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AWARENESS AND PERCEPTIONS AMONG PATIENTS ABOUT RECEIVING HEALTHCARE SERVICESTHROUGH TELEMEDICINE IN PRIMARY HEALTHCARE CENTERS

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Abstract:

Objective: *This study used an adaptation of the Technology Acceptance Model (TAM) to explore the interplay of telehealth perceptions and sociodemographic factors with the perceived ease of use (PEoU) and behavioral intention to use telehealth among primary care clients.*

Method: *A cross-sectional study was conducted at eight Primary healthcare centers (PHCCs) and two referral centers in Riyadh, Saudi Arabia, between May 2021 and July 2021. An online questionnaire was disseminated to collect sociodemographic data, lifestyle and health-related data, levels of communication technology use (LTCU), self- rating of soft skills (SRSS), perception of telemedicine services (PTS, 17 items), PEoU, and behavioral intentionto use telemedicine. Scores were calculated on the relevant scales and multivariate stepwise linear regression models were carried out to analyze predictors of PTS, PEoU, and behavioral intention scores.*

Result: *Four hundred and eleven PHCC visitors have participated, 62.3% were males and mean (SD) age was 35.04 (13.90) years. Overall, telehealth was perceived to have relatively positive impact on 9/17 dimensions of care that were related to patient confidentiality, health expenditure, emergency care and public health issues. SRSSscore was the only factor independently associated to PTS score (B=0.96, 95% CI=0.57-1.35; p<0.001), while PTS score was the only significant predictor of PEoU score (B=0.07, 95% CI=0.06-0.07; p<0.001).*

Furthermore, both PTS score (B=0.04; 95%CI=0.03-0.05, p<0.001) and PEoU score (B=0.57, 95%CI=0.49- 0.65; p<0.001) were independently associated with behavioral intention score.

Conclusion: *Authorities and healthcare providers should implement effective strategies to alleviate the misconceptions about telehealth and enhance the population's computer self-efficacy to increase effective implementation, optimal utilization, long-term efficacy, and cost-effectiveness of telemedicine in PHCCs.*

Keywords: *telemedicine, perception, acceptance, primacy care, computer, technology, self-efficacy;*

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INTRODUCTION:

Telemedicine or telehealth encompasses various applications of information and communication technologies to deliver remote healthcare services by healthcare professionals. Its applications range from direct patient counseling and exchange of clinical information between providers for collaborative decision-making or coordinated care, to genuine diagnostic and therapeutic services involving further remotely controlled instruments or devices [1,2]. Although most of these applications appear to require highly advanced technologies, the concept of telemedicine has evolved long-time ago. Bashshur and Shannon, in their book "History of Medicine", argued that attempts of telehealth emerged during ancient civilization, in the form of elementary health networking. Nevertheless, the authors attribute first modern application of telehealth to a Dutch physician, who tele-transmitted electrocardiogram recordings in 1905. This was followed by other applications in radiology, in the subsequent decades, first in Europe then in the USA and Canada [3]. The upturn of telemedicine occurred in late 1960s and early 1970s, when the National Aeronautics and Space Administration (NASA), in collaboration with the Soviet Union, developed several telemedicine systems to monitor the physiological parameters of astronauts. This was achieved via spacebridge satellites before the advent of internet [4].

Nowadays, the revolutionized information and communication technologies, notably the fifth-generation internet [5], block-chains [6], artificial intelligence and machine learning [7], and robotics [8] have propelled telemedicine to another level enabling further instrumental applications with higher precision and enhanced patient-centered approach [1,6,9,10].

In Saudi Arabia, the use of telemedicine grew rapidly and proliferated in the recent years. The local context conjugates the increasing population and demand for healthcare services, both qualitatively and quantitively, with a dire need for healthcare human resources, which urges the need for innovation in cost-effective strategies such as telehealth [11–13]. The Saudi Healthcare system is encouraging citizens through its policies and regulations to use telemedicine capacities. Vision 2030 implemented by the Saudi government foresees more efficiency and cost-effectiveness by incorporating advanced technology in telemedicine and improving patient-centered care [14].

