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Research Article

Knowledge , Attitude and Practice of Telemedicine Among Primary Health Care Physicians Working in Public Health Care Centres in Kuwait During COVID-19 Pandemic

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Abstract

Introduction: Telemedicine is the delivery of health care and the exchange of medical information across distances through electronic communications. Telemedicine includes the usage of technology and software to communicate with patients without direct contact, which can be given through secure videos, audios, or chats. In this research, we studied the experience of physicians in the provision of telemedicine services in Kuwait during the COVID-19 pandemic focusing on knowledge , practice, and attitude towards telemedicine.

Aim: The aim of our study is to highlight telemedicine practice among the primary health care physicians in Kuwait in order to provide authorities with data to help them facilitate provision of this service to the public.

Setting: Primary Health Care Doctors working in Public Health Care Centres in Kuwait during COVID-19 Pandemic.

Study Design: A Cross Sectional Study was conducted among 164 primary health care doctors working in public health care centres in Kuwait.

Methods and Materials: A representative sample of doctors were selected randomly from different health care centres distributed throughout the governorates of Kuwait. A sample of 400 doctors was collected, and a self-administered questionnaire was provided to however only 164 of them responded .Data collection was done through using SPSS and Microsoft Excel.

Results: Most of the respondents (39.6%) were 40-54 years ; gender distribution was almost equal. Only 31.1% (51) have demonstrated previous knowledge of telemedicine , a total of 22.7 % (37) have practiced telemedicine. Attitude towards telemedicine had a mean of 3.2 which showed that most responses were neutral.

Conclusion: Response rate in this study was limited, however some of the doctors have had practiced telemedicine, had good knowledge and attitude towards telemedicine. This study exhibits the importance of implication of a policy conducted by the Ministry Of Health of Kuwait regarding the use of telemedicine by doctors professionally.

Introduction

Telemedicine is the delivery of health care and the exchange of medical information across distances through electronic communications [1]. Much of the telemedicine that is now practised is in industrialized countries, such as the United States of America, but there is an expanding interest in the practice of telemedicine in developing countries. Telemedicine includes the usage of technology and software to communicate with patients without direct contact, which can be given through secure videos, audios, or chats. With telemedicine, doctors would determine if hospitalizations were necessary or if the condition can be managed at home [2].

In primary care, telemedicine includes phone calls, where the patient looks for the doctor's recommendation concerning non-crisis clinical issues, which does not need direct contact [3]. It is of great value in the follow-up of patients with chronic diseases such as high cholesterol, diabetes, or hypertension. Although it does not replace face-to-face consultation when needed but complements it however it is useful in certain circumstances where patients are required to practice physical distancing or if patients cannot attend in person [4]. Recording measurements like body weight, blood pressure, blood sugar and sending them to the doctor, having a virtual visit with the doctor, checking test results, prescriptions, schedule appointments, monitoring older adults at home can also be achieved by using telemedicine [5].

Telemedicine has many advantages, involving that it is more convenient, provides better care for people with mobility limitations or if they do not have access to local doctor or clinic, time saving, less expenses, more privacy, better patient follow-up, less missed & cancelled appointments [5]. During a telemedicine consultation, patients discuss about their condition, ask questions in turn, the healthcare specialist can ask questions directly. Other advantages include eliminating risk of transmitting infectious diseases between patients and healthcare professionals, monitoring patients through technology, therefore reducing outpatient visits. Furthermore, the homebound patients and other patients can seek medical help without moving to the clinic through ambulance or by in person visits [4,6,7].



Disadvantages include the overall cost of telecommunication system, telemedicine decreases interaction between the healthcare professionals and patients, increasing the risk of errors in clinical services, causes leakage of confidential medical information through faulty electronic system. Additionally, telemedicine might take longer time for the difficulties in connecting virtual communication due to low internet speed or server issues, this system cannot deliver immediate treatment. Telemedicine system requires tough legal regulations to prevent unauthorized and illegal service providers in this sector [4,6,7].

The first Covid-19 case was detected in Kuwait on 24 of February 2020. Till now, more than a year later, there are more than 521,341 diagnosed cases, 48,935 total active cases, 469,916 have recovered and 2,490 deaths. However, recently the status of Covid-19 has not been settled yet and the number of the new cases are increasing [8].

