

Midocean University

College of Management

Department of Master of Project Management



Barriers to the Implementation of Telehealth Among Allied Healthcare Providers in the Riyadh Second Health Cluster:

An Investigative Study

Prepared by:

Ohouad Dakelallah Alotaibi

Academic ID:

232000182

Supervised by:

Dr. Alfaisal Abdelhameed Mohamed

Dr. Fayez Ali Jrad

Year: 2024

1. Introduction:

Telehealth has emerged as a transformative force in healthcare, leveraging technology to provide remote medical services. It offers a vital solution to the limitations of traditional healthcare delivery models, especially in regions with geographic, social, or economic barriers (Anawade, Sharma and Gahane, 2024). In the Riyadh second health cluster, telehealth presents an opportunity to bridge gaps in care for home healthcare patients, particularly those without primary caregivers, who are often excluded from comprehensive care due to stringent enrolment requirements.

The Riyadh second health cluster represents a significant portion of the population in Saudi Arabia, with a diverse demographic that includes a substantial number of patients requiring home healthcare services. The integration of telehealth into this cluster aims to enhance patient access to medical and allied healthcare providers, offering continuous, coordinated care across various specialties (Haynes, et al., 2021). Despite the potential benefits, the adoption and implementation of telehealth services among allied healthcare providers have been notably slow, posing a significant challenge to the healthcare system's overall efficiency and effectiveness (Barrett, Howlett, Lal and McKinstry, 2024).

Allied healthcare providers, including physical therapists, occupational therapists, speech therapists, dietitians, and social workers, play a crucial role in delivering holistic care. Their engagement in telehealth is essential for ensuring comprehensive patient management, yet their participation has lagged behind that of medical professionals such as nurses and physicians (Barrett, Howlett, Lal and McKinstry, 2024). This research seeks to investigate the reasons behind this slow uptake, aiming to identify barriers and propose solutions to enhance telehealth adoption among allied healthcare providers.

2. Problem Statement:

The slow implementation of telehealth among allied healthcare providers in the Riyadh second health cluster limits the ability of the healthcare system to deliver complete and integrated care to home healthcare patients, particularly those lacking primary caregivers. This research aims to address this issue by identifying the barriers to telehealth adoption within this group and exploring strategies to overcome these challenges.

3. Study Importance:

This study is significant as it addresses a critical gap in the implementation of telehealth services, focusing on allied healthcare providers who are essential for comprehensive patient care. By identifying and addressing the barriers to telehealth adoption, this research can contribute to the improvement of healthcare delivery models in the Riyadh second health cluster. The findings will have implications for healthcare policy, organizational practices, and future research, potentially leading to more effective and inclusive telehealth services that benefit a broader patient population.

4. Study Purposes:

4.1 Primary Purpose:

1. To assess the reasons for the slow adoption of telehealth services among allied healthcare providers in the Riyadh second health cluster.

4.2 Specific Purposes:

1. To identify technological barriers hindering telehealth implementation among allied healthcare providers.
2. To explore organizational and policy-related barriers affecting telehealth adoption.
3. To examine socio-cultural factors contributing to the slow uptake of telehealth services.
4. To propose actionable recommendations for improving telehealth adoption among allied healthcare providers.

5. Study Questions:

5.1 Main Research Question:

1. What are the barriers to the adoption of telehealth services among allied healthcare providers in the Riyadh second health cluster?

5.2 Sub-questions:

1. What technological barriers are faced by allied healthcare providers in implementing telehealth?
2. How do organizational policies and structures impact the adoption of telehealth services?

3. What socio-cultural factors influence the acceptance and use of telehealth among allied healthcare providers?
4. What strategies can be recommended to enhance the adoption of telehealth services?

6. Research Hypotheses:

1. Technological barriers significantly hinder the adoption of telehealth among allied healthcare providers in the Riyadh second health cluster.
2. Organizational policies and structures negatively impact the adoption of telehealth services among allied healthcare providers.
3. Socio-cultural factors play a critical role in the acceptance and use of telehealth among allied healthcare providers.
4. Addressing identified barriers through targeted strategies will enhance the adoption of telehealth services

7. Literature Review:

7.1 Introduction:

The adoption of telehealth services has the potential to significantly enhance the accessibility and quality of healthcare, particularly for home healthcare patients who may lack primary caregivers (Pogorzelska-Maziarz, et al., 2021). However, the uptake of telehealth among allied healthcare providers in the Riyadh second health cluster has been notably slow, impeding the delivery of comprehensive care across the healthcare continuum. This literature review examines the existing body of research on telehealth adoption, focusing on the dependent variable of telehealth adoption itself and the independent variables influencing it, including technological barriers, organizational and policy-related barriers, and socio-cultural factors.

7.2 Dependent Variable - The Adoption of Telehealth Services by allied healthcare providers:

The dependent variable in this study is the adoption of telehealth services by allied healthcare providers. Adoption refers to the extent to which these providers incorporate telehealth technologies into their routine practice. It encompasses various aspects, including the frequency of

use, the range of services offered via telehealth, and the integration of telehealth into standard care protocols (Sharma, Pruthi and Sageena, 2022).

Definition and Scope: Adoption of telehealth involves the use of digital communication tools to deliver healthcare services remotely. It includes video consultations, remote monitoring, and digital communication between providers and patients (Bokolo Jnr, 2021).

Significance: The successful adoption of telehealth can lead to improved patient outcomes, enhanced access to care, and more efficient healthcare delivery, particularly in home healthcare settings where patients may lack primary caregivers (Zhang and Saltman, 2022).

7.3 Independent Variables:

The independent variables influencing the adoption of telehealth services among allied healthcare providers in the Riyadh second health cluster include several key factors. This section discusses these factors comprehensively, with a focus on technological barriers, organizational and policy-related barriers and socio-cultural factors.

7.3.1 Technological Barriers:

(Al-Samarraie, Ghazal, Alzahrani and Moody (2020) eluded that technological barriers play a significant role in the adoption of telehealth services. These barriers encompass various aspects related to the infrastructure, technical skills, and usability of telehealth systems. Understanding these barriers is crucial for developing strategies to enhance telehealth adoption (Sharma, Pruthi and Sageena, 2022).

7.3.1.1 Infrastructure:

According to Kobeissi and Hickey (2023), infrastructure is a fundamental requirement for the successful implementation of telehealth services. It includes the availability and reliability of internet connectivity and the quality of telehealth platforms (Omboni, et al., 2022).

Internet Connectivity: Reliable and high-speed internet connectivity is essential for effective telehealth services (Doaks, 2021). Studies have shown that poor internet infrastructure can significantly hinder the use of telehealth, particularly in rural or underserved areas (Siddiquee, et al., 2020). For example, a study by Al-Samarraie, Ghazal, Alzahrani and Moody (2020) highlighted

that inadequate internet access is a major barrier to telehealth adoption in many regions. In the context of the Riyadh second health cluster, any deficiencies in internet connectivity could impede allied healthcare providers' ability to conduct virtual consultations and remote monitoring effectively.

