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Patients Experience of Telemedicine in Saudi Arabia: A Review of User Perspective

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Abstract
Background: In today's world, one of the requirements is the urgent need to provide fast, low-cost, affordable, and high-quality medical services. These demands have led to the invention of ways in which medical services can be provided to patients in their homes. Methods: This study aimed to analyze patients' experience of the implementation of telemedicine in Saudi Arabia (Riyadh City). Samples from different categories of patients were randomly selected following opportunity sampling techniques. The study population included 332 participants (male and female). For data collection, we used a questionnaire consisting of 8 items. The questions were rated using a 5-point Likert scale (agree, strongly agree, average, disagree, and strongly disagree). Results: A total of 67 (19.5%) participants reported that they use telemedicine only for medical consultation, while 47 (13.7%) said that they use it for diagnosis and treatment as well. The participants revealed that telemedicine saves them time and money. However, they admitted that telemedicine negatively affected their relationship with the service providers. Finally, patients described communication challenges and a lack of confidence in accessing telemedicine. Conclusions: The study concluded that the main barriers to the use of telemedicine services are a lack of confidence in accessing telemedicine, difficulty communicating due to the use of different languages and dialects, and the fact that these services are not suitable for uneducated people.

Keywords: Telemedicine, Services Providers, Riyadh City, COVID-19 Pandemic, Interactive Medicine, Medical Consultation

1. Introduction

The Internet can be used as a powerful tool to promote community health. Growing the use of telemedicine can reduce the pressure on healthcare facilities and decrease the budget required for equipment and operation. Saudi citizens are well-equipped with electronic devices and social media applications. Thus, the results of this study can be used to expand the use of telemedicine in this population by creating positive attitudes and strengthening

confidence in the reality of telemedicine, especially in light of the circumstances of pandemics such as the COVID-19 pandemic, during which remote interaction became one of the basic features.

According to our literature review, all studies on telemedicine to date included physicians, or in some cases, university students as their participants (Kaliyadan, et al, 2020 , Al-Hazmi, et al 2021 and Mubaraki. et al. 2021). Several other studies on telemedicine were associated with telemedicine during the COVID-19 pandemic, and this factor may have some influence on the results, given that during the pandemic people avoided visiting health care services and used other methods for medical consultation and treatment, such as telephone calls and online contact with their physicians (Idriss. et al. 2022 and Alajwari. et al. 2022). This study covered most of the community populations from different disciplines.

The main objectives of this research were to study patients' experience of the implementation of telemedicine and analyze the association between the demographic variable and telemedicine.

2. Literature Review

In the modern medical dictionary, telemedicine is simply defined as "the remote delivery of health care services" (Field. 1996). This refers to the delivery of healthcare services to people at home. There are three common types of telemedicine, which include but are not limited to store-and-forward telemedicine and remote patient monitoring (Alaboudi, et al. 2016).

Recent studies in Saudi Arabia have revealed the widespread use of telemedicine among health professionals in various hospitals (El-Mahalli, et al. 2012). An extensive review of the literature in the field of telemedicine in Saudi Arabia resulted in few publications on the identification of barriers and the challenges inherent to telemedicine (Greysen, et al. 2021). A study was conducted in the KSA in 2021 to assess the knowledge and perceptions of physicians about willingness to use telemedicine in the Riyadh region of Saudi Arabia (Albarrak 2021) The same was studied in the context of the COVID-19 pandemic in Riyadh, Saudi Arabia, through a cross-sectional survey in 2022. The questionnaire was distributed among 500 physicians who employed telemedicine in their practice between October 2021 and December 2021. This study revealed that 70% (n=254) of the responding physicians considered telemedicine consultations to be cost-effective. Regarding burnout, 4.1% (n=15), 7.5% (n=27), and 27.3% (n=99) of the doctors reported feeling burnout every day, a few times a week, and a few times a month, respectively (Sarah. et al. 2022). Another study reported four major concerns by various health professionals from four main hospitals in the KSA regarding the adaptation of telemedicine. These concerns were mainly patient privacy, the high cost of equipment, the lack of suitable training, and the lack of consultation between information technology experts and medical staff. All these stated factors are inconsistent with various published studies, and more studies need to be conducted in this field to fill the gap between the theoretical and practical implementation of telemedicine in the field (Idriss. et al. 2022).