The Ministry of Health with the help of the Kuwaiti government has taken various responses to minimise the impact of this virus. First, commercial flights were suspended, schools and entertainment facilities were closed, and employees were advised to work from home. It was the collaboration of the Ministry of Health of Kuwait, Central Agency for Information Technology, and Zain Telecommunication Company that accomplished «Shlonik» app for tracking those who came from traveling abroad during quarantine and for tracking and monitoring COVID-19 patients during quarantine. In the beginning of this crisis, Kuwait announced a partial curfew to prevent the spread of the virus; followed by a complete lockdown in May 2020 [8].

Telemedicine pertains to the use of technology in providing certain healthcare services. It was originally created to treat patients who were situated in remote places, far from local healthcare providers or medical professionals. While telemedicine is still being used to address these problems, it is increasingly becoming an effective setup for the “new normal” [9].

Telehealth can mobilize all aspects of healthcare potentials to decrease transmission of disease, conduct people to the right level of health care, ensure safety for providers, protect patients, clinicians, and the community from exposure to infection, and diminish the burden on the healthcare providers and health system. These methods have the potential to reduce morbidity and mortality during pandemic. To provide continued access to necessary health services, tele-health should be a key weapon in the fight against the COVID-19 outbreak [10].

In this research, we studied the experience of physicians in the provision of telemedicine services in Kuwait during the COVID-19 pandemic.

Literature Review

In a time of restricted movement and social distancing, caring for patients can pose several challenges. The ongoing global crisis of SARS CoV-2 viral infection (COVID-19 pandemic) had forced healthcare institutions to turn to alternative ways of providing care while limiting exposure to the virus. In Bahrain, the COVID-19 pandemic has highlighted how telemedicine can aid in limiting exposure of the virus while lowering the possibility of spreading the disease. The e-government application «Sehati» provides several health services to the public. Apart from minimizing the risks for both parties, this arrangement offers an opportunity for healthcare providers to maximize their workforce. Digital health proves to be an adequate solution in this situation by bridging the gap between physicians, healthcare providers and the people [11].

Interestingly, telemedicine was significantly available in both the private and the public Kuwaiti health sectors without a legislation from Ministry of Health. One of the hospitals that used telemedicine was Al-Amiri Hospital a public hospital that supports patients through delivering medications, medical equipment, nutritional supplements, and replying to patient's inquiries including online consultations through booking appointments. [12] Other public and private hospitals also used their own websites, the Ministry of health website [8] using Zoom App or WhatsApp for replying and following up patients' conditions. Moreover, the authorities established a vaccination centre and designed a website to book for the vaccine for COVID-19.

A study done in Kuwait in October of 2017 about the knowledge, attitude, and practice of E-health among health care providers in Kuwait showed that health care worker's knowledge and practice was less than expected. Hence, the authors suggested that more resources should be directed to elevate healthcare workers' knowledge and to motivate them to practice e-health using the available tools [13].

A retrospective study from Vergata Hospital in Rome, Italy aimed to assess the widespread use of telemedicine in terms of feasibility and safety during COVID-19 pandemic between March 8 to May 31, 2020. This emergency of the pandemic enforced healthcare workers and doctors to provide medical services through telemedicine, changing how patients were regularly treated. It was also mentioned in the study that during the pandemic telemedicine was already in place, but health care workers did not practice it, yet it became important to meet patients' needs [14].

During COVID-19 pandemic Chinese hospitals responded to the emergency by creating new regulations for hospital management, redesigning the physical layout of outpatient services, and setting up specific areas for inpatient services for confirmed or suspected cases. They utilized mobile apps, websites, and on January 27, 2020, Guangdong Provincial People's Hospital welcomed 2 new robotic employees to help deliver medicines throughout the hospital. This article from the Journal of the American Medical Informatics Association aimed to investigate the role of Information Technology in helping hospitals respond to the pandemic [15].

A study was done in Iran University of Medical Sciences on the willingness of a group of physicians to accept telemedicine. As a result, the authors recommended increasing the capabilities of physicians through strengthening their abilities when working with information and communication through technology as this would facilitate their acceptance towards telemedicine [16].

