

# Population perceptions of health care services provided virtually (telehealth): a cross-sectional study

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## ABSTRACT

**Background** In the era of the Coronavirus Disease 2019 (COVID-19) pandemic, health care systems wish to harness the advantage of distant care provision to transcend barriers to access health care facilities. This study aims to investigate general population perceptions (acceptance, comfort, perceived ease of use and perceived quality of care) toward telehealth.

**Methods** A cross-sectional survey was conducted using a validated online questionnaire. The questionnaire investigated the general population's familiarity and experience with virtual provision of health care (telehealth) in Kuwait. Descriptive statistics and multivariate analysis were performed.

**Results** A total of 484 responses were received. Of those, 65% ( $N = 315$ ) showed high acceptance of telehealth of which 73.5% ( $N = 119$ ) were comfortable using it and 48.2% ( $N = 78$ ) perceived themselves capable of utilizing its systems. Multivariate analysis showed that participants with moderate or high comfort score and those who perceived equal quality of care received from Virtual Visits (VV) are more likely to accept a virtual call from their health care provider compared to those with low comfort score (odds ratio (OR): 4.148, 95% confidence interval (CI): 1.444–11.91,  $P = 0.008$ , OR: 20.27, 95% CI: 6.415–64.05,  $P < 0.0001$ , OR: 2.585, 95% CI: 1.364–4.896,  $P < 0.004$ , respectively).

**Conclusions** Perceptions of telehealth were overall positive, indicating a tendency to accept the implementation of such technology.

**Keywords** Kuwait, patients, perception, telehealth, telemedicine,

## Introduction

Governments and health organizations worldwide have been developing services and regulations dedicated to providing the general population with a high-quality health care system. This system aims to reduce the burden of disease, injury or disability and to improve peoples' overall health status as well as functioning level.<sup>1,2</sup> In the past few decades, the swift development in technology led to a concurrent telehealth advancement, resulting in a sophisticated targeted service used in homes, hospitals and other health care facilities.<sup>3</sup>

Telehealth, as defined by the World Health Organization (WHO), is the delivery of health care services utilizing a variety of telecommunication tools, including telephones, smartphones and portable wireless devices, with or without a video connection, where patients and providers are separated by a considerable physical distance.<sup>1,2</sup> Although WHO stated the terms telehealth and telemedicine can be used interchangeably, the American Association Of Family Physicians

foundation envisioned telehealth as an umbrella term that covers a broader scope of clinical and non-clinical health services, while telemedicine only refers to clinical services.<sup>4</sup> This paper, will focus on clinical video call visits using any of the telecommunication tools, including telephones, smartphones and portable wireless devices, which will be expressed using the term telehealth throughout this paper.

The digital revolution is not the only reason behind telehealth implementation into health care systems, but it is the desired enhancement of patient-centered health care.<sup>5</sup> This enhancement is achieved by increasing both provider efficiency and patient satisfaction together with increasing patient compliance, facilitating access to care and reducing

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costs.<sup>6</sup> Also, telehealth is considered as a convenient alternative to pursuing in-person health care visits, especially for those who live far away from medical sites or have physical or mental disabilities.<sup>7</sup> Another gained value from telehealth is the improved and coordinated communication between providers and patients, thus enabling the support of self-management and improving the experience with health care services.<sup>2</sup> On the other hand, the main disadvantage of telehealth is related to information security and privacy issues, where confidentiality might be sacrificed.<sup>8,9</sup> Unless a unified telehealth regulatory framework is used in all health care facilities in one country, fragmentation of care will be evident due to the absence of connection between providers in different facilities and levels of care.<sup>10</sup>

The rapidly spreading Coronavirus Disease 2019 (COVID-19) led to devastating consequences on health care systems, health workers and patients as well as the economy worldwide.<sup>11</sup> During the pandemic, social isolation and extreme lockdown measures were implemented, and this resulted in using telehealth to not only take care of COVID-19 patients but also in the continuity of care for patients with chronic conditions.<sup>12</sup> Additional benefits from telehealth during the COVID-19 pandemic include public awareness, continued medical education, research and teaching.<sup>12</sup> These versatile areas of applications suggest using telehealth even after the COVID-19 pandemic is over due to the enhanced health care providers' (HCPs') perception of such technology.<sup>8</sup>

