The Role of Virtual Clinics in Saudi Healthcare Transformation: Insights from the Saudi Population

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KEYWORDS

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Abstract

Background: Telemedicine has become an essential solution in healthcare by increasing accessibility and lowering burdens on healthcare systems, especially during the COVID-19 pandemic. In Saudi Arabia, the growth of telemedicine aligns with Saudi Vision 2030, thereby highlighting the importance of evaluating patient satisfaction to optimize service provision and find solutions to existing challenges.

Objective of the study: to assess patient satisfaction with Saudi telemedicine services, focusing on overall satisfaction, post-consultation experiences, clinician interaction, and ease of use. It also assessed how satisfaction ratings are associated with demographic and service-related characteristics.

Subjects and Methods: A cross-sectional study was carried out using an electronic questionnaire distributed via social media. 1,072 participants were recruited through convenience sampling. SPSS data analysis utilized descriptive and inferential statistical methods to assess the associations between satisfaction levels and demographic factors.

Results: Overall satisfaction scores indicated a positive experience. Private telehealth consumers, those with postgraduate degrees, and participants older than 30 were all found to have a higher level of satisfaction. According to the four-point Likert scale, most participants rated telemedicine services as good to excellent in all evaluated domains,

Conclusion: Private service users and highly educated Saudi Arabians have expressed positive perceptions toward telemedicine services. While satisfaction ratings are generally high, there is potential for improvement in appointment scheduling and post-consultation support. Future research should concentrate on developing strategies to improve the accessibility of telehealth and assessing long-term adoption trends.

Introduction

In recent years, digital and telecommunications technology advancements have significantly transformed global healthcare delivery systems. Telemedicine, which includes remote consultations, patient monitoring, and digital health apps, has become an effective solution to healthcare accessibility issues [1,2]. During the COVID-19 pandemic, there was an urgent necessity for innovative methods to maintain healthcare services amid disruptions caused by travel restrictions, lockdowns, and the requirement for social distancing [3]. Countries worldwide, including Saudi

Arabia, responded by rapidly expanding telehealth services to ensure continuity of care while reducing the risks associated with in-person visits.

Saudi Arabia's healthcare sector faced challenges during the pandemic, particularly in rural and underserved areas with limited access to healthcare facilities [4]. Essential services, including consultations, prescription administration, and follow-ups, are provided by virtual clinics through platforms such as the Sehha app. These applications mitigated geographical obstacles, decreased waiting times, and provided patients with a secure and efficient alternative to physical clinics. Nevertheless, the rapid transition to telehealth revealed challenges, such as patient literacy with digital tools, technological barriers, and data privacy [5].

Telemedicine is not merely a transitory solution during crises but a long-term opportunity to improve healthcare systems worldwide [6]. Virtual clinics, in particular, have the potential to resolve persistent issues, including healthcare disparities, overwhelmed health systems, and inefficiencies in service delivery. In Saudi Arabia, virtual clinics align with the objectives of Saudi Vision 2030, which emphasizes healthcare innovation to enhance access, quality, and efficiency [7]. Across the globe, telehealth is recognized as a critical component of contemporary healthcare, with robust frameworks prioritizing patient safety, clinical efficacy, and data security [8]. These frameworks ensure that remote consultations can yield results comparable to those of conventional in-person encounters. The Saudi Health Council has established guidelines and standards for the implementation of telehealth in Saudi Arabia [7]. These guidelines address critical areas, including patient consent, data privacy, liability, and the scope of services. While these guidelines set a strong foundation for telehealth practices, the long-term success of virtual clinics depends on understanding and meeting the expectations and needs of the Saudi population.

Although telemedicine has gained global recognition, research on the Middle East, particularly Saudi Arabia, remains limited. Research [9,10] has indicated high satisfaction levels with telehealth services during the COVID-19 pandemic; however, technical difficulties and the necessity for user-friendly platforms remain significant barriers. The current study aimed to address this gap by assessing telehealth services from the viewpoint of Saudi users and discussing their viability as a sustainable substitute for conventional consultations.

Objectives of the study:
Aim of the study:
This study aims to evaluate virtual clinics' impact on healthcare accessibility and efficiency from the Saudi population's perspective.

Primary (Specific) Objective:

The **primary objective** of this study is to assess the Saudi population's satisfaction with virtual clinics and evaluate their feasibility as a substitute for in-person visits.