According to our web search, there are few studies conducted among everyday citizens, except for two studies that were conducted among university students and faculty members. The findings of such studies cannot help solve the issue completely because university students and faculty members are recognized as well-educated and do not represent the whole community. These studies revealed that both students and faculty members do not trust telemedicine and insist that face-to-face medication is essential, especially when patients have severe symptoms or unfamiliar disorders. Another study conducted among 314 participants aimed to study the factors affecting the adoption and acceptance of e-health in the context of Saudi Arabia. The study showed that usefulness and privacy significantly affected the adoption of e-health. Furthermore, the perceived ease-of-use factor has an indirect effect on people's perception of e-health services. Furthermore, the results show that the quality and trust in the system are not influencing factors (Almazroi, et al. 2022).

Generally, telemedicine is the most preferred method for medical consultation and treatment because of easy access to a network of physicians from the largest group of hospitals, and because the independence and autonomy of patients increases by offering additional information and advice on medical issues.

2. Method

2.1 Study Design and Setting

This is a cross-sectional study conducted between October 2022 and September 2023. The study was designed to assess patients' experiences of the implementation of telemedicine. The sociodemographic characteristics of the participants were measured using a questionnaire adopted from the literature and modified to fit with the research questions.

2.2 Questionnaire development

The questionnaire evaluated patients' experience of the implementation of telemedicine, as well as their sociodemographic characteristics. They rated their experience using a 5-point Likert scale (agree, strongly agree, disagree, strongly disagree, and average).

2.3 Study population and sample size

According to the latest census in KSA (Saudi Statistics Authority in April 2021), the total number of Saudi citizens in Riyadh city is approximately 3,138,517 (females 1,633,322; males: 1,500,195). We adopted the opportunity sampling technique, with a confidence level of 96%, but the degree of freedom was adjusted to 0.4 instead of 0.5. The sample size was 332, which included both males and females. The sample size was calculated using the following formula:
S= Z2XPx(1-P)/M2,
where: S = sample size for population, Z = critical value, P = population proportion (calculated to be 0.1), and M = Margin of error (set at 0.0025).

The participants were selected randomly from some health facilities that apply telemedicine services in Riyadh. A predesigned questionnaire was administered to the potential participants through direct contact or via email. Experts reviewed the questionnaire for the validity and reliability of all items. The questionnaire included closed questions regarding socio-demographic characteristics, type of services, and opinions on telemedicine services. The open-ended question was used to gather respondents' recommendations for improvement.

2.4 Data Analysis

The responses were recorded, validated, and analyzed using appropriate statistical software (SPSS 26). A descriptive analysis was conducted to obtain distributions of variables, central tendencies, frequencies, and proportions. An infernal analysis was conducted to measure the magnitude of the correlation between different variables and factors were analyzed using appropriate statistics tools to assess the association between variables.3.

2.5 Ethics Statement

The study was conducted per the Declaration of Helsinki and approved by the Institutional Review Board and Ethics Committee of Saudi Electronic University (SEUREC-220019-, 17.2.2022). Informed consent was obtained from all subjects involved in the study.

3. Results

The total sample included 332 patients from some hospitals in Riyadh City, representing various components of society. The response rate among males was high (81.3%; n=270), while only 18.7% (n=62) of females responded to the questionnaire (mean: 1.18). The average age of 24-34 years was predominant for both males (33.8%) and

females (35.5%). For the level of education, the descriptive data analysis showed that most of the males (128, 45.5%) and females (25, 8.9%) have bachelor's degrees.