Another study about the knowledge and attitude of physicians toward telemedicine in Ethiopia showed that only 37.6% demonstrated good knowledge of telemedicine, however, most had good attitude toward telemedicine [17]. A study about the overview of the current state of telemedicine regulations worldwide showed that telemedicine is allowed in Kuwait and is offered by private medical centres through videoconferencing and teleconferencing. It also showed that there are no specific privacy laws that apply to the provision of telemedicine, but all client's data must be retained privately and confidentially [18].

Another study was done on the status and trends of e-Health tools and applications in Kuwait. As a result, the authors suggested making an e-health policy framework to address factors affecting Kuwaiti's health, and it should be based on evidence and needs to incorporate a combined approach linking disease prevention, treatment and promoting public health [19].

Since the beginning of the COVID-19 pandemic, several healthcare services programs aiming to provide telemedicine services have been introduced in Libya, and physicians' awareness, knowledge, attitude, and skills of telemedicine was studied. The awareness and skill levels of the respondents were found to be 56% and 36.8%, respectively, while the knowledge and attitude levels were found to be 86.5% and 82.6%, respectively [20].

On March 9, 2021, an article was published from King Saud University, Saudi Arabia to assess knowledge, attitude, and perceptions of health care personnel toward telemedicine robotic remote presence technology, at the intensive care units. The findings showed overall positive attitude, but the knowledge was limited. However, concerns about patient privacy and confidentiality were raised. Other barriers include lack of training, insufficient knowledge regarding telemedicine and robotic systems' applications [21].

Aim:

The aim of our study is to highlight telemedicine practice among the primary health care physicians in Kuwait in order to provide authorities with data to help them facilitate provision of this service to the public.

Objectives:

- To assess the perceptions, attitude, and practice of telemedicine services among primary health care physicians practicing in the Public Sector in Kuwait during COVID-19 pandemic.
- To relate the above variables to different sociodemographic characteristics within this group of physicians.

Materials and Methods

Type of Study

A cross-sectional study

Study Population

Primary health care physicians working in Public Health Care centres in Kuwait.

There are six governorates in Kuwait: Al Asimah, Al Jahra, Hawally, Farwaniya, and AL-Ahmadi. In addition, there are Health Centres in all these governorates.

Inclusion Criteria

Physicians of both genders and all nationalities working in general primary healthcare clinics in public Health Centres in Kuwait during covid-19 pandemic.

Exclusion Criteria

Physicians who are newly appointed and have been working for less than 3 months. Dentists, diabetologists and physicians working in maternity clinics.

Study Sample:

Sample Size

The sample size was calculated using the following formula:

$$n = \frac{Z^2 \left(\frac{a}{2}\right) \times \hat{p}(1 - \hat{p})}{E^2}$$

a=Significance level=0.05 a/2 =0.025, 1-a/2 = 0.975, Z (0.975) = 1.96

p̂=Sample proportion=50%=0.50

n=Sample size

E=Margin of error =0.05

$$n = \frac{(1.96)^2 \times 0.50 \times (1 - 0.50)}{(0.05)^2} = 384.16 \approx 384$$

It was decided to include 400 physicians in the sample

Sampling Technique

A proportionate number of physicians from each governorate (Table 1) was calculated according to the following formula

Number of Physicians included from each governorate=Proportion of Physicians working in the governorate multiplied by 400 and divided by 100

A representative sample of health centres was selected randomly from each governorate till the number of physicians needed in that governorate was reached and all primary health care physicians working in the selected centres were included in the study.

Table 1: Distribution of Primary Health Care Physicians among all Governorates in Kuwait.

