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ORIGINAL ARTICLE

Physicians' View on Telemedicine during the Corona Outbreak: A Cross-Sectional Study Conducted in Imam Reza Teaching Hospital of Mashhad

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ABSTRACT

Telemedicine uses information and communication technology (ICT) to provide remote care to patients, especially during outbreaks. This study aimed to evaluate the attitudes toward and knowledge about the telemedicine system among healthcare professionals. This cross-sectional study was conducted among physicians working at Imam Reza Hospital, affiliated with Mashhad University of Medical Sciences, in 2021. Data were collected using a well-structured self-administered questionnaire. A total of 133 specialists and subspecialists participated in this study, including 25 internists, 14 anesthesiologists, 10 cardiologists, 9 emergency medicine specialists, 9 radiologists, and 9 dermatologists. The average age and years of experience were 49.9 ± 8.6 and 13.4 ± 7.6, respectively. Investigating their attitudes toward and knowledge about telemedicine revealed that 50% of them had a "high" attitude, and their knowledge was above medium. Based on the research and the positive views on the use of telemedicine, especially during the recent pandemic, it can be concluded that this technology may be suitable for only specific healthcare tasks. However, healthcare organizations may benefit from implementing telemedicine in various aspects, such as reducing treatment costs and increasing the speed, accuracy, and quality of care provided to patients and injured individuals.

Keywords: Telemedicine, Attitude, Knowledge, COVID-19, Health Personnel

INTRODUCTION

Coronavirus 2019 (COVID-19) started in Wuhan, China, in December 2019 and has spread worldwide (1). Thus, the World Health Organization (WHO) described the disease as a pandemic (2). The number of cases affected by COVID-19 is increasing rapidly. According to the latest reports from the WHO, there are more than 452,052,304 confirmed cases of COVID-19 with more than 6,027,059 deaths across the world (March 12, 2022) (3).

In order to decrease the transmission of such a virus, several disease control strategies have been developed, including "social gaps" and "social distancing", which are possible by reducing contact. Relevant instructions were created, and people's mobility in their daily lives was limited and affected (4). However, people who were not infected with COVID-19, especially those at higher risk for the disease (e.g., the elderly and those with underlying diseases), had to receive day care without the risk of being exposed to other patients in the hospital Healthcare providers are now more interest and less resistance among innovative practices such as telemedicine because of the recent pandemic. Therefore, it seems that telemedicine can be considered as an alternative among physicians in order to provide healthcare services safely in the time of need. This would reduce the

need for in-person visits without physical contact, which was very common before, especially at outpatient clinics (5).

Several studies have shown that remote health solutions/telemedicine should be considered as part of the response to COVID-19 outbreaks by healthcare systems. It is an effective way to use existing technologies to facilitate the delivery of optimal services while minimizing direct risk to the individual. The application of telemedicine in times of pandemic conditions (e.g., COVID-19) has the potential to improve epidemiological research, disease control, and clinical case management (6-10). The significance of this research lies in the urgent requirement for efficient healthcare solutions during such recent pandemics since traditional face-to-face medical consultations carry a substantial risk of virus transmission. Telemedicine can be considered as an alternative by providing remote healthcare services, thereby mitigating the risk of infection risks among both healthcare providers and patients.

The WHO defines telemedicine as the delivery of healthcare services where distance is a crucial factor, utilized by healthcare professionals using Information and Communication Technology (ICT) to exchange valid information for diagnosing, treating, and preventing diseases and injuries (11). On the other hand, telemedicine seeks to improve patient health by allowing direct, two-way interactive communication between patient and physician in a remote location, according to Medicare and Medicaid Service Centers (CMS) (12).