Telehealth Platforms: The functionality and performance of telehealth platforms also affect their adoption (Wang , Liu, Car and Zuckerman, 2020). A robust telehealth platform should support various features such as video conferencing, secure messaging, electronic health records (EHR) integration, and remote monitoring. Research indicates that telehealth platforms with poor functionality, frequent downtimes, and lack of integration with other healthcare systems can discourage healthcare providers from using them. For instance, Alghamdi et al. (2022) found that technical issues related to telehealth platforms were a common barrier among healthcare providers.

7.3.1.2 Technical Skills:

The technical competence of allied healthcare providers is another critical factor influencing the adoption of telehealth services (Thomas, et al., 2024).

Training and Education: Jonasdottir, Thordardottir and Jonsdottir (2022) highlight that the ability of healthcare providers to effectively use telehealth technologies depends on their technical skills and training. Studies have shown that insufficient training and lack of familiarity with telehealth systems can deter providers from adopting these technologies. According to Calleja, Wilkes, Spencer and Woodbridge, (2022), continuous education and training programs are essential to equip healthcare providers with the necessary skills to utilize telehealth effectively. In the Riyadh second health cluster, ensuring that allied healthcare providers receive adequate training on telehealth platforms is vital for promoting adoption.

Support and Resources: The availability of technical support and resources also plays a significant role. Providers need access to technical support to troubleshoot issues and maintain the functionality of telehealth systems (Wootton, et.al., 2020). A lack of technical support can lead to frustration and decreased use of telehealth services. Studies such as those by Tsai, et. al., (2019) have emphasized the importance of technical support in the successful adoption of telehealth.

7.3.1.3 Usability:

Soltanzadeh, Sangar and Majidzadeh (2022) stated that usability refers to the perceived ease of use and user-friendliness of telehealth systems. It is a crucial determinant of telehealth adoption.

User Interface and Experience: Fouquet and Miranda, (2020) advocate that the design and user interface of telehealth platforms should be intuitive and user-friendly. Healthcare providers are more likely to use systems that are easy to navigate and require minimal effort to operate. Research by Alduaij (2019) on the Technology Acceptance Model (TAM) suggests that perceived ease of use is a significant predictor of technology adoption. Telehealth platforms with complex interfaces can discourage use among healthcare providers, as highlighted in Wootton et al., (2020).

Integration with Workflow: The integration of telehealth systems into existing clinical workflows is also important (Khoshrounejad, et al., 2021). Telehealth platforms that align with the routine practices of healthcare providers are more likely to be adopted. For example, a study by Al Haydar, et al., (2023) highlighted that telehealth systems that seamlessly integrate with EHRs and other clinical tools facilitate smoother adoption. In the Riyadh second health cluster, ensuring that telehealth platforms are designed to complement the workflows of allied healthcare providers can enhance their usability and adoption.

Technological barriers such as infrastructure, technical skills, and usability significantly influence the adoption of telehealth services among allied healthcare providers (Rettinger, et al., 2024). Addressing these barriers through improved internet connectivity, robust telehealth platforms, comprehensive training programs and user-friendly system designs is crucial for promoting telehealth adoption in the Riyadh second health cluster, as highlighted in Bailey, et al., (2021). Understanding these factors provides a foundation for developing targeted interventions to enhance telehealth integration and utilization (Bailey, et al., 2021).

7.3.2 Organizational and Policy-Related Barriers:

Ganapathy, Clough and Casey (2021) found that organizational and policy-related barriers significantly impact the adoption of telehealth services. These barriers include organizational support and the regulatory framework governing telehealth practices, including licensing, reimbursement, and data security (Gajarawala and Pelkowski, 2021).

7.3.2.1 Organizational Support:

The level of support provided by healthcare institutions is a crucial factor in telehealth adoption. Organizational support encompasses the availability of training, resources, and a supportive culture that encourages the use of telehealth technologies (Al-Samarraie, Ghazal, Alzahrani and Moody, 2020).

Training and Resources: Effective telehealth adoption requires that healthcare institutions provide adequate training and resources to their staff. Training programs should cover not only the technical aspects of telehealth platforms but also clinical and communication skills necessary for remote care delivery (Thomas, et al., 2024). Research by Garber and Gustin (2022) underscores the importance of comprehensive training programs in facilitating telehealth adoption. In the Riyadh second health cluster, ensuring that allied healthcare providers have access to regular training sessions and updated resources can enhance their confidence and competence in using telehealth technologies.

Institutional Culture and Support: The organizational culture and the degree of support from management play a significant role in the adoption of telehealth services (Binci , Palozzi and Scafarto, 2022). Institutions that foster a culture of innovation and provide strong leadership support for telehealth initiatives are more likely to see higher adoption rates. Studies by (Velayati, Ayatollahi, Hemmat and Dehghan (2021) have shown that management support and a positive organizational attitude towards telehealth are critical for its successful implementation. In the context of the Riyadh second health cluster, creating a supportive environment that encourages the use of telehealth can significantly boost adoption rates among allied healthcare providers.

7.3.2.2 Policies and Regulations:

The regulatory framework governing telehealth practices is another critical determinant of telehealth adoption. Policies and regulations related to licensing, reimbursement, and data security can either facilitate or hinder the implementation of telehealth services (Rangachari, Mushiana and Herbert, 2021)

Licensing: Regulatory requirements for licensing can be a barrier to telehealth adoption if they are overly stringent or not well-defined. Healthcare providers need clarity on the legal aspects of providing telehealth services, including cross-border practice (Santoso, Soares, Fauzi and Amallia, 2024). Research by (Timmons and Norris (2022) highlights that inconsistent licensing regulations across regions can impede the expansion of telehealth services. In the Riyadh second health cluster,

clear and supportive licensing policies are essential to encourage allied healthcare providers to integrate telehealth into their practice.

Reimbursement: The financial viability of telehealth services is largely dependent on reimbursement policies. Adequate reimbursement for telehealth services ensures that healthcare providers are compensated for their time and effort (Rangachari, Mushiana and Herbert, 2021). Studies have shown that uncertainty or inadequacy in reimbursement policies can deter providers from adopting telehealth. For instance, a study by Zhao, et al., (2020) found that reimbursement issues were a major concern among healthcare providers considering telehealth. In the Riyadh second health cluster, establishing clear and fair reimbursement policies for telehealth services is crucial for promoting its adoption.

Data Security: Ensuring the security and privacy of patient data is paramount in telehealth practices. Regulatory frameworks need to address data protection issues to build trust among healthcare providers and patients (Wenhua, et al., 2024). According to research by Pool, Akhlaghpour, Fatehi and Gray (2022), concerns about data security and privacy are significant barriers to telehealth adoption. Regulations should mandate robust security measures, such as encryption and secure data storage, to protect patient information. In the Riyadh second health cluster, implementing stringent data security policies can alleviate concerns and encourage the use of telehealth technologies.

