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# Patients and providers satisfaction with telemedicine in Riyadh

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**Abstract**
**Background:** Patients' and physicians' satisfaction toward the healthcare system could be considered as a good indicator for measuring the quality of the health services itself. The level of satisfaction of general population toward any aspect related to medical practice could be obtained throughout using surveys. One of the factors that increase the need for telemedicine is the occurrence of COVID-19 pandemic however, telemedicine did not be tested before during disaster settings. Therefore, the aim of this study is to assess the satisfaction level of patients and physicians toward using of telemedicine in Al Riyadh region, Saudi Arabia.
**Methodology:** This is cross-sectional study that was conducted among general population and physicians in Al-Riyadh region, Saudi Arabia. The study depended on online self-reported questionnaire which include parts of previous studies. The questionnaire includes three parts: demographic factors of participants, assessment of patients' satisfaction toward telemedicine and assessment of physician's satisfaction toward telemedicine. Data analysis will be performed using SPSS version 26.
**Results:** In this study, we were able to collect 408 responses for our questionnaire, where 218 of them were patients (53.5%) and 190 were physicians (46.5%). Among physicians, 75.3% of them were aged between 26-35 years old while 70.5% of patients were in the same age interval. Among physicians, 43.9% of the physicians were satisfied with experience with telemedicine while 22.4% were dissatisfied and 4.9% were very dissatisfied with experience. Moreover, 50.8% of patients were satisfied with their experience with telemedicine and 28.1% were very satisfied. Furthermore, 72.9% of the patients were very satisfied with the fact that telemedicine made healthcare easier in the time of COVID-19 pandemic.
**Conclusion:** We found the patients and physicians in Saudi Arabia had good satisfaction toward using of telemedicine however, some issues were found and those could be used for further development of the telemedicine in Saudi Arabia.

**Keywords:** Telemedicine, physicians, patients, satisfaction

## Introduction
In every country worldwide, the aim of healthcare organizations is to provide health services to their patients including diagnosis of medical conditions, dispensing appropriate medications, performing needed surgical procedures and follow-up of patients with chronic conditions [1]. Theses services should meet people's needs, satisfied them by improving their quality of life and decreasing of incidence of diseases [2]. In order to have ability to healthcare system to provide a high-quality healthcare for their patients and general population, it is important to have high quality human and materials resources as well as ensuring full access to all services by all population including elderly patients and people who live in rural areas besides ensuring patients' compliance and satisfaction of all provided services [3]. Patients' and physicians' satisfaction toward the healthcare system could be considered as a good indicator for measuring the quality of the health services itself [4]. The level of satisfaction of general population toward any aspect related to medical practice could be obtained throughout using surveys [5]. One of the important factors that could affect satisfaction of patients about health services provided to them is quality of communications between physicians and patients [6, 7].

Telemedicine (TM) was defined by the Office of the National Coordinator for Health Information Technology as the ability to use of electronic information and technologies of telecommunications in order to support and promote the long-distance clinical health care as well as patients and professional health related education and health and health administrations [8].

Nowadays, telemedicine applications are commonly used in most of the developed countries and some of the developing countries with general aim of maximizing of the quality of delivering of healthcare services to patients with different medical conditions [9]. These telemedicine applications was developed using the most appropriate available material and human resources in order to measure the vital signs, patients history, take symptoms of the current condition and in sometimes make possible diagnosis and treatment [10]. Thanks to the advanced information and communications technologies such as smartphones, it was able to improve the delivery of healthcare including electronic consultations (e-consultations) using smart phone which offer an increasing of the accessibility of patients to healthcare services and improve patients' satisfaction toward provided health services where many pervious studies had shown that the quality of virtual consultations may be very comparable to that of traditions consultations including face to face office visits with the additional benefit of enhanced access to health care [11–14].