Secondary objectives include identifying barriers to telehealth adoption and exploring demographic variations in satisfaction levels.

Materials and Methods:

- **Study Area/Setting**:

The study was conducted in Saudi Arabia, and participants were approached through an electronic questionnaire distributed via Facebook, WhatsApp, and Twitter, the most commonly used social media platforms among the Saudi population.

- **Study Subjects**

The study population included all patients aged 18 years and older who utilized telemedicine consultation services through private or governmental telehealth service providers and were willing to participate.

- **Study Design and sample size**

This cross-sectional study was conducted in Saudi Arabia to assess patient satisfaction with telemedicine services. A non-probability convenience sampling method was employed, with participants recruited through an electronic questionnaire distributed via social media platforms, including Facebook, WhatsApp, and Twitter. Initially, a minimum sample size of 385 was estimated based on a 95% confidence level, a 5% margin of error, and an expected satisfaction rate of 70–80% from prior studies. However, due to a high response rate, the final sample included 1,072 participants, significantly enhancing the statistical power and generalizability of the findings. Responses were automatically filtered to meet eligibility criteria, ensuring that only patients aged 18 years and older who had used telemedicine services from private or governmental providers were included in the study.

- **Data Collection Methods, Instrument Used, Measurements:**
  - **Instrument Used**

The questionnaire of this study was electronic and self-administered. It comprised three main sections: demographic data, patient experiences with telemedicine, and service satisfaction. It contains 19 items, utilizing a 4-point Likert scale for satisfaction-related questions (1 = Poor, 2 = Fair, 3 = Good, 4 = Excellent).

The survey design is adapted from the Telehealth Satisfaction Scale (TeSS) [11], ensuring its alignment with established standards for evaluating patient satisfaction in telehealth settings. The current questionnaire was translated into Arabic using the WHO standard translation and back-translation methodology to ensure linguistic and cultural appropriateness for the Saudi population.

  - **Studied Variables**

The questionnaire assessed various variables related to patient demographics, telemedicine experience, and satisfaction. Demographic data included age, gender, educational level, marital status, and the presence of chronic diseases. Telemedicine experience was evaluated based on the type of healthcare institution used, the device utilized for consultations, preferred communication methods, and notification preferences. Patient satisfaction was measured across multiple dimensions, including ease of platform use, the quality of clinician interaction, post-appointment follow-up experiences, and overall satisfaction with telemedicine services.

  - **Validation and Reliability**

The instrument's validity was tested through a pilot study with 20 participants, ensuring clarity, relevance, and comprehensiveness. Experts in telemedicine and healthcare research confirmed content validity. Reliability testing indicated that Cronbach's alpha score is (0.83), indicating the instrument's internal consistency.

Questionnaire: (see the appendix)

Data Management and Analysis Plan:

For data entry and statistical analysis, the SPSS statistical software package for Windows (version 20.0; IBM Corp., Armonk, NY, USA) was used. Quality control was performed during the coding and data entry stages to ensure accuracy. Data were analyzed using descriptive statistics, with frequencies and percentages used for qualitative variables and means with standard deviations for quantitative variables. Appropriate statistical tests were applied to determine statistically significant associations between participants' assessment scores and their demographic characteristics.

Ethical Considerations:

Data collection commenced after obtaining approval from the ethical and scientific committee of King Abdullah International Medical Research Center at King Abdul-Aziz Medical City. Participant confidentiality was strictly maintained, and all data were kept confidential throughout the research. Informed consent was obtained from all participants before their inclusion in the study.

Result

Characteristics of the study subjects:

As shown in **Table 1**, the study included 1,072 participants, representing users of telemedicine services. The majority (73%) were older than 31 years. Males and females were almost equally represented, comprising 51% and 49% of the sample.

Regarding educational attainment and marital status, more than half of the participants (53%) held a bachelor's degree, while 28% reported having postgraduate qualifications. In terms of marital status, nearly two-thirds of the participants were married, 26.9% were single, and 6% were widowed or divorced.

