology (ICT) in order to supply national health care services (Badriah Mousa, et al., 2024). Saudi Arabia's Ministry of Health recently implemented an e-Health plan that involves the use of telemedicine to increase patient accessibility and service quality (Albarrak et al., 2021). In addition to the Vision 2030 plan, the Saudi government is promoting healthcare innovation and entrepreneurship through several initiatives (Alharbi et al., 2023). Telemedicine has been more popular among health professionals in Saudi Arabia's hospitals in recent years. An exhaustive survey of literature in the field



of telemedicine in Saudi Arabia resulted in a few articles in the identification of hurdles, problems of telemedicine, knowledge and attitude of health professionals toward telemedicine (Albarrak et al., 2021).

Despite recent advances and increased acceptance of telemedicine in Saudi Arabia, there is still a considerable gap in understanding the factors of telehealth readiness among healthcare professionals. While several research has investigated the barriers and attitudes toward telemedicine, detailed systematic examinations of healthcare practitioners' preparedness to use telehealth services are scarce. Furthermore, previous research has not adequately investigated the precise elements that impact healthcare professionals' willingness to use telehealth technologies, such as training, technical infrastructure, institutional support, and provider-related factors. The aim of this systematic review was to explore and map the existing literature regarding telehealth readiness among healthcare providers in Saudi Arabia.

Methodology

Using a methodical methodology, this systematic study sought and mapped the body of evidence on telehealth preparedness among Saudi Arabian healthcare professionals. Following accepted systematic review norms, the approach guaranteed a thorough overview of the pertinent research by means of a comprehensive search strategy, clear inclusion and exclusion criteria, and a systematic data extraction procedure.

Search Strategy

Many academic databases, including PubMed, Scopus, Web of Science, and Google Scholar were searched extensively for material. To find a broad spectrum of pertinent papers, the search included predefined

keywords like "telehealth ready," "healthcare providers," "Saudi Arabia," "Technology". After the first search, reference management tools helped to arrange the results so that duplicate entries could be eliminated; the titles and abstracts of the studies were then methodically reviewed using the pre-defined inclusion and exclusion criteria.

Inclusion Criteria

Particular criteria were developed to guarantee the relevance and quality of the papers incorporated in this systematic review. Between January 2022 and December 2024 eligible studies must be peer-reviewed empirical research papers, systematic reviews, or pertinent policy documents published. Healthcare practitioners in Saudi Arabia including doctors, nurses, administrators, and allied health professionals were given particular attention. Research has to specifically examine elements of telehealth preparedness, including infrastructure, training, support systems, and provider attitudes. Moreover, included papers need publication in English to guarantee research team comprehensibility.

Exclusion Criteria

The review rejected research that fell short of the given standards. This included non-peer-reviewed works like editorials, opinion pieces, conference papers without enough data. Eliminated were studies targeted on telehealth practices outside of Saudi Arabia or those without clear address of healthcare provider preparation for telemedicine. Articles devoid of sufficient methodological rigor or those without pertinent analysis on telehealth preparedness were also removed. Non-English articles were excluded to keep analysis consistent and clear.

Selection Process



The search for 2024 produced 75 items overall. After deduplication, 45 items stayed for review. Later screening of the titles and abstracts resulted in the exclusion of 30 papers failing the inclusion criteria. This produced 15 papers that were carefully searched for eligibility using full text. Ten papers in all were eventually under closer examination, and five of them were excluded because they lacked original study data or fit the review objectives less. As a result, this systematic review comprises five pertinent research that help to clarify telehealth preparedness among Saudi Arabian healthcare professionals. See table (1).

Data Extraction

Key information from the chosen research was methodically gathered under the data extraction procedure. For research design, author(s), year of publication, methods, and results we recorded documentation for analysis. See Figure 1 for a PRISMA flowchart built to graphically show the phases of the systematic review process, therefore showing the journey from first search results to the final choice of pertinent material. The aggregated results of the five included studies were then examined to spot trends, themes, and gaps in the body of current knowledge on telehealth preparedness among Saudi Arabian healthcare practitioners.

