

ORIGINAL ARTICLE

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Evaluation of possible telehealth scenarios in Turkey by family medicine residents in Izmir**Arif Erbayraktar¹, Esra Meltem Koc², Gulseren Pamuk²**¹Public Health Center, Afyon, Turkey²Izmir Katip Celebi University, Faculty of Medicine, Department of Family Medicine, Izmir, Turkey

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**Abstract**

This study aims to evaluate the socio-demographic characteristics of the family medicine residents in Izmir, their thoughts on telehealth and possible scenarios on this topic. It aims to find a correlation between these variables and to increase awareness of telehealth. 158 physicians, who were doing their family medicine residencies in training & research hospitals and university hospitals in Izmir, took part in our cross-sectional study by answering an online survey. After informing the participants of the study's details, we obtained an informed consent from each volunteer. We applied the survey on socio-demographic and general information about telehealth, which we prepared in alignment with the relevant literature. The participants went through fictionalized scenarios and their input was recorded. 48.1% of the participants were female, 51.9% were male, and the mean age was 28.82 ± 4.53 . 76.6% of the participants stated they had heard of telehealth before. According to the replies, radiology was the most common area of telehealth applications with 84.8%, and the telehealth target group was physically disabled with 81.0%. The approval rate of the most accepted scenario was 98.1% (Screening Notification). While the most common benefit of the scenarios was increased access to health care, the most common obstacle was technical prerequisites. We concluded that most physicians were aware of telemedicine and they wanted the scenarios to be implemented in common practice. They stated that they can adapt to scenarios higher than patients. Considering the willingness of physicians to implement telehealth practices, the necessary studies and regulations about telehealth should gain momentum in our country.

Keywords: Telehealth, telemedicine, family medicine**Introduction**

Since the beginning of remote access in medicine, telecommunication systems have become more accessible. The most important reasons for this are the widespread use of internet-based applications and smartphones [1].

Until the beginning of the COVID-19 pandemic, telehealth applications were considered as an alternative option for citizens who had difficulties accessing a hospital or could not go at all to the hospital. Today, we can see that telemedicine can have an application area for any situation where it is necessary to receive health care without physically going to a health institution (1). During the COVID-19 pandemic, telehealth had an imperative position at the core of the medical field's response to this pandemic [2].

A telehealth system is a system that includes information transfer tools such as audio, display, chat, video, communication technology such as phone line, satellite connection, digital wireless connection, computer, fax, and mobile phone. This system provides two-way, audiovisual communication between health professionals and the patient [3]. Telehealth also increases efficiency, helps reduce costs, and enables healthcare providers and hospital systems to provide more for more people [4].

There are four components mentioned by the WHO regarding telehealth: Firstly, its purpose is to provide clinical support. Secondly, it aims to connect users who are not in the same place by eliminating geographical barriers. Thirdly, it involves the use of various types of ICT (Information and Communication Technologies). The ultimate goal is to improve health care outcomes [5].

This study aims to have family medicine residents working in Izmir evaluate possible telehealth scenarios in Turkey. In this context, we aim to determine the telehealth scenarios that health workers in

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our country can adapt to more conveniently, the factors affecting convenience, the benefits that we can achieve through possible scenarios, and obstacles that we can face along the process.

Materials and Methods

This research is designed as a cross-sectional and descriptive type of study. Volunteers filled out an online survey during the time frame between 22 January 2021 and 15 February 2021. The population comprises 267 physicians going through their family medicine residencies in training & research hospitals and university hospitals in Izmir. When setting the parameters of power of analysis at 80%, margin of error at 5%, unknown frequency at 50% and deviation at 5%, the sample size was calculated as at least 158.

The three-part survey was conducted online via Google Forms. The survey used in the study was prepared by researchers based on information in the literature [6,7]. In the first part of the survey, there were questions about the characteristics of the participants, in the second part about general opinions on telehealth, and in the third part, there were questions about possible scenarios created for telehealth, using the studies of Halus and Pehlivan [6,7].

In the first section, there were questions on gender, age, time spent in the profession, relationship with internet-connected devices (computers, tablets, smartphones, etc.), and familiarity with the concept of telehealth.