Table 1: Demographic characteristics of Participants (n=1072)

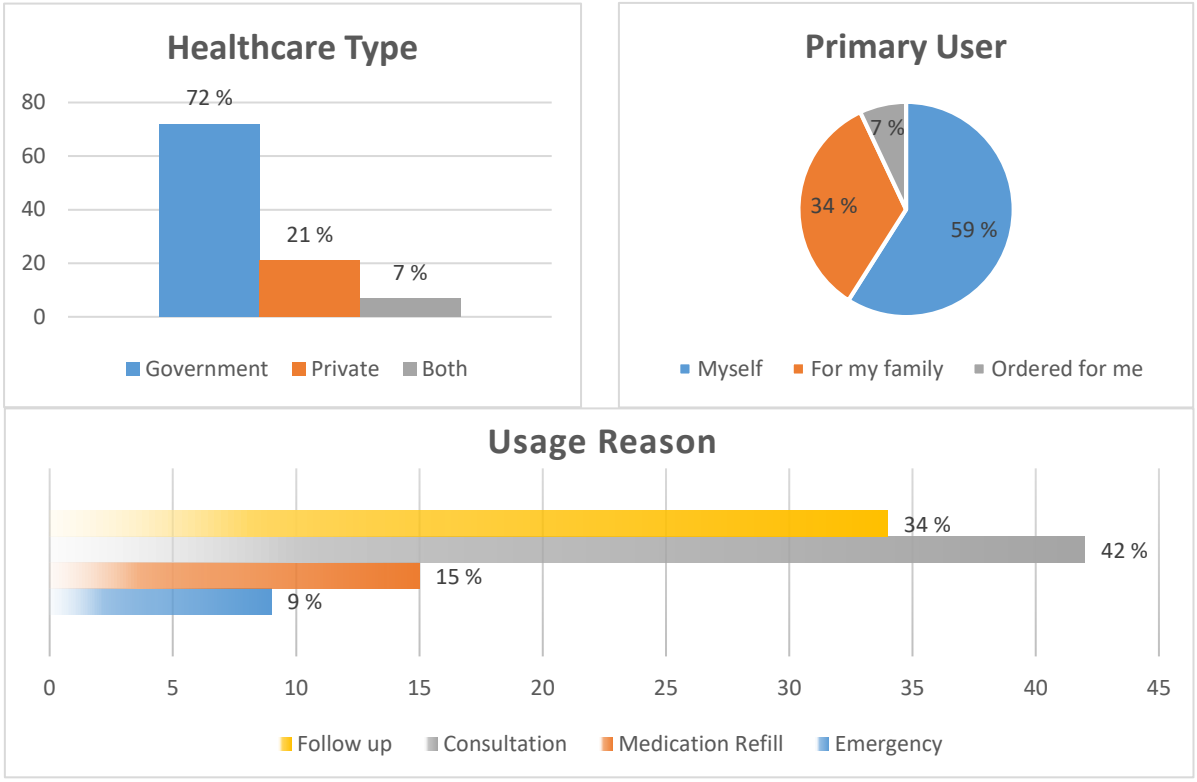
Demographic characteristics	Frequency (n)	Percent (%)
Age category		
20 - 30 years	288	27
31 - 40 years	384	36
41 - 50 years	320	30
More than 50	80	7
Gender		
Male	544	51
Female	528	49
Level of Education		
Basic/intermediate	176	16
High School	112	11
Bachelor	480	45
Postgrad	304	28
Marital Status		
Widow/Divorce	64	6.0
Single	288	26.9
Married	720	67.2

Utilization of Telemedicine Services and Communication Preferences

Figure 1 highlights the participants' patterns of telemedicine service utilization. The majority (72%) relied on government telehealth services, with 21% utilizing private providers and 7% accessing both. Most telemedicine services were used by the participants for themselves (59%), while a significant proportion (34%) used the services on behalf of family members. Follow-ups (34%) and consultations (42%) were the most common reasons for using telemedicine, whereas medication refills (15%) and emergencies (9%) were less frequent.

Figure 2 illustrates participants' preferences for devices and communication methods in telemedicine. Smartphones were the dominant device used (91%), with minimal reliance on tablets (6%), laptops (1%), or desktops. Voice calls were the most preferred mode of communication (55%), followed by video calls (31%) and chat services (13%). For healthcare notifications, Short Message Service (SMS) was the most favored method (73%), followed by app notifications (11%), email (10%), and phone calls (6%).

