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A Research on the Perceptions of Individuals and Health Professionals about the Wearable Technologies Used In Healthcare Services

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ABSTRACT

The aim of this study is to provide information about wearable technologies used in healthcare services, to make a literature review about the accuracy of data obtained from these technologies, and to reveal the perceptions of individuals and healthcare professionals about using of wearable technologies in healthcare services. In this context, firstly, the literature regarding the wearable technologies used in health services and the accuracy of the data obtained from them were examined. Then, an online questionnaire was prepared by the researchers regarding the usage levels of wearable and traditional digital technologies and the accuracy of the data obtained from these technologies. The sample of the study consisted of 439 participants, 137 of whom were healthcare professionals. According to the results, 64.9% of the participants used smart phones to monitor their health indicators. Only, 9.6% of participants reported that they used smart watches while 9.8% of participants reported that they used smart wristband. 65% of the healthcare professionals recommended traditional digital devices to their clients for monitoring their health indicators. 82.5% of the healthcare professionals reported that they would trust more the data obtained from pulse while only 5.1 of the healthcare professionals reported that they would not trust the data obtained from traditional digital devices nor wearable devices. The responses of the participants regarding the usage of wearable technologies and digital devices were differed significantly according to participants' profession, education, and age groups ($p < 0.05$).

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INTRODUCTION

Wearable technologies become more and more important every day with the development and digitalization of technology (Lou, Wang, Jiang, Wei, & Shen, 2020). The production of these technologies has increased tremendously in recent years, leading to their usage becoming widespread and spreading to more industries (Fuller et al., 2020; Saleem et al., 2017). Wearable technologies provide many facilities in the areas where they are applied (Kristoffersson & Lindén, 2020). Their economic effects cannot be ignored in Turkey as well as in all countries. According to 2019 statistics of Turkish Information Technologies and Communication Authority, 77% of population use smartphones in Turkey. 9% of population use wearable technology such as wristbands and smart watches and 71% of population between the ages of 16 and 24 want to use wearable technology. The wearable technology market has grown by 55% until 2020. The total sales of wearable devices, which were 3.3 billion in 2020, is expected to reach 5 billion by 2026. The global size of the remote healthcare market in 2018 was $ 34.28 billion. It is estimated that it will be $ 185.66 billion in 2026 (Turkish Information Technologies and Communication Authority, 2020).

Wearable technologies provide continuous monitoring of physiological and biochemical parameters as well as human physical activities and behavior throughout daily life (Purohit, Kumar, Mahato, & Chandra, 2020). The smartphone is often used for information collection, storage, monitoring, and transmission to a remote server for analysis (Li, Ma, Chan, & Man, 2019). Big data produced by wearable devices is both a challenge and an opportunity for researchers who can apply more artificial intelligence techniques to these data in the future (Chawla, 2020; Din & Paul, 2019). It can directly influence clinical decision-making (Haghi & Deserno, 2020). Some researchers have shown that wearable technologies can increase the quality of patient care while reducing the cost of care, such as out-of-hospital patient rehabilitation (Kakria, Tripathi, & Kitipawang, 2015). Wearable devices save time and they allow many tasks to be done at the same time. In addition to these advantages, they have some disadvantages such as having a distracting potential, being expensive, needing different platforms to function properly, having technical limits such as size and battery capacity, difficulty in ensuring privacy and data security (e.g., Spann, 2016, Kitanin, 2016).

