

Patients' Attitude and Satisfaction with Telemedicine and Electronic Health Clinics in Aseer Healthy Cities, Saudi Arabia

Mohammed Alqahtani¹; Metrek Almetrek¹; Ali JAlfaifi²; Asaiel Al Hadi³; Enas Al Hadi³; Nasser Al Hayder³; Amnah Alzarar³; Shuruq Alzahuf³; Zahra Abdalwahab³; Laila Almalki⁴; Sarra Alqahtani⁵; Ahlam Alqahtani⁵; Nazeha Alassiri⁵; Arif Alamri⁵; Mubarak Alqahtani⁶; Adel Alqahtani⁵

(1) Consultant, Healthy Cities Program, Abha, Saudi Arabia

(2) Consultant, Family Medicine Department, Medical City at King Khalid University, Abha, Saudi Arabia

(3) Internship Department, College of Medicine, Najran University, Saudi Arabia

(4) Khamis Maternity & Children Hospital, Khamis Mushait, Saudi Arabia

(5) General Directorate of Health Affairs, Aseer Region, Saudi Arabia

(6) Khamis Mushait General Hospital, Khamis Mushait, Saudi Arabia

Corresponding Author:

Dr. Mohammed Alqahtani

Email: msqahtani@moh.gov.sa

Received: November 2023. Accepted: November 2023; Published: December 1, 2023.

Citation: Mohammed Alqahtani et al. Patients' Attitude and Satisfaction with Telemedicine and Electronic Health Clinics in Aseer Healthy Cities, Saudi Arabia. World Family Medicine. December 2023; 21(11): 86-95. DOI: 10.5742/MEWFM.2023.95256235

Abstract

Background: Telemedicine was integrated into the medical sector to provide information and communication technologies and achieve more effective treatments. Telemedicine service has a pivotal role during the coronavirus pandemic enabling healthcare providers to communicate and follow up with patients, especially elderly patients, or those with chronic conditions. Patient satisfaction is an effective indicator to assess that service.

Aim: To assess the attitude and satisfaction of patients with telemedicine and e-clinics in Aseer Healthy Cities.

Methods: This cross-sectional study was performed at the medical centers that provided telemedicine clinics in seven healthy cities in Aseer (Abha, Bisah, Balgarn, Muhayel, Alharajah, Tareeb, and Alamwah) during 2023. The study was conducted in seven cities on patients who were served by telemedicine, using a valid-written questionnaire that was sent electronically.

Results: A total of 497 patients participated in this study; 50.3% were females, and most of the patients, 81.5%, used E-clinics 1-3 times. A small percent reported having worries about e-clinics (35.8%) and found confusion while using it (29.8%). The mean±SD of the satisfaction score was 4.306±0.8. The determinants of satisfaction included age (P<0.0001), medical insurance (P<0.0001), and family doctor (P<0.0001). There was a positive attitude among patients toward using e-clinics. Participants reported that using e-clinics is better than doctors' visits, they will use it again and will recommend it, (36.2%, 51.1%, and 57.5%, respectively).

Conclusion: Patients are satisfied with the telemedicine and e-clinic healthcare services, and they have positive attitudes toward them. This reflects improvements in healthcare services provided by Aseer Healthy Cities.

Keywords: Attitude, Telemedicine, Satisfaction, Healthcare services, Saudi Arabia.

Introduction

Healthcare service is considered one of the most crucial policies required by all populations around the world. Most of the population had different obstacles preventing them from getting adequate medical care and effective treatments. The demographic issue, especially for the elder patients and the geographical aspect (remote and rural areas) are considered a major obstacle to obtaining a good healthcare service. Therefore, integrating technology into the medical sector became essential for providing more information and communication technologies to achieve more effective treatments [1].

The telemedicine technology provides medical information for everyone worldwide to facilitate data exchange among relevant parties in different locations [1]. It provides remote medical diagnosis, medical care, and effective treatment and most of the elderly showed feelings of safety and reassurance with telemedicine [2]. Telemedicine has been used in different areas worldwide to manage healthcare from postoperative care to long-term medical conditions, according to Jeffery et al. [3]. Telehealth enabled healthcare staff to provide medical care services in remote areas using telemedicine technology such as video conferences and imaging. It was reported that using this technology improved the quality of health care and patient outcomes [4].

