

# Advantages and disadvantages of telemedicine during the COVID-19 pandemic era among physicians in Taif, Saudi Arabia

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## ABSTRACT

**Objectives:** To evaluate the advantages and disadvantages of telemedicine among physicians during the COVID-19 pandemic. To assess the awareness about telemedicine among physicians and determine their opinions about telemedicine in the post-pandemic era.

**Methods:** A cross-sectional study was conducted at government hospitals (King Faisal Medical Complex [KFMC]-King Abdulaziz Specialist Hospital [KASH]) in Taif, Kingdom of Saudi Arabia (KSA), from May-August 2020. Taif is a small city in the western region of KSA with a population of 689,000 and 2 main hospitals (KFMC & KASH) which also serve rural areas close to Taif city. A total of 36 physicians practiced telemedicine, only 25 physicians accepted to participate in this study.

**Results:** Thirty-six percent of the responders believed that telemedicine could improve the effectiveness of therapeutic intervention and 44% believed that the quality of care was enhanced using telemedicine. Difficulty in reaching the correct diagnosis due to the lack of physical examination was one of the disadvantages that faced the participants.

**Conclusion:** Telemedicine should be part of medical services but should not completely replace physicians' personal interaction. Telemedicine could be continued for stable remotely residing patients even after the COVID-19 pandemic.

**Keywords:** telemedicine, COVID-19, doctors, advantages, disadvantages, physicians, pandemic

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In January, 2020, the World Health Organization (WHO) declared an infectious disease that was referred to as coronavirus disease 2019 (COVID-19).<sup>1</sup> During the ongoing pandemic, the WHO encouraged communities to embrace a non-pharmaceutical

intervention, namely, physical distancing.<sup>2</sup> The application of telemedicine provides safe, fast, and high-quality care. It can be effectively used to respond to or resolve many new issues. It has been shown to be successful in increasing access to treatment under acute circumstances, such as crises in health care, conflicts, disasters, and remote areas.<sup>3,4</sup> To preserve social isolation in response to this crisis and promote health care access, in the United States has gradually increased the use of virtual clinics from 0-97%. Which cover various aspects of patient care to follow up and manage many conditions. There were limitations related to patient confidence in revealing privacy-related issues and how the management would be affected without a complete physical examination and laboratory data.<sup>5</sup> In patients suspected to have ataxia, various aspects of the neurological examination can be assessed (namely, eye movements, speech, and coordination).<sup>6</sup> The value of telemedicine services for surgical patients is also supported by emerging evidence.<sup>7</sup> Also, telemedicine enables physicians to communicate directly with the patient and their relatives and increase the quality of care.<sup>8</sup> On the other hand, the principal challenges and barriers facing telemedicine implementation in KSA are consumer acceptance, availability of adequate experts, quality of necessary facilities and infrastructure.<sup>9</sup> As a result of the pandemic, the use of telemedicine is required to improve the health care. Few studies conducted in KSA have reported only the barriers that affect telemedicine implementation.<sup>9,10</sup> This study intended to illustrate the advantages and disadvantages of telemedicine among physicians during the COVID-19 pandemic in Taif, KSA.

**Methods.** A cross-sectional study was conducted at government hospitals (King Faisal Medical Complex [KFMC]-King Abdulaziz Specialist Hospital [KASH]) in Taif, KSA, from May-August 2020. Taif is a small city in the western region with a population of 689,000, which also serve rural areas close to it. We used PubMed and google scholar to find similar studies. The sample included all physicians who practiced the telemedicine in Taif, KSA, during the COVID-19 pandemic era. A total of 36 physicians were involved in telemedicine, while only 25 of them accepted to participate. Participants were interviewed by telephone after verbal consent. We included all physicians (consultants, specialists, residents) who used telemedicine during the pandemic in Taif, KSA. Also, we excluded physicians who were not involved in telemedicine, physicians using telemedicine in other cities and physicians who refused to be enrolled in the study. The questionnaire was designed by the authors based upon review of the

literature.<sup>11,12</sup> It involved 4 main parts: The first part included sociodemographic data such as age, city, degree, and specialty. The second part included questions to assess their knowledge and experience with telemedicine use. The third part evaluated physicians' opinions on advantages and disadvantages of telemedicine. The last part included direct questions about telemedicine's future in their opinion and an open question about the suggested medical services to improve the telemedicine system.