Although the use of wearable technologies is widespread, there are still few studies on the usage rates. It is also important to determine the perceptions of patients and healthcare professionals towards the use of data obtained from wearable technologies in health services. Because, variables such as individuals' belief in the accuracy of the data obtained from wearable technologies and the use of these data in the early diagnosis and treatment process will also affect the use of these devices. More importantly, in order to prevent social isolation during the COVID-19 pandemic, it has begun to be compulsory for distance education and remote work. It has also become more important to monitor patients remotely for hospitals with the highest contamination during this period. Follow-up of chronic diseases is always very important. With the use of wearable devices, it will be possible to monitor these patients remotely. However, these devices have some challenges such as being expensive, needing internet access, and difficult adaptation of elderly patients to technological devices. According to Mosconi et al. (2019), perceptions of patients about monitoring symptoms and communicating with the physicians on eHealth applications are rarely analyzed by previous studies. In addition, there is limited study about perceptions of healthcare professionals on wearable technology. For example, Maskara et al (2017), Oh et al (2019), and Abdullah & Fakieh (2020) have investigated the perceptions of healthcare professionals about implementation of artificial intelligence. Besides, Jacomet et al. (2020) determined the both patients' and physicians' perceptions of eHealth. However, these studies do not provide us with perception about usage of wearable technologies. Therefore, our study aims to determine the usage levels of wearable and traditional digital technologies, to determine the participants' and healthcare professionals' perceptions about the using wearable technologies in health services and their perceptions about reliability of the data obtained from these technologies.

1.1. Literature Review

Wearable technologies can be defined as mechanical and technological devices that can be worn by humans (Liu & Han, 2020; Zhu & Pham, 2020). Wearable technologies transmit the data they receive from the human body via their sensors to smartphones via wireless connection (Yue, Voronova, & Voronov, 2020). Many wearable technology products have both high access speed and comfort, and contain unlimited information networks and types (Zhu & Pham, 2020).

Wearable technologies have the potential to provide continuous, real-time physiological information through dynamic, non-invasive measurements of biochemical markers in bio fluid such as sweat, tears, saliva and interstitial fluid through biosensors (Kim, Campbell, de Ávila, Wang, 2019; Kristoffersson & Lindén, 2020, Li & Wen, 2020; Khan, Parkinson, Grant, Liu, & Mcguire, 2020). Usage areas of these products are generally health products, textile products and consumer electronics (Kılıç, 2017). It is used in many products such as smart watches, smart shoes and

clothes, smart wristbands and jewelry, smart glasses (Lou et al., 2020). In addition, there are studies on products such as wearable body parts, miniature sensors, devices to extend life-span - nanoparticles (Haghi & Deserno, 2020). These products are used in many diverse fields such as health, education, industry, tourism, military, information exchange and entertainment. In the health sector, it is mainly used for activity and exercise tracking, heart rate determination and electrocardiogram monitoring, respiratory rate and oxygen saturation measurement, blood pressure detection, sleep habits, detection of sudden movements of the body, and even monitoring the emotional state of the person ((Fuller et al., 2020; Greiwe & Nyenhuis, 2020; Miyaji et al., 2020; Muthu et al., 2020; Sana et al., 2020)). (Purohit, Kumar, Mahato, & Chandra, 2020).

Wearable technology products have the potential to offer innovative solutions for healthcare problems. It is divided into three categories according to their roles in the healthcare industry (Wu & Luo, 2019): (1) disease prevention and health protection; (2) patient management, and (3) disease management. Although the use of wearable technologies is promising in healthcare, large cohort validation studies are needed to increase reliability and support clinical acceptance. With the use of wearable technologies, accurate and reliable real-time acquisition of physiological information will have a wide impact on our daily lives (Kim, Campbell, de Ávila, Wang, 2019).

The accuracy, reliability, and validity of data obtained from wearable devices are important (Piwek, Ellis, Andrews, Joinson, 2016). These devices are marketed under the motto that they will help improve overall health and wellness. However, most manufacturers offer no empirical evidence to support the effectiveness of their products (Piwek, Ellis, Andrews, Joinson, 2016). Recent comparisons between various wearables to monitor physical activity have shown that there are large variations in accuracy between different devices - with margins of error up to 25% (Lee, Kim, Welk, 2014; Case, Burwick, Volpp, Patel, 2016). This is a serious inconsistency and reflects the problems witnessed in the medical applications market. Lack of reliability is a serious hurdle that must be addressed long before a device can be evaluated for any medical application (Piwek, Ellis, Andrews, Joinson, 2016).