Other studies found that patients' perception was affected by the quality of care provided virtually, security and privacy of telehealth and the level of comfort while using this technology.<sup>10,13–15</sup> Powell *et al.* noted that the vast majority of patients voiced interest in continuing to use telehealth, specifically virtual visits (VV), as an alternative to the usual in-person visits.<sup>15</sup> This interest was driven by the advantages of saving time, money and increased convenience as well as easy access into virtual visits as cited by participants in several studies as well.<sup>10,13,15</sup> From patients' perspective, saved costs of travel, parking, co-pays and work absenteeism motivated them to accept virtual visits.<sup>15</sup>

To our knowledge, telehealth is not widely used in Kuwait health care facilities. However, the readiness to implement such technology in Kuwait's health system was investigated in one study by Buabbas and Alshawaf before COVID-19 emerged.<sup>16,17</sup> The studied population in Buabbas was limited to patients of referral and their physicians, affecting results generalizability to the general population and all HCPs. Buabbas found that participants thought telehealth would be useful and cost-effective when properly applied. Barriers preventing its implementation, include staffs' resistance to change, privacy or confidentiality issues and increased work-

load. Moreover, participants reported that policies must be carefully developed for the organization of telehealth practice to overcome those barriers.

With limited studies from Kuwait and the Middle East in general, the present study fills a gap in the literature and provides some evidence on general population perceptions (acceptance, comfort, perceived ease of use and perceived quality of care) toward telehealth. Findings from this study will support health care stakeholders to have informed decisions for implementing telehealth technologies that can improve access to health care information, facilitate more timely diagnoses and treatments and improve access to care for patients at home and at health care facilities.<sup>18</sup>

## Materials and methods

### Study design and settings

A cross-sectional study was performed using an online questionnaire. Inclusion criteria were participants from the general population who were living in Kuwait, tend to use health facilities, either governmental or private and aged  $\geq 18$  years. Confidentiality was assured and participants provided consent to participate in the study before starting the online questionnaire. Participants were asked to choose either 'I agree to participate' or 'I do not agree to participate' before proceeding to questionnaire questions. Participants who selected 'I do not agree to participate' were directed to the end of the questionnaire immediately.

### Sampling strategy

The sample size was determined using the Raosoft calculator<sup>19</sup> with choosing 5% as a margin of error, 95% as a confidence interval (CI) and a response distribution of 50%. According to Central Statistical Bureau in Kuwait, the population estimate at the beginning of 2020 was 4 464 521, so a minimum sample of 385 was required. Convenient sampling was employed, and the questionnaire link was sent to eligible participants through the authors' social networks. The anonymous link was also posted on social media such as WhatsApp, Twitter, Instagram and Microsoft Teams to increase response rate. The survey was conducted during the period from April to May 2021.

### Ethical considerations

This study was approved by the Ministry of Health Research Ethical Committee, Kuwait (MoH/REC/1385).

### Questionnaire characteristics

The questionnaire was adapted from a similar validated research study by Viers *et al.* after taking their permission.<sup>6</sup> Some questions were modified to suit Kuwait health care system. The questionnaire included three sections: demographic characteristics and factors affecting population perception toward the use of telehealth (acceptance to use telehealth, comforts with telehealth use, perceived ease of use of telehealth technology and perceived quality of care provided virtually). The questionnaire ended with an open-ended question as a third section to know if there were any additional factors that might affect participants' willingness to use telehealth and was not mentioned in the questionnaire. The term 'telehealth' was explained in the survey first page as follows: 'Virtual Healthcare Services, also known as Telehealth, is the use of digital information technology to provide and access healthcare services remotely'.

The first section consisted of nine demographic questions, including age, gender, nationality, governorate of residence, the highest level of education, occupation and state of health (e.g. physical status and presence of chronic disease) as well as transportation, followed by four questions assessing familiarity and experience with internet-connected devices and their use.

The second section assessed factors affecting population perception toward the use of telehealth. For acceptance, participants were asked how likely they would accept an invitation to meet their HCP via a video call from home (e.g. acceptance). This measure was assessed using a five-point Likert scale (1 = very unlikely to 5 = very likely).

