

The Increasing Importance of the e-Health System after the COVID-19 Outbreak with New Healthcare Expectations

Zerrin Gamsızkan¹, Abdulkadir Kaya², Mehmet Ali Sungur³

¹Department of Family Medicine, Duzce University Medical Faculty, Duzce, Turkey. ORCID iD: 0000-0001-8677-4004. zgamsizkan@yahoo.com (Corresponding Author)

²Department of Family Medicine, Duzce University Medical Faculty, Duzce, Turkey. ORCID iD: 0000-0003-1725-1220

³Department of Biostatistics and Medical Informatics, Duzce University Medical Faculty, Duzce, Turkey. ORCID iD: 0000-0001-5380-0819

ABSTRACT

Aim: The health system is undergoing a rapid transformation with the constantly developing world. The Covid-19 pandemic that threatens humanity seems to change the health system as in every field. The study aimed to determine the use of the e-Health system before and after the pandemic and how health services have changed after the pandemic.

Methods: The study was designed with a mixed method that includes analysis of qualitative and quantitative data. The quantitative data of the study were collected with the help of a questionnaire before the pandemic. Qualitative data acquisition and analysis were carried out after the pandemic.

Results: According to the results of the study, the rate of participants who did not use the e-Health system before the pandemic was 73.5% (n=155). When asked about the reasons for not using the e-Health system; 43.2% of the participants (n=67) stated that they did not need it, 28.4% (n=44) were not aware of the system and 28.4% (n=44) stated that they did not know how to use the system. According to the qualitative data results, five main themes were obtained after the Covid -19 outbreak. The themes were; getting health information and guidance remotely during the pandemic is the best alternative, creating a sense of trust, compliance with the new situation, expectations from the health system in the new period, and expectations for guidance in accessing e-health information.

Conclusion: The most important result of this study, the increase in the use of distance health and e-health, seems to be the framework of the new health service. When the results are read in this context, it can be predicted that a large share of the investments in the field of health will be shifted to digital health systems.

Keywords: e-Health, digital health, COVID-19, expectations, pandemics

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Introduction

In our daily lives, sharing information, recording data, and making them accessible when necessary give positive results to improve service quality by various institutions. Personal health data and health information have started to be widely used in the field of health with the opportunities provided by technology (1). Easily available health information, smart health applications, and personal health records are increasingly preferred by both patients and healthcare professionals (2). With such developments, patients can access counseling services and effective health information both online and offline without geographical restrictions (3).

In Turkey, the Ministry of Health developed the E-Pulse Personal Health System in 2015. Service items that can be reached on the E-pulse Personal Health System include, information such as the medical history of the person, prescription information, medication reminders, allergy information, and vaccinations. Patients can make appointments from hospitals and communicate with their physicians through this system (4). The system can also be downloaded as a mobile phone application and followed by users. In 2018 the Ministry of Health also developed a telemedicine project integrated with the E-Pulse system, a portal where patients can access their radiological images online (5). Today, examples of these systems, which are associated with an increase in improved communication and care quality, are increasing day by day (6,7).

The main concept of our study was to investigate the use of remote health systems such as E-pulse and telemedicine that make life easier. With the idea that determining the qualitative meanings of health information and service usage characteristics of individuals will be a guide for the health policies to be created, we planned our study in two stages, where quantitative and qualitative data could be gathered together. While planning interviews for qualitative data after collecting quantitative data, the world unexpectedly started to struggle with a viral pandemic. In a short time, people needed more effort to reach

remote healthcare and health information than ever before. According to our literature research on the subject, we have seen that after this unexpected pandemic, there are new attempts and information flows to increase the accessibility of health information that will protect public health (8). At a time when it is risky for people to go out, trying to access health information remotely is a natural reflex. It has been reported that daily telemedicine visits increased eight times in one and a half months with the onset of the pandemic in America (9).

With this new context; our study aims is to evaluate the situation of monitoring remote health systems such as E-pulse and telemedicine before COVID-19 and to determine whether there is a change in the perspective of people about these systems after the pandemic.

Methods

The study was designed with a mixed method that includes analysis of qualitative and quantitative data. For the quantitative part of the study, after a literature review including health records and attitudes towards medical informatics, a questionnaire was created by interviewing informatics experts. After considering the possible shortcomings of the survey and a pilot test was conducted with 30 participants, our survey was finalized. The questionnaire was sent to participants via mobile phones. In the qualitative dimension of the research, the focus group interview method was used as the screening model, which is one of the qualitative research methods (10). Two focus groups with nine participants were formed. An unstructured interview was planned in the focus group meeting. Thus, the aim was to create a conceptual framework that will enrich the interaction of new ideas and experiences that may occur during the interview. Two open-ended questions were asked at the beginning of the focus group meeting. In the later stages of the meeting, three new questions emerged depending on group dynamics (Table 1). Data were analyzed using Frame Analysis. The Framework analysis method is a systematic and flexible approach to analyzing qualitative data and is increasingly used in health research (11). Responses

were organized considering the differences and similarities of participants' responses. Coded data were gathered to create themes.