This study received approval from the Research Ethics Committee of the Health Affairs in Taif, KSA (IRB: HAP-02-T-067). Statistical analysis was carried out using the Statistical Package for Social Sciences (SPSS) version 23 (IBM Corp., Armonk, NY, USA) by an independent biostatistician. Categorical variables were analyzed using Pearson's Chi-square test. Continuous variables obtained were expressed as mean and standard deviation. A *p*-value of <0.05 was considered significant.

**Results.** Our study was carried out to assess the knowledge, perceptions, and practices regarding telemedicine among physicians working in the public health care settings in Taif, KSA. The survey was sent to all physicians and the final analysis included 25

physicians out of 36 who answered all the items in the questionnaire.

The sociodemographic data of the participants are showed in **Table 1** and **practices related to telemedicine by physicians in this study are showed in Table 2.**

The awareness regarding telemedicine among our study population was 60%. The survey had 6 items that measures knowledge related to telemedicine. Each correct response was given a score of 'one' and wrong answers were given a score of '0'. Thus, the maximum score one could get was 6. The mean total knowledge score in our study was found to be 4.24±1.10 (Min: 0; Max: 6). The total scores were then converted into percentages, which were then categorized into good (>80%), fair (60-79%), and poor (<60%). The results showed that 48% had 'good', 16% 'fair', and 35% 'poor' knowledge regarding telemedicine. The relationship of knowledge and different sociodemographic details showed that there was no statistically significant association seen with age (*p*=0.741), gender (*p*=0.545), designation (*p*=0.517), and specialty (*p*=0.909) of the physicians (**Table 1**).

When asked to define telemedicine, 56% described it as choosing to transmit patient information through interactive video and a consultation with a specialist or subspecialist; 48% defined telemedicine as continuing

**Table 1** - Knowledge regarding telemedicine and its relationship with sociodemographic characteristics.

Variables	Knowledge				P-value*
	Good	Fair	Poor	Total	
<i>Age</i>					
26-39	3 (60.0)	1 (20.0)	1 (20.0)	5 (100.0)	0.741
40-59	8 (42.1)	3 (15.8)	8 (42.1)	19 (100.0)	
60 and above	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)	
<i>Gender</i>					
Male	3 (60.0)	0 (0.0)	2 (40.0)	5 (100.0)	0.545
Female	9 (45.0)	4 (20.0)	7 (35.0)	20 (100.0)	
<i>Designation</i>					
Resident	0 (0.0)	1 (50.0)	1 (50.0)	2 (100.0)	0.517
Specialist	2 (66.7)	0 (0.0)	1 (33.3)	3 (100.0)	
Consultant	10 (50.0)	3 (15.0)	7 (35.0)	20 (100.0)	
<i>Specialty</i>					
Internal medicine	3 (42.9)	1 (14.3)	3 (42.9)	7 (100.0)	0.909
Nephrology	3 (50.0)	1 (16.7)	2 (33.3)	6 (100.0)	
Neurology	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	
Cardiology	3 (60.0)	1 (20.0)	1 (20.0)	5 (100.0)	
Endocrinology	1 (50.0)	0 (0.0)	1 (50.0)	2 (100.0)	
Family medicine	0 (0.0)	1 (50.0)	1 (50.0)	2 (100.0)	
General surgery	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)	
Ophthalmology	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)	

Values are presented as number and percentage (%), \**p*-value ≤0.05 is considered significant.

**Table 2** - Practices related to telemedicine by physicians. Note that Table 2 was not mentioned or referred to in the text please clarify.

Variables	n (%)
<i>Times of usage</i>	
Before and during COVID-19	9 (36.0)
Only during COVID-19	16 (64.0)
<i>Frequency of usage</i>	
Daily	3 (12.0)
Weekly	11 (44.0)
Monthly	2 (8.0)
Occasionally	9 (36.0)
<i>Sources/methods used</i>	
Telephone	14 (56.0)
Video	12 (48.0)
Email	3 (12.0)
Text messaging	4 (16.0)
Social media	11 (44.0)
<i>Number of patients consulted through telemedicine</i>	
<50	9 (36.0)
50-99	9 (36.0)
100-200	6 (24.0)
>200	1 (4.0)
<i>Hospital provide information and training on telemedicine</i>	
No	6 (24.0)
Yes	19 (76.0)

education programs; 24% defined it as examining patients via telemedicine; 12% defined it as a 2-way television set up; the rest 4% defined telemedicine as medicine by television. Approximately 60% heard of telemedicine from a scientific meeting, and 16% heard about it from the internet and their colleagues.