Telemedicine is one of the services that must be provided by health care providers to follow up the patients while minimizing the risk of exposure or transmission of COVID-19. In China, areas with poor access to health care reported a higher mortality rate of COVID-19 than areas with adequate access (13). Telemedicine may provide remote or virtual care services to patients with less access to in-person care. The potential increase in patients with outbreaks such as COVID-19 is a serious concern for healthcare providers (14). In the event of increasing the number of patients in critical conditions, telemedicine helps the care providers visit more patients and reduces the number of in-person patients during the day (15). While adoption of telemedicine increased during the COVID-19 pandemic, understanding healthcare providers' perspectives on its implementation and effectiveness seems to be missing.

Much evidence, including theoretical and practical, has been provided by researchers during the COVID-19 pandemic about the importance of utilizing telemedicine and remote patient treatment. (16). Prominent health organizations such as the World Health Organization (WHO), the US Centers for Disease Control and Prevention (CDC), and the American Medical Association (AMA) have endorsed telemedicine adoption during the pandemic and have actively encouraged its implementation. (17-19). Telemedicine has become a valuable resource during the pandemic, alleviating the strain on overwhelmed healthcare systems. The willingness or hesitation of physicians to adopt telemedicine significantly impacts its acceptance. (20).

Furthermore, studies suggest that the utilization of telemedicine systems hinges on the satisfaction levels of both physicians and patients with the service (21). Therefore, to encourage telemedicine adoption during the COVID-19 pandemic, this study assessed the feasibility of implementing a teleconsultation system for suspected or confirmed cases of COVID-19 in -redacted- Hospital -redacted-

METHODS

This was a descriptive cross-sectional study in which the knowledge and attitudes of physicians working in Imam Reza Teaching and Medical Hospital of Imam Reza were investigated in 2021. The sample size was determined considering a 39% prevalence rate for a positive attitude, as reported in a prior study (10). Given a significance level (alpha) of 5% and an effect size (d) of 0.078, the calculated sample size for this study is 151. Considering a 10% attrition rate, a total of 168 physicians were evaluated for this study. In the end, 133 specialists and subspecialists were selected as participants. The sample size was determined using the following formula: N=(Z^2*P*(1-P))/D^2 where Z is the z-value (1.96 for 95% confidence level), P is the prevalence rate (39%), and D is the margin of error (0.078). A 10% attrition rate was added to the calculated sample size. All physicians working at Imam Reza Hospital in Mashhad city who were willing to participate in the study were included without any limitation, and the exclusion criteria were dissatisfaction and failure to complete the questionnaire.

A researcher-made questionnaire compiled using the Delphi method was employed to collect data. First, after reviewing the texts and unstructured interviews with specialists, the initial components and indicators were prepared for submission to the panel of experts. The panel of experts consisted of ten experts in the field of medical informatics who, in the first round of Delphi, commented on the relevance or irrelevance of each component and indicator to the subject of research and presented their suggestions. 21 indicators out of 30, which were accepted according to the experts, along with 10 indicators suggested by them, were sent to the second round of Delphi for ranking. Subsequently, for experts' consensus, the third round of Delphi was held, and 25 indicators were agreed upon and finalized. Based on the final components of the questionnaire, it consisted of three parts, the first part of 6 questions related to demographic information including age, gender, level of education, years of experience, specialty; the second part of 5 questions related to physicians' knowledge about telemedicine services, and the third part that consisted of 14 questions related to physicians' attitudes towards using the telemedicine system. The questions about physicians' knowledge of and attitude toward telemedicine-based services were adjusted from "low" to "high" on a 3-point Likert scale.

The validity of the instrument was confirmed by ten experts and professors (CVI = 0.8, CVR=0.6). In addition, the reliability was evaluated 14 days afterwards using a retest method (r=0.9). The collected data was entered into SPSS software version 26 and analyzed by descriptive statistics.

In order to collect data, a letter of introduction was taken from the officials in Mashhad University of Medical Sciences, and thence, the email addresses of physicians working in Imam Reza Hospital were given to the researchers. Finally, while stating the importance, goals, and application of the research results, they were asked to complete the questionnaire.

