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Advancement of Telehealth Services in Saudi Arabia: A Comprehensive Review

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Abstract

1. Introduction

Introduction Telemedicine or Telehealth services can be in the form of telephone calls, short message service (SMS), chat, and video conferencing, easily accessible and not restricted by time or distance using IT and telecommunication technologies. The appeal of telehealth has expanded practically in all healthcare experiences, particularly during the COVID-19 pandemic. The COVID-19 pandemic promoted a need for various healthcare systems throughout the world to reorganize care delivery in a short time frame. This comprised increasing focus on telehealth as well as various digital health solutions, aiming to improve healthcare accessibility, quality, and continuity of care, as well as lessening potential exposures to SARS-CoV-2. Optimally, implementing telemedicine and digital health solutions free up visit time with healthcare professionals and decrease the risk of cross-contamination. Implementing telemedicine can potentially reduce lecturing queue in posted settings and decrease the time it takes to access medical advice.

Only a minority is using telemedicine among healthcare providers in Saudi Arabia. However, exposure to and experience using telehealth technologies for diagnosis and the frequency with which using telehealth often with patients are predicted by knowing, feeling, recommending, perceiving, and appreciating. Expecting, feeling confident, considering and managing are

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predictors of experiencing using telehealth technologies. Additionally, concerns with the delivery of telehealth methods and dissatisfaction with current work infrastructure appear to act as significant barriers in technology knowledge transfer and use between clinical and healthcare providers. There is a connection here to raise health professionals' knowledge of telehealth technology to better shape the consultation process optimization for improved technology adoption. Out-of-touch healthcare providers are less likely to have the technical skills necessary for a fast mediated transfer of knowledge, even if they are familiar with the techniques.

Methods

There are several interchangeable terms used to refer to telehealth applications in clinical settings, such as E-health, mobile health, and telemedicine. In general, telehealth refers to a healthcare service that can be performed remotely over a long distance by using information and communication technology (M. Alghamdi et al., 2022). The development of telecommunication technology and the internet has led to computer and mobile-based telehealth applications, which have been widely used in hospitals and are accepted by health professionals. The application of telehealth approaches in clinical practice is increasing because studies from various countries have shown that telehealth reduces the cost of healthcare and leads to the improvement of the quality of care. The government of Saudi Arabia also has been taking measures to increase the quality of care and the efficiency of healthcare services. In 2016, the Ministry of Health (MOH) in Saudi Arabia launched the National Transformation Program 2020 (NTP2020) to achieve the vision of Vision 2030. Since 2018, as part of the NTP2020 strategy, the MOH has been committed to adopting eHealth services to improve the health efficiency and quality of care. To meet this target, the MOH introduced several health applications such as Seha, Tawakkalna, Mawid, Tabaud, and Tataman.

Conclusion

Telehealth services are being modernized and evolving in numerous fields of medical practices due to the rapid technologies of digitization and mobile health. Thus, telehealth services will not only reduce the economic cost of hospitalization for patients in the future but also reduce hassle in the service of healthcare for both the doctors and the healthcare organization. For that aim, it is necessary to investigate the telehealth capability in the country, its drawbacks, field of work, and other common facts to strengthen the telehealth practice in Saudi Arabia. Usually marketed as a fairly fresh idea, telehealth programs utilizing the resources of telecommunication have existed for many years. It is a concept obtaining the possibility to assist in caring for a lot of those who find it hard to get access to healthcare services such as individuals living in distant, rural, or separated locations.

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Recent studies demonstrate the advantages and growing realization of the need for telehealth systems which includes countries from all over the world, however some research report there is only a minor presence of the telehealth system among low- to middle-income countries, with a significant requirement for the enhancement. There is an evident significant increase in the expansion of the telehealth service in the past few years. The target is to examine the utility of telehealth services that are currently present in the Saudi Arabian healthcare sector. This research offers a comprehensive review of evaluations, studies, and investigation on the subject of telehealth services in healthcare. The different types of telehealth services are briefly described, addressing its utility, functionality, and barriers along with the telehealth service provision in hospitals, primary care clinics, and ambulance services that are providing teleconsultation and monitoring services. The way forward towards telehealth implementation in Saudi Arabia will be discussed including policy, privacy, security, and the adaptation of telehealth services.