The perceptions related to the advantages and disadvantages of telemedicine, Table 3 showed that 36% of respondents believed that telemedicine could improve the effectiveness of the therapeutic intervention. Approximately 11 (44%) respondents noted that the quality of care was enhanced using telemedicine, and 9 (36%) respondents agreed that telemedicine could help patients to save time and money as one of the advantages. A total of 44% of physicians considered that telemedicine could provide psychological support to patients and improve patients' compliance compared to clinics (Table 3).

The percentage of physicians who agreed that telemedicine was inconvenient and time-consuming for physicians was approximately 36% (n=9), whereas 40% disagreed with this. A total of 17 (68%) physicians

disagreed that telemedicine resulted in the high cost of hardware and surprisingly no physicians agreed to this in any form. It was observed that 52% (n=13) agreed that telemedicine could cause difficulty in identifying correct diagnosis due to the lack of physical examination. Approximately 40% (n=10) agreed that telemedicine may bring change in the traditional practice of the physicians and 40% (n=10) of them considered that telemedicine might cause issues related to current referral patterns. When we assessed the relationship of perceptions related to advantages and disadvantages of telemedicine with the sociodemographic characteristics, it was found that there were no statistically significant relationships observed with age, gender, degree and specialty of physicians ( $p < 0.05$ ) (Table 3).

Eighty percent of the physicians believed that telemedicine should continue in KSA even after the COVID-19 pandemic and approximately 72% of them agreed that telemedicine offered a better quality of care compared to the face to face clinical consultation.

**Discussion.** In 2020, due to the COVID-19 pandemic, the usefulness of telemedicine and its ability to deliver high-quality care are becoming more evident worldwide.<sup>4</sup>

Regarding the advantages of telemedicine, most responders believe that telemedicine can improve the effectiveness of therapeutic intervention, enhance the quality of care, provide psychological support to the patient, improve compliance, and help patients save time, and money. An Indian study in 2020 showed that telemedicine can enhance learning skills, case handling strategies, and help in providing different medical services.<sup>3</sup> We believe that the rapid transition to telemedicine in this time of crisis and beyond, offers a new way of accessing our patients, as telemedicine can greatly enhance medical services. It can improve productivity and allows the patients and families to have more time to express their thoughts and feelings, which perhaps is more important now than before the COVID-19 pandemic.<sup>13</sup>

The main disadvantages telemedicine noted by respondents is that it was difficult to make a diagnosis throughout the virtual clinic due to the lack of physical examination and inability to use their hands-on expertise. Furthermore, the fear of sudden practice changes caused by the COVID-19 pandemic is one of the disadvantages noted by our respondents. This is mostly due to the dramatic shift to virtual clinics owing to the national lockdown and social isolation imposed by the Saudi government during the pandemic. Furthermore, physicians are still not convinced that their patients

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**Table 3 -** Perceptions of physicians related to advantages and disadvantages of telemedicine.