However, the effective implementation and long-term effectiveness of telehealth is challenged by several factors related to both the providers and end users, besides the organizational and technical issues [15].

By focusing on the end user, several social, economic, and cultural factors may influence the patients' awareness and perception about the new technology in healthcare. These factors shape the attitudes and subjective perceptions about telehealth, which influence the acceptance of and behavioral intention to use the related services [16,17]. Cumulative research is being published locally regarding telemedicine challenges and opportunities, with a few significant works addressing the issue from the user perspective [17–19].

In order to support the existing local literature, this study used an adaptation of the Technology Acceptance Model (TAM) to explore the interplay of the levels of telehealth perceptions and sociodemographic factors with the perceived ease of use (PEoU) and behavioral intention to use telehealth. This type of data is crucial for the strategic planning of telemedicine implementation in the Kingdom as it explores the significance of the modifiable factors directly related to the acceptance of telehealth among the end users. This analysis in turn would help to guide the educational interventions and give policy makers vital indications on how to approach solving the problem of resistance to use such technologies.

METHODS:

Design and setting

A descriptive and analytical cross-sectional study has been conducted at the Ministry of Health (MOH) primary healthcare centers (PHCCs) in Riyadh city, Saudi Arabia, between May 2021 and July 2021. The study was approved by the institutional review board of Institutional review board of King Fahad Medical City (ref. no. 20-749).

Population and sampling

The study targeted Arabic-speaking adult attendees for PHCCs including both patients and companions. Individuals with psychiatric conditions, major sensorial handicaps or impaired cognitive and psychomotorfunctions were excluded.

The sample size was calculated to detect an unknown proportion (P=0.5) of patients who had adequate level ofacceptability of using telemedicine with 0.05 type I error, 95% confidence interval (95% CI), 80% statistical power. The sample size was calculated at 377 and rounded up to 400.

Participants were recruited using a multistage

stratified sampling. In Riyadh City, PHCCs are divided into two strata: 1) King Saud Medical City, the referral center, and PHCCs from the Southern and Western sectors of Riyadh; 2) King Fahad Medical City, the referral center, and PHCCs from the Northern and Eastern sectors of Riyadh. A random sampling technique was used to select two PHCCs from each sector, i.e. four PHCCs from each stratum, in addition to referral hospitals. Thus, a total 10 centers were targeted in the study, and a convenience sampling method was used to include equivalent number of patients (N=40) from each participating center.

Tool

Theoretical framework

This study used an adaptation of the TAM to predict the acceptance and effective use of telemedicine (the behavioral response). It analyzed the effect of the cognitive response, represented by the interplay between the perceived benefit/impact and PEoU of telehealth technology, on the affective response represented by the behavioral intention [20]. The study model included the effect of other external factors, including sociodemographic and health-related factors and exposure to specific and non-specific communication technologies.

Tool description

A semi-structured questionnaire was designed by authors for this study. It comprised five parts. **Part one** explored the sociodemographic factors such as age, gender, educational level, etc. **Part two** explored lifestyle and health-related data such as eating habits, exercise, chronic diseases, and healthcare utilization during the past six months. **Part three** explored the levels of communication technology use (eight items), number of connected devices in the household (one item), self-rating of soft skills such as office programs, internet use, etc. (seven items), and experience in telehealth using phone, social media or smart applications (three items). **Part four** explored telemedicine perceptions using a 17-item scale that was designed by authors, and which assessed the participants' levels of agreement (from extremely disagree = 1 to extremely agree = 5) with statements regarding the perceived impact of telemedicine on several dimension of care, such as patient's rights protection, care quality, safety, etc. **Part five** assessed the PEoU, defined as "the degree to which an individual believes that using a particular system would be free of physical and mental effort", and the behavioral intention, defined as the "individual's subjective probability that he or she will perform a specified behavior" [20]. In this study, adaptation of TAM, PEoU scale comprised of two items including "Learning to use telemedicine would be easy for me) and "I would find it easy to communicate with my doctor using telemedicine technology"; while behavioral intention scale comprised of three items: "Assuming I have access to the system, I intend to use telemedicine", "To the extent possible, I intend to use telemedicine technology in all dimensions of my healthcare and that of my children", and "I intend to encourage my relatives to use telemedicine". Both PEoU and behavioral intention items were rated using a five-level Likert-type agreement scale.