Figure 1: Distribution of Participants by Healthcare Type, Primary User, and Usage Reason (n=1072)



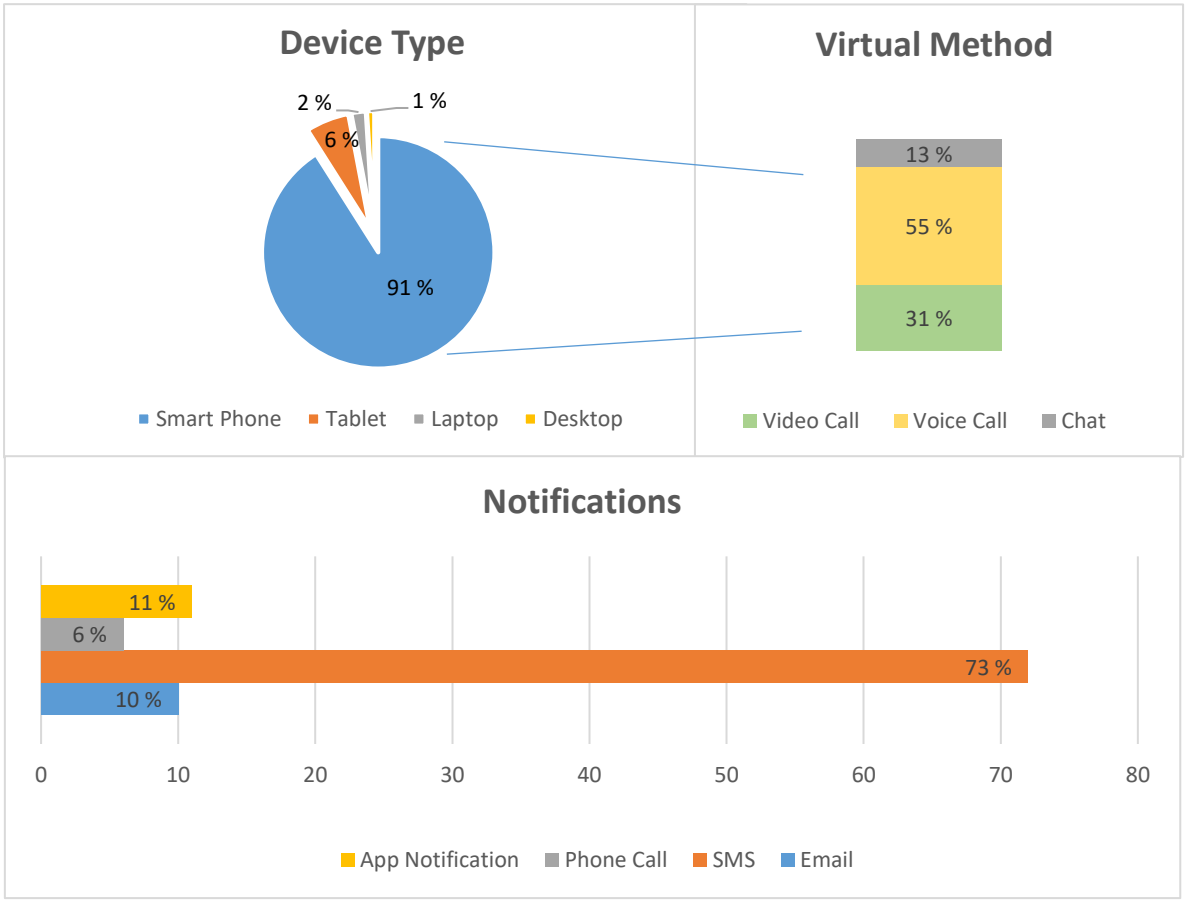


Figure 2: Device Type, Virtual Communication Method, and Notification Preferences of Participants (n=1072)

Patient Satisfaction and Perceived Quality of Telemedicine Services

Table 2 summarizes patient satisfaction with telemedicine services across four domains. Ease of use received a mean score of 2.79, with clarity of instructions rated highest (2.9), while appointment scheduling was slightly lower (2.7). Clinician interaction scored 2.87, with communication quality (2.9) rated highly, but the explanation of treatment plans was slightly lower (2.7). Post-appointment experiences averaged 2.78, with prescription clarity (2.8) rated well but access to follow-up services (2.7) needing improvement. Overall satisfaction was 2.85, with telemedicine's effectiveness and ease of access (2.9) rated highest, while comparison to in-person visits (2.7) was rated lower. These findings indicate generally positive experiences with room for scheduling and follow-up support improvement.

