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RESEARCH ARTICLE

PATIENT ACCEPTANCE AND TRUST FOR DIRECT-TO-CONSUMER TELEMEDICINE FOR OUT PATIENT SERVICES AT KING ABDULLAH MEDICAL CITY, MAKKAH

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ABSTRACT

Aim: This study aimed to assesspatient acceptance & trust for DTC telemedicine for outpatient services at King Abdullah Medical City, Makkah. **Method:** The researcher adopted the descriptive analysis cross-sectional design. The population of the study was the number of scheduled outpatients in King Abdullah Medical City- outpatient clinics, Makkah city, Saudi Arabia during 2021. To collect the needed data, the questionnaire is used as a tool for collecting data. The response rate was 100%. Data were analyzed by using SPSS. Two hypotheses were tested based on data collected. **Result:** The results of the Chi square analysis revealeda significant relation between telemedicine services and both patients trust and acceptance of direct to consumer telemedicine (P value <0.0001). **Conclusion and recommendation:** Telemedicine was proved to be a valuable addition to usual care. Patients were generally showed a great trust and acceptance in telemedicine service implemented. The recommendations made from this study are the following: •the healthcare organization should increase telemedicine services with taking care of quantity as well as quality. And focus on providing the healthcare workers with the appropriate information and training about telemedicine.

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INTRODUCTION

Historically, telemedicine was not recent advent; but, it dates back to more than 100 years. The most prominent development in the use of telemedicine was in 1948 when the first radiologic images sent via telephone across 24 miles in Eastern Pennsylvania. In the late 1960s, telemedicine was used as a mean of healthcare delivery and propelled by NASA and the Nebraska psychology institute. Later on, radiologists started using tele radiologysystems to collect images to use during telemedicine consultation session in the eighties in the 1980s (1) During the 1990s there was an increasing development of internet facilitate telemedicine implementation. It is clear that over the last few decades the telemedicine has grown resulting from the increasing developments and applications of ICT (2). There are three different types of telemedicine which are store-and- forward, real-time, and hybrid.

The first one, which is store-and-forward, typically relies on the medical information swapping between the practitioner of healthcare through e-mail or web-based management to ask for the diagnosis and optimal management. Second, real-time telemedicine that required online interaction between participants such as video conferencing or Telesurgery application (2). The third type is a combination of both. One of the main telemedicine objectives is sharing medical information among health care practitioner to provide clinical decision and to cope with distance barriers (3). Healthcare system in Saudi Arabia is facing many challenges putting the Ministry of Health (MOH) under pressure to develop and improve healthcare services to meet all needs and expectations for citizens especially those living in remote areas (4). Saudi Arabia is the largest sovereign state in the Middle Eastand had a total population of33 million (3); therefore, there was a need to find solutions to cover the large geographical area.

In 2011, MOH adopted the E-health system (Electronic Health System) in order to upgrade health care providing and start utilizing the initial local project named as " Saudi Telemedicine Network" (STN) which covering all health care sectors (4). Coinciding with 2030 vision in Saudi Arabia, MOH has endorsed many strategies of information and communication technology (ICT) and reforms leading to improve the quality of healthcare offering and patient accessibility. The use of telemedicine is one ofthese strategies that put in the interest of patients and MOH (5). In Saudi Arabia, King Faisal Specialist Hospital and Research Center firstly launched the use of Telemedicine. KFSHRC is considered one of the largest specialist hospitals in the Middle East. (3). Consultants are able to exchange medical information and diagnosis cases then decide either to accept the case or provide instruction to manage the case without transferring the patient. One of the most effective implementation of Telemedicine is Ehalati Program. Ehalati system is a program founded in 1433 which designed to help physicians in different organizations sharing a patient's case and providing medical advice without transferring the patient normally in non- emergency or routine cases. The system works very much like Hotmail with store & forward feature. It allows sending the patient case attached with images and test results to physicians and later then, it reviewed and forwarded to the referring hospital (6). Some Patients with scheduled visits in Outpatient department at KAMC, they may cancelled or re-booking their appointments regards many factors. And due to government direction to maintain Social distancing during the pandemic, all OPD visits transferred to be Non-physical. This study aimed to asses patient acceptance &trust for DTC Telemedicine for outpatient services at King Abdullah Medical City, Makkah.