Then, participants were asked about the level of agreement with eight statements questioning how comfortable they would be in several situations using virtual calls (e.g. comfort). The comfort scale ranged from 1 = extremely uncomfortable to 5 = extremely comfortable. The internal consistency for the eight comfort statements was assessed using Cronbach  $\alpha$  test. The test result was (0.83) which shows acceptable reliability.

Finally, participants' confidence about their ability to use technology (e.g. perceived ease of use) and perception of VV quality of care compared to office visits (e.g. perceived quality of care) were investigated. The scales of telehealth ease of use and quality of care provided virtually ranged from 1 = strongly disagree to 5 = strongly agree.

The survey was designed and distributed through Qualtrics Survey Software QSS (Qualtrics, Provo, UT, USA). Before distribution, the questionnaire was translated into Arabic language and piloted on seven volunteer participants from the general population to test if the questions are clear, understandable and non-ambiguous. Convenient and purposive

sampling was used for the pilot testing. Few modifications related to the questionnaire's general format and navigation through questions were done based on the participants' comments.

### Data analysis

The software Qualtrics was used for coding before data transfer into Statistical Package for the Social Sciences (SPSS<sup>®</sup>) version 27.0 for manual data cleaning. For sociodemographic and personal characteristics as well as perceptions, descriptive statistics, including frequencies, percentages, median and interquartile range (IQR) were used. A score was calculated for the 'comfort to use telehealth' for each participant and was categorized into three groups: low,<sup>8–19</sup> moderate (19–29) and high (30–40).<sup>6</sup> Comfort score was calculated for each participant according to the comfort scale (1 = extremely uncomfortable, 2 = somewhat uncomfortable, 3 = neither comfortable nor uncomfortable, 4 = somewhat comfortable and 5 = extremely comfortable), and then according to their scores, participants were divided into three groups: low,<sup>8–19</sup> moderate (19–29) and high (30–40). Normality of data was investigated using Kolmogorov–Smirnov, which warranted the use of non-parametric tests. Ordinal regression model was used for the multivariate analysis to account for possible confounders and to explore the effect of different factors on the population acceptance. Statistical significance was accepted with a  $P$ -value < 0.05 and CI of 95%.

### Results

A total of 568 people accessed the questionnaire link, and 484 completed the questionnaire giving a response rate of 85.2%. Almost half of the participants ( $N = 227$ , 46.9%) were between 18 and 25 years old. The median age was 26 years with an IQR of 22–43. Majority were females 80.4% ( $N = 389$ ). Moreover, majority of participants indicated that they had a previous experience with a video call, whereas only 9.5% had no previous video call encounter. Almost all participants ( $N = 478$ , 98.8%) have a working internet-connected device and an internet connection at home. Table 1 shows the demographics and other social characteristics of the study participants.

#### Acceptance to use telehealth

Participants were asked how likely they would accept an invitation to meet with their HCP via video call from their home. Three hundred and fifteen participants (65%) were somewhat likely or very likely to accept a meeting with their providers using video calls.

**Table 1** Sociodemographic characteristics

	(N)	(%)
Age		
18–25	227	46.9
26–35	87	18
36–50	97	20
51–79	71	14.7
Gender		
Female	389	80.4
Male	95	19.6
Nationality		
Kuwaiti	270	55.8
Non-Kuwaiti	213	44
Residence governorate		
Hawally	230	47.5
Al-Asimah (capital)	97	20
Ahmadi	30	6.2
Farwaniya	47	9.7
Jahra	41	8.5
Mubarak Al-Kabeer	39	8.1
Occupation		
Private sector employee	68	14
Government employee	127	26.2
Business owner	16	3.3
Retired	27	5.6
Unemployed	44	9.1
Student	202	41.7
Highest level of education		
Middle school or less	6	1.2
High school	104	21.5
Diploma	56	11.6
University	271	56
Postgraduate	47	9.7
Transportation		
I have my own transportation method	371	76
I hire a transportation method (Taxi, Uber)	11	2.3
I got driven by family/friend	97	20
Other	5	1
Which best describes your physical state status?		
My health makes it impossible for me to engage in most activities	11	2.3
My health makes it impossible for me to engage in some activities	27	5.6
My health makes it difficult for me to engage in some activities	44	9.1
I am able to go about my daily activities with minimal difficulty	150	31
Fully active without restrictions	252	52.1
Presence of chronic disease		
Yes	135	27.9
No	349	72.1
Type of chronic disease		
Diabetes	18	3.7
HTN	30	6.2
Heart disease	5	1
Asthma	42	8.7
Hypothyroidism	11	2.3
Other	29	6