Table 2: Patient satisfaction with telemedicine services (n=1072)

Questions	Mean Scores Min 1 Max 4	SD
Ease of Use		
1) How easy was it to access the telemedicine platform?	2.81	1.2
2) Were the instructions for booking and accessing the service clear?	2.92	1.1
3) How simple was it to schedule an appointment?	2.71	1.1
4) Could you get an appointment at a time that suits your needs?	2.71	1
Mean score	2.79	
Clinician Interaction		
1) How would you rate the voice or video quality during the telemedicine session?	2.92	1.1
2) How attentive and concerned was the doctor towards your health problems?	2.91	1.1
3) How relaxed did you feel during the telemedicine session?	3.00	1.1
4) Did the doctor spend enough time listening to your concerns?	2.91	1.1
5) How clear was the doctor's explanation of your health problem?	2.80	1.1
6) Was the doctor's explanation of the treatment plan and follow-up satisfactory?	2.70	1.2
Mean score	2.87	
Post Telemedicine Appointment		
1) How clear was the prescription provided after the consultation?	2.85	1.2
2) How easy was obtaining medications or follow-up services based on the consultation?	2.75	1.2
3) How timely were the follow-up actions, such as test results or additional advice?	2.82	1.1
4) How convenient was accessing further support or resources if needed?	2.72	1.1
Mean score	2.78	
Overall Satisfaction		
1) How effective was telemedicine in relieving your present medical problem?	2.91	1.1
2) How would you rate the ease of accessing healthcare services through virtual clinics?	2.92	1.1
3) How does telemedicine compare to a regular in-person visit regarding convenience and effectiveness?	2.73	1.2
4) How likely are you to recommend telemedicine services to others?	2.88	1.1
Mean score	2.85	

Determinants of Patient Satisfaction with Telemedicine Services

Table 3 illustrates the relationship between demographic and usage characteristics and participants' satisfaction with the ease of use of telemedicine services. Statistically significant differences were observed in satisfaction levels across age groups (p = 0.001), with participants aged 31–50 reporting the highest satisfaction (mean 2.93, 95% CI: 2.81–3.04). The educational level also significantly impacted (p = 0.001), where postgraduate-level participants expressed the highest satisfaction (mean: 3.22, 95% CI: 2.83–3.30). Concerning the reason for use, participants seeking telemedicine services for medical refills reported the highest satisfaction (mean 2.85).

Regarding healthcare type, satisfaction was higher among participants using private services (mean 2.96, p = 0.043). Device type significantly influenced satisfaction (p = 0.001), with smartphone users reporting the highest scores (mean: 2.89, 95% CI: 2.83–2.95). Similarly, virtual method preference affected satisfaction (p = 0.001), where video calls achieved the highest scores (mean: 2.88, 95% CI: 2.75–3.01).

Table 3: Relation between the participants' satisfaction regarding the ease of telemedicine services and their demographic and usage characteristics. (n=1072)

Demographic characteristics	Satisfaction score (max=4) of **ease of use telemedicine services**			
	Median	Mean 95% CI Lower - Upper	Median test Statistic	p-value
Age				
20 - 30 years	2.5	2.67 (2.57 - 2.76)		
31 - 40 years	3	2.85 (2.76 - 2.95)		
41 - 50 years	3.5	2.93 (2.81 – 3.04)		
More than 50	2.5	2.20 (1.94 – 2.43)	81.3	0.001*
Gender:				
Male	3	2.76 (2.68 - 2.85)		
Female	3	2.79 (2.71 - 2.87)	1.9	0.165
Educational level:				
Basic/intermediate	1.5	1.86 (1.71 - 2.01)		
High School	2.5	2.86 (2.70 - 3.01)		
Bachelor	3	3.00 (2.92 - 3.08)		
Postgrad	3	2.92 (2.83 – 3.01)	49	0.001*
Healthcare type				
Government	3	2.74 (2.67 - 2.81)		
Private	2.75	2.96 (2.84 - 3.09)	4	0.043*
Usage reason:				
Emergency	3.25	2.83 (2.59 - 3.07)		
Medication Refill	3.25	2.85 (2.69 - 3.01)		
Consultation	3	2.70 (2.62-2.77)		
Follow up	2.50	2.83 (2.72-2.94)	32	0.002*
Device type:				
Smartphone	3	2.89 (2.83 - 2.95)		
Tablet	1.5	1.60 (1.47 - 1.73)		
Laptop	1.5	1.5 (1.5 – 1.5)	62	0.001*
Virtual Method				
Video call	3.5	2.88 (2.75 - 3.01)		
Voice call	3	2.76 (2.68 – 2.83)		
Chat	2.5	2.61 (2.49 – 2.73)	52	0.001*

