The Experience of Physicians and Nurses of Telemedicine in Riyadh, Saudi Arabia: A Cross-Sectional Study

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Abstract

The view of modern science towards medical means has changed and information technology occupies a large space in the medical field. The COVID-19 pandemic has led to an increase in the use of telemedicine worldwide, including Saudi Arabia. The main aim of the research was to evaluate the physicians and nurses' experience and perception of utilizing Telemedicine. The study design was in the form of an observational, descriptive, and cross-sectional survey. An electronic questionnaire was created using the Internet. The estimated sample size was 300. The questionnaire was distributed as a link through social media groups for physicians in the area (the response rate was difficult to calculate due to the shape of the distribution). Descriptive statistics, in the form of frequencies and percentages, are used to represent the data. the results of the study indicated that Telemedicine can provide a convenient way to accurately and cost-effectively expand access to healthcare in Saudi Arabia while reducing the risk of transmission of COVID-19. More efforts should be made to provide healthcare settings with technical equipment and training for telemedicine. The study also recommends involving allied health providers in using telemedicine and participating in the patient care plan.

Keywords*: Physicians, Nurses, Telemedicine, Saudi Arabia.*

1. Introduction

The tremendous development in communication technology has effectively contributed to the development of medical means and increased the spread of the concept of telemedicine. Because of the migration of experienced doctors outside the country and travel costs, and the gap between developing and developed countries in medical capabilities, content management systems used in designing a website; the doctor can add his available appointments, the patient makes a reservation with the appropriate doctor, and then the interview between the doctor and the patient takes place via video. The patient can also upload any files to support the medical process (Kaliyadan, 2020).

The view of modern science towards medical means has changed and information technology occupies a large space in the medical field. Medicine is no longer limited to research medical methods, but rather has expanded and developed and become highly dependent on information technology. This development shed light on the significance of the emergence of the so-called telemedicine, remote health, telehealth (Asia, 2019). A Telemedicine service is defined as a remote medical practice using of electronic information and communications technologies to provide and support health care when distance separates the participants. The telemedicine categories are remote patient mentoring, online Interaction and store-and-forward applications (Kronenfeld, 2021).

The COVID-19 pandemic has led to an increase in the use of telemedicine worldwide, including Saudi Arabia (Ashique & Kaliyadan, 2020). Telemedicine can be an integral part of the 'new normal'. Although there are some studies that have examined the practice of telemedicine in Saudi Arabia, they are few and far between. In general, the actual practice of telemedicine has not been extensive in Saudi Arabia, until recently. Implementation of telemedicine in Saudi Arabia has seen hurdles, especially with regard to acceptance (by both clinician and patient), technology, standardization, and legal cultural/ethical issues (Alshahrani, 2019). One of the major barriers that need to be explored is the acceptance of telemedicine by medical practitioners. It will therefore be important to study the attitudes and perceptions of doctors and nurses towards telemedicine. The COVID-19 pandemic has exposed more doctors and nurses to actual telemedicine practice.

This study assesses telemedicine perspectives from the experience of doctors and nurses. We believe the results of this will help improve the process and delivery of telemedicine in the long term. The main aim of the research was to evaluate the physicians and nurses' experience and perception of utilizing Telemedicine.

2. Literature review

2.1 Telemedicine

According to the World Health Organization (WHO), telemedicine uses information and communication technologies to promote health, provide medical care, exchange medical information, and educate health care providers and patients over long distances. Similarly, these technologies are used by healthcare professionals to diagnose 8 - systems are used Telemedicine Smartphones, computers, tablets, internet platforms, webcams, microphones, telecommuting devices, video calls, video conferencing systems, video communications, email and other digital and virtual communications that facilitate communication between patients and health care providers over long distances (Kronenfeld, 2021).

Due to the COVID-19 pandemic and mandatory social distancing to reduce exposure and spread of infection, telemedicine has been used for telemonitoring of COVID-19, diabetes, cardiovascular diseases, dermatology, urology, neurology, obstetric care, oncology and other diseases in many countries around the world, including USA, China, Italy, Australia, Saudi Arabia and Japan. It is used in the emergency department of a hospital in the USA to create a protective barrier to reduce transmission of COVID-19 between health care providers and patients (Chou, 2020). Similarly, in Saudi Arabia, telemedicine has been an important tool in treatment (Al-Sofiani M, 2021). The use of telemedicine during the COVID-19 pandemic has also reduced the use of personal protective equipment, reduced patient visits, reduced health care workers' exposure to

the coronavirus, and reduced face-to-face interactions between physicians and nurses and patients (Patterson, 2021).