Table 1. Follow-up questions inspired by the discussion with the focus group

The main questions asked for the unstructured interview;

1. Has there been any change in following your health information with the means of communication after the pandemic?
2. What do you think about providing health services and your necessary health information and needs remotely especially after this period?

Subtitle questions that occurred after the thoughts developed in the group during the interview;

3. What are your expectations of health services in the next period?
4. What do you think about providing your health needs remotely in the future?
5. How ready do you feel for remote healthcare?

We determined inclusion criteria for the study to whom we sent the questionnaire as being over the age of 18 and being able to use the Internet and mobile phone. The questionnaire created for the study was sent to the participants via google forms. In the study, no sample was selected for participant selection, and the data were collected by the snowball method, which was sent by reaching each other. Participants were asked to add their e-mail addresses while answering the questionnaire to reach them later for creating a focus group. Focus group participants were selected from those who do not use the e-Health system.

Ethical permission was obtained for the study from the Ethics Committee of Düzce University Faculty of Medicine (approval no. 2019-201). All participants approved the consent form to participate in the study.

Quantitative data mean \pm standard summarized as deviation. Group independent of the two groups in their comparison two groups t-test, three or more groups one-directional variance analysis, and LSD post hoc test used. Statistical analysis was conducted in the SPSS v.11.5 package program, and results of $p < 0.05$ were considered significant. For the qualitative data analysis, framework analysis was used.

Results

In our study, the rate of return of the survey was 40.5%. A total of 211 people answered the survey (64% female, 36% male). Of the participants, 45% (n=95) were an officer, 9.5% (n=20) a worker, 25.6% (n=54) self-employed, 15.6% (n=33) a housewife, and 4.3% (n=9) retired. When the educational level of the participants was questioned, it was found that 64% (n=135) were graduates of higher education, 21.8% (n=46) were primary school and 14.2% (n=30) were high school (Table 2).

Table 2. Sociodemographic characteristics of participants

		Number (n)	Percent (%)
Gender	Female	76	36.0
	Male	135	64.0
Age	18-20	9	4.3
	21-30	35	16.6
	31-40	64	30.3
	41-50	88	41.7
	51-60	13	6.2
	<60	2	0.9
Education	Primary school	46	21.8
	High school	30	14.2
	University	135	64
Job	Housewife	33	15.6
	Worker	20	9.5
	Civil servant	95	45
	Self-employment	54	25.6
	Retired	9	4.3
Marital Status	Married	153	72.5
	Single	58	27.5
Income Status	<4000₺*	120	56.9
	>4000₺	91	43.1

*: Monthly income

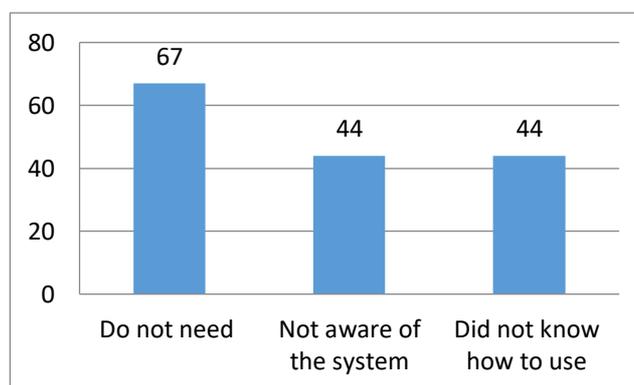


Figure 1. Reasons for not using e-Health system

The e-Health system usage rate was determined as 26.5% (n=56). When the participants were asked why they did not use the system, 43.2% (n=67) of participants stated that they do not need it, 28.4% (n=44) stated that they were not aware of the system, and 28.4% (n=44) did not know how to use the system (Figure 1). No significant difference was found between male and female participants in terms of using the e-Health system (p=0.214). While there was no significant difference between the use of the e-Health system and age, it was determined that the participants used the system more as their education level increased (p<0.001) (Table 3).

Table 3. Relationship Between Gender and Educational Status and Usage of e-Health System

	Using of e-Health system	Searching health information on net	p
Education	Primary	14	p<0.001
	High school	18	
	University	98	
Gender	Male	24	p=0.214
	Female	32	

In the study, the information areas used in the system by the participants were; prescription information 26.1% (n=30), laboratory results 25.2% (n=29), hospital visit processes 20.0% (n=23), appointment information 17.4% (n=20), report information 9.6% (n=11) and vaccine information 1.8% (n=2) (Figure 2).