Governorates of Kuwait	No. OF HEALTH centers per Governorate	No. of PHC Physicians working in HC per Governorate	No. of PHC Physicians per Governorate (%)	Number of PHC Physicians included per Governorate
ALAsimah	26	192	23.6%×4	94
Hawally	18	171	20.8%×4	83
ALFarwaniya	21	153	18.6%×4	74
ALAhmadi	28	184	22.4%×4	90
ALJahra	14	122	14.8%×4	59
Total	107	822	100%×4	400

Study Instruments and Data Collection

The study instrument is a self-administered questionnaire. It consists of:

- Independent qualitative variables: gender, nationality, language spoken, work position, certification, and marital status.
- Dependent variables: attitude and perception towards telemedicine and practice of telemedicine.
- Quantitative variables: age and years of experience.
- The questionnaire was constructed and piloted by the researchers to check its validity, clarity, and suitability. The questionnaire was then distributed by WhatsApp to all physicians under study using a Google form.
- The distribution of the questionnaire and the data collection was done during the period of June-August 2021.
- Attitude and perception were assessed on a Likert scale from 1-5, 'from strongly disagree to strongly agree.'
- Practice was assessed by "yes or no" and various facilities of telemedicine services that were available for use.

Ethical Consideration

Participants were briefed about the purpose of the study, and they were assured of confidentiality of their responses and that all data was dealt with in an anonymous matter and was used for research purposes only. Participants were informed that their participation in the study is voluntary and that they may refuse to participate or withdraw from the study, at any time, without penalty or loss of benefits to which they are otherwise entitled. An approval was obtained from the Research and Ethics Committee of College of Medicine and Medical Sciences at the Arabian Gulf University. An ethical approval was obtained from the Ministry of Health in Kuwait through the Permanent Committee for Coordination of Medical and Health Research.

Statistical Analysis

Data was calculated and analysed using statistical package for the social sciences (SPSS) and Microsoft Excel.

Scores for Attitude and perception were evaluated as follows:

1=Strongly Disagree	2=Disagree	3=Neutral	4=Agree	5=Strongly Agree
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Responses to the different attitude and perception items were categorized as per the above scale and related to the sociodemographic characteristics of the physicians. The Chi-square test was used to determine whether two categorical variables are related or not or the distribution is related to chance were a P-value of less than 0.05 indicates that there is a significant relationship between variables.

Scores for Practice were evaluated as follows:

Yes	1
No	0

Results

This study was done on Primary Health Care doctors working in Public Health care centres in Kuwait. The questionnaire was distributed to 400 doctors, however only 164 responded to the questionnaire. The age group of the respondents ranged from 25 to 72 years among whom slightly over a third (39.6%) were aged between 40 and 54 years. Among the 164 respondents, the gender distribution rate was proportional, wherein 50.6 % of them were males. As for the marital status, 90.9% of them were married. Regarding the nationality, it was found that a significant majority (69.5%) of the participants were non-Kuwaiti doctors. Regarding their language proficiency nearly one - third (31.7%) of them were fluent in English, while 61.7% scored excellent in Arabic and the remaining stated they scored poorly in both Arabic and English. In response to their professional qualifications, thirty- nine percent of the total participants graduated from medical school 15-29 years ago. Concerning the years of experience in primary health care centres, 36%



of the participants had less than 10 years of experience and only 39% of the participants were certified as family physicians (Table 2).

Table 2: Sociodemographic characteristics of primary health care Physicians working in public health care centers in Kuwait, Aug 2021 (Total =164).

Characteristics	n (%)
Age	
25-39 years	57 (34.8)
40-54 years	65 (39.6)
≥55 years	42 (25.6)
Gender	
Male	83 (50.6)
Female	81 (49.4)
Nationality	
Kuwaiti	50 (30.5)
Non-Kuwaiti	114 (69.5)
Marital status	
Single	13 (7.9)
Married	149 (90.9)
Divorced	2 (1.2)
Fluency of English language	
Very poor	3 (1.8)
Poor	2 (1.2)
Average	30 (18.3)
Good	77 (47)
Excellent	52 (31.7)
Fluency of Arabic language	
Very poor	1 (0.6)
Poor	2 (1.2)
Average	18 (11)
Good	33 (20.1)
Excellent	110 (67.1)
Years since graduation from medical school	
<15 years	54 (32.9)
15-29 years	64 (39)
≥30 years	46 (28)
Years of experience in the primary health care centers	
<10 years	59 (36)
10-19 years	52 (31.7)
≥20 years	53 (32.3)
Certified as family physician	
Yes	64 (39)
No	100 (61)

Regarding the knowledge of primary health care doctors in Kuwait, out of 164 only 51 (31.1%) have had previous knowledge about telemedicine. Interestingly, responses of participants about practicing telemedicine shows that 22.7% (37) of them have practiced telemedicine either professionally or unprofessionally. When it comes to practicing telemedicine only 19 (48.6%) of participants have practiced it for more than 12 months while 18 (51%) have practiced less than the latter. It seems that most of the participants used telemedicine for prevention and health education accounting for 48.6 (18) of the total participants, 29.7% (11) of the participants used telemedicine for non-communicable diseases; and only 21.6% (8) of them used telemedicine for acute diseases. Smartphone apps were used by 18 participants which represents (48.6%) and considered as most used facility among those who practiced telemedicine.