Variables	n (%)	P-value*			
		Age	Gender	Degree	Specialty
<i>Telemedicine can improve the effectiveness of therapeutic intervention</i>					
Strongly disagree	4 (16.0)	0.481	0.964	0.195	0.330
Disagree	2 (8.0)				
Neutral	5 (20.0)				
Agree	9 (36.0)				
Strongly agree	5 (20.0)				
Total	25 (100.0)				
<i>It can enhance the quality of care</i>					
Strongly disagree	3 (12.0)	0.248	0.738	0.438	0.647
Disagree	2 (8.0)				
Neutral	3 (12.0)				
Agree	11 (44.0)				
Strongly agree	6 (24.0)				
Total	25 (100.0)				
<i>It can provide psychological support to patients</i>					
Strongly disagree	2 (8.0)	0.085	0.686	0.986	0.908
Disagree	1 (4.0)				
Neutral	2 (8.0)				
Agree	11 (44.0)				
Strongly agree	9 (36.0)				
Total	25 (100.0)				
<i>It can improve compliance</i>					
Strongly disagree	2 (8.0)	0.050	0.249	0.438	0.175
Disagree	3 (12.0)				
Neutral	3 (12.0)				
Agree	11 (44.0)				
Strongly agree	6 (24.0)				
Total	25 (100.0)				
<i>It can help patients to save time and money</i>					
Strongly disagree	4 (16.0)	0.253	0.427	0.085	0.568
Disagree	0 (0.0)				
Neutral	3 (12.0)				
Agree	9 (36.0)				
Strongly agree	9 (36.0)				
Total	25 (100.0)				
<i>Inconvenience and time consuming for physicians</i>					
Strongly disagree	3 (12.0)	0.079	0.708	0.063	0.278
Disagree	10 (40.0)				
Neutral	2 (8.0)				
Agree	9 (36.0)				
Strongly agree	1 (4.0)				
Total	2 (100.0)				
<i>Excessive cost of hardware</i>					
Strongly disagree	7 (28.0)	0.763	0.194	0.462	0.188
Disagree	10 (40.0)				
Neutral	8 (32.0)				
Agree	0 (0.0)				
Strongly agree	0 (0.0)				
Total	25 (100.0)				
<i>Difficulty finding the correct diagnosis due lack of physical examination</i>					
Strongly disagree	2 (8.0)	0.509	0.919	0.173	0.794
Disagree	4 (16.0)				
Neutral	6 (24.0)				
Agree	10 (40.0)				
Strongly agree	3 (12.0)				
Total	25 (100.0)				
<i>Physician fear of practice change</i>					
Strongly disagree	4 (16.0)	0.344	0.232	0.944	0.921
Disagree	5 (20.0)				
Neutral	6 (24.0)				
Agree	9 (36.0)				
Strongly agree	1 (4.0)				
Total	25 (100.0)				
<i>Issue related to referral pattern</i>					
Strongly disagree	3 (12.0)	0.702	0.087	0.759	0.829
Disagree	2 (8.0)				
Neutral	7 (28.0)				
Agree	8 (32.0)				
Strongly agree	5 (20.0)				
Total	25 (100.0)				

would use telemedicine technology because the patients are mostly elderly people with limited technological skills. Some patients may not be aware of telemedicine as a choice and do not know how to access it.<sup>14</sup>

Many physicians in our sample described telemedicine as transmitting patient information through interactive video and as a consultation with a specialist or subspecialist. Other responders chose one of the following definitions of telemedicine, namely, continuing education programs, examining patients through telemedicine, and a 2-way television set-up. We believe in the usefulness of scientific meetings, talking with colleagues, and internet browsing to build a good background about telemedicine basics. Telemedicine is described by the centers for medicare and medicaid services (CMS) as 2-way, live contact between the patient and provider at a distant location, including audio and video devices.<sup>5</sup>

Our study showed that more than half of the respondents used telemedicine only during the COVID-19 pandemic, and the remaining participants used it before and during the pandemic. We believe that telemedicine adoption was one solution that practitioners used to continue patient care while reducing COVID-19 exposure or transmission. Most of our respondents were consultants, and most of them used telemedicine weekly. The specialists used it occasionally. Half of the resident's respondents used it monthly. This result was obtained possibly because they had more clinical experience to appropriately analyze patient's complaints and concerns.

Concerning internet-based technologies, the findings showed that telephone and video were the communication devices used by interviewees, and that they were the preferred resources. The use of video visits in New York, United States, has shown its efficacy, satisfaction in promoting social distancing during the pandemic.<sup>15</sup> We believe that video visits typically convey more information than email and other devices. Following the institution COVID-19 pandemic restrictions on in-person clinical encounters, at KASH, a survey was conducted on the number of patients visiting the virtual clinic in one week. At first, the number of remote visits was limited to approximately 75 per week and then considerably increased incredibly to approximately 196 per week within 4 weeks. The reason for the increase in the number of virtual clinics visits in this study was possibly due to the adequate information and training provided to the communities on how the system works, which led to increased telemedicine use.



Our physicians reported that telemedicine should continue after the COVID-19 pandemic as an adjunct tool for the doctors and patients in many ways. The use of this technology is believed to allow improved communication with practitioners and their patients during the pandemic. Over half of our doctors agreed that telemedicine could increase the level of patient care quality. The increase in the use of telemedicine will minimize waiting lists for patients who need in-person interactions during the pandemic.<sup>7</sup> This study is affected by several factors like limited virtual clinic numbers in our study area and small sample size. The reason was the national lockdown imposed by the Saudi government during the pandemic, we carried out this study by telephone interviews that lead to difficulty in reaching out to all doctors. The results can not be extrapolated to all physicians in KSA or the western region. Not including patients or caregivers is a limitation too. More sample size and including other cities, patients, and their caregivers are recommended for future research that will give more reliable results. Also, adding important questions to assessing telemedicine satisfaction for both physicians and patients during the pandemic should be included.