In the telehealth overview section, we asked questions to determine potential medical fields, target groups, and healthcare levels for telemedicine implementation. We asked the participants their opinion on how telehealth applications would affect healthcare costs compared to existing applications, whether it is necessary to include telehealth in medical school curriculums, and how the pandemic process affects the views on this topic.

The third part, called potential telehealth scenarios, contains four telehealth scenarios prepared by researchers inspired by telehealth practices in the literature [7]. We questioned the approval rate, possible benefits, possible obstacles, innovation score, physician compliance score, and patient compliance percentage regarding Scenario 1 (Reminder), Scenario 2 (Preventive Health Services), Scenario 3 (Screening Notification) and Scenario 4 (Medical Home). Scenarios are shown in Table 1.

The ethics committee approval required for the research was obtained from the Izmir Katip Celebi University Non-Interventional Studies Ethics Committee (Decision Date: 21/01/2021, Decision No: 0010).

Statistical Analysis of Data

Statistical analyses were performed using the Statistical Program for Social Sciences (SPSS) Statistics® v21.0 package program.

Whereas descriptive analyses for numerical variables were presented as mean, median, standard deviation, and min-max value, for categorical variables, they were presented as numbers, ratios, and percentages.

Normal distribution of the data was tested with Kolmogorov-

Smirnov test. In cross-group comparisons, Chi-square and Fisher's exact tests were used in accordance with the variable characteristics. Values below $p=0.05$ were considered statistically significant.

Table 1. Possible Telehealth Scenarios Included in Survey

No	Scenario
Scenario 1 (Reminder)	The measurements of parameters that require monitoring for chronic diseases are made through smart digital devices in the individual's home (blood pressure device, glucose meter, pulse oximeter, temperature meter, scale, etc.), and are transferred to the system via the internet. This data is monitored periodically. If the predetermined limit values are exceeded, an informative message goes to the physician. When necessary, the patient is invited for a consultation.
Scenario 2 (Preventive Health Services)	When chronic disease risk factors (obesity, physical inactivity, unhealthy nutrition, etc.) are detected, educational materials (educational images, videos, etc.) are transferred to the patient using information and communication technologies. Health-enhancing interventions (healthy eating, physical exercise, etc.) are determined and planned in the consultancy of health personnel. The patient's compliance with these interventions is monitored periodically through wearable technologies (smart wristbands, smartwatches, etc.).
Scenario 3 (Screening Notification)	A reminder message is sent to individuals who need a cancer screening (breast cancer, cervical cancer, colorectal cancer). They are notified with instructions to follow, and they are informed remotely about cancer screening with educational video material.
Scenario 4 (Medical Home)	Patients enrolled in home healthcare services programs review their previously used and newly prescribed medications, materials and disability reports without coming to the hospital and without the physician visiting at home.

Results

There were 158 participants of which 48.1% were female, 51.9% male, and whose mean age was 28.82 ± 4.53 . The average time of participants' medical practice was 3.78 ± 3.54 years. We asked participants about their tech-savviness with internet-connected devices (phones, computers, tablets, etc.). We asked them to answer on a scale from 1 to 5, 1 being "very bad" and 5 being "very good", and then we obtained a technological aptitude score. The average technological aptitude score was 3.95 ± 0.87 . 76.6% of the participants said they were familiar with telehealth.

In the telehealth overview section, the most common answers to the question on the general uses of telehealth were radiology with 84.8% and preventive health services with 82.9%. According to the answers, the potential target groups of telehealth applications were individuals with physical disabilities (81.0%), individuals living in a restricted environment (75.3%), and the elderly (74.7%). When asked about the levels of healthcare where telehealth could be applied, while 58.2% of participants said it could be applied on all levels and 22.2% in primary care, 3.2% of the participants stated that telehealth could not be applied at any level.

89.2% of the participants responded that telehealth would reduce the cost of health care, 84.2% stated that telehealth should be part of medical school curriculums, and 85.4% said that the pandemic positively affected their views on telehealth.

According to the participants, the approval rates for every

fictional telehealth scenario were 98.1% for Scenario 3, 86.7% for Scenario 2, 81.0% for Scenario 1 and 79.7% for Scenario 4. When questioning possible benefits and obstacles for each scenario, the most common benefit was the increase in access to health care with 72.7%, and the most common obstacle was technical prerequisites with 61.6% (Table 2).