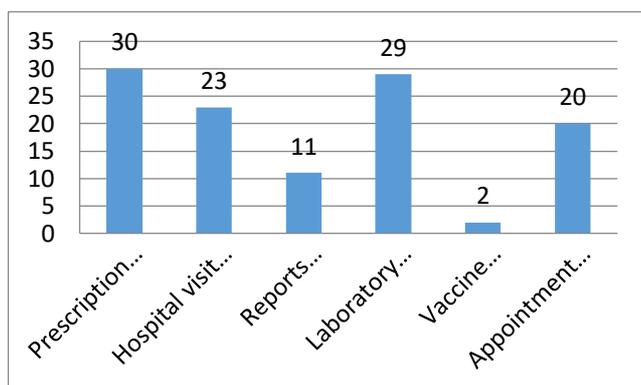


Figure 2. Usage areas of e-Health system and health informations

While 39.7% of the participants stated that the need to go to a health facility decreased after the use

of their health records, 60.3% said that no such change occurred. When the participants were asked whether they have any doubts about the safety of the application, 80.9% thought that the application was safe.

According to the qualitative data results, five main themes; ‘‘Theme 1: Getting health information and guidance remotely during the pandemic is the best alternative’’, ‘‘Theme 2: Creating a sense of trust’’, ‘‘Theme 3: Compliance with the new situation’’, ‘‘Theme 4: Expectations from the health system in the new period’’ and ‘‘Theme 5: Expectations for guidance in accessing e-health information’’ were obtained (Table 4).

Table 4. Themes formed by expectations of participants' access to e-health systems and health information after the pandemic

Main Themes	Total comments
1. The best alternative	10
2. Creating a sense of trust	7
3. Compliance with the new situation	12
4. Expectations from the health system	7
5. Expectations for guidance in accessing e-health systems	11

Theme 1: Getting health information and guidance remotely during a pandemic is the best alternative

A total of 55.5% (n=10) of the participants described the main reason for this difference after the pandemic as an alternative to helplessness. Some of the participants' statements on the subject are as follows:

‘I should not get sick in any way. I guess I'll call the authorities over the phone when I get sick.’ (45-year-old woman)

‘My mother has heart failure. I can't take her to the hospital; it's best to print her prescription remotely and take her medication.’ (47-year-old man)

Theme 2: Creating a sense of trust

A total of 38.8% (n=7) of the participants focused on a sense of confidence in the face of uncertainty, stating that e-health service is more reliable than other

health information on the internet. A statement of a participant is as follows:

‘Whenever I called my family doctor, he always gave clear answers. He wrote my online prescription so I could take my medicine; it made me feel safe.’ (39-year-old woman)

Theme 3: Compliance with the new situation

A total of 66.6% (n=12) of the individuals participating in the focus group interview stated that the opportunity to receive remote healthcare for both themselves and their families was comforting and resolved their concerns.

‘It is very calming for me to use our information to obtain consultancy in a digital environment when we want and that our health information is stored correctly in these difficult days.’ (43-year-old woman)

‘I am an asthma patient. I connected to my doctor online. It made me very comfortable, and I am very grateful.’ (44-year-old woman)

Theme 4: Expectations from the health system in the new period

A total of 61.1% (n=11) of the participants stated that the health system will change during and after the pandemic and their demands are in this direction. At the same time, they expressed their expectations regarding easier access to health records in the digital environment.

‘I think that the pandemic will change service and information access in healthcare.’ (44-year-old woman)

‘I would like to access the health information of myself and loved ones more easily for the safety of me and my children. I would also like to make an appointment not only in healthcare but also in an electronic environment and to meet my various needs.’ (46-year-old man)

‘I think that technology will be used more in the field of health. There are some developments I have heard, some innovations such as remote examinations; this is very assuring.’ (48-year-old man)

Theme 5: Expectations for guidance in accessing health information

During the meeting, three participants stated that they had not used the system before, they were

unaware of this issue, and it should be promoted more. Four participants stated that they tried to use the system before but failed. Explaining the previous experiences, the participants stated that guidance service is also required to use health information systems more effectively.