Organizational and policy-related barriers, including organizational support and regulatory frameworks, significantly influence the adoption of telehealth services among allied healthcare providers (Dicianno, Salh, Morris, Xiang and Ding, 2024). Addressing these barriers through comprehensive training programs, supportive institutional cultures, clear licensing regulations, adequate reimbursement policies, and robust data security measures is essential for promoting telehealth adoption in the Riyadh second health cluster, as highlighted in Mbunge, Muchemwa and Batani (2022). Understanding these factors provides a foundation for developing targeted interventions to enhance telehealth integration and utilization (Rangachari, Mushiana and Herbert, 2021).

7.3.3 Socio-Cultural Factors:

Socio-cultural factors play a crucial role in the adoption of telehealth services. These factors encompass cultural acceptance, attitudes and perceptions, and patient engagement (Forbes and Chakraborty, 2023). Understanding these factors is essential for identifying barriers and facilitating the integration of telehealth into routine healthcare practice.

7.3.3.1 Cultural Acceptance:

Cultural acceptance of telehealth technologies by both patients and providers is fundamental to the successful adoption of these services (Kamal, Shafiq and Kakria, 2020).

Patients: For telehealth to be effective, patients must be willing to engage with and accept these technologies. Cultural norms and beliefs can significantly influence this acceptance. For instance, in some cultures, face-to-face interactions with healthcare providers are preferred, which may hinder the acceptance of telehealth. Studies such as those by Harst, Lantzsich and Scheibe (2019) have shown that cultural beliefs about healthcare delivery can impact patients' willingness to use telehealth services. In the Riyadh second health cluster, addressing cultural reservations through education and demonstrating the benefits of telehealth could enhance patient acceptance.

Providers: Similarly, healthcare providers' acceptance of telehealth is influenced by their cultural context. Providers may have preconceptions about the efficacy and appropriateness of telehealth compared to traditional in-person consultations (Lundereng, et al., 2023). Research by Kamal, Shafiq and Kakria (2020) indicates that cultural attitudes towards technology and innovation can affect healthcare providers' acceptance of telehealth. In the context of the Riyadh second health cluster, fostering a culture that values technological innovation in healthcare can encourage providers to adopt telehealth services.

7.3.3.2 Attitudes and Perceptions:

The attitudes and perceptions of allied healthcare providers regarding telehealth are critical determinants of its adoption. These include the perceived usefulness and trust in telehealth services (Pullyblank, 2022).

Perceived Usefulness: The extent to which healthcare providers believe that telehealth can enhance their practice influences its adoption. According to the Technology Acceptance Model (TAM) proposed by Holtz, Mitchell, Hirko and Ford, (2022), perceived usefulness is a key predictor of technology adoption. Providers are more likely to use telehealth if they believe it can improve patient outcomes, increase efficiency, and expand access to care. Studies such as those by Minen, et al., 2021 support this view, indicating that positive perceptions of telehealth's benefits can drive its adoption. In the Riyadh second health cluster, highlighting the tangible benefits of telehealth to allied healthcare providers can promote its use.

Trust: Trust in the reliability and effectiveness of telehealth technologies is also vital. Providers need to trust that telehealth platforms will function correctly and provide accurate and secure patient

information. Research by Garavand, et. Al., (2022) shows that trust in technology is a significant factor influencing telehealth adoption. In the Riyadh second health cluster, building trust through evidence-based demonstrations of telehealth efficacy and robust data security measures can encourage providers to adopt these services.

7.3.3.3 Patient Engagement:

The willingness and ability of patients to engage with telehealth services are crucial for its successful adoption. Patient engagement involves both the technical ability to use telehealth platforms and the motivation to participate in remote healthcare interactions (Aalam, Osman and Martin, 2021).

Technical Ability: Patients must have access to the necessary technology and the skills to use telehealth platforms. This includes having devices such as smartphones or computers and understanding how to navigate telehealth applications. A study by Sieck, Rastetter and McAlearney (2021) found that lack of technical literacy among patients is a barrier to telehealth adoption. In the Riyadh second health cluster, providing technical support and education to patients can help overcome this barrier.

Motivation and Willingness: Patients' motivation to use telehealth services is influenced by their health beliefs and previous experiences with healthcare technologies. Studies have shown that patients who perceive telehealth as convenient and beneficial are more likely to engage with it. Research by Jiang, et al., (2022) indicates that patient-centred approaches that address individual preferences and concerns can enhance engagement. In the Riyadh second health cluster, understanding patient preferences and tailoring telehealth services to meet their needs can improve engagement levels.

Socio-cultural factors such as cultural acceptance, attitudes and perceptions, and patient engagement significantly influence the adoption of telehealth services among allied healthcare providers. Addressing these factors through cultural sensitivity, building trust and positive perceptions of telehealth, and enhancing patient engagement through education and support is essential for promoting telehealth adoption in the Riyadh second health cluster. Understanding these socio-cultural dynamics provides a foundation for developing targeted interventions to facilitate the integration of telehealth into healthcare practice (Alrowaily et. al., 2024; AlBar and Hoque 2019).

8. Theoretical Framework of the study:

This chapter outlines the theoretical framework guiding the study, integrating relevant theories and a model that explains the adoption and implementation of telehealth services.

8.1.1 Technology Acceptance Model (TAM):

The Technology Acceptance Model (TAM) is the theoretical framework guiding this study. TAM, developed by Davis in 1989, is a widely used model for understanding the adoption of new technologies. It posits that two main factors influence an individual's intention to use technology: perceived usefulness and perceived ease of use (Davis and Granić, 2024).

Perceived Usefulness: The degree to which a person believes that using a particular technology will enhance their job performance. In the context of telehealth, perceived usefulness refers to the extent to which allied healthcare providers believe that telehealth will improve their ability to deliver care (Tsai, Cheng, Tsai, Hung and Chen, 2019).

Perceived Ease of Use: The degree to which a person believes that using a particular technology will be free of effort. For telehealth, this involves the ease with which allied healthcare providers can use telehealth platforms and integrate them into their practice (Yalcin and Kutlu, 2019).

8.2 Application of TAM to Telehealth Adoption:

Perceived Usefulness: Allied healthcare providers are more likely to adopt telehealth if they believe it will enhance their efficiency, improve patient outcomes, and provide better access to care (Rouidi, Elouadi and Hamdoun, 2022).

Perceived Ease of Use: Tsai, et. al., (2019) advocates that if telehealth systems are user-friendly and providers feel confident in their ability to use them, adoption rates are likely to increase.

The application of TAM in this study will help identify specific factors that influence the adoption of telehealth among allied healthcare providers in the Riyadh second health cluster. By understanding these factors, targeted strategies can be developed to enhance telehealth adoption and improve healthcare delivery in this region.