In this section, information will be given about the reliability of four main measurements obtained from wearable devices. These are heart rate and electrocardiogram (ECG), blood pressure, blood oxygen saturation, and step count. Examples of the accuracy of these technologies will be given from the studies conducted in the current literature:

Heart rate: Wearable devices are frequently used to monitor heart rate, especially in physical activity (Bent, Goldstein, Kibbe, & Dunn, 2020). Although the use of wearable devices for heart rate monitoring is common practice, it is unusual to use information obtained through such devices in the context of health and clinical decision-making (Jin, Adams, Cocco, Martin, & Palmer, 2020). Because doubts about the reliability and accuracy of the data obtained from these devices make it difficult to use them in the health services. Therefore, a number of questions are asked: how reliable and accurate is the data from the biometric sensors of these devices? Can any of these be used in healthcare? (Jin, Adams, Cocco, Martin, & Palmer, 2020; Gonçalves, Leitão, & Carvalho, 2017).

With increased computing capacity, storage capacity and ubiquitous connectivity, smartphones enable individuals to actively monitor their health (Nwagwu & Areo, 2020). Physicians recommend to use wearable devices to detect early signs or cardiac abnormalities in cardiac patients. For example, atrial fibrillation is the most common cardiac disorder and can be asymptomatic. Most patients are not diagnosed with atrial fibrillation until their condition has worsened to the degree of heart attack, angina, stroke or heart failure (Appelboom et al., 2014). In a study, AliveCor's ECG device, which can be carried in a pocket, was compared with a standard 12-Lead ECG to investigate whether it is suitable for diagnosing silent atrial fibrillation. According to the results of this research, it was found that AliveCor's ECG device provides accurate and reliable data (Paton, Hansen, Fernandez-Luque, & Lau, 2012).

In another study, an analysis was performed using an approved clinical device (ECG) to evaluate the accuracy of heart rate obtained from the Microsoft Band2 device (a smart watch) (Gonçalves, Leitão, & Carvalho, 2017). According to the results of this study, under certain conditions, Microsoft Band2 provides valid information for use in clinical practice in relation to the evaluation of RR interval and cardiac frequency (Gonçalves, Leitão, & Carvalho, 2017).

Another study investigated the role of data obtained from smartphones that monitor the heart rate of patients in China in early diagnosis. In a project called "Wireless heart health program", 11,000 patients in rural areas of the country benefited from wireless healthcare. In this project, smartphones with heart rate sensors were used. These smart phones were connecting to 96 local physicians who could send and call patients using these phones. In addition, physicians were able to analyze the data received from patients and send feedback via these phones. As a result of this project, it was announced that 1,100 patients in the experimental group controlled by health sensors had serious cardiovascular problems (Carey, Klotz, & Kenny, 2015).

Blood pressure: European guidelines on the prevention of cardiovascular diseases recommend frequent blood pressure monitoring to prevent coronary disease (Ton, Martin, Blumenthal, & Blaha, 2013). In

addition, telehome monitoring has been shown to improve the quality of care in patients with cardiovascular diseases (Chandrasekaran, 2010). Today, sensors with very advanced technology are produced to facilitate the management of hypertension and congestive heart failure (Appelboom et al., 2014). One of them is the smart watch named InBodyWATCH. A research was conducted using a manual blood pressure measurement device and a smart watch, InBodyWATCH (Moon et al., 2020). Blood pressure was first measured three times with the InBodyWATCH, before and then blood pressure was measured four times using a manual sphygmomanometer. The blood pressure value obtained from the InBodyWATCH was compared to the more recent values of the previous and subsequent manual blood pressure measurement. The InBodyWATCH has been validated with accuracy (reported as 97.1%) compared to a manual sphygmomanometer (Moon et al., 2020).

Oxygen Saturation: Oxygen saturation values are important in patients with chronic lung disease, sleep apnea disorder, infection diseases such as Covid-19 or in monitoring the performance of athletes. Lauterbach et al. (2020) analyzed oxygen saturation values at different altitudes by comparing peripheral blood oxygen saturation (SpO2) taken from a Garmin fēnix® 5X Plus watch with measurements taken from a standard medical pulse oximeter. The reliability of the device was tested by repeating each measurement multiple times for each participant in a wide variety of environmental conditions. It showed a 3.3% deviation for SpO2 measurements taken at an altitude of 12,000 ft on the Garmin fēnix®. Average differences in SpO2 measurements were smaller at levels below 12000 ft altitude. Data from the study suggest that the Garmin fēnix® watch could be a suitable device for monitoring SpO2 in most ambient conditions.