Table 2. The participants' responses on possible benefits and obstacles of telehealth scenarios.

		Scenarios			
	Mean	1	2	3	4
Benefits*					
Increased Access to Health Care	72.7	69.6	70.3	81.6	69.6
Increased Quality of Health Care	58.4	49.4	52.5	81.0	50.6
Decreased Costs of Health Care	69.3	69.6	67.1	72.2	68.4
Development in Physician Patient Relationship	40.2	36.7	31.6	57.0	35.4
Increase in Patients Literacy on Health	57.3	53.8	58.9	77.2	39.2
Increasing Patients' Quality of Life	59.3	55.7	60.1	74.7	46.8
Saving Time for Physicians and/or Patients	67.2	70.9	60.1	71.5	66.5
No Benefits	4.1	5.7	3.8	0.6	6.3
Obstacles*					
Data Security and Privacy	41.1	57.6	43.0	31.6	32.2
System Installation Cost	49.2	54.4	60.1	35.4	46.8
Legal Regulations	49.2	56.3	50.0	39.9	50.6
Technical Prerequisites	61.6	72.8	70.9	47.5	55.1
Inadequate Medical Care	27.7	31.0	25.3	17.7	36.7
Malpractice Problems	39.5	54.4	36.7	20.3	46.2
Deterioration in Physician-Patient Relationship	26.1	32.9	28.5	15.2	27.8
Refusal of Health Workers	26.1	33.5	32.9	14.6	23.4
Refusal of Patients	37.5	39.2	44.9	27.2	38.6
Refusal of Administrators	21.8	23.4	24.7	15.2	24.1
No Obstacles	11.2	4.4	5.1	27.8	7.6

*The participants have answered with multiple options.

When asked how innovative they thought the scenarios to be, and told to scale their answers from 1 to 5, participants evaluated an average innovation score of 3.87 (Table 3)

Table 3. The participants' estimated rate for each scenario in regards to innovation, physician compliance and patient compliance

	Mean	Scenarios			
		1	2	3	4
Innovation score*	3.87	3.83	3.93	4.00	3.72
Physician compliance score**	4.01	3.80	3.92	4.53	3.82
Patient compliance presumed percentage	42.3	37.16	36.85	51.56	43.65

* An answer scaling from 1 to 5 was required. (1=the least, 5=the most), **An answer scaling from 1 to 5 was required. (1=never, 5=always)

We asked participants whether they could adapt to one of the scenarios in case it was implemented and requested to answer on a scale from "1= I could never adapt" to "5= I can adapt at any circumstances". According to the participants, the average value of the compliance score was 4.01 (Table 3).

Participants assessed the patient compliance score as well for each possible scenario and the average value was 42.3% (Table 3).

Discussion

In our study, 76.6% of the participants said they had previously heard of the concept of telehealth. In a study comprising primary care health workers in Bolu, the frequency of familiarity with telehealth of the participants was 54.4% [7]. A 2019 study conducted by Kissi et al. in Ghana found that 72.2% of healthcare workers had previous experience with telehealth practice [8]. The frequency of familiarity with telehealth in these studies is compatible with the other studies in the literature. The high frequency in our study can be because of the increasing prevalence of telehealth today due to the pandemic and the fact that we have started to include more and more physicians who use telehealth in the health sector.

In this study, 89.2% of participants responded that telehealth would reduce the cost of health care. In the study of Kim et al., 47.2% of family physicians stated that telehealth would increase the cost of health care, and 41.7% said that it would not change [9]. In a 2019 study by Wernhart et al. with medical students and physicians in Austria, 39.5% of participants said that telehealth would reduce the cost of health care, 39.2% stated it would not change it, and 21.2% said it would increase it [10]. Many publications say telehealth practices reduce the cost of health care [11–13]. In this study, we can understand that family medicine residents respond more accurately about costs. In this study, the frequency of answers, inclining possible reduced costs, was higher compared to other studies and this can be due to the positive attitude of the participants towards telehealth.