### Comforts with telehealth use

Participants' responses to statements related to comfort with telehealth technology are presented in Table 2. More than half of the participants (67.8%) were 'somewhat comfortable' to 'extremely comfortable' to discussing diagnosis, treatment

and follow-up recommendations with their HCPs using telehealth. On the other hand, 68% of respondents were 'somewhat comfortable' to 'extremely comfortable' to review imaging and laboratory tests with their HCPs using telehealth. However, 41.5% of respondents were extremely or somewhat

**Table 2** Comfort with telehealth use

Statements	Extremely uncomfortable	Somewhat uncomfortable	Neither comfortable nor uncomfortable	Somewhat comfortable	Extremely comfortable
1. Discussing new symptoms and concerns	14 (2.9%)	69 (14.3%)	67 (13.8%)	179 (37%)	106 (21.9%)
2. Discussing sensitive and personal information	66 (13.6%)	135 (27.9%)	65 (13.4%)	123 (25.4%)	46 (9.5%)
3. Discussing diagnosis, treatment and follow-up recommendations	16 (3.3%)	44 (9.1%)	43 (8.9%)	183 (37%)	149 (30.8%)
4. Review imaging and laboratory tests	20 (4.1%)	46 (9.5%)	40 (8.3%)	178 (36.8%)	151 (31.2%)
5. Undergoing an initial clinic visit with a new provider	35 (7.2%)	101 (20.9%)	96 (19.8%)	137 (28.3%)	66 (13.6%)
6. Undergoing an initial clinic visit with a provider in the presence of my established physician	8 (1.7%)	30 (3.2%)	60 (12.4%)	197 (40.7%)	140 (28.9%)
7. Completing post-operative follow-up	21 (4.3%)	42 (8.7%)	67 (13.8%)	168 (34.8%)	137 (28.3%)
8. I am confident that communications using video calls are private and secure	37 (7.6%)	81 (16.7%)	82 (16.9%)	142 (29.3%)	93 (19.2%)

**Table 3** Comfort score groups

Comfort score	(N)	(%)
Low, 8–18	22	4.5
Moderate, 19–29	199	41.1
High, 30–40	214	44.2

uncomfortable in discussing sensitive and personal information with their HCPs virtually.

Comfort score for each participant was calculated and it was found that more than three-quarters (85.3%) of respondents had a moderate to a high score (Table 3). The median score was 29 (IQR = 25–33).

### Perceived ease of use of telehealth technology

More than half of respondents ( $N = 323$ , 66.8%) strongly agreed or agreed with the statement saying, ‘I am confident that I would be able to connect based on my level of computer experience’.

### Perceived quality of care provided virtually

However, only 114 (23.6%) agreed or strongly agreed with the statement ‘I believe I can get the same quality of care from a video call as from an in-person visit’.

### Multivariate analysis

The multivariate analysis (Table 4) shows that participants with moderate comfort score were four times more likely to accept a virtual call from their HCP compared to those with low comfort score (odds ratio (OR) = 4.148, 95%

CI = 1.444–11.91,  $P = 0.008$ ). Interestingly, participants with high comfort score were 20 times more likely to accept a virtual call from their HCP than those with low comfort score (OR = 20.27, 95% CI = 6.415–64.05,  $P < 0.0001$ ). Moreover, participants who perceived that they would get the same quality of care from a video call to the in-person visit were 2.5 times more likely to accept a virtual call from their HCP than those who disagreed or strongly disagreed (OR = 2.585, 95% CI = 1.364–4.896,  $P < 0.004$ ). Conversely, age, gender, current health status, education, perceived technology ease of use and owning a car did not have a significant effect on the participants likelihood to accept a virtual call from their HCP.