1.1. Background of Telehealth Services

During the recent times of global crisis, the severe acute respiratory syndrome coronavirus 2 (COVID-19) pandemic rapidly spread worldwide (A Al-Rayes et al., 2021). Health care systems around the world were affected and remained under pressure due to the increasing number of confirmed cases. In this environment, technological medical advances were required to support health care systems, and this can influence the way health care is delivered. In light of this, government laws and medical operating protocols have been largely modified to establish the availability of health care delivery through telehealth to encourage health care workers to provide remote care. In this regard, it is essential to explore the technical aspect or requirement in this medical facilities system with respect to telehealth connectivity performance for ensuring a safer patient environment (M. Alghamdi et al., 2022). In the Kingdom of Saudi Arabia (KSA), the Ministry of Health (MOH), as well as other private health organizations, introduced several forms of telemedicine as an alternative to face-to-face consultations in clinical settings, along with home-based services such as the diabetes tracking project by the Saudi Red Crescent Authority in June 2017.

2. Regulatory Framework

Recently, there has been considerable advancement in information technology, which is being utilized to provide medical care and reach people in their remote areas anywhere in the world. The development, implementation, and adoption of telehealth platforms have addressed common barriers to healthcare access and promoted innovative opportunities to receive medical care support services. Telehealth enables support services for patients with chronic diseases to be received extensively directly from wherever they are located. Telehealth's flexibility and

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mobility can be used to address a wide range of issues at times and locations that are not available to traditional examination. Advanced telehealth systems use two-way communications, electronic media, and other telecommunication technologies to foster long-distance (asynchronous) clinical healthcare services and technical healthcare education, as well as to assess and monitor occupational physical therapy service provision and outcome over a distance. Saudi Arabia faces growing healthcare demands with simultaneous challenges, such as increased patient populations, limited economic and human resources access to primary healthcare, rural and remote settings, primary care physicians, and specialists' shortages. Consequently, the Saudi government is actively facilitating widespread access to mediated healthcare services using innovative telehealth technologies. This can contribute to the anticipated state's healthcare objectives, such as timely provision of quality healthcare services in remote places and in raising national awareness and preventive healthcare promotion. Currently, numerous Saudi telehealth services have been running or tested for efficient medical care provision, therapy in primary care, and clinicians' education and training. Many structures and strategies to increase telehealth use are being developed, adjusted, or implemented, including most of the electronic health records in national hospitals (M. Alghamdi et al., 2022).

2.1. Government Policies and Regulations

The advancement of telehealth, the expansion of internet networks, and the improvement in health care infrastructure have all had a prominent impact on health care services, challenging conventional health care systems and conventional health service delivery. Moreover, telehealth has prompted the reform of many governments to address and cultivate these innovative services. For instance, many countries in their respective regions have enacted regulations related to telehealth services. In Saudi Arabia, there have been various rules, policies, and requirements designed to manage such services. In this review, those regulations, laws, and standards are evaluated from national and local government levels. General government strategies on potential expansion are also comprehensively reviewed, as telehealth services have become important to health system operation throughout the COVID-19 pandemic. Regulations enabling the widespread application of telehealth services after the epidemic will increase access to telehealth services, though the country needs further development to meet this need. With many advances in technology, the landscape of health care is evolving constantly. One of the most important changes is the increasing role of telehealth. The World Health Organization (WHO) defines telehealth as "the delivery of health care services, where patients and providers are not in the same physical location, using digital technologies" ((M. Alghamdi et al., 2022)). In Saudi Arabia, after the worldwide spread of COVID-19, the telehealth system was initiated and

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individuals were better informed about 937, resulting in the large number of calls received ((A Al-Rayes et al., 2021)).