Although telemedicine is an important tool for providing health services over long distances, some obstacles and barriers must be overcome to achieve maximum benefits in the application of this tool; Internet platforms, remote diagnostic systems, remote monitoring devices, teleradiology tools, computed tomography devices and other virtual technologies. Moreover, it is necessary to implement legal structures and mechanisms to maintain the privacy and confidentiality of patients (Alajwari et al., 2021).

Telemedicine could be useful for patients in isolated communities and remote areas, who can receive care from physicians or specialists in remote locations without the patient having to travel to visit, and recent advances in mobile collaboration technology could allow health care professionals in multiple locations to share Information and discussion of patients' issues as if they were in the same place (Berman & Fenaughty, 2005). Remote patient monitoring through mobile technology could reduce the need for outpatient visits and enable remote physician prescription verification and medication administration, which could significantly reduce the overall cost of medical care (Alshareef et al.,2021). Telemedicine can also facilitate medical education by allowing students to observe experts in their various medical fields and learn best medical practices more easily (Conde et al., 2010).

Telemedicine can also be useful in eliminating transmission of infectious diseases or parasites between patients and medical staff. This is a particular

problem as MRSA is common. In addition, some patients who feel uncomfortable in the doctor's office may feel better with telemedicine, for example, white coat hypertensive syndrome can be avoided. Also considered are patients who are at home and require an ambulance to take them to the clinic.

The downsides of electronic medicine include the cost of telecommunications equipment, data management, and technical training for the medical staff that will employ it. Virtual medical treatment also has the potential for reduced human interaction between medical professionals and patients, increased risk of error when providing medical services in the absence of a registered professional, and increased risk of PHI being compromised through electronic storage and transmission (Hjelm, 2005). There is also concern that telemedicine may actually reduce time efficiency due to difficulties in evaluating and treating patients with apparent interactions; For example, it has been estimated that a telephone consultation can take up to thirty minutes, while 15 minutes is considered typical for a traditional consultation. Additionally, poor quality of transmitted records, such as photographs or patient progress reports, and reduced access to relevant clinical information are considered mucus that can affect the quality and continuity of patient care for the reporting physician. Other obstacles to telemedicine implementation include unclear legal regulation of some telemedicine practices and difficulty in demanding reimbursement from insurance companies or government programs in some areas (Asia, 2019).

Another disadvantage of electronic medicine is the inability to start treatment immediately. For example, a patient with a bacterial infection can take an antibiotic by injecting it under the skin in the clinic, noting any reaction, before the antibiotic is prescribed in pill form (Alshahrani, 2019).

2.2 Telemedicine in KSA

The importance of telemedicine technology has emerged greatly around the world since the beginning of the Corona pandemic. Internet sites concerned with e-health and distance education have spread among Arab countries, especially in the Kingdom of Saudi Arabia, and the number of these sites during the past year reached more than 500 sites, according to the Saudilinks.com site directory, which recently added a special section to the directory of health sites and remote medical consultations. This inflation comes in the large number of medical sites due to the difficulty of communicating with hospitals and specialized clinics from remote areas, which closed the doors of attendance for patients to limit the spread of Corona infection (Wilson & Maeder, 2015).

Telemedicine is the use of information technology and electronic communications to provide diagnosis, examination and medical treatment services to the patient. It aims to facilitate communication between health practitioners and between them and the patient and his doctor, and telemedicine has also facilitated communication between doctors among themselves, whether related to consultations, scientific conferences, or other medical educational activities. Through it, health crises can be managed using information systems. Telemedicine is also used to

disseminate medical information, define the country's health status, and establish comprehensive medical databases (Khan, 2021).

The development of telemedicine with the beginning of the eighties of the last century, and the main objective of it was to provide medical services in rural areas, parallel to those provided in large cities and capitals, where the goal was to reduce the expenses of patient transportation and communication between the patient and the doctor in a way that provides the greatest comfort For the patient who may suffer from the troubles of traveling to large cities and moving long distances, which is harmful to his health (Alshahrani, 2019). Scientists have proven that physiological functions such as blood pressure, heart rate and body temperature can be monitored by doctors on the ground. Some other early experiments also showed the possibility of remote diagnosis and transfer of medical data while preserving quality and detail (Aldekhyyel, 2021). The benefits of electronic medicine are multi-media, it may increase the improvement of health care, the cost is less than traveling to distant specialized places, and the possibility of developing the principles of health care faster, enhancing medical cooperation in the sharing of information and specialized expertise, it may be the use of foreign specialists from different countries is easy and it is inexpensive, as the exchange of experiences and the exchange of cases are among the most important pillars of the distinguished doctor (Arafa, 2021).