One of the factors that increase the need for telemedicine is the occurrence of COVID-19 pandemic which forced physicians to avoid the traditional visits including face-to-face meeting between physicians and patients and shift to more socially distant visits where physicians use phone visit or a video visit with their patients in order to conduct the medical care [15]. However, telemedicine did not be tested before during disaster settings [16] and the widespread adoption of telemedicine associated with the COVID-19 pandemic could be unprecedented and may have a significant and durable effect on delivery of health care services. Telemedicine could be considered one of main component of the medical response to COVID-19 that helped in reducing the demand on strained health care infrastructure and provide an effective solution of providing appropriate health care delivery of patients at home with little or no exposure between patients and medical staff [17, 18]. In the United States for example, the percentage of providers who reported using of audio or video teleconsultations had increased from 11% pre-COVID 19 pandemic to 69% during the height of COVID-19 in April 2020 [15].

In Saudi Arabia, as most of countries worldwide, had been negatively impacted by COVID-19 which was widely spreading across the kingdom starting from March 2020, which cause many patients to have fear of having infected when they go hospitals to receive treatment, medical advice and their regular follow-up. In response to that emergency, patients was expected to have diverse technologies that would enable them to continue living in their house with social distance and in the same time be more informed and engaged in their own health with minimum exposure between patients and healthcare providers [19].

Moreover, the advantages of tele-medicine reported in previous studies including fast access to care [20], being an effective tool for evaluating of patients' complaints, as well as preventing unnecessary clinical visits and reduce the waiting time [21]. However, these advantages of telemedicine, continuous assessment of satisfaction of both of patients and physicians should be conducted in order to perform improvement of the system allowing for reaching the maximum effective healthcare services to patients. Therefore, the aim of this study is to assess the satisfaction level of patients and physicians toward using of telemedicine in Al Riyadh region, Saudi Arabia.

## Methodology

### Study design and Setting

This is cross-sectional study that was conducted among general population and physicians in Al-Riyadh region, Saudi Arabia. The study depended on online self-reported questionnaire which include parts of previous studies.

### Study population

**Sample size:** The study included all general population and physicians who dealt with telemedicine in Al Riyadh region. To get reliable results sample size was 383 or more to have a confidence level of 95% that the real value is within ±5% of the measured/surveyed value. Calculated by calculator.net/sample-size-calculator.

### Inclusion criteria

1. Patients and physicians who used any type of telemedicine in the last year.
2. Residents of Al-Riyadh region
3. Older than 18 years
4. Both gender
5. Agree to participate in the study

### Exclusion criteria

1. Participants do not agree to participate in the study
2. Participants indicate never using of telemedicine
3. Participants who are younger than 18 years old.
4. Residents outside of Al-Riyadh region

### Study instrument and distribution

In this study, we depended on online distributed self-reported questionnaire. The questionnaire was prepared using previous literature [23, 25]. The questionnaire included three parts; first part was prepared to collected demographic factors of participants including age, gender, nationality, specialty of physicians and experience, and education level. Second part was prepared for assessment of patients' satisfaction toward telemedicine using 5 Likert scale (very satisfied, satisfied, neutral, dissatisfied, very dissatisfied) for eleven statements. This part of our questionnaire was used before in previous study [25]. Moreover, the third part was used in assessing of physician's satisfaction toward telemedicine and was used before in previous study [23]. The study was online distributed using Google forms.

### Statistical analysis

MS Excel was used for data entry while SPSS version 26 was used for data analysis. Frequency and percent were be used for categorical variables while mean and standard deviation were be used for description of continuous variables. Chi test and t test were be used for determining of the factors affecting patients and physicians' satisfaction toward telemedicine. All statement was considered significant if p value is lower or equal to 0.05.