3. Technological Infrastructure

Telemedicine changes the face of healthcare worldwide. In the twenty years prior to the COVID-19 pandemic, telemedicine activities remained very limited in the Kingdom of Saudi Arabia. Teleconsultations between the patient and healthcare personnel shall include a video call to contrast with COVID-19 pandemic regulations stipulating that telemedicine shall not involve video calls. Patient-opinion studies in Saudi Arabia on this matter are rare. Patient opinion about telemedicine in Saudi Arabia between April and October 2021, the time when 6,354,111 virtual consultations were delivered by the Ministry of Health to an average of 49,620 patients daily, were researched. It was discovered that resulting virtual consultations were multidisciplinary and included physical therapy, dental, referral, dermatology, surgical, second opinion, eye, nutrition, medical report, and ps). In addition, the resulting virtual consultations were mostly follow-up or routine care and largely involved chronic disease care. Sehhaty was the cornerstone of telemedicine services provided by the Ministry of Health and was designed for patients living in the KSA, containing a communication and follow-up function and the ability to schedule outpatient telemedicine clinics. Between June 2021 and February 2022, 351,087 telemedicine consultations were delivered, an average of 937 daily. The majority of these consultations were multidisciplinary and included electronic prescriptions or treatment. Anaat was released on June 23, 2021, and was specifically developed for healthcare professionals working in the KSA (Mohammed Alkhalifah et al., 2022). Using the Anaat app, medical doctors can retrieve the medical report of the patient, including the results of the laboratory or radiology images. Physicians can issue electronic prescriptions in an authenticated manner, and the patient can get their medicines dispensed from the nearest pharmacy participating in the system. On July 22, 2021, the “Seha” virtual hospital was inaugurated as a priority initiative in the Saudi Healthcare Transformation Program. Seha virtual hospital is the second biggest virtual hospital globally and the first in the Middle East. The 4,565 medical staff provide telehealth services using the latest medical technologies to an average of 2,000 patients every day. It supports 131 hospitals and more than 30 specialized services. It has 36 telemedicine wards, two at each hospital. Here, patients can be remotely monitored, and video consultations are possible. Seha virtual hospital uses Internet of Things technology that includes wearables, sensors, and gauges implanted around the hospital location in the patient’s home or workplace (Mohammed AlShareef & Abdulaziz AlWabel, 2024). The Internet of Things relies on electronic devices that the patient wears, or is implanted, to monitor vital signs. Data on vital signs are automatically collected by the device and analyzed by medical staff. If vital signs do not fall within the reference range, an

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alert may be sent to the hospital. Similarly, artificial intelligence (AI) interprets medical imaging and prioritizes examinations that promptly require medical intervention. One example of this is the prioritization of magnetic resonance imaging examination for strokes. Furthermore, augmented reality may be employed in surgery. A junior surgeon may request a senior surgeon to provide advice while watching the surgical field. A surgical team locates an external camera in the operating room and transmits the audio-visual feed to the senior surgeon who is remotely located.

3.1. Digital Health Platforms

During the COVID-19 pandemic, the Saudi Arabian government has urged the use of telehealth services. The Saudi Arabian government's health services application has a teleconsultation service. More than 5 million consultations were provided in real time. Through the teleconsultation, 3,684,000 examinations were conducted, of which 2,073,836 prescriptions were issued. An application was also developed by the Saudi Arabian Ministry of Health that is integrated with the system. The purpose of the application is to enable medical doctors to issue e-prescriptions in an authenticated manner through the application. The application aims to support patient care delivery involving e-prescription, consultation, referral, and sick leave certificates. The patient can have the medicine dispensed from the nearest pharmacy that participates in the system. The e-prescription is generated through the application after the doctor issues it. Hence, the pharmacist just taps the button to initiate the process and provide the necessary medicine to the patient without the need of visiting the hospital.

For new drugs, certain drugs are not allowed to be prescribed using telehealth applications. For specialist clinics, first-visit cancer care and opioid use are also excluded from telehealth consultations. During the COVID-19 pandemic, the Saudi Arabian Ministry of Health provided different services for the residents of Saudi Arabia through the telemedicine application. Various applications were available for users. Connections between the patient, family, and doctor could be consulted through applications in real time, whether in public or private hospitals. After submitting a request for consultation, the doctor will contact the patient's family to discuss the details of the consultation before making an appointment with the patient's family. Video calls with a doctor or medical assistant can be forwarded to the hospital or health clinic provided directly by the digital health application. An application developed by the Saudi Arabian Ministry of Health for mental and psychological health provides users with countless resources on mental and psychological counseling, all supervised by specialized staff. A notification will be generated if a new article releases integer multiples of every 3-hour duration.

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4. Implementation Challenges

Telehealth has seen a significant rise in several countries across the globe. Several reasons have contributed to this surge, such as cost control, population demand, remote area saturation, and reliable communications technology. Nevertheless, several missed days have happened to the continuing rise in telehealth, related to successful method and current technologies. Consequently, the purpose of this study is to perform a complete analysis of the needed steps and schemes to further advance the present telehealth services in Saudi Arabia. It is clear that telehealth is in a crucial phase. Initiatives are completely focused on general and financial tasks, prevention, outpatient management, and health care at home. The usage of telehealth applications will definitely grow, and a restructuring of the management and technology system in healthcare will inevitably arise. To ensure that the advancement of telehealth proceeds successfully and benefits from all the schemes existing in Saudi Arabia, a high-level project should be laid down. Such a project should represent a cooperation of a vast variety of organizations of the State. Legislative measures are then taken to enact the safe and ordered use of telehealth services in Saudi Arabia.