METHODOLOGY

This study was a descriptive analytic cross-sectional method, conducted among patients who attend the out patients clinic in King Abdullah Medical City, during 2021. The sample size was calculated using Raosoft site, the level of significance was set at 5%, Confidence interval as 95%, the alpha error as 5%, the problem prevalence was 50%, Sample size was (374), and 10% was added in case of withdrew, so the sample size was (411) patients (7). Sampling technique was a convenient nonprobability sampling method until the author achieved the required sample size. The data collected by sending the questionnaire through online applications (Whats-app, and Google document).The questionnaire was a Self-administrated questionnaire designed after revising several researches in the same fields, where the independent variable was DTC Telemedicine Service,and the dependent variable werepatient acceptance, patient trust , and quality of services.Itconsists of eight parts;Demographic data consist of6 items,Factors related to computer access and literacy consist of 3 items,Interesting in Telemedicine consist of 2 items,Barriers /challenges of adopting Telemedicine consist of 4 items,The benefits of adopting Telemedicine consist of 4 items,Factors related to usability of Telemedicine consist of 3 items,Factors related to patients' trustful ofTelemedicineconsist of3 items, andFactors related to acceptances of Telemedicine consist of 5 items.Before starting the actual field work, a pilot study was conducted on 10% of the sample (41 patients). Overall reliability coefficient of the scale (Cronbach's Alpha=0.882, number of items:15), it was indicating good reliability.

All ethical approvals were obtained ;(the ethical committee,written permission from the concerned authority inKing Abdullah Medical City, and written individual consent from participants). All information kept confidential.

Statistical analysis: Data was transformed by google document and analyzed using (SPSS) version 22. Numerical variable was offered as mean and standard deviation. Categorical variablewas presented as percentage and frequency. Chi-square was used for comparing 2 or more qualitative variables.A p-value of less than 0.05 and Confidence interval 95% .

RESULTS

This study included 411 patients of which 133(32.4%) were male and 278(67.6%) were female. The third 134 (32.6%) were from group age 30-39 years, 24.6% is 18-29years, 19.7% is 40-49 years, 17.8% is 50059, and 5.3% is more than 60.the majority 370 (90.0%) were Saudi and 41 (10.0%) is non-Saudi. Almost two thirds 260 (63.3%) were postgraduate and 12.5% had university degree.Two thirds 397 (96.6%) were from urban areas and only 14 (3.4%) were from rural areas. Less than half of the patients 180 (43.8%) had fair health condition , 169 (41.1%) had excellent health condition, 57 (13.9%) had very good health condition, and only 5 (1.2%) had good health condition (Table 1). The majority 365 (88.8%) use computer, 361 (87.8%) have more than one smart device, and 338 (82.3%) search information online. The main reasons for using Telemedicine were 126 (30.7%) " Follow up", and 50 (12.2%) " Emergency". The main outcomes of the call were; 225 (54.7%) " Reassurance & Self-management", followed by 76 (18.5%) " Drugs Prescription", and 60 (14.6%) " Appointment". (Table 2).

Table 1. Demographic data

Variables		N	%
Gender	Male	278	67.6
	Female	133	32.4
Age	18-29	101	24.6
	30- 39	134	32.6
	40-49	81	19.7
	50-59	73	17.8
	More than 60 years	22	5.3
Nationality	Saudi	370	90.0
	Non-Saudi	41	10.0
Educational level	Elementary	8	1.9
	Intermediate	76	18.5
	High school	16	3.9
	University	51	12.4
	Postgraduate	260	63.3
Residency	Rural	14	3.4
	Urban	397	96.6
Experience	Fair	180	43.8
	Good	5	1.2
	Very good	57	13.9
	Excellent	169	41.1

The main benefits were; 361(87.8%) "Telemedicine services save money & time", followed by 334 (81.3%) "Telemedicine services enhance access to health care system", then 314 (76.4%) "Telemedicine services improve the quality of care", and lastly 313 (76.2%) "Telemedicine services provide better follow up after face to face contact". The main barriers were; 287 (67.8%) "Lack of knowledge about benefits of Telemedicine", followed by282 (68.6%)