### Ethics consideration

- The study was approved by ethical committee
- The anonymity and confidentiality of the participants was preserved
- Confidentiality of the data was ensured and maintained and not used except for the study purpose.
- Freedom of every respondent to participate. It requires obtaining informed consent

## Results

In this study, we were able to collect 408 responses for our questionnaire, where 218 of them were patients (53.5%) and 190 were physicians (46.5%). Among physicians, 75.3% of them were aged between 26-35 years old while 70.5% of patients were in the same age interval. Percent of male in this study was not different between both population (51.1%, 50.9% respectively), either their nationality. Moreover, 50.0% of the patients reported using of telemedicine in the last 6 months compared to 40.5% if the physicians. Among physicians, 92.4% of them were family medicine physicians generally with experience of lower than 5 years (87.3%) however, among patients, university was the most common educational level (72.9%) (Table 1).

**Table 1:** Demographic factors of the participants

| | | Physician (190) | | Patient (218) | |
|---|---|---|---|---|---|
| Age | 18-25 | 14 | 7.4% | 17 | 7.8% |
| | 26-35 | 143 | 75.3% | 153 | 70.5% |
| | 36-45 | 16 | 8.4% | 24 | 11.1% |
| | 46-55 | 7 | 3.7% | 9 | 4.1% |
| | Older than 55 | 10 | 5.3% | 14 | 6.5% |
| Gender | Male | 97 | 51.1% | 111 | 50.9% |
| | Female | 93 | 48.9% | 107 | 49.1% |
| Nationality | Saudi | 186 | 97.9% | 214 | 98.2% |
| | Non-Saudi | 4 | 2.1% | 4 | 1.8% |
| When was the last time you used telemedicine network | In the last week | 63 | 33.2% | 2 | 0.9% |
| | Week to month ago | 40 | 21.1% | 55 | 25.2% |
| | Month to 6 months ago | 77 | 40.5% | 109 | 50.0% |
| | Month to 6 months ago | 10 | 5.3% | 52 | 23.9% |
| subspeciality (For physician) | General practitioner | 10 | 6.4% | ----- | |
| | Family medicine | 145 | 92.4% | | |
| | Emergency physician | 1 | 0.6% | | |
| | Pharmacist | 1 | 0.6% | | |
| how many years have you been in practice? | 0-5 year | 137 | 87.3% | ----- | |
| | 6-10 year | 19 | 12.1% | | |
| | 6-10 yea | 0 | 0.0% | | |
| | 16-20 years | 1 | 0.6% | | |
| Education level | Secondary school | ----- | | 4 | 2.4% |
| | University | | | 124 | 72.9% |
| | Higher education | | | 42 | 24.7% |

Among physicians, 43.9% of the physicians were satisfied with experience with telemedicine while 22.4% were dissatisfied and 4.9% were very dissatisfied with experience. Moreover, 47.8% of the physicians thought that telemedicine has minor negative impact of decision making because they could not touch the patients for examination while 17.6% reported major negative impact and 11.7% reported moderate negative impact. Furthermore, 13.7% of the physicians had extremely concern about reimbursement related to telemedicine and 23.9% had slightly concern while 28.3% had no concern. However, considering concerns about an increased risk of misdiagnosis related to telemedicine, 18% had no concern, 41.0% had slightly concern and 13.2% had extremely concern. Moreover, 54.1% of the physicians thought that they are likely to perform procedures as endoscopy if patients come to normal clinic visits and 74.6% of them reported that patients did not have at home interface to transit pictures to them. Finally, 44.9% of patients would consider telemedicine for all patients (Table 2).