## Discussion

### Main finding of this study

This study investigated perceptions of telehealth among members of the general population in Kuwait and assessed their acceptance, comfort, perceived ease of use and perceived quality of care of health care services provided virtually. Respondents were found to accept health care services provided virtually with high to moderate level of comfort. Moreover, respondents perceived that technology to provide virtual health care services in general easy to use; however, they perceived that they will not receive equal quality of care compared to in-person visit.

### What is already known on this topic

In the present study, as in other studies, respondents showed acceptance to utilize telehealth, which is consistent with Viers *et al.* and Lee *et al.* who showed similar percentage of respondents that were likely going to accept video visits. Although

**Table 4** Acceptance: population willingness to accept a virtual video call from their HCP, ordinal regression model results

Factor	OR	95% CI	Significance
Age			
18–25	0.916	0.393–2.13	0.840
26–35	0.819	0.323–2.074	0.674
36–50	0.616	0.227–1.670	0.342
51–79	Ref		
Education			
High school or less	Ref		
Diploma or higher	0.822	0.829–3.255	0.563
Transportation			
Does not own a car	1.132	0.424–1.593	0.576
Owens a car	Ref		
Comfort score			
Low (8–18)	Ref		
Moderate (19–29)	4.148	1.444–11.91	0.008*
High (30–40)	20.27	6.415–64.05	<0.0001*
Gender			
Male	0.720	0.351–1.475	0.370
Female	Ref		
Which best describes your physical state of health			
1. My health makes it impossible for me to engage in most activities	1.732	0.324–9.249	0.520
2. My health makes it impossible for me to engage in some activities	0.357	0.089–1.425	0.149
3. My health makes it difficult for me to engage in some activities	0.704	0.277–1.786	0.461
4. I am able to go about my daily activities with minimal difficulty	0.907	0.447–1.546	0.560
5. Fully active without restriction	Ref		
Comfort with technology: ease of use			
Strongly agree or agree	1.405	0.579–3.409	0.452
Strongly disagree or disagree	Ref		
Quality of care: I believe I can get the same quality of care from a video call as from an in-person visit			
Strongly agree or agree	2.585	1.364–4.896	0.004*
Strongly disagree or disagree	Ref		

Ref, reference.

\*Statistical significance.

both studies were conducted before COVID-19 pandemic, the pandemic could have had affected respondents' acceptance to telehealth in the present study.<sup>6,17</sup>

The comfort assessment results of this study showed overall moderate to high comfort scores, which is similar to Viers *et al.*<sup>6</sup> Findings from the present study demonstrated that 24.3% of participants were concerned with the privacy and security of video calls, whereas 48.5% of them were confident that communication using video calls was private and secure. This finding was consistent with two studies, which noted perceived privacy as the main concern among patients when using telehealth.<sup>15,17</sup>

Participants showed high confidence in their ability to utilize telehealth. This high percentage may be attributed

to the swift development seen in all aspects of technology through the past few decades.<sup>3</sup> This finding is consistent with Gardner *et al.* who showed that patients with previous experience with video calls believed in their abilities to express their needs using technology.<sup>20</sup> Additionally, technology has been integrated into almost all our daily activities through smartphones, watches, televisions and the list goes on.

Respondents of the present study did not agree that the quality of care provided virtually is similar to that provided in-person. By contrast, three studies showed that the majority of their participants attributed equal or even higher quality of care using virtual methods of health care provision compared to face-to-face visits.<sup>6,13,20</sup> A study by Donelan *et al.*, however, showed that both physicians and patients perceived

no quality difference.<sup>10</sup> The level of perceived quality was affected by previous experience with telehealth as found in Gardner *et al.* in which 62% of those who already engaged in telehealth described its quality of care as equal to that of in-person visits.<sup>20</sup> On the contrary, only 34% of those without previous experience perceived equal quality of care.<sup>20</sup> Perceived quality of care using telehealth was a key driver of acceptance as in multiple high-quality studies.<sup>6,10,13,20</sup>