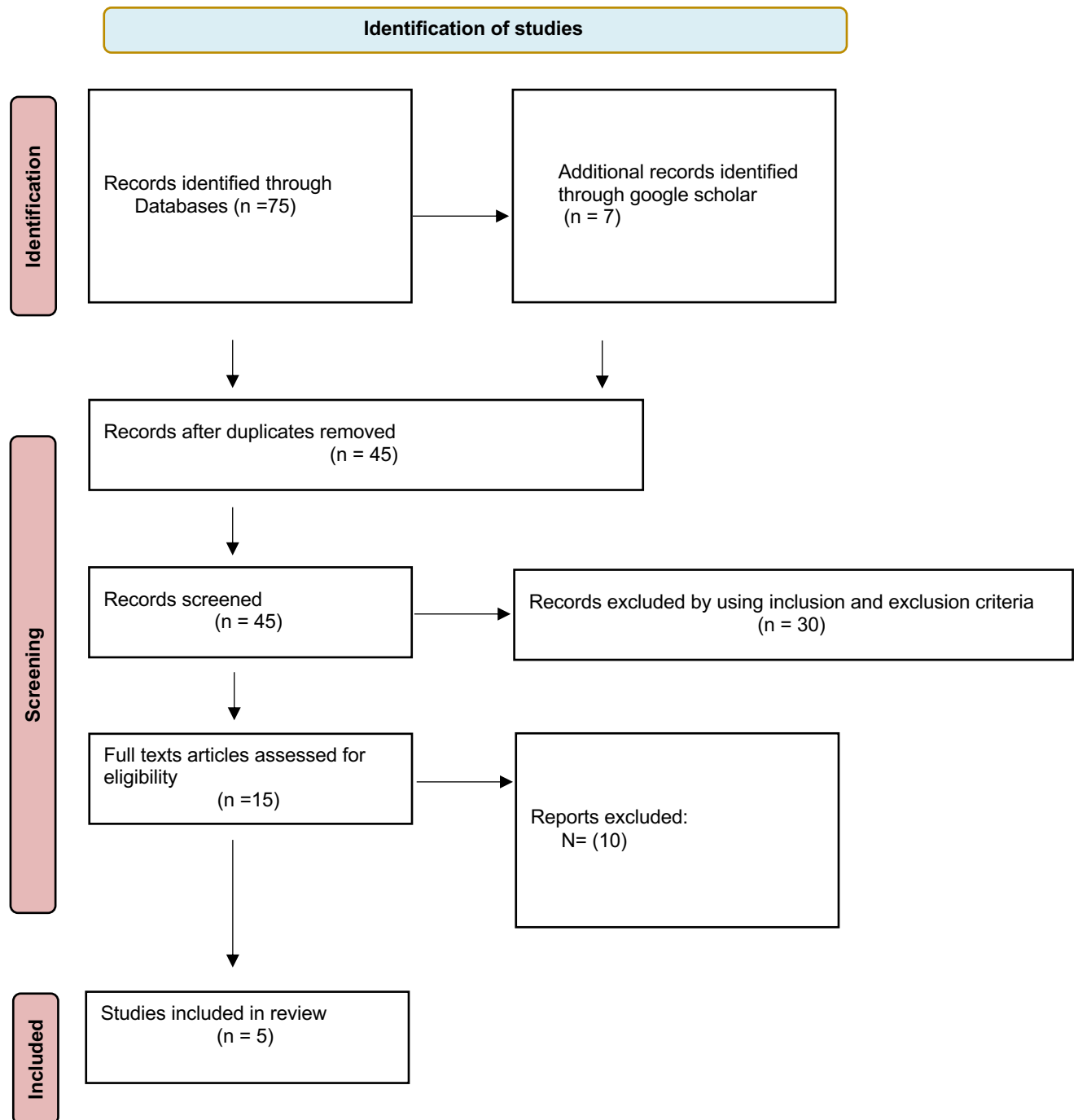


Fig. 1. PRISMA 2009 Flow Diagram

Results

We offer an overview of the findings from several research on telehealth, with an emphasis on healthcare professionals' knowledge, attitudes, and preparedness to adopt technological developments. The research shows that healthcare personnel are generally eager to utilize telehealth services, however knowledge gaps and particular hurdles remain. Key research demonstrate a variety of opinions on telemedicine and telepharmacy, stressing age, gender, education level, and cultural effects

on attitudes. Furthermore, satisfaction levels with current telehealth frameworks, such as call centers, are investigated, offering insights into the benefits and problems experienced by professionals in the sector. This summary intends to educate current telehealth activities and overcome identified barriers to better serve healthcare practitioners and patients alike. See Table (1).

Table (1): Summary of the related studies			
Author	Aim	Study Design	Results
Ozbak et al. (2022)	To assess the knowledge, perceptions, and readiness of telepharmacy among pharmacists in the outpatient clinics setting.	Cross Sectional	The study of 200 patients found a strong willingness (75.0%) for telepharmacy services among participants, who were primarily aged 20 to 40 and had lower education levels. The use of pharmacist-led telemedication management led to significant improvements in clinical outcomes and patient satisfaction.
Bashir et al. (2023)	To evaluate the knowledge and perspectives of healthcare professionals at King Fahad Medical City, Saudi Arabia, toward telemedicine.	Cross sectional	Of 370 healthcare professionals surveyed, 63.7% had limited knowledge of telemedicine. The overall attitude was positive (mean score of 3.26), with physicians scoring highest (3.69) compared to allied health professionals (3.31) and nurses (3.07). Education and nationality minimally influenced attitudes, indicating a need for focused educational initiatives.
MAJRASHI et al. (2023)	The aim of the study was to assess the willingness of healthcare professionals in Saudi Arabia to work in e-	Cross sectional	Of the 301 medical professionals polled in Saudi Arabia, 81.7% were eager to work in e-hospitals. Age and

	hospitals and to identify the perceived facilitators and barriers associated with this transition.		acquaintance with e-health were major favorable characteristics, but gender and education level had no significant effect on willingness. Supporters cited advantages such as enhanced efficiency, while skeptics cited challenges such as time restrictions and policy issues.
Badriah Mousa et al. (2024)	To examine the telehealth knowledge and perspectives of healthcare professionals in Saudi Arabia.	Systematic Review	The analysis found that while providers have a favorable stance on telehealth, noting its benefits in enhancing treatment, they also have limited expertise and face problems such as inadequate support, privacy concerns, and high prices, which are impacted by demographics and job experience.
Al-Wathinani et al. (2024)	To assess healthcare professional (HCP) satisfaction with the call center, identify challenges faced, and provide recommendations for improvement.	Cross sectional	The survey discovered that 86.8% of healthcare professionals were pleased with the contact center, noting its simplicity of use and efficacy, while also identifying issues such as distant assessment accuracy and the need for defined telehealth laws.