The study was approved by the ethics committee of Mashhad University of Medical Sciences (ID: IR.MUMS.MEDICAL.REC.1399.475).

RESULTS

The knowledge about and attitudes towards telemedicine among 133 specialists and subspecialists were investigated in this study. Among the participants, there were 25 internists, 14 anesthesiologists, 10 cardiologists, 9 emergency medicine specialists, 9 radiologists, and 9 dermatologists, who had the most significant number of specialists. Moreover, 56% of the participants were male, and 44% were female (Table 1).

TABLE I. DISTRIBUTION OF SAMPLES SHOWING GENDER, FIELD, AGE GROUP, AND YEARS OF EXPERIENCE OF PHYSICIANS

Categories	Number (%)
GENDER	
Female	57 (44%)
Male	76 (56%)
FIELD	
Internal	25 (19%)
Anesthesiology	14 (11%)
Cardiology	10 (6%)
Emergency Medicine	9 (7%)
Radiology	9 (7%)
Dermatology	9 (7%)
Urology	6 (4%)
Pathology	5 (4%)
Pediatrics	5 (4%)
Infectiology	7 (5%)
Forensic Medicine	7 (5%)
Surgery	1 (1%)
Obstetrics and Gynecology	8 (6%)
Occupational Medicine	6 (5%)
Otolaryngology	2 (2%)
Hematology	5 (4%)
AGE GROUP	
28-42	26 (19.5%)
43-55	70 (52.6%)
>56	37 (27.8%)
YEARS OF EXPERIENCE	
<5	26 (20%)
5-10	23 (17%)
11-15	42 (32%)
16-20	31 (23%)
>20	11 (8%)

The average age and years of experience for these individuals were 49.9 ± 8.6 and 13.4 ± 7.6, respectively. 76% of the participants were specialists, and the remaining 24% had a sub-specialty education.

Investigating the attitudes of the participants towards telemedicine indicated that it was "high" among 50% of them. Out of 5 maximum scores, the average score was 4.08, with a standard deviation of 0.36. The results revealed that there was no significant difference between physicians' attitudes and gender, level of education, years of experience, and age group (Table 2).

TABLE III. PHYSICIANS' ATTITUDES BASED ON DEMOGRAPHIC CHARACTERISTICS

Category	Subcategory	Attitude			P-value
		LOW	Medium	High	
Gender	Female	9 (15.8%)	36 (63.2%)	12 (21.4%)	0.88
	Male	14 (18.4%)	48 (63.2%)	14 (18.4%)	
Education	Specialists	21 (20.8%)	59 (58.4%)	21 (20.8%)	0.26
	Sub-Specialty	2 (6.3%)	25 (78.1%)	5 (15.6%)	
Years of experience	Less than 5 years	2 (7.7%)	17 (65.4%)	7 (26.9%)	0.32
	More than 5 years	21 (19.6%)	67 (62.6%)	19 (17.8%)	
Age	28 - 42	2 (7.7%)	16 (61.5%)	8 (30.8%)	0.91
	43 - 55	12 (17.1%)	46 (65.7%)	12 (17.1%)	
	> 56	9 (24.3%)	22 (59.5%)	6 (16.2%)	

Moreover, the study of the average score of physicians' knowledge showed that the physicians had a “medium to high” level of knowledge about telemedicine counseling. However, there was no significant difference between physicians' knowledge and gender, level of education, years of experience, and age group (Table 3).