AlBar et al. [5] found that perceived usefulness and ease of use significantly affected Saudi patients' attitudes, which had a significant effect on the behavioral intention among patients ($P < 0.05$). Albarrak et al. [6] reported that the majority of Saudi physicians had low knowledge of telemedicine, while others had positive perceptions of telemedicine and had the tendency to adopt it through clinics. Most physicians reported some barriers, such as costs, privacy issues, communication technology issues, and lack of training.

Patients' satisfaction is considered effective for the performance of healthcare service and reflects patients' expectations towards healthcare service. Patients became satisfied when there was a matching between the healthcare service that they expected and that they received [7].

Polinski et al. [4] conducted a cross-sectional patient satisfaction survey to assess patients' satisfaction with telehealth visits at the Consumer Value Store (CVS) MinuteClinic, United States. Most of the participants (94% to 99%) reported that they were very satisfied with telehealth services. Approximately 95% of patients reported their satisfaction with seeing the diagnostic images on the monitor and could see and hear the practitioner. Additionally, 95% appreciated the convenience and care quality. Most of them reported that telehealth facilitated access to care.

López et al. [8] carried out a telephone survey to assess patient satisfaction with real-time telemedicine consultation in a rural community in Colombia. The study results showed that 80% of patients were very satisfied with the teleconsultation. Almost 65% of the participants reported that their medical care was improved by using telemedicine technology. Additionally, more than half of patients reported telemedicine's positive impact in saving costs and 63% would use telemedicine again. In contrast, 27% reported that teleconsultation was not effective compared to traditional face-to-face consultation. Familiarity with it and the cognitive factors were recorded as the most common factors that affected patient satisfaction.

Davies et al. [9] performed a postal survey to assess patient satisfaction using telephone follow-up to manage thyrotoxicosis. Most patients (90%) were very satisfied with the telephone follow-up service. They reported that telephone follow-up met their needs, saved time, and they would use the service again. On the other hand, 12% of the participants expressed their disagreement with telephone follow-up, and the service wasn't good compared to traditional face-to-face consultation. The results were agreed with by Jeffery et al. [3] and Yip et al. [10].

Fleischhacker [11] conducted a systematic review to investigate patient's satisfaction with telehealth compared to in-office visits. They showed that the most common factors impacted patients' satisfaction with telehealth, such as cost savings, travel time/convenience, provider relationship, access to healthcare, inhibiting influences of telehealth, and clinical outcomes. It was reported that telehealth met patients' needs, and provided a better connection to healthcare providers, so it showed a positive effect on the patient's satisfaction. Also, Orlando et al. [12] reported patient's satisfaction with telehealth services.

In Saudi Arabia, telemedicine was integrated into the medical sector to provide information and communication technologies and achieve more effective treatments. The COVID-19 pandemic is a major health concern worldwide, due to its rapid transmission and several precautions were applied such as staying at home. Therefore, telemedicine service has a pivotal role during the coronavirus pandemic enabling healthcare providers to communicate and follow up with patients, especially elderly patients, or those with chronic conditions. Patient satisfaction is an effective indicator to assess the performance of healthcare services provided. Few studies have investigated patient satisfaction and attitude toward telemedicine and e-clinics in Saudi Arabia.

In Saudi Arabia, Wali et al. [13] carried out a cross-sectional survey among patients who attended the Primary Health Care centers (PHCCs). Most patients (74.5%) showed their agreement with improving telehealth by implementing electronic medical records (EMRs). Most of them were satisfied with implementing EMRs compared to the paper medical records with highly significant differences.

Most of the participants attributed their satisfaction to increasing the time for consultation and increasing listening by healthcare providers. They concluded that patient satisfaction during clinical consultation improved with the implementation of EMR.

This study aimed to assess patients' satisfaction and attitudes toward telemedicine and e-clinics and the associated factors in Aseer Healthy Cities, Saudi Arabia.

Subjects and Methods

This study followed a cross-sectional research design. Family medicine centers or PHCCs that provide Telemedicine clinics in seven Healthy Cities (Abha, Bishah, Balgarn, Muhayel, Alharajah, Tareeb, and Alamwah) in Aseer Region, Saudi Arabia, were included during the period from January till November, 2023.