In the present study, participants' acceptance of telehealth was mainly driven by comfort with telemedicine and perceived quality of care. Previous studies have found that acceptance of telehealth depends on multiple factors, such as sociodemographic characteristics, comfort with technology, perceived quality of care and confidence in the capability of using technology.<sup>13,20</sup> Like studies conducted by Viers *et al.* and Mammen *et al.*, the previous factors were found to be correlated with telehealth acceptance in this study, with comfort having the highest OR, followed by the perceived quality of care.<sup>6,13</sup> On the other hand, no correlation was seen between the level of acceptance and sociodemographic characteristics of the current study as opposed to the studies conducted by Viers *et al.* and Gardner *et al.*, where they found an increased comfort score with increased age.<sup>6,20</sup>

Our study showed no effect of age on neither comfort nor acceptance of telemedicine. This might be because almost half of participants were between 18 and 25 years old, making differences between age groups less evident. Nevertheless, one study showed that telehealth acceptance of participants with a baseline high comfort score increases with increased age.<sup>20</sup> By evaluating the correlation between acceptance and comfort score in our results, 96.8% of those likely to accept VV had a moderate to high comfort score as expected.

Unlike Holtz and Lee *et al.*, this study showed no association between technology perceived ease of use and telehealth acceptance.<sup>14,17</sup> This could be attributed to the fact that almost all our participants were young with a median age of 26, who tend to use internet-connected devices or video calls in their daily life activities, such as e-learning and socializing platforms. However, a study stated that those who experienced telehealth before had different reasons to accept such technology from new users.<sup>14</sup> Additionally, another study suggested that, by providing a good experience with telehealth, we can enhance acceptance.<sup>17</sup> The accordance of telehealth acceptance between those with or without a chronic disease in our study may be due to the increasing demands on the health care systems to provide new innovative methods of health care provision to all patients.<sup>5</sup>

Perceived quality of care was found to be related to overall telehealth acceptance, which is consistent with Holtz.<sup>14</sup> Although the correlation between perceived quality of care

and telehealth acceptance was significant, those who perceived quality to be equal to conventional methods were only 23.6%. In another study, the perceived quality of care was much greater, where 95.5% of participants perceived equal or greater quality with telehealth.<sup>13</sup> Similarly, two studies noted that almost 62% of patients perceived equal quality of care.<sup>10,20</sup>

### What this study adds

Our study results gave an insight of the acceptance readability of the general population in Kuwait to participate in virtual health care visits, paving the way to start designing a virtual health care framework to be incorporated into daily practice. Nevertheless, assessment of perceptions of telehealth quality of provided care, comfort and perceived ease of use forms the foundation to carry out further studies about perceived barriers. Additionally, by knowing what concerns users from the general population, it will be easier to account for their needs in the developed telehealth system, like maintained confidentiality or privacy, accessibility and high-quality care.

### Limitations of this study

This study has some limitations. Using self-reported online survey adds selection bias to the results. Those who are not familiar with or have not used virtual health care services may not have responded to the survey. However, the global COVID-19 outbreak and the mandatory public lockdown in Kuwait hindered face-to-face survey distribution. Another limitation was the lack of a general population electoral roll impaired our ability to distribute the questionnaire randomly and may have resulted in a non-representative sample. Future research may address these limitations by including underserved populations and those with less familiarity with the internet for better generalizability of results. To reduce response bias, interviews with patients may be used as opposed to online surveys.

### Conclusion

Telehealth is envisioned as acceptable, easy-to-use and comfortable method of health care delivery, which could be a convenient alternative to conventional methods of providing care. Noteworthy, high quality of care and confidentiality as well as ensured privacy are important factors to consider when providing telehealth for the population in Kuwait.

### Authors' contributions

All authors of the paper have contributed to the final manuscript. Conceptualization was by AA-H, IA and SW;

methodology was by AA-H, IA, RA and SW; formal analysis was performed by SW, RA and IA; writing—original draft preparation was by RA; writing review and editing was by AA-H, SW and IA; supervision was by AA-H and SW. All authors have read and agreed to the published version of the manuscript.

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## Declarations

### Ethics approval and consent to participate

Ethical approval for this study was obtained by the Ministry of Health Research Ethical Committee, Kuwait (MoH/REC/1385). Confidentiality was assured and participants provided informed consent to participate in the study before starting the online questionnaire. All methods were performed in accordance with the relevant guidelines and regulations.

### Availability of data and materials

The datasets analyzed during the current study are available from the corresponding author on reasonable request.

## Disclosure statement

The authors declare that they have no competing interests.

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