The Ministry of Health in the Kingdom of Saudi Arabia provides advanced services in the field of e-health through the national e-health strategy, including telemedicine within the framework of the transformation of

electronic transactions. (Health) launched smart device applications; to promote health care and telemedicine, including: (Seha), (Seha for Doctors), (Tatman), (Tabaq), (Tawakulna), and other applications. It also receives (937) calls, and meets the health needs of callers around the clock. Health has solicited the views of the beneficiaries through several questionnaires, for example, to benefit from telemedicine (937 for medical consultations), and (to benefit from telemedicine (health application). The National Center for Medical Information is a communication center for providing, organizing and exchanging health information automatically among sectors' agencies (Wilson & Maeder, 2015). The center is a member of the International Society for Telemedicine and Electronic Health (ISfTeH) (Alshahrani, 2019). The center is linked to the Saudi Health Council and is connected to an automated health information network with the Ministry of Health and other relevant government agencies (Serper & Volk, 2018). The center launched the Saudi Network for Telemedicine initiative to link specialized health care facilities with health care centers Primary health care and hospitals in remote areas with telemedicine systems, which enhances the provision of health care services with high quality and cost-effectiveness, regardless of the geographical location or the size of the facility. Despite the expectations that the reliance on telemedicine services will decline with the decrease in the number of cases of corona infection, the demand for this service It is continuous, and is expected to increase with the great development in medical technology and in the means of remote communication, especially with the low cost of these services and its breadth (Kaliyadan, 2020). The first national project for telemedicine under the title of Saudi Telemedicine Network (STN) and

Project between MOH, Canada Health Infoway and Ontario Telemedicine Network (Al-Hazmi, 2021)

2.3 Telemedicine and COVID-19 Pandemic in KSA

The COVID-19 pandemic has put pressure on healthcare systems, not to mention widespread social distancing measures. This makes direct conventional medical care more difficult and current research on telemedicine may provide information to help in this regard. Saudi Arabia was among the countries hardest hit by the COVID-19 pandemic in the Eastern Mediterranean Region (Al-Tawfiq & Memish, 2020). As a result, the Saudi government has taken decisive measures to prevent the spread of COVID-19, such as imposing closures, imposing social distancing measures, suspending public transportation, schools, and universities, banning religious gatherings, and tracing travelers with possible coronavirus infection. 19 Furthermore, it has improved the capacity for early detection and management of COVID-19 cases by preparing several primary health care centers with staff and equipment to receive people with COVID-19 symptoms and to enhance the preventive capacity by making the COVID-19 vaccine widely available. These regulations made face-to-face medical advice more difficult. Like most countries around the world, the increasing need for healthcare in Saudi Arabia during the COVID-19 pandemic has faced diminishing medical practice capacity and limited access to healthcare (Khan, 2021).

The evolution of the COVID-19 pandemic and associated restrictive measures have increased awareness of telemedicine and led to a rapid increase in the volume of telemedicine services provided. To fill this gap, several digital solutions have been proposed. With the tremendous improvement in telecommunication technologies, telemedicine has become one such solution that can allow healthcare workers to communicate interactively with remote patients to provide them with diagnostic and therapeutic services (Nittari, 2019).

The Kingdom of Saudi Arabia has many developments in the field of digital healthcare, with specific strategic plans in place to advance healthcare using information technology (Ekeland et al.,2010) The changes in insurance policies announced by the Saudi Council for Cooperative Health Insurance during the pandemic, which indicates that telemedicine services will be covered by insurance companies, affected the rapid spread of telemedicine services. While the efficacy of telemedicine care has been published in the literature, with specific studies focusing on the satisfaction of telemedicine users during a pandemic (Alshareef, et al., 2021), little is known about the ease of use of telemedicine applications (Narasimha, et al., 2017).