The study population included Saudi adults (aged >18 years old) who have been served by Telemedicine throughout Family medicine centers or PHCCs. A valid questionnaire was designed by the researchers and sent electronically to participants. The study questionnaire included patient's demographic data (i.e., age, gender), in addition to questions regarding their satisfaction and attitudes toward telemedicine and e-clinics using the five-point Likert scale (i.e., somewhat satisfied, very satisfied, neutral, somewhat dissatisfied, or very dissatisfied). The participants were also asked to describe their needs or suggestions for telemedicine service improvement.

Before data collection, a brief description of the study and its objectives were provided to all potential participants, and written consent was obtained from each participant. Confidentiality was assured to all participants.

Statistical Analysis

Data were analyzed using the Statistical Package for Social Sciences (IBM, SPSS, version 25). Descriptive statistics (i.e., frequencies, percentages, mean and standard deviation) were used to present all categorical variables. Testing significance of differences was applied using the Kruskal Wallis and Mann Whitney-U tests. P-values <0.05 were considered statistically significant.

Results

A total of 497 Saudi individuals in seven healthy cities of e-Clinics responded to our online self-administered questionnaire to assess their attitude and satisfaction. Table (1) shows that the most common age group was 25-34 years (200, 40.2%). Females were slightly more than males (250, 50.3% vs. 247, 49.7%, respectively). Most participants reported using the services of E-clinics 1-3 times (405, 81.5%). About one-third reported having medical insurance (167, 33.6%), and having a family doctor (196, 39.4%). Also, about one-third reported having worries about E-clinics (178, 35.8%) and experienced confusion while using E-clinics (148, 29.8%).

Table (2) shows that, regarding patients' satisfaction, the highest percentages of patients who were very satisfied were related to understanding the services provided by e-clinics (275, 55.3%), hearing and seeing the healthcare providers very clearly (279, 56.1%), and 269 (54.1%) were very satisfied with E-clinics service. The mean(\pm SD) of the overall satisfaction score was 4.306 ± 0.8 , whereas the maximum score was 5.

Table (3) shows the relation between participants' characteristics and their mean satisfaction scores (\pm SD). There were significant differences according to their mean scores of satisfaction regarding their age groups, medical insurance, and having a family doctor ($P<0.0001$ for all).

The questions of attitude and the answers of participants are shown in Table (4). More than one-third of participants (180, 36.2%) reported that E-clinics are better than a real doctor. More than half of patients (254, 51.1% and 286, 57.5%) reported that they would use e-clinics again and they will recommend using e-clinics, respectively.

Tables (5-7) show that participants' attitudes did not differ significantly according to their gender. The medical insurance significantly affected the attitude of participants (Table 6). Table (7) shows that their worries regarding E-clinics significantly affected their preferences ($P=0.001$) and their recommendation ($P=0.003$).

Table (8) shows that the highest mean satisfaction score was associated with preferring E-clinic, reusing E-clinic, and recommendation for E-clinics ($P<0.0001$, for all).

Table 1: Participants' baseline characteristics

Characteristics	No.	%	
Age	18-24 years	148	29.8
	25-34 years	200	40.2
	35-44 years	103	20.7
	45-54 years	31	6.2
	55-64 years	8	1.6
	≥ 65 years	7	1.4
Gender	Male	247	49.7
	Female	250	50.3
How many times did you use the e-Clinics service?	1-3 times	405	81.5
	4-10 times	63	12.7
	>10 times	29	5.8
Do you have medical insurance?	No	330	66.4
	Yes	167	33.6
Do you have a family doctor?	No	301	60.6
	Yes	196	39.4
Did you have any worries about e-Clinics?	No	319	64.2
	Yes	178	35.8
Did you find any confusion or misleading things while you are using e-Clinics?	No	349	70.2
	Yes	148	29.8