Table 1: Characteristics of the study population (gender, age, and level of education).

Gender		Male		Female	
		Count	%	Count	%
Age	18–24	49	18%	10	16.1
	24–34	95	35%	22	35.5
	35–44	77	29%	22	35.5
	45–54	49	18%	8	12.9
	Total = 332	270	81%	62	19%
Education level	Post-graduate degree	28	10%	11	18%
	Bachelor's degree	118	44%	25	40%
	Secondary school	86	32%	18	29%
	Intermediate school	6	2%	1	2%
	Primary school	23	9%	5	8%
	Other	9	3%	2	3%

Table (2) presents the descriptive analysis (frequency) data. Only 118 (35.5%) of the respondents said that they used telemedicine services before, while 214 (64.5%) had no practical experience with telemedicine.

Table 2: Use of telemedicine services.

Use of telemedicine services		Frequency	Percent
	Yes	118	35.5%
	No	214	64.5%
	Total	332	100.0%

Table (3) shows information on the purposes of using telemedicine as cited by the participants. About 19.5% of the participants said they used the services only for medical consultation, while 13.7% said they used it for diagnosis and treatment

Table 3: Purpose of using telemedicine services.

Purpose	Frequency	Percent
Medical consultation only	67	19.5%

	Diagnosis and Treatment	47	13.7%
	Other	4	1.2%
	Total	118	35.5%

Table (4) shows the participants' opinions regarding the positive impacts of telemedicine in terms of saving time and money. Most of the participants chose average levels (14.0%), high (10.8%), and very high (6.1%).

Table 4: The positive impact of telemedicine on time and cost.

Likert scale	**Positive impact of telemedicine on time**		**Positive impact of telemedicine on cost**	
	Frequency	ercent	Frequency	Percent
Very high	22	19%	21	18%
High	45	38%	37	31%
Average	47	40%	48	41%
Low	2	2%	6	5%
Very low	2	2%	6	5%
Total	118	100%	118	100%

As shown in Table (5), a total of 127 (38%) respondents rated highly the negative effect of telemedicine on relationships between patients and doctors, compared to only 52 (16%) who chose a low effect.

Table 5: Effects of telemedicine on the doctor–patient relationship

Effects of telemedicine	Frequency	Percent
Very high	42	13%
High	127	38%
Average	96	29%
Low	52	16%
Very low	15	5%
Total	332	100.0

The main barriers that limit the use of telemedicine services according to the respondents are 1) lack of confidence in accessing telemedicine (20%), 2) difficulty in communicating due to different languages and dialects (32%), 3) service being unsuitable for uneducated people (31%). Many of them believe that communication and Internet services will not be a major obstacle when using telemedicine.

Table 6: Main barriers to the use of telemedicine services:

Responses	Lack of confidence in accessing telemedicine		Difficulty in communicating due to different languages and dialects		The service is not suitable for uneducated people		Lack of or weak Internet connections	
	requency	Percent	Frequency	ercent	requency	ercent	requency	Percent
Very high	66	20%	106	32%	101	31%	89	27%
High	123	38%	128	39%	127	38%	90	27%
Average	83	25%	77	23%	64	19%	57	17%
Low	42	13%	11	3%	27	8%	44	13%
Very low	13	4%	10	3%	11	3%	52	16%

	Total	327	98%	332	100%	330	99%	332	100%

4. Discussion

The study aimed to assess the patient experience of the implementation of telemedicine in Saudi Arabia (Riyadh City). A total of 332 male and female participants agreed to participate. The response rate among males was high (81%; n=270), while only 19% (n=62) of females responded (Table 1). This phenomenon was studied in research titled "Comparison of Web and Telephone Survey Response Rates in Saudi Arabia", which revealed that the males have a significantly higher response rate (51.51) average to research questionnaire than females (15.09) (P-value = 0.035) (Ali. 2008). No more evidences were found to justify female's reluctance to fill out the questionnaire, except that we attribute this to some social factors, as Saudi society is largely conservative and it is not easy to involve females in community studies.