(*) Statistically significant at p < 0.05

Table 4 highlights participants' satisfaction with clinician interaction. Significant variations were found across age groups (p = 0.001), with participants aged 41–50 reporting the highest satisfaction (mean 3.13, 95% CI: 3.01–3.24). Educational attainment also influenced satisfaction (p = 0.001), where participants with postgraduate education reported higher satisfaction (mean 3.05, 95% CI: 2.94–3.16). Among usage reasons, participants using telemedicine for medication refills reported the highest satisfaction (mean 3.15)

Healthcare type significantly impacted satisfaction (p = 0.004), with participants using private telemedicine services reporting higher satisfaction (mean: 3.07, 95% CI: 2.94–3.21). Device type (p = 0.001) and virtual methods (p = 0.057) were also associated with differences in satisfaction, with smartphones and video calls achieving the highest satisfaction scores.

Table 4: Relation between the participants' satisfaction regarding the clinician interaction during telemedicine services and their demographic and usage characteristics. (n=1072)

Demographic characteristics	Satisfaction score (max=4) of **clinician interaction**			
	Median	Mean 95% CI Lower - Upper	Median test Statistic	p-value
Age				
20 - 30 years	2.5	2.75 (2.62 - 2.88)		
31 - 40 years	3	2.79 (2.68 - 2.91)		
41 - 50 years	3.5	3.13 (3.01 – 3.24)		
More than 50	3	2.60 (2.41 – 2.79)	27	0.001*
Gender:				
Male	3	2.78 (2.68 - 2.88)		
Female	3	2.95 (2.86 - 3.04)	1.9	0.162
Educational level:				
Basic/intermediate	2	2.05 (1.90 - 2.19)		
High School	3	3.14 (2.98 - 3.31)		
Bachelor	3.25	2.98 (2.88 - 3.09)		
Postgrad	3	3.05 (2.94 – 3.16)	91	0.001*
Healthcare type				
Government	3	2.85 (2.78 - 2.93)		
Private	3.50	3.07 (2.94 - 3.21)	11	0.004*
Usage reason:				
Emergency	3.50	2.83 (2.56 - 3.11)		
Medication Refill	3.25	3.15 (3.00- 3.30)		
Consultation	2.75	2.61 (2.51-2.71)		
Follow up	3	3.07 (2.95-3.18)	44	0.002*
Device type:				
Smartphone	3	2.95 (2.87 - 3.02)		
Tablet	2	2(1.84 - 2.16)		
Laptop	2	2 (2 – 2)	71	0.001*
Virtual Method				
Video call	3	2.98 (2.75 - 3.08)		
Voice call	3	2.85 (2.76 – 2.95)		
Chat	2.5	2.67 (2.48 – 2.85)	5.7	0.057

(*) Statistically significant at p < 0.05

Table 5 presents participants' satisfaction with post-telemedicine services. Age (p = 0.001) and educational level (p = 0.001) significantly affected satisfaction, with the highest scores observed among participants aged 41–50 years (mean 2.93, 95% CI: 2.80–3.50) and those with postgraduate qualifications (mean: 2.90, 95% CI: 2.80–3.00). Participants using telemedicine for medication refills also reported the highest satisfaction in this domain (mean: 2.90).

Healthcare type (p = 0.001), device type (p = 0.001), and virtual method (p = 0.021) also influenced satisfaction levels. Participants using private healthcare services, smartphones, and video calls reported higher satisfaction than their counterparts.

Table 5: Relation between the participants' satisfaction regarding the post-telemedicine services and their demographic and usage characteristics. (n=1072)