Table 2: Patients' satisfaction toward e-Clinics

Satisfaction variables		No.	%
I do understand all the services provided by e-Clinics	Very dissatisfied	6	1.2
	Dissatisfied	6	1.2
	Neutral	64	12.9
	Satisfied	146	29.4
	Very satisfied	275	55.3
Images and videos are clear on both ends	Very dissatisfied	4	0.8
	Dissatisfied	13	2.6
	Neutral	93	18.7
	Satisfied	130	26.2
	Very satisfied	257	51.7
Hearing and seeing the health care provider was very clear	Very dissatisfied	6	1.2
	Dissatisfied	9	1.8
	Neutral	66	13.3
	Satisfied	137	27.6
	Very satisfied	279	56.1
The nurse can provide me the service well	Very dissatisfied	10	2.0
	Dissatisfied	15	3.0
	Neutral	101	20.3
	Satisfied	112	22.5
	Very satisfied	259	52.1
Distant medicine was very good	Very dissatisfied	9	1.8
	Dissatisfied	6	1.2
	Neutral	77	15.5
	Satisfied	137	27.6
	Very satisfied	268	53.9
The treatment plan and educational tools were very good	Very dissatisfied	8	1.6
	Dissatisfied	9	1.8
	Neutral	83	16.7
	Satisfied	125	25.2
	Very satisfied	272	54.7
The service is very easy to use	Very dissatisfied	6	1.2
	Dissatisfied	7	1.4
	Neutral	60	12.1
	Satisfied	128	25.8
	Very satisfied	296	59.6
I'm satisfied with e-Clinics service	Very dissatisfied	11	2.2
	Dissatisfied	8	1.6
	Neutral	90	18.1
	Satisfied	119	23.9
	Very satisfied	269	54.1

Table 3: Participants' satisfaction score (Mean±SD) according to their characteristics

Characteristics		Satisfaction score		P-value
		Mean	SD	
Age	18-24 years	4.541	0.709	<0.0001*
	25 – 34 years	4.126	0.798	
	35-44 years	4.346	0.828	
	45-54 years	4.137	0.784	
	55-64 years	4.188	1.301	
	≥ 65 years	4.750	0.323	
Gender	Male	4.234	0.845	0.075**
	Female	4.376	0.751	
How many times did you use the e-Clinics service?	1-3 times	4.290	0.812	0.710*
	4-10 times	4.395	0.761	
	>10 times	4.328	0.753	
Do you have medical insurance?	No	4.205	0.822	<0.0001**
	Yes	4.504	0.722	
Do you have a family doctor?	No	4.177	0.799	<0.0001**
	Yes	4.503	0.767	
Did you have any worries about e-Clinics?	No	4.317	0.758	0.700**
	Yes	4.286	0.877	
Did you find any confusion or misleading things while you are using e-Clinics?	No	4.277	0.795	0.075**
	Yes	4.374	0.815	
		*Kruskal Wallis test		**Mann Whitney U test

Table 4: Participants' attitudes towards e-Clinics

Attitudes		No.	%
Comparing between e-Clinics and real doctor visit	Not sure	140	28.2
	Worse than a doctor's visit	34	6.8
	Same as a doctor's visit	143	28.8
	Better than a doctor visit	180	36.2
How likely to reuse e-Clinics?	For sure, I will not use it again	12	2.4
	Maybe I will not use it again	43	8.7
	Not sure	47	9.5
	Most probably, I will use it again	141	28.4
	For sure I will use it again	254	51.1
How likely will you recommend using e-Clinics?	No for sure	15	3.0
	Maybe not	52	10.5
	Most probably	144	29.0
	For sure	286	57.5

Table 5: Participants' attitudes towards e-Clinics according to their gender

Attitudes		Gender				P-value
		Male		Female		
		No.	%	No.	%	
Comparing between e-Clinics and real doctor visit	Not sure	59	23.9	81	32.4	0.13
	Worse than a doctor's visit	20	8.1	14	5.6	
	Same as a doctor's visit	71	28.7	72	28.8	
	Better than a doctor's visit	97	39.3	83	33.2	
How likely to reuse e-Clinics?	For sure I will not use it again	5	2.0	7	2.8	0.96
	Maybe I will not use it again	23	9.3	20	8.0	
	Not sure	23	9.3	24	9.6	
	Most probably, I will use it again	70	28.3	71	28.4	
	For sure I will use it again	126	51.0	128	51.2	
How likely will you recommend using e-Clinics?	No for sure	7	2.8	8	3.2	0.84
	Maybe not	24	9.7	28	11.2	
	Most probably	69	27.9	75	30.0	
	For sure	147	59.5	139	55.6	

Table 6: Participants' attitudes towards e-Clinics according to their medical insurance