Table 2.The computer access and the interest in Telemedicine

	variables	N	%	Mean	SD
The computer access					
I use PC / Laptop at home, work and other places	Strongly disagree	1	.2	4.35	0.74
	Disagree	7	1.7		
	Not Sure	38	9.2		
	Agree	168	40.9		
	Strongly agree	197	47.9		
I search for information / consultation online	Strongly disagree	3	.7	4.13	0.85
	Disagree	18	4.4		
	Not Sure	52	12.7		
	Agree	182	44.3		
	Strongly agree	156	38.0		
I have (1 or more) smart devices	Strongly disagree	4	1.0	4.33	0.83
	Disagree	14	3.4		
	Not Sure	32	7.8		
	Agree	153	37.2		
	Strongly agree	208	50.6		
The interest in Telemedicine:					
For what reason do you use the service?	Medication Refill	46	11.2		
	Covid-19 related	28	6.8		
	Emergency	50	12.2		
	Follow up	126	30.7		
	All	161	39.2		
what is the treatment or the outcome from your call consultation?	Appointment	60	14.6		
	Drugs Prescription	76	18.5		
	Reassurance & Self-management	225	54.7		
	Admission	7	1.7		
	Other	43	10.5		

Data are presented as number and % as well as mean ± SD

"Lack of knowledge about Telemedicine services", then 255 (62.1%) "Lack of time & financial issues", and lastly 228 (55.5%) "Weak & poor infrastructure".Most of the participants agreed with 294 (71.5%) "The Telemedicine system is simple & easy to use", followed by 246 (59.8%) "The way I interact with the Telemedicine is pleasant" and "Using the Telemedicine services, I can meet & see the physician as in physical visit" equally (Table 3). All the items had good mean score more than 4.0, with significant difference ($p<0.05$), indicating high degree of agreement with the trustfulness on Telemedicine. Where, the majority agreed with: 334 (81.3%) "Everything I say / do remains privet" followed by 322 (78.3%) "Telemedicine services is a safe environment", then 293 (71.3%) "I trust the Telemedicine services".Most of the items had good mean score 3.9-4.03 , except one item (I easily explain my medical problem to the physician) had 2.96, with all items showed significant difference ($p<0.05$), indicating high degree of agreement with the acceptances of Telemedicine. Where, the majority agreed with: 325 (79.1%) "I easily explain my medical problem to the physician" followed by 323 (78.6%) "I feel comfortable to conduct my Telemedicine visit at my preferred place", then 312 (76.0%) "I accept the Telemedicine services", 305 (74.2%) "I would use the Telemedicine services again", and lastly 296 (72.0%) "I believe the physician understands my medical condition" (Table 4). Table (5) show there is a significant positive relationship between Telemedicine services and patient trust on direct-to-consumer Telemedicine where X2=112.17 and P-value<0.0001, Also there is a significant positive relationship between Telemedicine services and patient acceptance of direct-to-consumer Telemedicine where $X^2=208.30$ and P-value<0.0001.Pearson correlation revealed significant positive correlation between Telemedicine services and patient acceptance & trust for direct-to-consumer Telemedicine ($p<0.0001$ and $p<0.0001$)respectively (Table 5)

DISCUSSION

The current research aimed to asses patient acceptance & trust for DTC telemedicine for outpatient services at King Abdullah Medical City, Makkah. In order to help in increasing the experience and knowledge of weakness and strength areas to improve the telemedicine services. The main findings of the study revealed a significant relation between Telemedicine services and patient acceptance & trust for DTC which affects the whole vision of the improving in healthcare services. The current study reported barriers and benefits of usingTelemedicine. Where, the main benefits were; enhancing access to health care system, and saving time and money. While, the main barriers were; lacking of knowledge about Telemedicine services, and lacking of knowledge about Telemedicine benefits. Similar results reported in Sharma et al,. (2020) study, where the main barriers were the lack of awareness and acceptance of new technology, by the community and the professionals. On the other hand, Tele-ophthalmology is a solutions for patients who experienced less time consumption and convenience of seeking consultation, also, it improved commitment for follow-up (8). Regarding the hypothesis one, the results showed a significant positive relationship between telemedicine services and patient trust where X2=112.17 and P-value<0.0001. Which means that the good quality of telemedicine services increase patient trust in telemedicine services. Where, there are four forms of trusting telemedicine service; the care organization, the care professional, the treatment, and the technology (9). This finding consistent with Costantino (2021) study, where they reported that the patients who had IBD showed telemedicine trust. It is value to record that the poor trust in technology did not disturb telemedicine trust (10). Also, in 2018 study, the author reported that trust in the online service has been found