Tool validation

The questionnaire underwent face and content validation by the authors and all the family medicine physicians with the concurrence of an independent methodologist. The internal consistency of the perceptions scale, as wellas the PEoU and behavioral intention scales was analyzed by calculating Cronbach's alpha. Additionally, the construct behavior of the perceptions scale was analyzed using Principal Component Analysis (PCA), followed by Varimax rotation; and the suitability of dataset for factor analysis was assessed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. Initial extraction criteria included an Eigenvalue ≥1 and an extraction value above 0.3. This was followed by the analysis of the Scree plot as well as comparison of calculated Eigenvalues with those of the Monte Carlo PCA for parallel analysis by setting the number of replications to 100.

Scoring

Scores were calculated on the following variables: levels of communication technology use (LCTU, range 0 – 8), self-rated soft skills (SRSS, range 7 – 28), perceptions about telemedicine services (PTS, 0 – 100 [scaled score]), PEoU (0 – 10 [scaled]) and behavioral intention (0 – 10 [scaled]). In all scores, higher values indicatedmore positive levels.

Procedure

The questionnaire was translated into Arabic and edited online using Google Forms platform. The online form comprised a brief introduction of the study objectives and importance, with statements about confidentiality and consent for participation. The link was shared with eligible participants during doctor visits or in the waiting rooms by the nurses.

Statistical methods

The database was edited and analyzed using the Statistical analysis Statistical Package for Social Sciences version 21.0 for Windows (SPSS Inc., Chicago, IL, USA). Descriptive statistics were used to present the frequencies and percentages on

categorical variables, and central tendency and variances on numerical variables. Independent t-test and One-Way ANOVA were used as applicable to compare the means and variances of PTS and PEoU scores across different factor categories. Three multivariate stepwise linear regression models were carried out. The first model analyzed LCTU, SRSS, and sociodemographic and lifestyle and health-related factors as independent factors for PTS score. The second model analyzed the previously mentioned factors and PEoU as independent factors for PEoU score. The third model analyzed PTS and PEoU scores as predictors for behavioral intention score. A *p*-value of <0.05 was considered to reject the null hypothesis.

RESULTS:

Sociodemographic characteristics

Four hundred and eleven PHC visitors completed the questionnaires. Males were 62.3% and the mean age (SD) was 35.04 (13.90) years. Majority were Saudi citizens (98.5%) and highly educated (university or higher degree, 79.5%), and approximately, two-third were married and employed, having a median of two children. Remarkably, 64.5% declared having no health insurance (**Table 1**).

Table 1. Sociodemographic data (N=411)

Parameter	Category	N	%
Gender	Male	256	62.3
	Female	155	37.7
Age (Years)	Mean (SD)	35.04 (10.90)	
Social status	Single	125	30.4
	Married	279	67.9
	Divorced	6	1.5
	Widowed	1	0.2
Nationality	Saudi	405	98.5
	Non-Saudi	6	1.5
Number of children	median (IQR)	2 (0, 4)	
Family monthly income	<7K SAR	98	23.8
	7-15K SAR	141	34.3
	15-20K SAR	99	24.1
	>20K SAR	73	17.8
Professional status	Housewife	43	10.5
	Employed	264	64.2
	Business-man/ Self-employed	13	3.2
	Student	38	9.2
	Retired	27	6.6
	Unemployed	26	6.3
Educational level	Primary or lower	3	0.7
	Middle school	7	1.7
	High school	74	18.0
	University or equivalent	257	62.5
	Higher education	70	17.0
Health Insurance	None	265	64.5
	Through employer	128	31.1
	Purchased directly	18	4.4
Residence area	Urban	395	96.1
	Rural/ countryside	16	3.9