Attitude		Do you have medical insurance?				P-value
		No		Yes		
		No.	%	No.	%	
Comparing between e-Clinics and real doctor visit	Not sure	115	34.8%	25	15.0%	<0.0001
	Worse than a doctor visit	21	6.4	13	7.8	
	Same as a doctor visit	85	25.8	58	34.7	
	Better than a doctor visit	109	33.0	71	42.5	
How much likely to reuse e-Clinics?	For sure, I will not use it again	7	2.1	5	3.0	0.007
	Maybe I will not use it again	29	8.8	14	8.4	
	Not sure	37	11.2	10	6.0	
	Most probably, I will use it again	106	32.1	35	21.0	
	For sure, I will use it again	151	45.8	103	61.7	
How likely will you recommend using e-Clinics?	No for sure	8	2.4	7	4.2	0.002
	Maybe not	44	13.3	8	4.8	
	Most probably	104	31.5	40	24.0	
	For sure	174	52.7	112	67.1	

Table 7: Participants' attitudes towards e-Clinics according to their worries about e-Clinics

Attitude		Did you have any worries about e-Clinics?				P-value
		No		Yes		
		No.	%	No.	%	
Comparing between e-Clinics and real doctor visit	Not sure	102	32.0	38	21.3	0.001
	Worse than a doctor's visit	16	5.0	18	10.1	
	Same as a doctor's visit	101	31.7	42	23.6	
	Better than a doctor's visit	100	31.3	80	44.9	
How likely to reuse e-Clinics?	For sure, I will not use it again	4	1.3	8	4.5	0.18
	Maybe I will not use it again	25	7.8	18	10.1	
	Not sure	32	10.0	15	8.4	
	Most probably, I will use it again	92	28.8	49	27.5	
	For sure I will use it again	166	52.0	88	49.4	
How likely will you recommend using e-Clinics?	No for sure	9	2.8	6	3.4	0.003
	Maybe not	24	7.5	28	15.7	
	Most probably	107	33.5	37	20.8	
	For sure	179	56.1	107	60.1	

Table 8: Participants' attitudes towards e-Clinics according to their satisfaction scores (Mean±SD)

Attitudes		Satisfaction score		P value
		Mean	SD	
Comparing between e-Clinics and real doctor visit	Not sure	3.922	0.742	<0.0001
	Worse than a doctor visit	3.460	1.001	
	Same as a doctor visit	4.416	0.716	
	Better than a doctor visit	4.676	0.603	
How much likely to reuse e-Clinics?	For sure I will not use it again	3.010	1.254	<0.0001
	Maybe I will not use it again	3.776	0.818	
	Not sure	3.723	0.630	
	Most probably, I will use it again	4.082	0.792	
	For sure I will use it again	4.688	0.544	
How likely will you recommend using e-Clinics?	No for sure	3.442	1.154	<0.0001
	Maybe not	3.563	0.848	
	Most probably	4.023	0.765	
	For sure	4.628	0.588	

Discussion

Effective adoption of e-health is dependent on the engagement of the patients [5]. In our study, most of the patients (81.5%) reported using e-clinics 1-3 times, whereas the least proportion (5.8%) reported using it more than ten times. Moreover, some participants reported having worries about e-clinics and found confusion while using them. This can be solved by educating the patients about how to use E-clinics and their benefits. A study in Jeddah reported a perception of the effectiveness of teleconsultation ranged between 71.43%-88.77% [14].

In Colombia, a study revealed that more than half of respondents thought that telemedicine had a positive impact on the improvement of medical care and saving time and cost [8]. The satisfaction of the patients is an essential factor in the performance of healthcare service; the satisfaction of patients occurs when they receive healthcare service that matches their expectations [7].

In the current study, the maximum score of satisfaction was five, and the mean score was 4.3, reflecting a high level of satisfaction among patients. The highest percentage of patients reported that they were very satisfied with the easiness of using the services and hearing the healthcare providers very well. Age of 65 years and older, having medical insurance, and family doctor were significantly associated with a higher level of satisfaction. These findings can be explained by the fact that the older age population prefers not to move frequently due to their medical conditions, and e-clinic and telemedicine saves their time and effort of visiting conventional clinics and waiting. Also, having a family doctor may help to educate the patients about E-clinics and their benefits and how to use them.