**Table 2:** The level of satisfaction of physicians considering experience with telemedicine

| | | Count | Column N% |
|---|---|---|---|
| How satisfied are you about the experience with telemedicine | Very dissatisfied | 10 | 4.9% |
| | Dissatisfied | 46 | 22.4% |
| | Neutral | 56 | 27.3% |
| | Satisfied | 90 | 43.9% |
| | Very satisfied | 3 | 1.5% |
| Do you think your decision making was negatively impacted by being unable to touch the patients for exam? | No negative impact | 29 | 14.1% |
| | Minor negative impact | 98 | 47.8% |
| | Neutral | 18 | 8.8% |
| | Moderate negative impact | 24 | 11.7% |
| | Major negative impact | 36 | 17.6% |
| Are you worried or concerned about reimbursement related to telemedicine? | Not at all | 58 | 28.3% |
| | Slightly concerned | 49 | 23.9% |
| | Somewhat concerned | 25 | 12.2% |
| | Moderately concerned | 45 | 22.0% |
| | Extremely concerned | 28 | 13.7% |
| Are you concerned about an increased risk of malpractice and/ or misdiagnosis due to telemedicine? | Not at all | 37 | 18.0% |
| | Slightly concerned | 84 | 41.0% |
| | Somewhat concerned | 41 | 20.0% |

| | | | |
|---|---|---|---|
| | Moderately concerned | 16 | 7.8% |
| | Extremely concerned | 27 | 13.2% |
| Consider your most recent patient encounter with telemedicine, if you are seen this patient in your office, how likely would you have been perform a procedures as endoscopy during this visit? | Not very likely | 17 | 8.3% |
| | Not likely | 47 | 22.9% |
| | Neutral | 29 | 14.1% |
| | Likely | 111 | 54.1% |
| | Very likely | 1 | 0.5% |
| Consider your most recent patient encounter with telemedicine, did the patient have an at home interface to transmit the images to you before or during the visits? | Yes | 52 | 25.4% |
| | No | 153 | 74.6% |
| For which patients would you consider telemedicine encounter: | New patients | 19 | 9.3% |
| | Established patients | 54 | 26.3% |
| | Post operative patients | 27 | 13.2% |
| | None | 13 | 6.3% |
| | All of them | 92 | 44.9% |

In table 3, we showed the level of satisfaction among patients considering telemedicine. Generally, we noticed that most of the participants were satisfied with telemedicine. The main features that leading to higher satisfaction were quality of the audio sound (76.8% were very satisfied) ease of registration and scheduling (70.4% were satisfied), Ability to talk freely over telemedicine (52% were very satisfied) and with how physician deals with you (69% were very satisfied). However, many participants were dissatisfied with comfort of the telemedicine suite (the location where I received my care) (24.1%), and time of waiting until physician answer (19.7%). Moreover, 50.8% of them were satisfied with their experience with telemedicine and 28.1% were very satisfied. Furthermore, 72.9% of the patients were very satisfied with the fact that telemedicine made healthcare easier in the time of COVID-19 pandemic (Table 3).

**Table 3:** Level of satisfaction of patients considering telemedicine

| | **Very dissatisfied** | | **Dissatisfied** | | **Neutral** | | **Satisfied** | | **Very satisfied** | |
|---|---|---|---|---|---|---|---|---|---|---|
| Ease of registration/scheduling | 1 | 0.5% | 0 | 0.0% | 2 | 1.0% | 143 | 70.4% | 57 | 28.1% |
| Quality of the visual image | 1 | 0.5% | 2 | 1.0% | 51 | 25.1% | 92 | 45.3% | 57 | 28.1% |
| Quality of the audio sound | 1 | 0.5% | 0 | 0.0% | 1 | 0.5% | 45 | 22.2% | 156 | 76.8% |
| Ability to talk freely over telemedicine | 0 | 0.0% | 3 | 1.5% | 87 | 42.9% | 6 | 3.0% | 107 | 52.7% |
| Ability to understand the recommendations or diagnosis made | 0 | 0.0% | 3 | 1.5% | 88 | 43.3% | 105 | 51.7% | 7 | 3.4% |
| The comfort of the telemedicine suite (the location where I received my care) | 1 | 0.5% | 49 | 24.1% | 1 | 0.5% | 144 | 70.9% | 8 | 3.9% |
| Are you satisfied with how physician deals with you? | 0 | 0.0% | 3 | 1.5% | 0 | 0.0% | 140 | 69.0% | 60 | 29.6% |
| Are you satisfied with time of waiting until physician answer? | 1 | 0.5% | 40 | 19.7% | 103 | 50.7% | 54 | 26.6% | 5 | 2.5% |
| The overall quality of care provided | 0 | 0.0% | 3 | 1.5% | 0 | 0.0% | 97 | 47.8% | 103 | 50.7% |
| Overall telemedicine consult experience | 1 | 0.5% | 1 | 0.5% | 41 | 20.2% | 103 | 50.7% | 57 | 28.1% |
| Telehealth services made healthcare easier today during the virus Covid 19 pandemic | 1 | 0.5% | 0 | 0.0% | 1 | 0.5% | 53 | 26.1% | 148 | 72.9% |