Lifestyle and health-related data

Minority participants declared having optimal eating habits (7.5%) and regular exercise (11.2%), while 25.8% were active smokers. Medical history revealed 18.7% of participants with chronic disease, 13.4% taking chronic medication, 5.8% had psychiatric history, 19.7% had visual disability, while ≤1% had reduced mobility or hearing loss. Regarding health care utilization in the past six months, 64.8%, 10.9% and 10.7% visited their doctor, were hospitalized, or underwent a surgical intervention at least once (**Table 2**).

Table 2. Life style and health-related data (N=411)

Parameter	Category	n	%
Eating habits	Not watchful	92	22.4
	Somewhat watchful	288	70.1
	Very watchful	31	7.5
Exercise	None or rarely	112	27.3
	Irregular	253	61.6
	Regular	46	11.2
Smoking status	Nonsmoker	271	65.9
	Past smoker	34	8.3
	Current smoker	106	25.8
Existence of Chronic disease	None	334	81.3
	Yes	77	18.7
Chronic medication	None	356	86.6
	Yes	55	13.4
Psychiatric history	None	387	94.2
	Yes	24	5.8
Reduced mobility	None	407	99.0
	Yes	4	1.0
Hearing loss	None	408	99.3
	Yes	3	0.7
Visual disability	None	330	80.3
	Yes	81	19.7
A doctor visit in the past six months	None	145	35.3
	Once	140	34.1
	Two or more	126	30.7
Hospitalization in the past six months	None	366	89.1
	Once	35	8.5
	Two or more	10	2.4
Surgery in the past six months	None	367	89.3
	Once	36	8.8
	Two or more	8	1.9

Communication technology use and telehealth experience

Results of this section are available in the **Supplemental Table 1** and **Supplemental Table 2**. Majority of the participants had a smartphone (97.8%) or a computer (73.7%) and had illimited internet access (80.3%). The median number of connected devices was five per household (IQR=3-8). Experience in telehealth was relatively significant, using phone (44.5%) and social media (38.4%) consultations, along with telemedicine smart applications (44.5%). Further, self-declared levels of performance in soft skills, scored between 0 "no experience" to 4 "expert level" showed mean (SD) performance scores ranging between 2.54 (0.86) for Microsoft Office applications to 3.22 (0.72) for use of social media.

Perceptions about telehealth services

On a scale from 1 to 5, mean of all 17 items were in the neutral range from 3.22 to 3.87 with standard deviations

≤ 1.09. The agreement rate (percentage of participants who replied 'agree' or 'extremely agree') reached majority for nine dimensions of telehealth impact, including respect of confidentiality (60.9%), enhanced involvement in own care (60.1%), decreased health expenditures (62.8%), improved equitability in health accessibility (63.5%), improved availability of healthcare providers (63.5%), faster access to health care (72.7%), improved management of chronic diseases (63.8%), improved control of communicable diseases (65.6%), and enhanced efficiency of emergency care (59.1%) (**Table 3**).

Table 3. Perception about telemedicine services (N=411)