Table 3. The benefits, The barriers /challenges of adopting Telemedicine, and The usability of Telemedicine:

variables		N	%	Mean	SD
The benefits of adopting Telemedicine					
Telemedicine services can help save money & time	Strongly disagree	2	.5	4.35	0.79
	Disagree	12	2.9		
	Not Sure	36	8.8		
	Agree	151	36.7		
	Strongly agree	210	51.1		
Telemedicine services can improve the quality of care	Strongly disagree	2	.5	4.05	0.94
	Disagree	34	8.3		
	Not Sure	61	14.8		
	Agree	160	38.9		
	Strongly agree	154	37.5		
Telemedicine services can enhance access to healthcare system	Strongly disagree	1	.2	4.17	0.85
	Disagree	20	4.9		
	Not Sure	56	13.6		
	Agree	166	40.4		
	Strongly agree	168	40.9		
Telemedicine services can provide better follow up after face to face contact	Strongly disagree	10	2.4	4.04	0.91
	Disagree	28	6.8		
	Not Sure	60	14.6		
	Agree	152	37.0		
	Strongly agree	161	39.2		
The barriers /challenges of adopting Telemedicine					
Lack of time & financial issues	Strongly disagree	7	1.7	3.7	0.97
	Disagree	40	9.7		
	Not Sure	109	26.5		
	Agree	163	39.7		
	Strongly agree	92	22.4		
Lack of knowledge about Telemedicine services	Strongly disagree	9	2.2		
	Disagree	36	8.8	3.80	0.98
	Not Sure	84	20.4		
	Agree	181	44.0		
	Strongly agree	101	24.6		
Lack of knowledge about benefits of Telemedicine	Strongly disagree	10	2.4		
	Disagree	33	8.0	3.85	0.98
	Not Sure	81	19.7		
	Agree	172	41.8		
	Strongly agree	115	28.0		
Weak& poor infrastructure	Strongly disagree	13	3.2	3.62	0.97
	Disagree	53	12.9		
	Not Sure	117	28.5		
	Agree	124	30.2		
	Strongly agree	104	25.3		
The usability of Telemedicine					
The way I interact with the Telemedicine is pleasant	Strongly disagree	2	.5	3.7	0.94
	Disagree	43	10.5		
	Not Sure	120	29.2		
	Agree	155	37.7		
	Strongly agree	91	22.1		
The Telemedicine system is simple & easy to use	Strongly disagree	2	.5	3.96	0.90
	Disagree	24	5.8		
	Not Sure	91	22.1		
	Agree	165	40.1		
	Strongly agree	129	31.4		
Using the Telemedicine services, I can meet & see the physician as in physical visit	Strongly disagree	13	3.2	3.64	0.90
	Disagree	64	15.6		
	Not Sure	88	21.4		
	Agree	141	34.3		
	Strongly agree	105	25.5		

Data are presented as number and % as well as mean ± SD

to rise perceived helpfulness, comfort of use, customer satisfaction, and the aim to make transactions.. (11). Where, trust has become a critical factor with regard to novel eHealth technologies (12). Regarding the hypothesis two, the results showed a significant positive relationship between telemedicine services and patient acceptance where X2=208.30 and P-value<0.0001. Which means that the good quality of telemedicine services increase patient acceptance in telemedicine services.. Where, telemedicine services acceptance counts on several issues. These issues are primarily contextual, such as the service design is appropriate to daily life, the psychological weight made by the technology, or personal stimulus (13) This finding consistent with So et al study (2020), where the authors reported that the use of telemedicine showed a respectable level of acceptance regarding follow-up. The main factors behind the acceptance were; confidentiality matter, the good evaluation of disease progression, and the afraid of the infection. (14). Similar result reported by Viers and colleagues (2017), the authors reported that almost two thirds of the patients who received health care due to urology problems and have the ability to use online health-specific content accept the invitation to run a remote video visits, the reasons for the acceptance reasons were positively associated with technology simplicity level, the remote video visits meeting kind, and being relax with some precise questions such as; talking about high sensitive information, diagnosis, and the advisable treatment (15). Also, it is with agreement with Dario and colleaues, where the authors reported that patients suffered from various chronic illness accepted Telemedicine services and stated a