Demographic characteristics	Satisfaction score (max=4) of **post-telemedicine services**		Median test Statistic	p-value
	Median	Mean 95% CI Lower - Upper		
Age				
20 - 30 years	3	2.75 (2.62 - 2.88)		
31 - 40 years	3	2.65 (2.53 - 2.76)		
41 - 50 years	3	2.93 (2.80 – 3.05)		
More than 50	2.5	2.70 (2.44 – 2.96)	10	0.01*
Gender:				
Male	2.75	2.56 (2.46 - 2.66)		
Female	3	2.97 (2.88 - 3.05)	57	0.001*
Educational level:				
Basic/intermediate	1.5	2.09 (1.92 - 2.26)		
High School	3	2.86 (2.69 - 3.02)		
Bachelor	3	2.89 (2.78 – 3.01)		
Postgrad	3	2.90 (2.80 - 3.00)	23	0.001*
Healthcare type				
Government	3	2.69 (2.61 - 2.77)		
Private	3.50	3.18 (3.05 - 3.30)	14.9	0.001*
Usage reason:				
Emergency	3	2.58 (2.38 - 3.79)		
Medication Refill	3	2.90 (2.72- 3.08)		
Consultation	3	2.57(2.47 -2.68)		
Follow up	3	2.98 (2.86-3.09)	48	0.002*
Device type:				
Smartphone	3	2.84 (2.76 - 2.91)		
Tablet	1.5	2(1.86 - 2.14)		
Laptop	2	2 (2 – 2)	55	0.001*
Virtual Method				
Video call	3	2.83 (2.71 - 2.95)		
Voice call	3	2.78 (2.69 – 2.87)		
Chat	2	2.50 (2.30 – 2.70)	3.22	0.21

(*) Statistically significant at p < 0.05

Discussion

Telemedicine has become essential for maintaining healthcare access during the COVID-19 pandemic, overcoming geographical barriers, and minimizing waiting times. Previous studies have emphasized the significance of virtual clinics in providing efficient and safe alternatives to in-person consultations. However, there is limited literature on the specific factors influencing telemedicine satisfaction in Saudi Arabia. This study aims to assess user satisfaction and identify key determinants of telemedicine service quality in the Saudi context.

The current study found that the majority of participants (72%) relied on government-provided telemedicine services, with consultations (42%) and follow-ups (34%) being the most common reasons for use. Smartphones were the primary devices used (91%), and voice calls emerged as the preferred communication method (55%), followed by video calls (31%). These findings are consistent with previous research in Saudi Arabia [12], which revealed that majority of participants recognized the benefits of using governmental telemedicine mobile applications, such as Seha and Mawid, for booking appointments and accessing healthcare services.

The results of this study indicate that participants generally reported favorable satisfaction with telemedicine services, with mean scores of 2.79 for ease of use and 2.87 for clinician interaction. Another important finding was that post-appointment experiences, such as prescription clarity, had a slightly lower satisfaction score (mean: 2.78), suggesting room for improvement in follow-up services. These findings further support the idea that user-friendly platforms and clear communication are critical for enhancing telemedicine satisfaction. This is corroborated by another study [13], which found that telehealth has been associated with higher levels of patient satisfaction and that the quality of telehealth services may be comparable to traditional face-to-face visits.

The most important finding was the impact of demographic factors on satisfaction. In the current study, participants aged 31–50 years and those with postgraduate education reported the highest satisfaction across all domains. Comparing private telehealth services with government services showed that the former consistently achieved higher satisfaction scores, mainly for ease of use (mean: 2.96). These findings align with previous research [14], indicating that higher education levels were associated with a greater preference for telemedicine services. In contrast, a J.D. Power report [15] found higher satisfaction with payer-provided telehealth services, emphasizing the importance of addressing demographic and regional factors to tailor telehealth services and enhance patient satisfaction.

Despite providing valuable insights into telemedicine utilization and patient satisfaction in Saudi Arabia, this study has some limitations. First, the reliance on a convenience sampling technique may limit the generalizability of findings to the broader population. However, the large sample size of 1,072 participants strengthens the study's statistical power and allows for more robust subgroup analyses. Second, the self-reported nature of the survey may introduce response bias, as participants may overestimate or underestimate their satisfaction levels. Additionally, the study focused solely on telemedicine users, potentially excluding individuals who faced barriers to accessing telehealth services, which could provide a more comprehensive perspective on challenges in adoption. Finally, the cross-sectional design captures perceptions at a single point in time, limiting the ability to assess long-term trends in telemedicine adoption and satisfaction. Future studies should consider longitudinal approaches to track changes in telemedicine utilization, patient preferences, and emerging challenges over time.

Conclusion

This study highlights high patient satisfaction with telemedicine services in Saudi Arabia, particularly regarding ease of use and clinician interaction. Demographic factors, including age and education level, significantly influenced satisfaction. Private telehealth services consistently received higher ratings than government-provided platforms. While most users were satisfied, opportunities exist to

enhance scheduling efficiency and prescription clarity. Future research should explore telemedicine's long-term adoption and integration into mainstream healthcare services.

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