		Extremely disagree	Disagree	Mixed opinion, or neutral	Agree	Extremely agree	Agreement rate[§] (%)	Mean	SD
My rights seem more protected	n	16	29	134	160	72	56.4	3.59	0.98
	%	3.9	7.1	32.6	38.9	17.5			
Respected confidentiality	n	13	29	119	163	87	60.9	3.69	0.99
	%	3.2	7.1	29.0	39.7	21.2			
Health providers are more responsible	n	20	47	134	132	78	51.1	3.49	1.07
	%	4.9	11.4	32.6	32.1	19.0			
The diagnosis is easier to obtain	n	21	94	120	126	50	42.9	3.22	1.09
	%	5.1	22.9	29.2	30.7	12.2			
my issues would be managed more efficiently	n	19	68	146	119	59	43.4	3.32	1.06
	%	4.6	16.5	35.5	29.0	14.4			
Health providers would be more available	n	18	25	107	195	66	63.5	3.65	0.97
	%	4.4	6.1	26.0	47.4	16.1			
Faster access to healthcare	n	12	16	84	202	97	72.7	3.87	0.92
	%	2.9	3.9	20.4	49.1	23.6			
Better treatment adherence	n	13	33	156	156	53	50.9	3.49	0.93
	%	3.2	8.0	38.0	38.0	12.9			
Ensured social care	n	10	37	150	162	52	52.1	3.51	0.91
	%	2.4	9.0	36.5	39.4	12.7			
Reinforced doctor-patient relationship	n	12	35	132	172	60	56.4	3.57	0.94
	%	2.9	8.5	32.1	41.8	14.6			
I'd be more involved in my health	n	11	31	122	184	63	60.1	3.63	0.92
	%	2.7	7.5	29.7	44.8	15.3			
Decreased health issues costs	n	12	31	110	171	87	62.8	3.71	0.98
	%	2.9	7.5	26.8	41.6	21.2			
Equitable access for healthcare	n	11	33	106	182	79	63.5	3.69	0.96
	%	2.7	8.0	25.8	44.3	19.2			
Better management for chronic diseases	n	15	33	101	168	94	63.8	3.71	1.02
	%	3.6	8.0	24.6	40.9	22.9			
Better control of communicable diseases	n	16	28	97	172	98	65.5	3.75	1.02
	%	3.9	6.8	23.6	41.8	23.8			
Efficient emergency care	n	25	24	119	155	88	59.1	3.63	1.07
	%	6.1	5.8	29.0	37.7	21.4			
Less medical errors	n	27	70	153	104	57	39.2	3.23	1.09
	%	6.6	17.0	37.2	25.3	13.9			

§ Agreement rate corresponds to the percentage of participants who replied 'agree' or 'extremely agree'.

Perceived ease of use and behavioral intention to use telemedicine technologies

Similar to perceptions' scale items, all PEoU and behavioral intention mean item scores were in the neutral range 3.66-3.89 out of 5. However, the agreement rates were higher and reached majority for all five explored dimensions (63.3% - 76.4%) (**Supplemental Table 3**).

Internal consistency of the study scales and respective scores

Internal consistency of the study scales is depicted in **Table 4**, and showed Cronbach's alpha values and mean scaled scores for PTS (0.96, 71.44), PEoU (0.84, 7.62 out of 10) and behavioral intention (0.92, 7.41 out of 10). Further, both LTCU and SRSS were analyzed for internal consistency and showed Cronbach's alpha of 0.60 and 0.87, respectively.

Table 4. Internal consistency of the study scales and descriptive statistics of the related scores

Score / Questionnaire part	Items	Cronbach's alpha	Score	Mean score
LCTU	8 items	0.60	Simple score 0-8	4.77
SRSS	7 items	0.87	Simple score 7-28	20.56
PTS	17 items	0.96	Scaled score 0-100	71.44
PEoU	2 items	0.84	Scaled score 0-10	7.62
BI	3 items	0.92	Scaled score 0-10	7.41
LCTU: Levels of communication technology use; SRSS: self-rated soft skills; PEoU: perceived ease of use; PTS: perceptions about telemedicine services; BI: behavioral intention;				

Construct analysis of the PTS scale

KMO measure of sampling adequacy was 0.947 and Bartlett's test of sphericity was significant ($p<0.0001$), indicating the suitability of the dataset for PCA. Two components met the initial criteria of Eigenvalue >1 and factor loading >0.3, explaining 68.5% of the scale variance. The first component showed an Eigenvalue=10.4 and accounted for 61.0% of the variance. All 17 factors successfully loaded in the structure matrix component 1,with loading values 0.569 – 0.878. The analysis of the Scree plot as well as the comparison of calculated Eigenvalues with those of the Monte Carlo PCA for parallel analysis showed that PTS scale behaved as a unidimensional construct. Hence, only the overall PTS score was considered in further analysis.