9. Research Methodology:

This chapter outlines the research methodology employed to investigate the barriers to the adoption of telehealth among allied healthcare providers in the Riyadh second health cluster. Given the quantitative nature of this study, a structured approach is utilized to gather, analyse, and interpret data. The methodology encompasses the research design, study population, sample characteristics, sample size determination, data collection procedures, study determinants, and methods of analysis.

9.1 Research Design:

This study adopts a quantitative research design to systematically assess the factors influencing telehealth adoption among allied healthcare providers, as guided by Bougie and Sekaran (2020). Quantitative research allows for the collection and analysis of numerical data, facilitating the identification of patterns, relationships, and statistical significance (Saunders, Lewis and Thornhill, 2019). A cross-sectional survey design is used, enabling the collection of data at a single point in time to capture the current state of telehealth adoption and the associated barriers (Saunders, Lewis and Thornhill, 2019).

9.2 Population of the Study:

The study population consists of allied healthcare providers working within the Riyadh second health Cluster Two. This includes physical therapists, occupational therapists, speech therapists, dietitians, and social workers. These professionals play a crucial role in delivering comprehensive care to patients, particularly in home healthcare settings, as guided by (Babbie, 2020).

9.3 Sample Characteristics:

The sample for this study will be representative of the allied healthcare providers within the Riyadh second health cluster. Key characteristics to be considered include:

Professional Role: Distribution across different allied healthcare professions.

Experience Level: Years of experience in the healthcare sector and with telehealth technologies.

Demographic Information: Age, gender, and educational background.

9.4 Sample Size Determination:

Babbie, (2020); Nanjundeswaraswamy and Divakar (2021) guide that the sample size for this study is determined using Cochran's formula for sample size calculation:

$$n_0 = \frac{Z^2 \cdot p \cdot (1 - p)}{e^2}$$

Where;

n_0 = required sample size

Z = Z-value (1.96 for 95% confidence level)

p = estimated proportion of the population (assumed to be 0.5 for maximum variability)

e = margin of error (0.05)

Using these parameters:

$$n_0 = \frac{1.96^2 \cdot 0.5 \cdot (1 - 0.5)}{(0.05)^2} \approx 384$$

Given the population size and practical considerations, a sample size of approximately 400 allied healthcare providers will be targeted to ensure sufficient representation and statistical power, as guided in (Nanjundeswaraswamy and Divakar, 2021).

10. Study tools:

10.1 Survey Questionnaire:

The primary tool for data collection in this study is a survey questionnaire. The questionnaire is designed to capture a comprehensive range of information related to the barriers to telehealth adoption among allied healthcare providers. It is structured to include both closed-ended and open-ended questions, allowing for the collection of quantitative data and some qualitative insights (Saunders, Lewis, and Thornhill, 2019).

The approach for this study will utilize a customized questionnaire designed by Alharbi (2023), to assess the factors influencing the adoption of telehealth services among allied healthcare providers in the Riyadh second health cluster. This questionnaire aims to gather data on the demographic characteristics, professional background and perceptions of telehealth among the respondents. The customization of the "Occupation" and "Place of Work" sections is particularly important to ensure

the relevance and accuracy of the data collected in relation to the specific context of the Riyadh second health cluster.

Customization of Occupation Section

The "Occupation" section of the questionnaire will be edited to better reflect the specific roles and titles of allied healthcare providers within the Riyadh second health cluster. Instead of the broader categories listed, more specific occupations relevant to allied health professions, such as physical therapists, occupational therapists, speech-language pathologists, dietitians, and social workers, will be included. This customization ensures that the study accurately captures data from the target population, allowing for a more detailed analysis of the factors influencing telehealth adoption among these specific allied healthcare providers.

Customization of Place of Work Section

Similarly, the "Place of Work" section will be tailored to focus on locations within the Riyadh second health cluster. The original options covering various regions of Saudi Arabia will be replaced with specific institutions and healthcare facilities within the Riyadh second health cluster. This modification is essential as it ensures that the data collected is directly relevant to the study's geographic focus, facilitating a more precise understanding of how telehealth adoption varies across different settings within the cluster.

By customizing these sections, the questionnaire will more effectively capture the unique characteristics and perspectives of the allied healthcare providers working within the Riyadh second health cluster. This tailored approach enhances the validity and reliability of the study, providing actionable insights into the barriers and facilitators of telehealth adoption in this specific context. The refined questionnaire will thus serve as a robust tool for gathering data that can inform strategies to improve telehealth integration and utilization among allied healthcare providers in the region.

10.2 Design and Development:

The design and development of the questionnaire for this study have been planned to ensure the collection of relevant and comprehensive data regarding the adoption of telehealth services among allied healthcare providers in the Riyadh second health cluster. The questionnaire consists of demographic questions, occupation-specific queries and questions related to telehealth knowledge, availability, usage and perceptions.

Demographic Questions: These questions cover nationality, gender, and age, providing a clear demographic profile of the respondents. Understanding the demographic background helps in analyzing how factors like age, gender, and nationality might influence the adoption and perception of telehealth services.

Occupation-Specific Questions: The questionnaire includes detailed categories under occupation, such as physician, health practitioner, health engineer, health administrator, and other health professions. This granularity allows the study to pinpoint specific professional groups and their unique challenges and attitudes towards telehealth.

Place of Work: This section lists various regions within Saudi Arabia. For the study's focus on the Riyadh second health cluster, this section will be tailored to reflect specific institutions and healthcare facilities within the Riyadh region, ensuring data relevancy and accuracy.

Telehealth-Related Questions: These questions assess the knowledge, availability, usage, and perceptions of telehealth among healthcare providers. They include questions on whether respondents know about telehealth, its availability at their hospital, different uses, types of telehealth, preparedness of telehealth facilities, and perceived validity, reliability, and benefits of telehealth.

This structured approach ensures the questionnaire comprehensively addresses the study's objectives and captures essential data to analyze the factors influencing telehealth adoption (Babbie, 2020).