In this study, we found that age of both of physicians and patients did not have significant impact on their satisfaction level (P= 0.148, 0.873 respectively) either their gender (P=0.218, 0.685 respectively). The only significant factor was the experience of physicians, where more duration of practice increases the satisfaction of telemedicine among physicians (P=0.000) (Table 4).

**Table 4:** The relation between demographic factors and satisfaction of physicians and patients considering their experience with telemedicine

| | | **Physicians' satisfaction** | | | | | **Patients' satisfaction** |
|---|---|---|---|---|---|---|---|
| | | **Very dissatisfied** | **Dissatisfied** | **Neutral** | **Satisfied** | **Very satisfied** | **Mean** |
| | | Row N% | Row N% | Row N% | Row N% | Row N% | |
| Age | 18-25 | 7.7% | 30.8% | 30.8% | 23.1% | 7.7% | 44.75 |
| | 26-35 | 3.2% | 20.4% | 28.7% | 47.1% | 0.6% | 45.06 |
| | 36-45 | 4.8% | 33.3% | 19.0% | 38.1% | 4.8% | 44.06 |
| | 46-55 | 28.6% | 28.6% | 14.3% | 28.6% | 0.0% | 44.92 |
| | Older than 55 | 14.3% | 14.3% | 28.6% | 42.9% | 0.0% | 44.33 |
| | | 0.148 | | | | | 0.873 |
| Gender | Male | 4.5% | 21.4% | 22.3% | 50.9% | 0.9% | 44.62 |
| | Female | 5.4% | 23.7% | 33.3% | 35.5% | 2.2% | 44.90 |
| | | 0.218 | | | | | 0.685 |
| how many years have you been in practice? | 0-5 year | 5.9% | 27.2% | 27.8% | 38.5% | 0.6% | ------ |
| | 6-10 year | 0.0% | 0.0% | 25.7% | 71.4% | 2.9% | |
| | | 0.000* | | | | | |
| Education level | Secondary school | ------- | | | | | 41.00 |
| | University | | | | | | 45.22 |
| | Higher education | | | | | | 44.83 |
| | | | | | | | 0.331 |

## Discussion

Health care usually involves a direct connection between the provider and the patient in the same place (in person) [26]. Over the past 20 years, the Internet and technology have made healthcare available digitally, providing new ways to improve the cost of care [27]. In the clinical response to the CVD-19 epidemic, the strengths of telemedicine make it become an important tool [22]. By eliminating financial incentives and privacy barriers for distributing telecoms drugs, the Saudi Vision 2030 framework paved the way for technology transfer, the pandemic of COVID-19 enabled the promotion and testing of this transition [28]. In this study, we aimed to assess the level of satisfaction of both patients and healthcare providers in Al Riyadh region, Saudi Arabia considering their experience with telemedicine.