Factors associated with PTS

There was no significant association of perceptions about telemedicine score with any of the sociodemographic, lifestyle or health-related factors (**Supplemental Tables 4** and **5**). On the other hand, participants who consulted doctors via social media (mean [SD] score=73.44 [14.62] versus 70.20 [15.93]) and those who had previous experience with telemedicine applications (73.19 [12.22] versus 70.04 [17.60]) had higher PTS scores than their counterparts, respectively (**Table 5**). However, multivariable stepwise linear regression showed that SRSS score was the only factor independently associated to PTS score (B=0.96, 95% CI=0.57-1.35; $p<0.001$), while experience in telemedicine parameters as well as LTCU score were not significant (**Table 6**).

Table 5. Association of experience in telemedicine with perceptions towards and perceived ease of use of telemedicine (N=411)

Experience in telemedicine		n	Perception score			PEoU score		
			Mean	SD	p-value	Mean	SD	p-value
Doctor consultation on the phone	No	228	70.46	16.72	0.145	7.57	1.74	0.502
	Yes	183	72.66	13.79		7.68	1.59	
Doctor consultation through socialmedia	No	253	70.20	15.93	**0.039**	7.60	1.76	0.821
	Yes	158	73.44	14.62		7.64	1.54	
Using telemedicine apps	No	228	70.04	17.60	**0.033**	7.58	1.77	0.621
	Yes	183	73.19	12.22		7.66	1.56	

PeoU: Perceived ease of use

Table 6. Independent factors associated with perception of telemedicine, PEoU and BI to use telemedicine (multivariate stepwiselinear regression)

Dependent variable / predictor	Coefficient	P-value	95% CI for the coefficient	
Perceptions towards telemedicine (score)				
Consultation via social media (yes)	1.46	0.369	-1.74	4.66
Telemedicine apps use (yes)	2.37	0.135	-0.74	5.47
LCTU score	-0.72	0.113	-1.61	0.17
SRSS score	0.96	**<0.001**	0.57	1.35
PEoU (score)				
PTS score	0.07	**<0.001**	0.06	0.07
LCTU score	0.06	0.078	-0.01	0.14
BI (score)				
PTS score	0.04	**<0.001**	0.03	0.05
PEoU score	0.57	**<0.001**	0.49	0.65

LCTU: Levels of communication technology use; SRSS: self-rated soft skills; PEoU: perceived ease of use; PTS: perceptions about
telemedicine services; BI: behavioral intention;

Factors associated with PEoU

PEoU score showed no significant association with any of the three dimensions of experience in telemedicine (**Table 5**). On the other hand, PEoU score showed strong positive relationship with PTS score (Pearson's correlation coefficient R=0.62, p<0.001) and weak positive relationship with LTCU score (R=0.24, p<0.001), while it showed no significant relationship with SRSS (R=0.08, p=0.013) (**Results not presented in tables**). The multivariate stepwise linear regression showed only PTS score to be independently associated with PEoU score (B=0.07, 95% CI=0.06-0.07; p<0.001) (**Table 6**).

Factors associated with behavioral intention

Behavioral intention score showed strong positive relationship with PTS score (R=0.67, p<0.001) and weak positive relationship with smart device use score (R=0.19, p<0.001) (**Results not presented in tables**). The multivariate model showed both PTS score (B=0.04; 95% CI=0.03-0.05, p<0.001) and PEoU score (B=0.57,95% CI=0.49-0.65; p<0.001) to be independently associated with behavioral intention score (**Table 6**). The summary of the TAM is depicted in **Figure 1**.