Discussion

The purpose of this systematic study was to analyze and map the available literature on telehealth preparedness among Saudi healthcare practitioners. The results of the research analyzed show both a potential interest in telehealth services and major gaps in knowledge and preparation that must be addressed for successful deployment.

Ozbak et al.'s (2022) research underlined the crucial function of pharmacists in outpatient telemedicine settings, making it a key study in this review. The results revealed that 75.0% of participants were



eager to use telepharmacy services, which would be especially beneficial for chronic disease treatment. In contrast, Bashir et al. (2023) found that 63.7% of healthcare professionals at King Fahad Medical City had limited knowledge of telemedicine, implying that, despite Ozbak et al.'s positive attitudes, a foundational knowledge base is lacking across various healthcare professions. The disparity between willingness to use telehealth and actual understanding underscores the critical need for comprehensive educational programs aimed at increasing telehealth competence among healthcare practitioners.

MAJRASHI et al. (2023) gave a more in-depth look at healthcare professionals' perspectives regarding e-hospitals. Their survey found that 81.7% of medical professionals were interested in working at e-hospitals, which is consistent with Bashir et al.'s positive attitude. However, the highlighted hurdles, such as time restrictions and insufficient legislation, demonstrate a gap between interest and real competence to shift to such models. This disparity highlights the importance of focused actions to strengthen support systems and lower perceived obstacles for healthcare providers shifting to e-hospital environments.

While Badriah Mousa et al.'s (2024) comprehensive study found that doctors have generally positive opinions regarding telehealth, it also identified significant barriers such as limited support, privacy concerns, and high costs. This duality is consistent with the findings of Al-Wathinani et al. (2024), who found that while 86.8% of healthcare professionals were satisfied with call center services, significant challenges were identified in terms of the accuracy of remote medical evaluations and the need for clear telehealth regulations. These disparate results may indicate that, while healthcare professionals value the efficacy of telehealth services, systemic challenges impede their overall experiences and perceptions.

The repeating topic of knowledge gaps in research suggests that professional training and education are important options to explore. For example, Bashir et al. discovered that the lack of awareness was particularly prominent among healthcare personnel, which reflected Badriah et al., (2024), Mousa et al. (2024) results on demographic impacts on views. The need for improved training resources is critical in overcoming the identified hurdles and empowering healthcare providers to integrate telehealth more seamlessly into their practice setups.

Furthermore, the encouraging outcomes of pharmacist-led telemedicine programs, as noted by Ozbak et al. (2022), contrast with the general skepticism demonstrated in the research of MAJRASHI et al. and Badriah et al. (2024). These findings reveal that, while some sectors such as telepharmacy demonstrate readiness and positive outcomes, Saudi Arabia's total healthcare infrastructure requires significant expansion to improve preparation for widespread telehealth deployment.

Conclusion

In conclusion, our systematic assessment found tremendous excitement for telehealth services among Saudi healthcare practitioners, as well as key knowledge and infrastructural gaps that restrict efficient adoption. Comparing findings from various studies reveals that, while certain areas of telehealth demonstrate readiness, systemic educational initiatives and supportive policies must be prioritized in order to align healthcare providers' capabilities with their positive attitudes toward telehealth and ensure the successful implementation of these services. Addressing these problems will be critical to meeting the lofty healthcare goals established in Saudi Vision 2030, eventually improving patient care and access throughout the region.

Recommendations



Based on the systematic study results, numerous recommendations may be made to improve telehealth readiness among Saudi healthcare professionals. First, it is critical to create and implement comprehensive instructional programs designed exclusively for healthcare workers. These programs should focus on raising knowledge and understanding of telehealth practices, legal frameworks, and technology tools in order to close the knowledge gaps highlighted in previous research. Second, developing a supporting framework with defined telehealth norms and guidelines can help assuage worries about the accuracy of remote assessments while also protecting patients' privacy. Furthermore, involving healthcare workers in regular training and competence tests will increase their confidence in using telehealth technology efficiently. Furthermore, healthcare organizations should explore incorporating telehealth services into established practice processes to reduce interruptions and increase provider adoption. Finally, tackling systemic constraints such as task management, motivating participation in telehealth projects, and improving infrastructure to support telehealth capabilities would be critical to increasing accessibility and efficacy. By implementing these measures, stakeholders can build a strong ecosystem that encourages the effective use of telehealth services, eventually enhancing healthcare delivery and patient outcomes in Saudi Arabia.

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