Table 4. Patients' trustfulness on and acceptances of Telemedicine

	variables	N	%	Mean	SD
Everything I say / do remains privet	Strongly disagree	1	.2	4.19	0.79
	Disagree	8	1.9		
	Not Sure	68	16.5		
	Agree	168	40.9		
	Strongly agree	166	40.4		
"Legal policy & technological safeguards make Telemedicine services a safe environment"	Strongly disagree	3	.7	4.05	0.84
	Disagree	15	3.6		
	Not Sure	71	17.3		
	Agree	190	46.2		
	Strongly agree	132	32.1		
The degree to which you trust the Telemedicine services	Strongly disagree	3	.7	4.00	0.92
	Disagree	26	6.3		
	Not Sure	89	21.7		
	Agree	168	40.9		
	Strongly agree	125	30.4		
Patients' acceptances of Telemedicine					
I feel comfortable to conduct my Telemedicine visit at my preferred place	Strongly disagree	2	.5	4.03	0.86
	Disagree	24	5.8		
	Not Sure	62	15.1		
	Agree	194	47.2		
	Strongly agree	129	31.4		
I easily explain my medical problem to the physician	Disagree	59	14.4	2.96	0.97
	Not Sure	27	6.6		
	Agree	198	48.2		
	Strongly agree	127	30.9		
I believe the physician understands my medical condition	Strongly disagree	1	.2	3.92	0.88
	Disagree	28	6.8		
	Not Sure	86	20.9		
	Agree	183	44.5		
	Strongly agree	113	27.5		
I would use the Telemedicine services again	Strongly disagree	4	1.0	4.01	0.90
	Disagree	23	5.6		
	Not Sure	79	19.2		
	Agree	177	43.1		
	Strongly agree	128	31.1		
The degree to which I accept the Telemedicine services	Strongly disagree	4	1.0	4.02	0.89
	Disagree	19	4.6		
	Not Sure	76	18.5		
	Agree	179	43.6		
	Strongly agree	133	32.4		

Data are presented as number and % as well as mean ± SD

Table 5. The relation between Telemedicine services and patients' trustfulness on and acceptances of direct-to-consumer Telemedicine

		Telemedicine services							
		Poor		Moderate		High		Total	
		N	%	N	%	N	%	N	%
patient trust	Poor	26	52.0%	20	21.1%	11	4.1%	57	13.9%
	Moderate	15	30.0%	29	30.5%	39	14.7%	83	20.2%
	High	9	18.0%	46	48.4%	216	81.2%	271	65.9%
	Total	50	100%	95	100%	266	100%	411	100%
Chi-square	X^2	112.17							
	P-value	<0.0001							
patient acceptance	Poor	40	80.0%	33	34.7%	11	4.1%	84	20.4%
	Moderate	8	160%	34	35.8%	21	7.9%	63	15.3%
	High	2	4.0%	28	29.5%	234	88.0%	264	64.2%
	Total	50	100%	95	100%	266	100%	411	100%
Chi-square	X^2	208.30							
	P-value	<0.0001**							
Variable		patient trust				patient acceptance			
Telemedicine services	r	0.683				0.811			
	P value	0.0001**				0.0001**			

Data are presented as number and %
Comparison done using Chi square test
r= Pearson correlation
P value < 0.05 considered significant
P value <0.0001 considered extremely significant

similarperception of it. No general difficulties were recorded and patients with the range of circumstances studied gave a positive assessment of the service (16). The current study differs from some other studies such as that of Martinez et al (2018),which aimed to describes the features of doctors, patients, and use of the big DTC telemedicine service and investigates the correlation between patient's satisfaction and the telemedicine doctors, however, the current research aimed to asses patient acceptance & trust for DTC telemedicine for outpatient services (17) In addition, the current study differs from Ramaswamy(2020), where the retrospective observational cohort study focused on investigation patient acceptance of video visits by comparing Press Ganey patient satisfaction scores for video vs in-person Visits, and identifying the factors associated with patient satisfaction (18).

Limitation:

The study had few limitations: thesubjectivenature, where the study was focused only on patients' acceptances and trustful on Telemedicine services, time duration only during 2021, and only the patients who attend the OPD clinic in King Abdullah Medical City, in Makkah.

CONCLUSION

Telemedicine was proved to be a valuable addition to usual care. Where, an encouraging perception for Telemedicine services is not a temporary effect, but it grows over the time.Patients were generally showed a great trust in Telemedicine service implemented. Where, trust is a significant antecedent of end-user acceptance of electronic services, which is very essential for patients when decide to use Telemedicine service or not. Patients were generally showed a huge acceptance in Telemedicine service implemented. As a result healthcare organizations should take care ofthe continues using ofTelemedicine services at least by the same quality, and work in improving the services. The healthcare organization should take care and work hardly on the process of usingTelemedicine services, provide good quality of services as well as quantity, and providing the healthcare workers with the appropriate information and training about Telemedicine.
Further multicenter studies in different regions need to be conducted to detect the relation between different Telemedicine services and the others aspects of trust and acceptance.

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