The internet-based facilities were mainly used by the participants. It can be seen from the data, that participants have practiced telemedicine, 27 (73%) are interested to continue and willing to use telemedicine services in their practice system after covid-19 pandemic (Table 3).

Table 3: Knowledge and practice of telemedicine among primary health care Physicians working in public health care centers in Kuwait, Aug 2021 (Total = 164).

	n (%)
Previous knowledge about telemedicine	
Yes	51 (31.1)
No	88 (53.7)
Do not know	25 (15.2)
Practice of telemedicine	
Yes, professionally	3 (1.8)
Yes, unprofessionally	34 (20.7)
No	127 (77.4)
Months of practicing telemedicine	
<12 months	18 (48.6)
≥12 months	19 (51.4)
Usage of telemedicine in several types of diseases	
Non-Communicable Diseases	11 (29.7)
Acute diseases	8 (21.6)
Prevention and health education	18 (48.6)
The facilities that were available for usage	
Video conferencing	12 (32.4)
Wireless technologies	8 (21.6)
Data monitoring	6 (16.2)
Internet-based technologies	13 (35.1)
Smartphone apps	18 (48.6)
Interactive voice response technology	8 (21.6)
Audio conferencing	11 (29.7)
Fax	1 (2.7)
Others	11 (29.7)
Interested to continue to use the telemedicine services in the practice system after covid-19 pandemic	
Yes	27 (73)
No	10 (27)



The mean attitude score (3.2±0.4) was computed by finding the mean of scores of the 28 items for every participant after reversing the scores of the negative item (1=5, 2=4, 3=3, 4=2, 5=1). Then, we found the mean attitude score of all participants by adding the mean scores of all participants and divided by the total number of participants. Each item score ranges from 1-5. Therefore, the mean of scores also ranges from 1 to 5. Lower score means more negative attitude and higher score means more positive attitude. According to our scoring, 1 means strongly disagree, 2 means disagree, 3 means neither disagree nor agree, 4 means agree, 5 means strongly agree. Upon that, the mean attitude score of 3.2 means that the participants in our study neither disagreed nor agreed with the telemedicine (Table 4).

Table 4: Attitude of primary health care primary Physicians working in public health care centers in Kuwait towards Telemedicine, Aug 2021 (Total = 164).