‘I think that my mother cannot make an appointment with these systems very easily. She needs guidance.’ (46-year-old woman)

Discussion

According to the quantitative data collected before the pandemic, only a quarter of the participants were actively using the e-health portal system. Similar to our results, in a study conducted in 2016, the majority of patients did not use advanced patient portals where health parameters were served (12). In our study, participants gave various reasons why they did not use the health record system, like not needing it, not knowing how to use it, and unawareness of the application. In a study by Ronda et al., 72.4% of patients reported that the reason for not using the patient health record systems was that they were not aware of the existence of such a system (13). In a qualitative study conducted in consultation with patient focus groups, Fix et al. (14) stated that patients complained of difficulties in registering for such patient information systems and recommended that healthcare providers should guide and encourage their patients to register with these systems. Similarly, in the qualitative part of our study, the participants also stated that they expect guidance from the healthcare providers for entry and use in the e-health systems.

In our study, there was no significant difference between male and female participants using the health records system or searching for health information on the Internet. Similarly, Munir et al. (15) reported that there was no difference between male and female participants in their interest in following personal health records. In a study conducted in 2014, in terms of gaining full access to electronic patient records, no significant differences were found for gender, age, or chronic illness (16). The participants in our study using the e-health system were mostly looking for

prescription and examination information, followed by report and appointment information. Similarly, in a study conducted in Korea, according to the results of use features of patient records and health information, the most used part of the system is the part where the patient examinations are recorded (17). In our study, one-third of the participants stated that the need to go to a health facility decreased after the use of health records. The results of a similar study indicated that the use of the e-health system resulted in fewer laboratory test requests and fewer hospital visits (18).

The collection and interpretation of qualitative data of our study took place after the pandemic. As is known, in the post-pandemic period, the frequency of hospital admissions and the habits of using the health systems have changed significantly (19). The majority of participants in focus group discussions stated that the opportunity to make an online appointment and access information relaxed them in pandemic conditions. In Italy, which was severely affected by the epidemic, physicians accelerated the application of telemedicine to their patients and carried out proactive interventions in emergencies (20). Given that risk groups should not go out during this period, it is said that getting remote assistance is beneficial (21).

In China, as of February, it was stated that hospitals were a potential source of COVID-19 cross-infection, so online consultations and internet-based drug prescription services began to be offered for patients with chronic diseases (22). As is frequently highlighted in the qualitative data results of our study, the continuation of remote healthcare and information flow, such as e-health, for elderly patients and those with chronic diseases create satisfaction in patients and indirectly in the health system. In this period when a new normal is talked about, the priorities of the health system are reviewed, and it is necessary to priorities the definition of service (23).

However, the fact that the resources accessed on the internet are not always accurate or scientific raises the idea that information should have some criteria for being correct. Al-Jefri et al. (24) planned a study on the criteria of health information quality and addressed this problem in their assessments. In the qualitative

findings section of our study, participants stated that general health information on the Internet is not reliable and should be checked.

In the focus group discussion, the participants expressed that they were also uncomfortable with intense and exaggerated information. In a study handling pandemic-related health reports and news, Liu et al. (25) found 7,791 news reports in only two months. The three main themes they described were prevention and control procedures, medical treatment and research, and global/local and social/economic impacts. The authors propose to address the real impact of mass media on readers through sentiment analysis of news data during the COVID-19 crisis to avoid panic and anxiety disorder during this period.

People are worried that their lives will continue to be threatened after this pandemic. However, despite these concerns, it has been observed that patient's health information is known and manageable to some extent by themselves, making the participants feel partly secure. After the pandemic, it seems inevitable to start discussing a 'new normal health system' instead of a 'normal health system' to continue our lives and duties. Similar guiding studies should be increased to plan the availability of health information safely in line with expectations. Health policies to be developed should include a 'new normal health system' considering the needs of all stakeholders. The concepts circulating in the world today make us think that we should keep up with change like never before. Although change is frightening at some points, it is essential for the development of humanity. Viral infections that do not have a drug and vaccine yet put people in different and changing expectations at the point of contact with the healthcare system and healthcare providers.

This study has some limitations. Since this is a cross-sectional study, the results cannot be generalized. In addition, as the surveys were sent over the Internet, participant characteristics may not be representative of the whole community. It cannot be said that the results reflect the whole society since relatively more educated participants are included in the quantitative data due to the need for Internet use

and electronic applications for the study. Considering these limitations, we can say that enriching individuals with qualitative data in a way that can measure their lives and affects them more deeply are the strengths of the study.

Conclusion

The results of the study reveal the new expectations of people from the health system due to the pandemic. Our study shows that people have new expectations from health system services such as

‘remote guidance for chronic diseases’, ‘reliable health information, and ‘accessible healthcare’ with this pandemic we are experiencing. During these and similar life events, patients want to solve their health problems safely and effectively. The results of the study also show that the participants are open to remote health service guidance and will follow the developments to be made in this regard. It is necessary to adapt e-health and telemedicine applications to health services correctly and rapidly in line with demands.

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