Nationality: ☐ Saudi ☐ Non-Saudi.	Gender: ☐ Male. ☐ Female.
Age: ☐ ≤ 20. ☐ 21 – 30. ☐ 31 – 40. ☐ 41 – 50. ☐ 51 – 60. ☐ 61 – 70. ☐ ≥ 71.	Occupation: ☐ Physical Therapists (PT). ☐ Occupational Therapists (OT) ☐ Speech-Language Pathologists (SLP) ☐ Dietitians and Nutritionists ☐ Social Workers ☐ Respiratory Therapists ☐ Audiologists
Place of work: ☐ King Salman Center for Kidney Diseases, Riyadh Region. ☐ King Fahad Medical City, Riyadh Region. ☐ Prince Mohammed Bin Abdulaziz Hospital, Riyadh Region. ☐ Alyamamh Hospital, Riyadh Region. ☐ Tumair General Hospital, Tumair Governorate in Riyadh Region. ☐ Zulfi General Hospital, Zulfi Governorate in Riyadh Region. ☐ King Khaled Hospital, Almajmaah Governorate in Riyadh Region. ☐ Al Artawiyah General Hospital, AlArtawiyah Governorate in Riyadh Region. ☐ Rumaah General Hospital, Rumaah Governorate in Riyadh Region. ☐ Hotat Sudir Hospital, Hotat Sudir Governorate in Riyadh Region. ☐ Prince Nasser Bin Saad Alsudeiry Hospital, Alghat Governorate in Riyadh Region.	
Do you know telehealth? ☐ Yes. ☐ No.	
Do you have telehealth at the hospital? ☐ Yes. ☐ No.	
Do you use telehealth for different purposes? ☐ Yes. ☐ No.	
Do you use different types of telehealth at the hospital? ☐ Yes. ☐ No.	
Is the place of telehealth at the hospital well prepared? ☐ Yes. ☐ No.	
Do think telehealth is valid? ☐ Yes. ☐ No.	
Do think telehealth is reliable? ☐ Yes. ☐ No.	
Do you think patients can benefit of telehealth? ☐ Yes. ☐ No.	
Do you think healthcare providers can benefit of telehealth? ☐ Yes. ☐ No.	
Do you think there are barriers of using telehealth in Saudi Arabia? ☐ Yes. ☐ No.	
Identify:	

10.3 Distribution and Administration:

The distribution and administration of the questionnaire are crucial to obtaining a representative sample of allied healthcare providers within the Riyadh second health cluster. A multi-faceted approach will be adopted to ensure broad reach and high response rates.

Digital Distribution: The questionnaire will be distributed electronically via email and through secure online survey platforms. This method allows for a wide distribution with minimal logistical challenges and enables easy data collection and management.

On-Site Administration: For healthcare providers who might have limited access to digital platforms, physical copies of the questionnaire will be distributed at various healthcare facilities within the Riyadh second health cluster. This approach ensures inclusivity and maximizes participation.

Awareness Interventions: To encourage participation, awareness campaigns will be conducted through internal communication channels within healthcare institutions. This includes emails, posters, and brief presentations during staff meetings to highlight the importance of the study and motivate healthcare providers to participate.

By employing these distribution and administration strategies, the study aims to achieve a high response rate and gather data from a diverse range of allied healthcare providers (Shamoo and Resnik, 2022).

10.3.1 Data Collection Procedures:

The data collection procedures are designed to ensure the accuracy, reliability and integrity of the data gathered through the questionnaire. (Saunders, Lewis and Thornhill, 2019).

Ethical Considerations: Informed consent will be obtained from all participants before they complete the questionnaire. Participants will be assured of the confidentiality and anonymity of their responses (Hair, Black and Babin, 2019).

Data Collection Timeline: A clear timeline will be established, with specific periods allocated for the distribution of the questionnaire, reminders, and final collection of responses. This timeline will ensure that data collection is systematic and organized.

Follow-Up and Reminders: Regular follow-up emails and reminders will be sent to participants who have not completed the questionnaire within the initial distribution period. This approach helps in maximizing response rates and ensuring comprehensive data collection.

Data Handling and Storage: All collected data will be securely stored in encrypted digital databases. Access to the data will be restricted to authorized personnel only to maintain confidentiality and data integrity.

These data collection procedures ensure that the study collects high-quality, reliable data that can be used for robust analysis.

10.4 Method of Analysis:

The collected data will be analysed using statistical software such as Statistical Package for the Social Sciences (SPSS). The analysis will include, as guided by Shamoo and Resnik, (2022).

Statistical Package for the Social Sciences (SPSS) would be used to examine quantitative data from the survey questionnaire. The method of analysis for the collected data will involve several statistical techniques to provide comprehensive insights into the factors influencing telehealth adoption among allied healthcare provider (Harley, Bryman and Bell, 2022).

Descriptive Statistics: Initial analysis will involve descriptive statistics to summarize the demographic characteristics of the respondents, their occupation, and their place of work. This step provides an overview of the sample population (Sharma S. , 2023).

Frequency and Percentage Analysis: Loveless, (2023) guides that the responses to telehealth-related questions will be analyzed in terms of frequencies and percentages. This analysis will identify common trends and patterns in telehealth knowledge, usage, and perceptions among the respondents.

Cross-Tabulation: Cross-tabulation will be used to explore relationships between different variables, such as the relationship between occupation and telehealth usage, or between age and perceptions of telehealth validity and reliability. This technique helps in identifying significant associations and differences between group (Bougie & Sekaran, 2020).

Inferential Statistics: Inferential statistical methods, such as chi-square tests and logistic regression analysis, will be employed to test the study's hypotheses and determine the influence of independent variables (e.g., demographic factors, occupation) on dependent variables (e.g., telehealth adoption, perceived barriers) (Hair, Black and Babin, 2019).

By using these analytical methods, the study will be able to provide detailed and evidence-based conclusions about the factors influencing telehealth adoption among allied healthcare providers in the Riyadh second health cluster (Harley, Bryman and Bell, 2022).

10.5 Validation and Pilot Testing:

To ensure the validity and reliability of the questionnaire, it will undergo a pilot test with a small group of allied healthcare providers not included in the main study sample. Feedback from the pilot test will be used to refine the questionnaire, ensuring clarity, relevance, and comprehensiveness of the items. The pilot test will also help in assessing the internal consistency of the questionnaire using Cronbach's Alpha (Saunders, Lewis and Thornhill, 2019).

In this research proposal, the decision to not pilot the questionnaire is based on the premise that the questionnaire has already been validated and utilized in a previous study by Alharbi (2023). This justification hinges on several key points that ensure the reliability and validity of the questionnaire without the need for a new pilot test.

Proven Reliability and Validity: The questionnaire used by Alharbi (2023) has already undergone validation processes, demonstrating its reliability and validity in assessing the factors influencing telehealth adoption among healthcare providers. The previous study's findings indicate that the questionnaire effectively captures relevant data, reducing the need for a new pilot test.

Similar Context and Population: The current study focuses on allied healthcare providers within the Riyadh second health cluster, a population similar to that of Alharbi's (2023) study. Given the comparable context, the questionnaire's items remain relevant and applicable, further supporting the decision to forego a new pilot test.

Use of Cronbach's Alpha: The internal consistency of the questionnaire was likely assessed using Cronbach's Alpha in the previous study. The established reliability metrics from Alharbi's (2023) study provide confidence in the questionnaire's ability to consistently measure the intended constructs, eliminating the need for re-assessment through a pilot test.

Time and Resource Constraints: Conducting a pilot test requires additional time and resources, which can be efficiently allocated elsewhere in the study. By leveraging the validated tool from Alharbi (2023), the research can proceed more swiftly, focusing efforts on data collection and analysis rather than instrument re-validation.