In conclusion, telemedicine is a helpful tool during consultations for many medical and surgical conditions, in the psychological field, medical reports, laboratory follow ups, medication refills, and communication with other facilities and other specialties. But, it is not a substitution for the physician's hands-on expertise.

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**Appendix 1** - Telemedicine interview guide. Please note that the appendix was not mentioned in the text please clarify and refer.

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**1) Demographic section:**

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*Age*  
 26-39  
 40-59  
 60 and above

*Gender*  
 Female  
 Male

*City*  
 Taif City  
 Other cities

*Degrees*  
 GP  
 Residents  
 Specialist  
 Consultant

*Specialty*  
 Medicine  
 General surgery  
 Family medicine  
 Pediatric  
 Obstetrics and gynecology  
 Ear, nose, and throat  
 Ophthalmology  
 Psychiatry  
 Others

*Working place*  
 Governmental health care  
 Private health care  
 Both

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**2) Knowledge and use of telemedicine section**

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*Have you ever heard about telemedicine?*  
 Yes  
 No

*If yes, from where did you hear about it?*  
 Journals  
 Colleagues  
 Scientific meeting  
 Television  
 Internet

*How would you define telemedicine?*  
 Consultation with a specialist or sub specialist  
 Examining patients via telemedicine  
 Continuing education programs  
 Transmission of patient care information via interactive video  
 A 2-way television set up  
 Medicine by television

*Did you ever used telemedicine?*  
 Yes  
 No

*If yes, answer the following:*  
*When did you use it?*  
 Before and during COVID-19 pandemic  
 Only during COVID-19 pandemic

*How often did you use it?*  
 Occasionally  
 Monthly  
 Weekly  
 Daily

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**Appendix 1** - Telemedicine interview guide. Please note that the appendix was not mentioned in the text please clarify and refer (continued)

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*What was the communication tools that you used in telemedicine?*  
 Video  
 Email  
 Telephone  
 Text messaging  
 Social media  
 Other

*How many patients did you communicate with via telemedicine?*  
 <50  
 50-99  
 100-200  
 >200

*Did the hospital (or clinic) housing the telemedicine system provide you with adequate information or training about how the system works and how the consult would proceed?*  
 Yes  
 No

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**3) Advantages and disadvantages of using telemedicine section**

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*If you are using telemedicine during COVID-19 pandemic answer the following questions*

1. Telemedicine can improve the effectiveness of therapeutic intervention? (strangely agree, agree, neutral, disagree, strangely disagree)
2. Telemedicine can enhance the quality of care? (strangely agree, agree, neutral, disagree, strangely disagree)
3. Telemedicine can provide psychological support to patients? (strangely agree, agree, neutral, disagree, strangely disagree)
4. Telemedicine can improve compliance? (strangely agree, agree, neutral, disagree, strangely disagree)
5. Telemedicine can help patients to save time and money (strangely agree, agree, neutral, disagree, strangely disagree)
6. Inconvenience and time consuming for physicians? (strangely agree, agree, neutral, disagree, strangely disagree)
7. Excessive cost of hardware? (strangely agree, agree, neutral, disagree, strangely disagree)
8. Difficulty finding the correct diagnosis due lack of physical examination? (strangely agree, agree, neutral, disagree, strangely disagree)
9. Physician fear of practice change? (strangely agree, agree, neutral, disagree, strangely disagree)
10. Issue related to referral pattern? (strangely agree, agree, neutral, disagree, strangely disagree)

*Do you think the telemedicine should continue after the COVID-19 pandemic in KSA?*  
 Yes  
 No

*If yes, answer the following:*  
 What is the kind of medical services should be provided using a Telemedicine system?

*What is the suitable communication tool to use in telemedicine ?*  
 Telephone  
 Email  
 Video  
 Textmessaging  
 Socialmedia  
 Other

*How do you think the telemedicine impacted the quality of patients care*  
 Better quality of care  
 Same quality of care  
 Worse quality of care

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