84.2% of the participants said telehealth should be part of medical school curriculums. In this study, the fact that 23.4% of physicians had not heard of telehealth before indicates a gap in the curriculum. In Pehlivan's study, 72.5% of the participants thought telehealth should be part of medical schools and other health-related schools' curriculums [7]. In the study of Wernhart et al., 74.7% of physicians and 82.9% of medical school students stated that they did not feel well-informed about telehealth [10]. These results show the physicians' need for training and a lack of information on the medical education curriculum.

85.4% of the participants stated that the pandemic positively affected their view of telehealth. During the pandemic period, the need and frequency of telehealth applications increased all over the world. The Centers for Disease Control and Prevention has instructed that the use of telehealth health during this period will have benefits for reducing transmission for both patients and healthcare workers [14]. Withal, we can say that the awareness and demand towards telehealth have increased during the pandemic process.

98.1% of participants wanted Scenario 3, 86.7% wanted Scenario 2, 81% wanted Scenario 1, and 79.7% wanted Scenario 4 to be

implemented. Although previous research has shown that health workers are one of the most important barriers to telehealth practices [6,9,15] in this study, the majority of family medicine residents responded positively to all scenarios. With this result, we can assume that the participants' view of telehealth is positive.

The average innovation score of the scenarios was 3.87. In Jungwirth and Haluza's study, 75.8% of physicians found the scenarios presented in telehealth innovative [15]. In Pehlivan's work, every scenario was innovative [7]. This result shows us that the scenarios are innovative.

Participants stated that an average of 42.3% of patients could adapt to telehealth practices. Studies show that patients who use telehealth applications are satisfied with these applications [12,16,17]. Since the studies carried out in Turkey are not on patients, a unilateral point of view may not reflect the correct information. In other studies, the adaptation to the telehealth applications that are up and running is quite adequate, contrary to the results of our study. It can be said that with the introduction of telehealth applications in Turkey, there will be a better consensus among patients than expected. Conducting studies with patients on telehealth will ensure that both demand and supply are evaluated correctly.

Strengths and limitations

The first strength of this study is that it is the first study in Turkey to evaluate the opinions of family medicine residents regarding telehealth and possible scenarios. Secondly, family medicine residents are the group that can look at the subject from the most widespread perspective, as they rotate in different residencies during residency training and can also evaluate the subject from the perspectives of these areas. Thirdly, the participants were not just asked telehealth information through some questions but were asked to answer through scenarios that they could visualize more concretely in their minds. The results from the scenarios may shed light on some future telehealth applications.

Some limitations to this study could be the fact that only family medicine residents participated in this study. We could have obtained more accurate results if physicians from other branches participated. Secondly, the scenarios in the study were created by the researchers, inspired by telehealth scenarios around the world. There is no information about telehealth practices in Turkey. Even if similar scenarios are applied in Turkey, their content and the way they are applied may change and this may change the outcome of the study. Thirdly, the study is carried out only with physicians, without including other healthcare personnel, health policymakers, and patients. Since healthcare is a service that needs to be evaluated from different points of view, larger studies should be carried out with the opinions of other stakeholders on the subject. Fourth, the study was carried out only in Izmir. A study conducted in various parts of Turkey can lead us to more accurate results.

Conclusion

Radiology is the most frequently and successfully used telehealth application in Turkey and the world. According to the study, telehealth practices about preventive health services will be adopted more quickly by physicians. The lack of education revealed in the study should be addressed by future arrangements. The positive

view of telehealth during the pandemic period in our country will contribute to facilitating compliance and reducing costs. Since these applications will prevent the contact of the patient-doctor, they can also prevent the risk of transmission.

In the analysis, we learned that having knowledge of telehealth beforehand was a positive factor in approving Scenario 2 and Scenario 4. This result once again revealed the importance of education about telehealth.

The most common possible benefit expected from the scenarios has been increased access to health care. During the pandemic, the access of society to health centers is restricted. Telehealth is a very important area to ensure that the health service in the country is not disrupted, as it will increase access and save time. More investments in telehealth should be made to strengthen our capabilities in the health sector.

The most common obstacle in all scenarios is technical prerequisites. Physicians' confidence in practice can be increased by eliminating technical barriers to applications.

Conflict of interests

The authors have not declared any potential conflicts of interest related to the research, authorship and/or publication of this article.

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Ethical approval

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