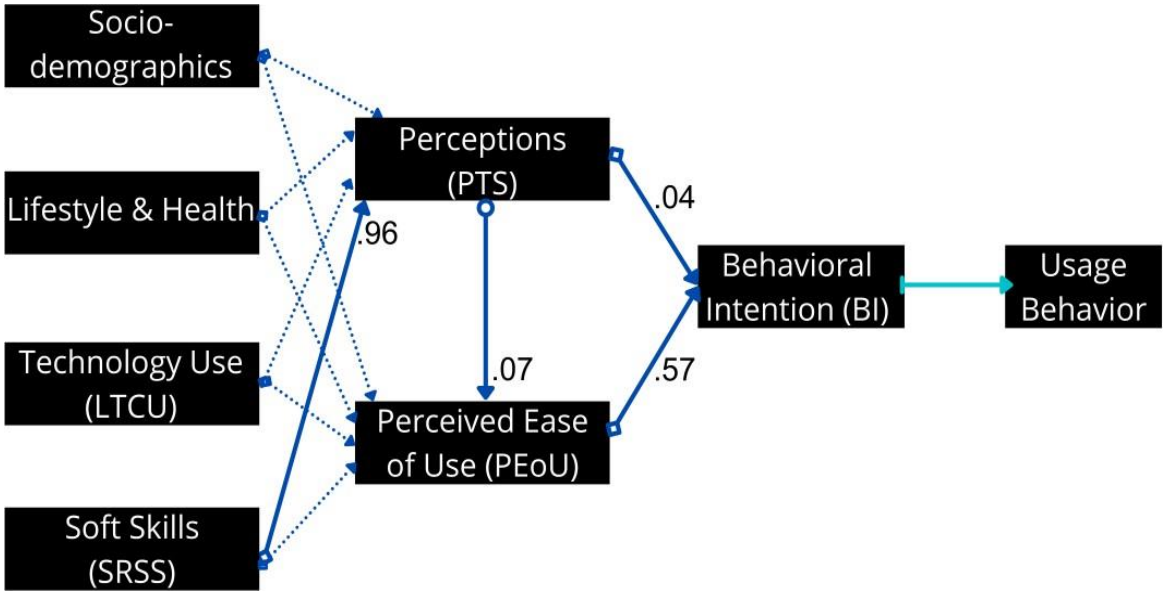

Figure 1. Summary of the Technology Acceptance Model adaptation of telehealth among primary care patients

DISCUSSION:

Telemedicine is an emerging technology in the PHCCs in Saudi Arabia, and its implementation, evaluation and development are led by the Saudi Telemedicine Unit of Excellence [21]. The current COVID-19 pandemic potentiated the applications of telemedicine services and related technologies, notably in epidemiological investigations and diagnostic and therapeutic managements, which further promoted its acceptance and use [22,23]. This study explored patient's perceptions about the potential telemedicine impacts on various dimensions of the healthcare. The perceptions were analyzed as predictors for acceptance to use telehealth, using an adaptation of the TAM that integrated previous experience with specific and non-specific use of communication technologies.

Findings showed moderate rates of healthcare using various communication technologies, which was consistent with perceptions showing overall neutral levels. However, we observed relatively more positive perceptions regarding nine dimensions of care related to confidentiality, health accessibility, health expenditure, urgent care, and public health issues. Enhancing accessibility to healthcare is undoubtedly one of the prominent advantages of telehealth. In geographically disadvantaged populations, the implementation of telehealth constitutes a good solution for alleviating inequalities and enabling rapid access to care, as an alternative to physical care [24,25]. These findings compare well

with data from local studies in the pre-COVID-19 era. For example, Alshammari & Hassan (2019) surveyed 781 individuals from different regions of the Kingdom regarding preferences and perceptions of using information and communication technology in seeking healthcare. Notwithstanding some significant differences in the rates of telehealth use between urban and rural areas and across age groups, perceptions showed high levels of agreement regarding multiple benefits of telehealth such as time-saving, distance saving, easiness of access, emergency care, etc. [19].