Compliance with Methodological Standards: Utilizing an already validated questionnaire aligns with established methodological standards, particularly when the research context and target population remain consistent. This approach is supported by scholarly guidance, such as Saunders, Lewis, and Thornhill (2019), which emphasizes the efficiency of using pre-validated instruments when appropriate.

The decision to not pilot the questionnaire in this research proposal is justified by its prior validation and successful application in a similar context by Alharbi (2023). This strategic choice ensures the efficient use of resources while maintaining the reliability and validity of the data collection tool. Consequently, the research can focus on gathering and analyzing data to achieve its objectives without the added step of re-validating an already proven instrument.

11. Research Limitation:

This chapter outlines the potential limitations of the study and how they might affect the findings and conclusions. By systematically exploring the barriers to telehealth adoption among allied healthcare providers, this research aims to provide valuable insights and practical recommendations to enhance healthcare delivery in the Riyadh second health cluster, ultimately improving patient outcomes and access to care (Saunders, Lewis and Thornhill, 2019).

This study, focused on assessing the factors influencing the adoption of telehealth services among allied healthcare providers in the Riyadh second health cluster, is subject to several limitations that need to be considered.

Geographic Limitation:

Focus on Riyadh Second Health Cluster: The study is geographically confined to the Riyadh second health cluster, which might limit the generalizability of the findings to other regions of Saudi Arabia or different countries. The healthcare infrastructure, technological readiness, and cultural factors in Riyadh may differ significantly from those in other areas, impacting the applicability of the results.

Sample Diversity: Occupation-Specific Representation: While the study aims to include a variety of allied healthcare professionals, there may be an uneven representation of different occupations due to variations in response rates. Some allied health professions might be underrepresented, which could bias the results and limit the comprehensive understanding of barriers and facilitators across all allied health fields.

Self-Reported Data:

Reliability of Responses: The study relies on self-reported data through questionnaires, which may be subject to biases such as social desirability bias, recall bias, or inaccurate reporting. Respondents might provide answers they perceive as favorable or may not accurately recall their experiences with telehealth, affecting the reliability of the data, as guided by Saunders, Lewis and Thornhill (2019).

Technological Literacy: Varying Levels of Technological Proficiency: The level of technological literacy among respondents can vary widely, influencing their perceptions and usage of telehealth services.

Those with lower technological proficiency might report more barriers, which could skew the results towards highlighting technological challenges over other potential issues (Saunders, Lewis and Thornhill, 2019).

Response Rate: Participation Variability: Achieving a high response rate can be challenging, and low participation from certain groups may affect the representativeness of the sample. Efforts to encourage participation may not completely mitigate this issue, leading to potential biases in the collected data.

Cultural Factors:

Cultural Attitudes Toward Telehealth: Cultural attitudes and beliefs towards telehealth may not be fully captured through the questionnaire. Nuanced cultural factors that influence the acceptance and usage of telehealth might require more in-depth qualitative methods, such as interviews or focus groups, which are not part of this study (Burkholder, Cox, Crawford and Hitchcock, 2019)

Temporal Limitation: Snapshot in Time: The study provides a snapshot of telehealth adoption at a specific point in time. Changes in technology, healthcare policies, and organizational practices can rapidly evolve, potentially making the findings less relevant in a different temporal context (Burkholder, Cox, Crawford and Hitchcock, 2019).

Infrastructure Variability:

Inconsistent Technological Infrastructure: The availability and quality of telehealth infrastructure may vary across different facilities within the Riyadh second health cluster. This variability can impact the findings, as some respondents might experience well-supported telehealth environments while others face significant infrastructure challenges.

Policy and Regulatory Changes:

Evolving Policies: The regulatory framework governing telehealth in Saudi Arabia is subject to change. New policies or revisions to existing regulations can affect the adoption and implementation of telehealth services, influencing the study's findings and their relevance over time.

Language and Interpretation:

Language Barriers: The questionnaire is designed to be distributed among a diverse group of healthcare providers, including non-Saudis. Language differences might lead to misinterpretation of questions or responses, affecting the accuracy of the data.

By acknowledging these limitations, the study aims to provide a transparent view of the potential constraints and challenges encountered during the research process. Understanding these limitations is crucial for interpreting the findings appropriately and for guiding future research efforts to build on and address these constraints (Babbie, 2020).

12. References:

- Aalam, A. A., Osman, K. A., & Martin, A. (2021). Telehealth Adoption and Patient Engagement. In N. Sikka (Ed.), *A Practical Guide to Emergency Telehealth* (pp. 39–50). New York: Oxford Academic. doi:10.1093/med/9780190066475.003.0004
- Al Haydar, F., Al Sharif, M., AL ALshahi, M., Al Alshahi, T., Al Shahi, S., & Al Saab, A. (2023). A CRITICAL ANALYSIS ON INTEGRATING OPERATIONS IN MEDICAL CLINICS TO ENHANCE SERVICE QUALITY. *Chelonian Research Foundation*, 18(1), 191–204.
- AlBar, A., & Hoque, M. (2019). Patient Acceptance of e-Health Services in Saudi Arabia: An Integrative Perspective. *Telemedicine journal and e-health*, 25(9), 847-852. doi:10.1089/tmj.2018.0107
- Alduaij, M. (2019). Employing the Technology Acceptance Model to Explore the Trends of Social Media Adoption and its Effect on Perceived Usefulness and Perceived Ease of Use. *Journal of Information Technology Management*, 11(2), 129-143. doi:10.22059/jitm.2019.290075.2405
- Alghamdi, S., Aldhahir, A., Alqahtani, J., Siraj, R., Alsulayyim, A., Almojaibel, A., . . . Alqarni, A. (2022). Healthcare Providers' Perception and Barriers Concerning the Use of Telehealth Applications in Saudi Arabia: A Cross-Sectional Study. *Healthcare*, 10(8), 1527. doi:10.3390/healthcare10081527
- Alrowaily, M., Mustafa, S., Mohammed, E., Makkawi, S., & Palani, K. (2024). Telemedicine Practice and Perceived Skills Among Primary Healthcare Physicians in the Riyadh Second Health Cluster, Saudi Arabia. *Majmaah Journal of Health Sciences*, 12(2), 94-107. doi:10.5455/mjhs.2024.02.010
- Al-Samarraie, H., Ghazal, S., Alzahrani, A., & Moody, L. (2020). Telemedicine in Middle Eastern countries: Progress, barriers, and policy recommendations. *International Journal of Medical Informatics*, 141, 104232. doi:10.1016/j.ijmedinf.2020.104232
- Anawade, P., Sharma, D., & Gahane, S. (2024). A Comprehensive Review on Exploring the Impact of Telemedicine on Healthcare Accessibility. *Cureus*, 3, e55996. doi:10.7759/cureus.55996
- Babbie, E. R. (2020). *The Practice of Social Research* (15th ed.). Boston, USA: Cengage.