Telehealth is seen as the leading regional and global trend in the field of public health and health management. Telehealth and telemedicine services afford long-distance access to high-quality medical care for patients who live in rural areas, are physically immobile, or are incapable of caring for themselves. The Kingdom of Saudi Arabia is no exception, with healthcare providers dependent on telehealth to provide services to the population of Saudi Arabia possessing remote needs. In 2020, regulations were issued intended to guide healthcare providers and patients about telehealth and telemedicine services access and providing such services. However, new methods and updated practices are required to keep pace with the growing use of telehealth services. This discussion includes the essential issues for using telehealth service and updating practices and includes a comprehensive look at perceptions, standards, and best practices that telehealth service providers and users should be aware of. Small-scale telehealth services are also discussed, aiming at enabling healthcare systems and providers in Saudi Arabia to deliver more effective and efficient health services.

4.1. Interoperability Issues

This section elaborates on the many challenges associated with the advancement of telehealth services in Saudi Arabia. It is separated into several sub-sections based on the Literature Review. The first concerns compatibility among technical devices and record platforms. The next sub-section discusses the lack of cyber-security and the privacy fears of healthcare providers. Another subset argues that many medical professionals merely have minimal to no understanding

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of telehealth at all. Finally, unapplicable telehealth programs for emergency cases are viewed as a barrier for future telehealth services (M. Alghamdi et al., 2022).

5. Future Prospects

Advanced and integrated proactive telehealth service refines the quality of health services and enhances the credibility of health care providers, thus contributing to the expansion of telehealth. In Saudi Arabia, the Saudi Vision 2030 document emphasizes the importance of upgrading the health care sector through the incorporation of advanced telehealth services. Telehealth incorporates these technologies into remote health monitoring, patient consultation in some medical branches, and reputable methodologies for posting electronic medical records remotely. The electronic infrastructure, security, and durability of detecting signals and applying telehealth technologies are some of the issues potentially hampering the development of telehealth provision. The high income per capita is a financial deterrent to constant telehealth use, which contrasts with results indicating a financial barrier to the integration of telehealth technologies in high-income countries (M. Alghamdi et al., 2022). There are two possible explanations for the apparent contradiction. First, predictive models cultivating a wide range of barriers should be viewed with caution because opposing trends may not be identified. Secondly, health systems are complex and dynamic, with interacting components that have a non-linear and synergistic response to potential barriers.

A lack of collaborative actions among health care providers in the effort to adopt telehealth is seen to discourage the adoption of the method. In cases where potential barriers to telehealth view the lack of support proposed for the health information technology sector, it is recommended that innovative actions are introduced to stimulate critical investments in the digital segment of the health care services. Some additional barriers for telehealth rise from a lack of next-level knowledge. There are possible reasons for this. National policy-makers should bear in mind several candidates signaling that the length of exercising posts helps differentiate the non-linear coefficients of digital competences. Below a ten-year experience of the implementation of telehealth, and the time reach is limited to a region closely connected to the technology, the relevant target data is too close to the cut-off point. Repeatedly coming into dialogue with the other bodies identified agrees with latest results from in-depth analysis. The need for targeted investments that generate the skills and competences required for effective telehealth deployment in the health care providers is crucial. Viewing the existing gap in current expertise and current practical knowledge of telehealth, filling such a gap appears to be pivotal in a pursuit to extend exploration to all areas.

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5.1. Emerging Technologies in Telehealth

Telehealth technologies are a subset of eHealth and have become essential for interventions, disease prevention, wellness, and healthcare delivery through digital communications. The collaboration between telecommunication services and the global health system is used to improve patient health status as well. Saudi Arabia has adopted several digital health technologies that are flourishing. During the implementations within these systems, the most vital domains of the telehealth repository in Saudi Arabia have been recognized. Currently, Saudi healthcare organizations are predominantly deploying telehealth facilities in order to transform the healthcare industry. Some digital health technologies such as mHealth, mobile applications, telemedicine, and other streaming devices have advanced. During telehealth services, big data and artificial intelligence continue to have a vital role in Saudi Arabia. As a result, telehealth technology continues to rise together with eHealth by functioning multilaterally within the Saudi digital health system. (Alhur, 2024)

Telehealth as an important means of offering health services to patients has become necessary in the COVID-19 pandemic. It functions to distribute health information, consultation schedules, and the distribution of medical treatment on a distant Internet-connected system. Because of the significant triumphs and potential for further expansion, Saudi Arabia was selected as the target country and this survey examines the advancement of telehealth technologies—a human health examination at a range or by the very legitimate health professional who is in contact with the use of telecommunications and gives priority to the development of the Riyadh area. This focuses on the examination method of the telehealth technology advancement database, presents the statistical outcomes of the investigation, and contrasts these results to previous surveys regarding digital health technology.

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