During the COVID-19 crisis, use of telehealth for the purpose of ensuring continuity of care while maintaining social distancing has been a success in several countries including Saudi Arabia [22,26]. However, some data showed that the increased demand during the pandemic has disadvantaged some geographical and demographic and socioeconomic subgroups [27]. This indicates that the effectiveness of telemedicine, after its implementations, may be challenged by the shift in the equalities and equities issues. Such issues should be forecasted in the design of the implementation and evaluation strategies. Another perceived benefit of telemedicine is the cost saving. Previous studies showed the beneficial effect of telemedicine in reducing health expenditures for patients, notably those suffering from chronic diseases requiring long-term follow-up and recurrent visits [28]. However, whether it enables cost savings at the level of the health system is a subject of controversy and may require long-term investment [29]. Another aspect that produced positive perceptions among the participants in this study is patient confidentiality. Legal and ethical aspects of healthcare raise great debates. Telemedicine technologies generate a huge stream of patients' data that compromise privacy, which exposes to different cyber threats notably in international exchanges where regulations may be lacking [30].

On the other hand, findings from this study showed that the impact of telemedicine on diagnostic accuracy and medical errors was perceived to be less positive. This may indicate lower expectations regarding the clinical performance of providers when using remote technologies. Patient's safety and quality of care are major concerns in telemedicine. Several clinical practices may be exposed to suboptimal performance when carried out remotely. Although several studies attempted to demonstrate the positive effects of telehealth in improving patient's safety and quality of care [31–33], it appears that such effects are essentially observed in initially disadvantaged populations or in highly morbid patients with impaired quality of life. It is then crucial to determine whether the observed patient's satisfaction towards telemedicine may be biased by a basically low satisfaction with healthcare. Such a hypothesis may deserve further exploration.

The TAM used in this study demonstrated strong association of perceptions with both PEoU behavioral intention to use the technology. This demonstrates the relevance of enhancing perceptions and alleviating misconceptions among the population to improve adherence and acceptance. In the same way, AlBar & Hoque (2019) investigated the determinants for adoption and acceptance of e-health by patients, in Saudi Arabia.

Interestingly, authors used a TAM and the Theory of Planned Behavior frameworks to analyze the perception of e-health as a predictor for behavioral intention to use it. Findings highlighted the importance of perceived usefulness and PEoU on behavioral intention to use, while perceived behavioral control was not a significant factor for the use decision [17]. Another recent study that used TAM demonstrated that PEoU, perceived usefulness, social influence, and facilitating conditions positively influence BI to telemedicine services.

Additionally, PEoU and perceived usefulness are considered as important drivers of telemedicine services indeveloping countries [34].

Furthermore, while most of the patients reported having good soft skills, the level of performance in such skills was a significant predictor for positive perceptions about telemedicine. This indicates that improving the population's computer literacy and familiarity with information technology in general would contribute to enhance their perceptions and, consequently, their acceptance of telehealth. An experimental study from Taiwan used a combined model of TAM to demonstrate the effect of technology anxiety in generating hesitancy for rejection of telehealth among patients. The study also highlighted discouraging effect of technology related costs incurred by users to transition from physical care to telehealth [35]. An integrative literature review evidenced that technological concerns were among the most frequent determinants of telehealth acceptance, besides other related factors such as costs and self-confidence in transitioning from physical care to telehealth [36]. Another study showed computer self-efficacy and computer anxiety to be among the seven predictors of telehealth perceptions among older adults [37].

Limitations:
This study used self-assessment in all scales, which provides inaccurate measurements notably for SRSS and limits the internal validity of the results. Further, several potential factors of telehealth acceptance were not investigated considering the length of the questionnaire. Finally, the external validity may be affected by the specificities of the regional context in which the study has been conducted.

CONCLUSION:

Perceptions about telehealth among primary healthcare clients are ill-defined regardless of the sociodemographic class or health status, resulting in indeterminate expectations about the impact of its implementation of several aspects of care. This is associated with an overall reticent affective response regarding its acceptance and use. Authorities and healthcare providers should implement effective communication strategies to alleviate the misconceptions about telehealth that may result in over- or under- expectancy, both being inconsistent with the effective implementation, optimal utilization and long-term efficacy and cost-effectiveness of the technology. Improving the computer literacy and self-efficacy among the population is a determinant in enhancing the positive perceptions about telehealth.

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