- Bailey, J., Gurgol, C., Pan, E., Njie, S., Emmett, S., Gatwood, J., . . . Shah, V. (2021). Early Patient-Centered Outcomes Research Experience With the Use of Telehealth to Address Disparities: Scoping Review. *Journal of Medical Internet Research*, 23(12), e28503. doi:10.2196/28503
- Barrett, S., Howlett, O., Lal, N., & McKinstry, C. (2024). Telehealth-Delivered Allied Health Interventions: A Rapid Umbrella Review of Systematic Reviews. *Telemedicine journal and e-health*, 6, e1649-e1666. doi:10.1089/tmj.2023.0546.
- Binci , D., Palozzi, G., & Scafarto, F. (2022). Toward digital transformation in healthcare: a framework for remote monitoring adoption. *The TQM Journal*, 34(6), 1772-1799. doi:10.1108/TQM-04-2021-0109
- Bokolo Jnr, A. (2021). Implications of telehealth and digital care solutions during COVID-19 pandemic: a qualitative literature review. *Informatics for Health and Social Care*, 46(1), 68-83 . doi:10.1080/17538157.2020.1839467
- Bougie, R., & Sekaran, U. (2020). *Research Methods For Business: A Skill Building Approach* (8th ed.). Wiley.
- Calleja, P., Wilkes, S., Spencer, M., & Woodbridge, S. (2022). Telehealth use in rural and remote health practitioner education: An integrative review. *Informit*, 22(1), 1-13. doi:10.22605/RRH6467
- Davis, F., & Granić, A. (2024). *The Technology Acceptance Model 30 Years of TAM* (1st ed.). Springer Cham. doi:10.1007/978-3-030-45274-2
- Dicianno, B., Salh, A., Morris, L., Xiang, Y., & Ding, D. (2024). Rehabilitation clinicians' use of mainstream wireless technologies in practice: a scoping review. *Disability and Rehabilitation: Assistive Technology*, 1–19. doi:10.1080/17483107.2024.2316891
- Doaks, T. (2021). Digital equity and high-speed health born from the COVID-19 Crisis. *North Carolina Medical Journal*, 82(4), 266-270.
- Forbes, M., & Chakraborty, J. (2023). The Effect of Socio-cultural Determinants on Designing Inclusive Telemedicine Tools for the Aging Population. *Cambridge Workshop on Universal Access and Assistive Technology* (pp. 50--58). Springer International Publishing.
- Fouquet, S. D., & Miranda, A. T. (2020). Asking the Right Questions—Human Factors Considerations for Telemedicine Design. *Current Allergy and Asthma Reports*, 20(66). doi:10.1007/s11882-020-00965-x

- Gajarawala, S., & Pelkowski, J. (2021). Telehealth Benefits and Barriers. *The Journal for Nurse Practitioners*, 17(2), 218-221. doi:10.1016/j.nurpra.2020.09.013
- Ganapathy, A., Clough, B., & Casey, L. (2021). Organizational and Policy Barriers to the Use of Digital Mental Health by Mental Health Professionals. *Telemedicine and e-Health*, 27(12), 1332-1343. doi:10.1089/tmj.2020.0455
- Garavand, A., Aslani, N., Nadri, H., Abedini, S., & Dehghan, S. (2022). Acceptance of telemedicine technology among physicians: A systematic review. *Informatics in Medicine Unlocked*, 30, 100943. doi:10.1016/j.imu.2022.100943
- Garber, K., & Gustin, T. (2022). Telehealth Education Impact on Provider Experience and Adoption. *Nurse Educator*, 42(2), 75-80. doi:10.1097/NNE.0000000000001103
- Hair, J. F., Black, . C., & Babin, B. J. (2019). *Multivariate Data Analysis* (8th ed.). Hampshire, United Kingdom: Cengage.
- Harst, L., Lantzsch, H., & Scheibe, M. (2019). Theories Predicting End-User Acceptance of Telemedicine Use: Systematic Review. *Journal of Medical Internet Research*, 21(5), e13117. doi:10.2196/13117
- Haynes, N., Ezekwesili, A., Nunes, K., Gumbs, E., Haynes, M., & Swain , J. (2021). "Can you see my screen?" Addressing Racial and Ethnic Disparities in Telehealth. *Current Cardiovascular Risk Reports*, 23. doi:10.1007/s12170-021-00685-5
- Holtz, B., Mitchell, K., Hirko, K., & Ford, S. (2022). Using the Technology Acceptance Model to characterize barriers and opportunities of telehealth in rural populations: A mixed methods study. *JMIR Formative Research*, 6(4), e35130. doi:10.2196/preprints.35130
- Jiang, Y., Sun, P., Chen, Z., Guo, J., Wang, S., Liu, F., & Li, J. (2022). Patients' and healthcare providers' perceptions and experiences of telehealth use and online health information use in chronic disease management for older patients with chronic obstructive pulmonary disease: a qualitative study. *BMC Geriatrics*, 22(9).
- Jonasdottir, S., Thordardottir, I., & Jonsdottir, T. (2022). Health professionals' perspective towards challenges and opportunities of telehealth service provision: A scoping review. *International Journal of Medical Informatics*, 167, 104862. doi:10.1016/j.ijmedinf.2022.104862

- Kamal, S., Shafiq, M., & Kakria, P. (2020). Investigating acceptance of telemedicine services through an extended technology acceptance model (TAM). *Technology in Society*, 60, 101212. doi:10.1016/j.techsoc.2019.101212
- Khoshrounejad, F., Hamednia, M., Mehrjerd, A., Pichaghsaz, S., Jamalirad, H., Sargolzaei, M., . . . Aalaei, S. (2021). Telehealth-Based Services During the COVID-19 Pandemic: A Systematic Review of Features and Challenges. *Frontiers Public Health*, 9(711762). doi:10.3389/fpubh.2021.711762
- Kobeissi, M. M., & Hickey, J. V. (2023). An Infrastructure to Provide Safer, Higher-Quality, and More Equitable Telehealth. *The Joint Commission Journal on Quality and Patient Safety*, 49(4), 213-222. doi:10.1016/j.jcjq.2023.01.006
- Lundereng, E., Gonçalves Nes, A., Holmen, H., Winger, A., Thygesen, H., Jøranson, N., . . . Steindal, S. (2023). Health Care Professionals' Experiences and Perspectives on Using Telehealth for Home-based Palliative Care: Scoping Review. *Journal of Medical Internet Research*, 25, e43429. doi:10.2196/43429
- Mbunge, E., Muchemwa, B., & Batani, J. (2022). Are we there yet? Unbundling the potential adoption and integration of telemedicine to improve virtual healthcare services in African health systems. *Sensors International*, 3, 100152. doi:10.1016/j.sintl.2021.100152
- Minen, M., Szperka, C., Kaplan, K., Ehrlich, A., Riggins, N., Rizzoli, P., & Strauss, L. (2021). Telehealth as a new care delivery model: The headache provider experience. *Headache: The Journal of Head and Face Pain*, 61(7), 1123-1131. doi:10.1111/head.14150
- Omboni, S., Padwa, R., Alessa, T., Benczúr, B., Green, B., Hubbard, I., . . . Wang, J. (2022). The worldwide impact of telemedicine during COVID-19: current evidence and recommendations for the future. *Connected Health And Telemedicine*, 1(1), 7-35. doi:10.20517/ch.2021.03
- Pogorzelska-Maziarz, M., Rising, K., Gentsch, A., Traczuk, A., Hsiao, T., Amadio, G., . . . Gerolamo, A. (2021). Home healthcare patient, caregiver and provider perspectives on use of unscheduled acute care and the usability and acceptability of on-demand telehealth solutions. *Geriatric Nursing*, 5, 1029-1034. doi:10.1016/j.gerinurse.2021.06.009
- Pool, J., Akhlaghpour, S., Fatehi, F., & Gray, L. (2022). Data privacy concerns and use of telehealth in the aged care context: An integrative review and research agenda. *International Journal of Medical Informatics*, 160, 104707.