The average age of 24-34 years was predominant for both males and females, with percentages of 35% and 35.5%, respectively. For the level of education, the descriptive data showed that most of the males and females have bachelor's degrees (118, 44%), (25, 40%), respectively (Table 1). Our descriptive analysis shows that only 118 (35.5%) of the respondents used telemedicine services, while 214 (64.5%) had no practical experience with telemedicine (Table 2). This result is similar to the results of a previous study conducted in the KSA in 2021, which showed that only 33% of the participants had used telemedicine services systems before (Alajwari, et al. 2022).

A total of 67 (19.5%) participants said that they used the services only for medical consultation, while 47 (13.7%) (Table 3) said that they used it for diagnosis and treatment. This result is different from those of a study conducted in December 2020 in Saudi Arabia, which showed that 305 (77.8%) conducted routine (live) patient consultations since the start of the pandemic (the period was approximately two months), while 228 (58.1%) had used some form of telemedicine (other than standard phone calls) during the COVID-19 pandemic (Greiwe. 2020).

Most of the respondents believed that telemedicine has a positive impact on reducing costs and saving time, as shown by the Likert scale rating of very high (6.4%), high, and average (Table 4). Similarly, some previous studies have suggested that telemedicine is an accessible and convenient tool that reduces costs and travel time (Bokolo, 2020, Abdel Nasser, et al. 2021, Vidal, et al. 2020 and CDC. 2020)]. The results are comparable to another study indicating that telemedicine can reduce unnecessary outpatient visits (87.5%) (Feroze, et al. 2020).

Approximately 38% of the respondents gave a high score for the negative effect of telemedicine on relationships between patients and physicians, compared to 16% who chose a low effect (Table 5). An early report titled "Telemedicine and the Provider-Patient Relationship: What We Know So Far" by Edward Alan Miller in the USA concluded that telemedicine may impact trust, which can facilitate patient disclosure and cooperation. It may also influence the extent of patient and physician participation during medical encounters, either facilitating movement toward patient-centered and consumerist patterns or reinforcing traditional paternalistic patterns (MacDonald, et al. 2022). Our results are similar to those of a recent study conducted in three National Patient-centered Clinical Research Network sites in New York City, North Carolina, and Florida, which revealed that a virtual environment (telemedicine) affects the quality of interpersonal relationships between patients and providers by limiting feelings of connectedness (Andreadis, et al.2023).

According to this study's participants, the main barriers that limit the use of telemedicine services, as presented in Table (6), are lack of confidence in accessing telemedicine (20%), the difficulty in communicating due to different languages and dialects (32%), the service being unsuitable for uneducated people (31%). Many of them believe that communication and Internet services will not be a major obstacle when using telemedicine. (Rivara. et al 2011).

A similar study showed that technological limitations (66.6%) and concerns about diagnostic reliability (66.1%) were the main barriers (Feroze, et al. 2020). Other barriers, such as provider-patient relationships, medical liability,

prescription of controlled substances, and others, were mentioned in scientific papers published in 2020 (Gajarawala and Jessica, 2021) In a KSA study conducted in 2016 that involved 905 respondents, 11 barriers were highlighted to be the most significant in the KSA context. The top three influential barriers were the availability of adequate sustainable financial support, ensuring the conformity of telemedicine services with the core mission, vision, needs, and constraints of healthcare facilities, and reimbursement for telemedicine services (Abdel Nasser, et al. 2021).

5. Conclusion

Telemedicine has a good opportunity to provide fast, low-cost, affordable, and high-quality medical services in Saudi Arabia. More efforts should be made to provide healthcare institutions and practitioners with the necessary technical equipment and training. Furthermore, improving knowledge about telemedicine among the population can develop positive perceptions and good attitudes.

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