Due to the transmission of viruses and increasing outpatient demands in health care settings, the need of developing an innovation strategy has become crucial (Alghamdi, 2020). Switching from direct patient services into virtual health care delivery might assist in managing effectively such contingencies (Centers for Disease Control and Prevention, 2020). Taking the Covid-19 pandemic as an example, although the Telemedicine services

in Saudi Arabia contribute effectively to care coordination during the pandemic; however, this service still does not meet the Saudi health care delivery expectation. Further studies are recommended on evaluating the Telemedicine use. The finding of this study might contribute to achieving the Ministry of Health Vision alignment with the Saudi 2030 vision, which is directed towards creating a new health system based on non-traditional methods of healthcare delivery (Ministry of Health, 2020).

3. Methods

The study design was in the form of an observational, descriptive, and cross-sectional survey. An electronic questionnaire was created using the Internet. The questionnaire has a demographic component that covers variables such as age, specialty, degree, and experience with telemedicine during the COVID pandemic. In the second part, there were questions to assess knowledge about the use of telemedicine, and the last part there were perceptions about telemedicine were assessed using the Likert scale. The Likert scale itself has two main areas for assessing doctors and nurses' perception of telemedicine, using two subsections. The Cronbach's alpha value for the final Likert scale component was acceptable. The estimated sample size was 300. The questionnaire was distributed as a link through social media groups for physicians in the area (the response rate was difficult to calculate due to the shape of the distribution). Descriptive statistics, in the form of frequencies and percentages, are used to represent the data. The study was approved by the institutional ethics committee.

4. Results

There were 108 valid responses. The ages of the respondents ranged from 25 years to 50 years (mean age 37 years). Of the total, nurse technician 9%, specialist nurse 55%, senior specialist, nurse 4%, resident 3%, assistant consultant 9%, consultant 17%, and other 3%. The answer to the following questions was as follows: "Have you ever heard about telemedicine?" (16%), (84%), "Did you ever used telemedicine?" (54%), (46%), and "Do you think the telemedicine should continue after the COVID-19 pandemic in KSA?" (23%), (77%).The most common communication tool used in telemedicine is video (48%); Email (25%); telephone (84%); text message (0%); and social media (13%).

For the component of the questionnaire covering the Likert scale-based responses, there was a strong agreement on the following statements: "Telemedicine can help patients to save time and money" (36%), "Telemedicine can improve compliance" (23%), "Telemedicine can enhance the quality of care" (21%) and "Telemedicine can improve the effectiveness of therapeutic intervention" (21%). A slightly lower level of concordance was seen for the following statements: "Difficulty finding the correct diagnosis due lack of physical examination" (18%).It was interesting that a majority of the respondents agreed or strongly agreed that the use of telemedicine will save time and money (36%) as table below.

Table 1: Responses to the Likert scale component of the questionnaire

Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	%	%	%	%	%
Telemedicine can improve the effectiveness of therapeutic intervention.	21%	41%	33%	5%	0%
Telemedicine can enhance the quality of care.	21%	41%	31%	7%	0%
Telemedicine can provide psychological support to patients.	21%	44%	30%	5%	0%
Telemedicine can improve compliance.	23%	44%	26%	7%	0%
Difficulty finding the correct diagnosis due lack of physical examination.	18%	41%	36%	5%	0%
Telemedicine can help patients to save time and money.	36%	48%	16%	0%	0%
Inconvenience and time consuming for physicians.	2%	25%	38%	26%	10%
Excessive cost of hardware.	3%	23%	34%	34%	5%

5. Conclusion

Telemedicine can provide a convenient way to accurately and cost-effectively expand access to healthcare in Saudi Arabia while reducing the risk of transmission of COVID-19. More efforts should be made to provide healthcare settings with technical equipment and training for telemedicine. Regulations are also needed to implement telemedicine on a large scale in Saudi Arabia while protecting data privacy. This study provided useful insight about the knowledge, perceptions and experience of telehealth in one of the hospitals in Riyadh, Saudi Arabia by obtaining data from a number of physicians and nurses. Telemedicine service has shown positive effect in health care system as saving the time and cost of patients as well as providing a better quality of care to the patients. Healthcare providers believed that using telemedicine was effective especially in pandemic period and needs to be continued after. Therefore, this research recommends the following:

- Education and training should be provided to the healthcare providers on the practice of telemedicine.
- Involved allied health providers in using telemedicine and participate in the patient care plan.
- Expanding of using telemedicine in the healthcare to enhance the quality of care
- Further research in different healthcare sittings is required to provide evidence of the effectiveness and feasibility of emerging telemedicine in health care delivery.

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