TABLE IIIII. PHYSICIANS' KNOWLEDGE STATUS BASED ON DEMOGRAPHIC CHARACTERISTICS

Category	Subcategory	Number	Average	Standard Deviation	P-value
Gender	Female	57	2.43	.68	0.44
	Male	76	2.34	.65	
Education	Specialists	101	2.35	.70	0.29
	sub-specialty	32	2.49	.49	
Years Of Experience	Less than 5 years	26	2.56	.59	0.11
	More than 5 years	107	2.34	.67	
Age	28 - 42	26	2.63	.56	0.09
	43 - 55	70	2.32	.64	
	> 56	37	2.31	.73	

DISCUSSION

The application of ICT in the healthcare domain is affected by many issues. Among others, human-related components such as knowledge and attitudes towards technology are of great importance (22). A survey at Michigan State University, USA, and other similar studies show that attitudes and perceptions are very important while investigating

the view of health professionals on telemedicine. In order to address these issues, purposeful strategies should be considered to facilitate the application of technology (23).

The COVID-19 pandemic provided sufficient motivation for the healthcare system to turn to remote care to minimize contact (6, 24). The health system needs to provide virtual medical care if possible to keep patients at home while providing them with essential medical care (25).

According to the findings of the present study, physicians had an excellent knowledge of telemedicine. Mir Hosseini et al. (2014) mentioned that specialists and staff of health care centers of Kerman University of Medical Sciences have a good knowledge about and attitude towards telemedicine technology and its efficiency (26). In addition, Meher et al. (2009) stated that most physicians in the hospitals of India have an "above medium" level of knowledge about telemedicine counseling, which was similar to the findings of our study (27). The study by Ashfaq et al. likewise showed that physicians have a clear understanding of the need for and practical techniques of this technology (28). Furthermore, a 12% response rate to current knowledge of telemedicine technology was reported in a study on 2,987 Italian physicians by Gagioli et al. (2005) (29) and in a study by Alhajri et al. (2021), which was conducted with the aim of evaluating physicians' attitudes towards telemedicine counseling during the COVID-19 pandemic, a positive attitude and knowledge was reported (30). These are consistent with the results of our study.

On the other hand, Zayapragassarazan et al. (2016) believed that knowledge and attitudes about telemedicine were not sufficient among health professionals (10). A similar study in Mashhad teaching hospitals showed that health professionals had little knowledge about telemedicine, but most of them had a positive attitude about it, which indicated a generally positive attitude (31). It has additionally been previously reported that physicians had little knowledge about telemedicine, which acted as a barrier to implementation (32, 33).

According to the findings of this study, the specialists had a positive attitude toward using telemedicine and its effective role in helping treatment and prevention of diseases, and they confirmed the need to use it. Consistent with the results, researchers concluded that physicians agreed with structural changes in organizations for telemedicine, having a program in the development of telemedicine, having access to telemedicine hardware, and increasing students' skills in using computers and the Internet to create and develop telemedicine methods (34-36).

A notable limitation of the present study is that physicians, due to their busy schedules, may not have had sufficient time to provide comprehensive responses to the survey questions. This time constraint could potentially affect the depth of data collected. The lower response rate can indeed impact the generalizability of the findings. In addition, the exclusive focus on public hospitals may limit applicability to private healthcare settings.

CONCLUSION

Telemedicine is an advanced and useful way of providing healthcare services such as diagnostics and treatment. Although it is constantly evolving and developing day by day, it still deals with many obstacles and challenges in four areas of technology, organization, user, and economy. According to the results of this study and considering the probable occurrence of COVID-19-like pandemics in the near future, the establishment of telemedicine in healthcare centers seems vital, given that using this technology not only reduces treatment costs but also increases the speed, accuracy, and quality of care provided to patients and injured people.

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CONTRIBUTORSHIP STATEMENT

Conceptualization: SMT and HRR, Data curation: HRR and MRK, Formal analysis: MTS

Methodology: SMT and MTS Writing – original draft: MRK and NSH, Writing – review & editing: SMT and MRK. All authors are responsible for the content of the manuscript.

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DECLARATION OF CONFLICTING INTERESTS

The authors declared no conflicts of interest regarding the research, authorship, and publication of this article.

DATA AVAILABILITY STATEMENTS

The data will be made available by the corresponding author upon reasonable request.

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