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
	n (%)	n (%)	n (%)	n (%)	n (%)
Telemedicine is beneficial.	3 (1.8)	9 (5.5)	63 (38.4)	80 (48.8)	9 (5.5)
Telemedicine is not appropriate for practicing medicine.	7 (4.3)	55 (33.5)	74 (45.1)	24 (14.6)	4 (2.4)
Telemedicine practice is widely accepted	2 (1.2)	25 (15.2)	79 (48.2)	57 (34.8)	1 (0.6)
I feel competent in using telemedicine.	4 (2.4)	26 (15.9)	90 (54.9)	39 (23.8)	5 (3)
I feel myself working easily in computer technologies.	1 (0.6)	13 (7.9)	39 (23.8)	95 (57.9)	16 (9.8)
Telemedicine does not replace face-to-face consultations when needed but complements it.	1 (0.6)	2 (1.2)	25 (15.2)	100 (61)	36 (22)
Telemedicine is time saving.	4 (2.4)	13 (7.9)	35 (21.3)	97 (59.1)	15 (9.1)
Telemedicine has a benefit of being less expensive than traditional face-to-face consultations.	2 (1.2)	12 (7.3)	45 (27.4)	93 (56.7)	12 (7.3)
Telemedicine allows more privacy to patients.	2 (1.2)	22 (13.4)	53 (32.3)	81 (49.4)	6 (3.7)
Telemedicine allows better patient follow up.	5 (3)	42 (25.6)	47 (28.7)	63 (38.4)	7 (4.3)
Telemedicine allows less missed and cancelled appointments.	3 (1.8)	15 (9.1)	29 (17.7)	106 (64.6)	11 (6.7)
Telemedicine prevents the transmission of infectious diseases between patients and healthcare professional.	1 (0.6)	3 (1.8)	14 (8.5)	91 (55.5)	55 (33.5)
Telemedicine has facilitated monitoring through technology, which will reduce outpatient visits.	0 (0)	7 (4.3)	32 (19.5)	106 (64.6)	19 (11.6)
Telemedicine can be applied to deliver emergency healthcare in many rural communities or post-disaster situations.	3 (1.8)	18 (11)	41 (25)	92 (56.1)	10 (6.1)
Telemedicine increases access to healthcare.	0 (0)	18 (11)	38 (23.2)	94 (57.3)	14 (8.5)
Taking into consideration the COVID-19 pandemic, telemedicine is useful during hard times like this.	2 (1.2)	3 (1.8)	12 (7.3)	94 (57.3)	53 (32.3)
Telemedicine compromises the doctor-patient relationship.	1 (0.6)	34 (20.7)	76 (46.3)	45 (27.4)	8 (4.9)
Telemedicine decreases interaction among healthcare professionals and patients.	1 (0.6)	30 (18.3)	40 (24.4)	84 (51.2)	9 (5.5)
Telemedicine increases the risk of errors in clinical services.	1 (0.6)	23 (14)	52 (31.7)	80 (48.8)	8 (4.9)
Confidential medical information can be leaked through faulty electronic system.	2 (1.2)	23 (14)	49 (29.9)	82 (50)	8 (4.9)
Telemedicine might take a longer time for the difficulties in connecting virtual communication due to low internet speed or server problem.	0 (0)	7 (4.3)	33 (20.1)	112 (68.3)	12 (7.3)
Telemedicine system cannot deliver immediate treatment, nor high quality follow up.	2 (1.2)	23 (14)	48 (29.3)	85 (51.8)	6 (3.7)
Telemedicine compromises the quality of care.	0 (0)	40 (24.4)	57 (34.8)	63 (38.4)	4 (2.4)
Telemedicine permitted early diagnosis of Non-Communicable Diseases (NCDs).	1 (0.6)	31 (18.9)	61 (37.2)	70 (42.7)	1 (0.6)
Telemedicine ensures better compliance to treatment plans by NCDs patients.	1 (0.6)	22 (13.4)	73 (44.5)	64 (39)	4 (2.4)
Telemedicine reduces the risk of complications for NCDs patients.	1 (0.6)	31 (18.9)	65 (39.6)	62 (37.8)	5 (3)
I am satisfied about the practice of Telemedicine for NCDs patients.	3 (1.8)	23 (14)	76 (46.3)	56 (34.1)	6 (3.7)
I recommend the use of Telemedicine in the future after covid-19 pandemic era.	2 (1.2)	18 (11)	51 (31.1)	72 (43.9)	21 (12.8)

Note: The mean attitude score is 3.2 ± 0.4.

Sociodemographic characteristics of this group of physicians in association with the knowledge of telemedicine revealed that those in the age group 25-39 years (42.1%) had better knowledge compared to the older aged physicians 40-54 years (29.2%) and ≥55 years indicating significant difference between these variables with a P-value of (0.046). Significant difference (0.046) was noticed between nationality and knowledge among this group of physicians. P-value of (0.012) indicates that physicians that graduated less than 15 years ago (46.3%) had better knowledge in comparison to those that graduated more than 15 years ago from medical school. Significant relationship was not noticed between knowledge and other sociodemographic characteristics and between practice and sociodemographic characteristics (Table 5).

Table 5: Association between sociodemographic characteristics of primary health care Physicians working in public health care centers in Kuwait and their knowledge and practice about telemedicine, Aug 2021.