Similar findings were reported by a previous Saudi study conducted during the COVID-19 pandemic. The study reported that most participants thought that telemedicine is easier; more than-one half were very satisfied (52%), and the highest satisfaction was regarding the ease of registration and quality of audio and video. Also, age was a significant predictor for the satisfaction of participants, but in contrast to our findings, participants with younger age reported the highest mean score of satisfaction [15].

Another Saudi study included 439 patients who reported overall satisfaction with the virtual clinic of 68.1%. The factors that determined the satisfaction of patients included gender, age group, and level of education; younger age groups (18-59 years), males, post-graduate and middle school were significantly associated with higher satisfaction [16]. The previous study reported determinant factors in contrast to ours. A study that included 407 participants from Jeddah reported that the satisfaction level among participants ranged from 59.4-83.96%; older age patients were more prone to use teleconsultation in the future and strongly agreed about the effectiveness of teleconsultation [14].

On the contrary to the previous Saudi studies and our study, one Saudi study conducted to assess the implementation of telemedicine in anesthesia clinic; the study found that 50.7% of participants reported low satisfaction with telemedicine, whereas 63.1% had high satisfaction till their last appointment. The low satisfaction level was significantly associated with younger age (20-30 years) [17]. A systematic review included 18 articles that reported a high satisfaction level regarding telehealth during the COVID-19 pandemic [18]. A study comparing the satisfaction among 100 individuals regarding virtual clinic and telemedicine revealed a high satisfaction score with a mean score of 9.08 out of 10. The study demonstrated that telemedicine continues to develop and become more acceptable among the population [19].

There was a positive attitude among patients toward using e-clinics, where the highest proportions reported that they would use the service again and would recommend it. The determinants of the attitude, including age, medical insurance, and worries about e-clinics significantly affected different aspects of attitude. Participants with younger ages (18-24 years old) significantly reported that e-clinics are better than doctor visits, and they will recommend using e-clinics. The medical insurance significantly affected the attitude of participants regarding all aspects. The worries regarding e-clinics significantly affected the preferences of patients and their recommendations.

A previous Saudi study reported an acceptable attitude toward telemedicine among participants during the COVID-19 pandemic. In contrast to our study, gender was a determinant of attitude, where males had significantly higher attitudes compared to females [15]. A study from Colombia found that 27% of participants thought that telemedicine wasn't as good as face-to-face consultation [8]. A study from Japan that included 103 patients and that was conducted during the COVID-19 pandemic revealed that 60% were inclined to use telemedicine, and there was a tendency among patients to use telemedicine during the pandemic [20].

Conclusions

Telemedicine and E-clinics are acceptable by the Saudi population which was especially observed during the COVID-19 pandemic due to the fears of infection. Patients are satisfied with healthcare services provided by Telemedicine and e-clinics, especially older patients. Therefore, improving that service and raising awareness of the public about it can promote its use and hence, reduce the crowding and waiting times in clinics, as well as the cost of healthcare services.

Acknowledgments

The authors would like to thank the Public Health Department in the General Directorate of Health Affairs in the Aseer region and the Family & Community Department at King Khaled University for supporting all expenses of this research work and also all participants who voluntarily participated in this study.