Considering patients' satisfaction, we found that most of the participants were satisfied with telemedicine where 50.8% of them were satisfied with their experience with telemedicine and 28.1% were very satisfied. The main obstacles that affect patients' satisfaction were comfort of the telemedicine suite (the location where I received my care), and time of waiting until physician answer. The current literature shows that telemedicine has many benefits for patients and providers. According to a study by Doshi *et al*., "Healthcare systems offer a number of benefits, including the use of telemedicine for patient care, including employment sustainability, supplier depletion, supplier reduction, and reduced personal protective equipment (PPE) waste." [29]. According to study of Sandberg *et al*., the authors found that telemedicine had many benefits during outbreaks. According to their study, "patients' had increased opportunities for greater communication and access to people who are not often served" [30]. Previous studies have shown similar satisfaction in patients with telemedicine [31], and clinical outcomes have been found to be comparable between patients who use telemedicine services and users of traditional 'in-person' clinical visits [32]. Made *et al*. used the questionnaire to assess satisfaction of patient; On a 6-point scale, patients in the study scored an average of 5.7, which is associated with good satisfaction [33]. Moreover, Mishra conducted a study among 34 other patients who underwent thyroidectomy and thyroidectomy where the authors used questionnaire finding that all patients reported their satisfaction with telemedicine [34]. Though, these studies were accomplished in the developed countries where telemedicine is better developed than it is in KSA and many other countries around the world [35]. In our study, three-quarters of patients believed that remote communication was important during the CVD-19 pandemic. A systematic review in 2019 supports our findings and demonstrates that there are many user-friendly capabilities for live video consultations for CV-19 control. Studies show that live video conferencing eliminates direct physical contact, reduces the risk of respiratory infections, and prevents transmission of infection to physicians and other healthcare providers [36]. Also, the live video can be useful for patients seeking advice about Covide-19, for people with severe anxiety, for diagnosing chronic diseases (such as diabetes and cancer), for some drug tests and for dismissal. If the phone is not enough [37].

Among physicians, we found good level of satisfaction toward telemedicine but in lower attitude rather than patients where only 45.4% were satisfied with telemedicine. According to previous studies, the same results were reported including study of Riely P, *et al*., who found that Providers had a less passionate response to telemedicine, related to an answer between "satisfied" and "neither satisfied nor dissatisfied." [23]. As well as, study of Van Den Brink *et al*. and Whitten *et al*. [38, 39]. There are many reasons why providers consider telemedicine to be uncomfortable including reducing of face-to-face telemedicine interactions. Changes in counseling where providers not relying on facial and body language cues to make sure patients understand the information they receive. Possibly technical and logistical issues; Prior to the outbreak, many departments did not have a robust telemedicine infrastructure. This, in contrast to patient care, led to further troubleshooting. In our study, concerns of the physicians considering telemedicine were the negative impact of decision making because they could not touch the patients for examination, reimbursement related to telemedicine and increased risk of misdiagnosis related to telemedicine. Prior to this study, it was estimated that a change in reimbursement with telemedicine visits would be a major concern for suppliers. Before the Covide-19 public health emergency, Medicare and other payment policies were seen as a barrier to telemedicine [40]. Possible because, for telemedicine encounters, Medicare usually offers payment for fee-for-service consultations [41]. Though, since March 30, 2020, the Centers for Medicare and Medicaid Services have changed its policies such that Medicare will make payment for virtual services with relaxed requirements [40]. Because of these policy changes, Medicare beneficiaries may receive needed services from otolaryngologists without risking exposure [41].

This study included some limitations including that some patients performed the survey up to 1 year after their encounter; this introduces recall bias when compared with the group of patients who were surveyed soon after their appointment. There was likely also participant bias; patients who participated may have been influenced to give answers to appease the physicians performing the survey. This was mitigated by telling each patient that the survey was confidential. The treating providers did not survey their patients. Providers had lower levels of satisfaction as compared with patients, though telemedicine had a neutral effect on providers' decision making and caused a "slight" to "somewhat" higher concern for malpractice and misdiagnosis. Overall, telemedicine appears to be a viable option for patients and providers, though further study is necessary to elicit which patients are at high risk for poorer outcomes.

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