- Pullyblank, K. (2022). A Scoping Literature Review of Rural Beliefs and Attitudes toward Telehealth Utilization. *Western Journal of Nursing Research*, 45(4), 375-384.
doi:10.1177/01939459221134374
- Rangachari, P., Mushiana, S., & Herbert, K. (2021). A Narrative Review of Factors Historically Influencing Telehealth Use across Six Medical Specialties in the United States. *International Journal of Environmental. Research and Public Health*, 18(9), 4995.
doi:10.3390/ijerph18094995
- Rettinger, L., Putz, P., Aichinger, L., Javorszky, S., Widhalm, K., Ertelt-Bach, V., . . . Kuhn, S. (2024). Telehealth Education in Allied Health Care and Nursing: Web-Based Cross-Sectional Survey of Students' Perceived Knowledge, Skills, Attitudes, and Experience. *JMIR Medical Education*, 10, e51112. doi:10.2196/51112
- Rouidi, M., Elouadi, A., & Hamdoune, A. (2022). Acceptance and use of telemedicine technology by health professionals: Development of a conceptual model. *DIGITAL HEALTH*, 8, 20552076221081693. doi:10.1177/20552076221081693
- Santoso, A., Soares, D., Fauzi, F., & Amallia, S. (2024). Telemedicine: International Law Comparison. *The Easta Journal Law and Human Rights (ESLHR)*, 2(3), 116–126.
doi:10.58812/eslhr.v2i03.286
- Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research Methods for Business Students*. Harlow: Pearson Education Limited.
- Shamoo, A. E., & Resnik, D. B. (2022). *Responsible Conduct of Research* (4th ed.). New York: Oxford University Press. doi:10.1093/oso/9780197547090.001.0001
- Sharma, A., Pruthi, M., & Sageena, G. (2022). Adoption of telehealth technologies: an approach to improving healthcare system. *Translational Medicine Communications*, 7(20).
doi:10.1186/s41231-022-00125-5
- Siddiquee, N., Poudyal, A., Pandey, A., Shrestha, N., Karki, S., Subedi, R., . . . Dirghayu, K. (2020). Telemedicine in Resource-Limited Setting: Narrative Synthesis of Evidence in Nepalese Context. *Smart Homecare Technology and TeleHealth*, 6, 1-14. doi:10.2147/SHTT.S227854
- Sieck, C., Rastetter, M., & McAlearney, A. (2021). Could Telehealth Improve Equity During the COVID-19 Pandemic? *The Journal of the American Board of Family Medicine*, 34, S225-S228. doi:10.3122/jabfm.2021.S1.200229

- Soltanzadeh, L., Sangar, A., & Majidzadeh, K. (2022). The Review of Usability Evaluation Methods on Tele health or Telemedicine Systems. *Frontiers in Health Informatics*, 11(112). doi:10.30699/fhi.v11i1.357
- Thomas, E., Taylor, M., Ward, E., Hwang, R., Cook, R., Ross, J.-A., . . . Caffery, L. (2024). Beyond forced telehealth adoption: A framework to sustain telehealth among allied health services. *Journal of Telemedicine and Telecare*, 30(3), 559-569. doi:10.1177/1357633X221074499
- Timmons, E., & Norris, C. (2022). Potential licensing reforms in light of COVID-19. *Health Policy OPEN*, 3, 100062. doi:10.1016/j.hopen.2021.100062
- Tsai, J.-M., Cheng, M.-J., Tsai, H.-H., Hung, S.-W., & Chen, Y.-L. (2019). Acceptance and resistance of telehealth: The perspective of dual-factor concepts in technology adoption. *International Journal of Information Management*, 49, 34-44. doi:10.1016/j.ijinfomgt.2019.03.003
- Velayati, F., Ayatollahi, H., Hemmat, M., & Dehghan, R. (2021). Key components and critical factors for developing a telehealth business framework: a qualitative study. *BMC Medical Informatics and Decision Making*, 21(339). doi:10.1186/s12911-021-01707-3
- Wang , C., Liu, T., Car, J., & Zuckerman, B. (2020). Design, Adoption, Implementation, Scalability, and Sustainability of Telehealth Programs. *Pediatric Clinics of North America*, 67(4), 675-682. doi:10.1016/j.pcl.2020.04.011
- Wenhua, Z., Hasan, M., Jailani, N., Islam, S., Safie, N., Albarakati, H., . . . Khan, M. (2024). A lightweight security model for ensuring patient privacy and confidentiality in telehealth applications. *Computers in Human Behavior*, 153, 108134. doi:10.1016/j.chb.2024.108134
- Wootton, A. R., McCuistian, C., Packard, D. A., Gruber, V. A., & Saberi, P. (2020). Overcoming Technological Challenges: Lessons Learned from a Telehealth Counseling Study. *Telemedicine and e-Health*, 26(10), 1278-1283. doi:10.1089/tmj.2019.0191
- Yalcin, M., & Kutlu, B. (2019). Examination of students' acceptance of and intention to use learning management systems using extended TAM. *British Journal of Educational Technology*, 50(5), 2414-2432. doi:10.1111/bjet.12798
- Zhang, X., & Saltman, R. (2022). Impact of Electronic Health Record Interoperability on Telehealth Service Outcomes. *JMIR Medical Informatics*, 10(1), e31837. doi:10.2196/31837

Zhao, M., Hamadi, H., Haley, D., Xu, J., White-Williams, C., & Park, S. (2020). Telehealth: Advances in Alternative Payment Models. *Telemedicine and e-Health*, 26(12), 1492-1499.
doi:10.1089/tmj.2019.0294