	Knowledge		P-value	Practice		P-value
	Yes	No		Yes	No	
	n (%)	n (%)		n (%)	n (%)	
Age						
25-39 years	24 (42.1)	33 (57.9)	0.046	17 (29.8)	40 (70.2)	0.267
40-54 years	19 (29.2)	46 (70.8)		12 (18.5)	53 (81.5)	
≥55 years	8 (19)	34 (81)		8 (19)	34 (81)	
Gender						
Male	23 (27.7)	60 (72.3)	0.343	15 (18.1)	68 (81.9)	0.164
Female	28 (34.6)	53 (65.4)		22 (27.2)	59 (72.8)	
Nationality						
Kuwaiti	21 (42)	29 (58)	0.046	16 (32)	34 (68)	0.055
Non-Kuwaiti	30 (26.3)	84 (73.7)		21 (18.4)	93 (81.6)	
Marital status						
Married	45 (30.2)	104 (69.8)	0.559	32 (21.5)	117 (78.5)	0.332
Unmarried	6 (40)	9 (60)		5 (33.3)	10 (66.7)	
Fluency of English language						
Average or below	6 (17.1)	29 (82.9)	0.132	4 (11.4)	31 (88.6)	0.176
Good	27 (35.1)	50 (64.9)		21 (27.3)	56 (72.7)	
Excellent	18 (34.6)	34 (65.4)		12 (23.1)	40 (76.9)	
Fluency of Arabic language						
Average or below	9 (42.9)	12 (57.1)	0.44	8 (38.1)	13 (61.9)	0.18
Good	9 (27.3)	24 (72.7)		6 (18.2)	27 (81.8)	
Excellent	33 (30)	77 (70)		23 (20.9)	87 (79.1)	
Years since graduation from medical school						
<15 years	25 (46.3)	29 (53.7)	0.012	16 (29.6)	38 (70.4)	0.315
15-29 years	16 (25)	48 (75)		12 (18.8)	52 (81.3)	
≥30 years	10 (21.7)	36 (78.3)		9 (19.6)	37 (80.4)	
Years of experience in the primary health care centers						
<10 years	18 (30.5)	41 (69.5)	0.058	15 (25.4)	44 (74.6)	0.705
10-19 years	22 (42.3)	30 (57.7)		12 (23.1)	40 (76.9)	
≥20 years	11 (20.8)	42 (79.2)		10 (18.9)	43 (81.1)	
Certified as a family physician						
Yes	21 (32.8)	43 (67.2)	0.704	18 (28.1)	46 (71.9)	0.173
No	30 (30)	70 (70)		19 (19)	81 (81)	

The mean attitude score of the primary health care doctors was investigated in relation to their sociodemographic characteristics. In other words, it studied whether there was a significant difference in mean attitude score between the different groups of doctors according to sociodemographic characteristics. The mean attitude score took the values from 1 to 5 which originally came from the 5-points Likert scale used in the 28 attitude items in the questionnaire. 1 means the lowest positive attitude and 5 means the highest positive attitude towards telemedicine. Looking at all the means scores in the table, we found that they range from 3.2 to 3.4, i.e. approximately 3, and this indicated that the attitude of all doctors' groups was neutral towards telemedicine, because 3 in the used Likert scale means neutral. Results showed that there were no significant differences in mean attitude scores between groups of doctors according to sociodemographic characteristics (p-values were greater than 0.05) except marital status and practicing telemedicine (p-values were less than 0.05). The married doctors significantly scored lower mean (3.2 ± 0.4) than the unmarried doctors (3.4 ± 0.3), and this revealed that unmarried doctors had more positive attitude towards telemedicine than married doctors. Moreover, doctors who practiced telemedicine significantly scored higher mean (3.4 ± 0.4) than doctors who did not practice telemedicine (3.2 ± 0.4), and this revealed that the doctors who practiced telemedicine had more positive attitude towards telemedicine than the doctors who did not practice telemedicine (Table 6).

Table 5: Association between sociodemographic characteristics of primary health care doctors and their attitude towards telemedicine.