References

1. Khemapech L, Sansrimahachai W, Toahchoodee M. Telemedicine – Meaning, Challenges and Opportunities. *Siriraj Medical Journal*, 2019; 71(3). <http://dx.doi.org/10.33192/Smj.2019.38>.
2. Bujnowska-Fedal MM, Grata-Borkowska U. Use of telemedicine-based care for the aging and elderly: promises and pitfalls. *Smart Homecare Technology and TeleHealth*. 2015; 8:91-105.
3. Jeffery S, Doumouchtsis SK, Fynes M. Patient satisfaction with nurse-led telephone follow-up in women with lower urinary tract symptoms. *J Telemed Telecare* 2007; 13:369–73.
4. Polinski JM, Barker T, Gagliano N, Sussman A, Brennan TA, Shrank WH. Patients' Satisfaction with and Preference for Telehealth Visits. *J Gen Intern Med*. 2016;31(3):269-275. doi:10.1007/s11606-015-3489-x.
5. AlBar, A. M., & Hoque, M. R. (2018). Patient Acceptance of e-Health Services in Saudi Arabia: An Integrative Perspective. *Telemedicine and e-Health*. doi:10.1089/tmj.2018.0107
6. Albarrak AI, et al. Assessment of physician's knowledge, perception and willingness of telemedicine in Riyadh region, Saudi Arabia. *J Infect Public Health* (2019), <https://doi.org/10.1016/j.jiph.2019.04.006>.
7. Un.org [Internet]. World population ageing [updated 2015; cited 2019 Apr 13]. Available from http://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2015_Report.pdf.
8. López C, Valenzuela JI, Calderón JE, Velasco AF, Fajardo R. A telephone survey of patient satisfaction with realtime telemedicine in a rural community in Colombia. *J Telemed Telecare*. 2011;17(2):83-87. doi:10.1258/jtt.2010.100611.
9. Davies C, Vas P, Oyibo SO. Telephone follow-up for the management of thyrotoxicosis: a patient satisfaction survey. *J Telemed Telecare*. 2013;19(1):29-32. doi:10.1177/1357633X12474737.
10. Yip MP, Chang AM, Chan J, MacKenzie AE. Development of the Telemedicine Satisfaction Questionnaire to evaluate patient satisfaction with telemedicine: a preliminary study. *J Telemed Telecare*. 2003;9(1):46-50. doi:10.1258/135763303321159693.
11. Fleischhacker, C. L. (2020). Patient satisfaction with telehealth services compared to in-office visits: A systematic literature review [Master's alternative plan paper, Minnesota State University, Mankato]. Cornerstone: A Collection of Scholarly and Creative Works for Minnesota State University, Mankato. <https://cornerstone.lib.mnsu.edu/etds/982/>.
12. Orlando, J., Beard, M., Kumar, S., & Orlando, J. (2019). Systematic review of patient and caregivers' satisfaction with telehealth videoconferencing as a mode of service delivery in managing patients' health. *PLoS One*, 14(8), e0221848–e0221848. <https://doi.org/10.1371/journal.pone.0221848>.
13. Wali, R.M., Alqahtani, R.M., Alharazi, S.K. et al. Patient satisfaction with the implementation of electronic medical Records in the Western Region, Saudi Arabia, 2018. *BMC Fam Pract* 21, 37 (2020). <https://doi.org/10.1186/s12875-020-1099-0>.
14. Magadmi MM, Kamel FO, Magadmi RM. Patients' Perceptions and Satisfaction Regarding Teleconsultations During the COVID-19 Pandemic in Jeddah, Saudi Arabia..2021.
15. Nasser AA, Alzahrani RM, Fella CA, Jreash DM, Almuwallad NT, Bakulka DS, Abed RA. Measuring the Patients' Satisfaction About Telemedicine Used in Saudi Arabia During COVID-19 Pandemic. *Cureus*. 2021 Feb;13(2).
16. Alharbi KG, Aldosari MN, Alhassan AM, Alshallal KA, Altamimi AM, Altulaihi BA. Patient satisfaction with virtual clinic during Coronavirus disease (COVID-19) pandemic in primary healthcare, Riyadh, Saudi Arabia. *Journal of Family & Community Medicine*. 2021 Jan;28(1):48.
17. Alrowailey AS, Saleh AA, Alshalan IS, Alshalan AS, Rafat A, Alsahaf AF. Postoperative patients' perspective toward the idea of implementing telemedicine in anesthesia clinic in a university hospital: a cross-sectional study. *History*. 2018 May 27;10:5-.
18. Andrews E, Berghofer K, Long J, Prescott A, Caboral-Stevens M. Satisfaction with the use of telehealth during COVID-19: An integrative review. *International journal of nursing studies advances*. 2020 Nov 1;2:100008.
19. Wall B, Daly P, Dunnill A, Osan J, Brogan K. Is Virtual Clinic the Way Forward: Patient Satisfaction Comparing Phone Clinic vs. Conventional Clinic.2021.
20. Kurihara K, Nagaki K, Inoue K, Yamamoto S, Mishima T, Fujioka S, Ouma S, Tsuboi Y. Attitudes toward telemedicine of patients with Parkinson's disease during the COVID-19 pandemic. *Neurology and Clinical Neuroscience*. 2021 Jan;9(1):77-82.