	Attitude score ¹	P-value
	Mean ± SD	
Age		
25-39 years	3.2 ± 0.4	0.425
40-54 years	3.3 ± 0.4	
≥55 years	3.2 ± 0.3	
Gender		
Male	3.2 ± 0.4	0.06
Female	3.3 ± 0.4	
Nationality		
Kuwaiti	3.3 ± 0.4	0.187
Non-Kuwaiti	3.2 ± 0.4	
Marital status		
Married	3.2 ± 0.4	0.049
Unmarried	3.4 ± 0.3	
Fluency of English language		
Average or below	3.2 ± 0.4	0.46
Good	3.3 ± 0.4	
Excellent	3.2 ± 0.4	
Fluency of Arabic language		
Average or below	3.3 ± 0.4	0.056
Good	3.4 ± 0.4	
Excellent	3.2 ± 0.4	
Years since graduation from medical school		
<15 years	3.3 ± 0.3	0.553
15-29 years	3.2 ± 0.5	
≥30 years	3.2 ± 0.4	
Years of experience in the primary health care centers		
<10 years	3.2 ± 0.3	0.851
10-19 years	3.2 ± 0.5	
≥20 years	3.2 ± 0.4	
Certified as a family physician		
Yes	3.2 ± 0.4	0.543
No	3.2 ± 0.4	
Practice about telemedicine		
Yes	3.4 ± 0.4	0.014
No	3.2 ± 0.4	

¹Attitude score was computed by finding the mean of scores of the 28 attitude items after reversing the scores of the negative items (1=5, 2=4, 3=3, 4=2, and 5=1). Each item score ranges from 1 to 5. Therefore, the mean of scores also ranges from 1 to 5. Lower score means more negative attitude and higher score means more positive attitude.

Discussion

Telemedicine is the distribution of health-related services and information via electronic information and technologies [1]. The COVID-19 pandemic pointed out the importance of telemedicine especially in certain circumstances where patients are required to practice physical distancing consequently reducing the risk of transmission. Furthermore, telemedicine has an added advantage of being more convenient, provides better care for people with mobility limitations or if they do not have access to local doctor and better patient follow-up [5]. In Kuwait October 2017, a study was conducted about the knowledge, attitude, and practice of E-health among health care providers in Kuwait conveyed that health care worker’s knowledge and practice was less than expected. [13].

The present study was conducted to provide an overview of primary health care physicians’ perception, attitude, and practice of telemedicine during COVID-19. The total population of the physicians were 400 and the respondents were 164. Attitude of primary healthcare doctors was tested with a neutral attitude towards telemedicine with an attitude score or mean of (3.2), while comparing it with a study conducted in Ethiopia, about knowledge and attitude of health professional towards telemedicine, had a good attitude towards telemedicine with a “relative advantage” mean of 4.1, “compatibility” mean of 3.4, and “trialability” mean of 3.8, and poor attitude regarding the complexity and observability of telemedicine (2.4 and 2.3 ,respectively) [16].

In this study, primary health care physicians’ knowledge was tested were 31.1% of the participants had good knowledge of telemedicine, 42.1% of them were in the age group of 25-39. Comparatively study conducted in Ethiopia about knowledge and attitude of health professionals towards telemedicine had a total of 37.6% of its participants with good knowledge about telemedicine, and 65.2% were in age group 20-29 however this indicates that knowledge of telemedicine is common in middle aged groups in Kuwait and Ethiopia [16]. Eighty-six point five percent of the participants of a study performed in Libya had good knowledge about telemedicine [19].

The major limitation of this study was the low response rate, the calculated sample size was approximately a total of 400 primary health care physicians however the total respondents were only 164 physicians. Moreover, as per inclusion criteria only Primary Health Care Doctors working in Public Health Care Centres were included in this study, it would have been advantageous if physicians working in the private sector were also included for better response rate. Nevertheless there was good knowledge and attitude of telemedicine among primary health care physicians that practiced it. This emphasizes that doctors are willing to use telemedicine not only during COVID-19 pandemic but also in the future. However, a policy, guidelines and adequate training should be provided by the Ministry Of Health of Kuwait for primary health care physicians to promote the usage and application of telemedicine efficiently.

Conclusion and Recommendation

Telemedicine could improve health care system in Kuwait coinciding with network evolution throughout the world. This study exhibits the importance of implication of a policy conducted by the Ministry Of Health of Kuwait regarding the use of telemedicine by doctors professionally during and after COVID-19.

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