Step count: Many smartphone apps and wearable devices have the ability to track step counts (Fuller et al., 2020). Step counts are often used to obtain other physical activity metrics such as distance or calories burned (Chong, Guo, Deng, & Woo, 2020). Fuller et al. (2020) conducted a meta-analysis study that examined nine different brands of commercial wearable devices and included 158 publications. Fitbit was the most researched brand. The study revealed that Fitbit, Apple and Samsung watches measure the steps accurately. Apple Watch and Garmin were the first two devices to give the most accurate results in measuring step count. For step counting, in controlled laboratory environments, a higher proportion of the devices showed accuracy and this was within a more acceptable accuracy range compared to free living conditions. In general, data from smartphones and watches were found to be either slightly lower or slightly higher than the observed step numbers (Fuller et al., 2020). In the light of the data in this meta-analysis, wearable devices and smart phones can be considered as alternative options for tracking step counts.

MATERIALS AND METHODS

This study was designed as descriptive to determine the utilization rates of wearable health technologies.

2.1. Sample

The study sample consisted of participants aged 18 years or above residing in Turkey. The sampling methods used are convenience sampling method and the snowball sampling method. Online survey was submitted to participants and requested to forward the link to other acquaintances over the age of 18.

439 people participated in the study. 31.2% (n = 137) of the 439 participants are healthcare workers. It was determined that 171 participants answered socio-demographic questions on age, gender, and education level, but 268 participants did not provide a response to these questions. The vast majority of these 171 participants (n = 146, 85.4%) were female, while 14.6% of them are male (n = 25). The average age of the participants was 26.54 ± 7.83; age range of 18 to 58 years. 52% of the participants (n = 89) were in the 18-25 age group, 32.2% (n = 55) were in the 26-33 age group, and 15.8% (n = 27) were in the 34 and above age group. When the educational status was assessed, 12.3% (n = 21) of the participants were high school graduates, 67.3% (n = 115) were university graduates and 20.5% (n = 35) were post-graduates.

2.2. Data Collection Tool and Process

The data were collected between December 1, 2020 and January 15, 2021 through an online questionnaire prepared by the researchers. The items in the questionnaire were prepared by the researchers. In the introduction part of the questionnaire form, information on purpose of the research, the voluntary participation and the confidentiality of the data of the participants was provided. Subsequently, questions about the usage level of wearable and digital technologies were included in the first section of the questionnaire. These questions are:

1. Select the devices that you use to monitor your health indicators.

2. How do you record measurements related to your health such as weight, blood pressure, blood sugar, oxygen level?

3. Would you like to regularly record and monitor your health-related values such as weight, blood pressure, blood sugar, oxygen level?

4. Would you consider online examination and follow-up opportunities for simple health problems or some chronic diseases?

5. Would you prefer monitoring patient remotely based on data obtained from wearable and digital devices (such as smart watches, smart wristbands, digital measurement devices)

In the second section of the survey, items about wearable devices concerning healthcare professionals was included. These are:

1. Are you a healthcare professional?

2. Which device would you recommend to your clients for signs monitoring?

3. What wearable devices data do you trust more?

The last section of the questionnaire involves socio-demographic characteristics of the participants, i.e., age, gender and educational status.

2.3. Data analyses

SPSS 22 statistical program was used to assess the data. In determining the descriptive characteristics of participants; percentage (%), frequency (n), arithmetic means and standard deviation values were used. The differences in the responses provided for wearable technologies according to profession, age groups, gender and education groups were analyzed using Chi-Square test.

RESULTS

Results are given under three headings. In the first part, the answers given by 439 participants to the questions regarding the use of wearable technologies were assessed. In the second part, the opinions of only healthcare professionals (n = 137) about wearable devices were assessed. In the third part, the significance in differences of the participants' responses to the use of wearable technologies and digital devices according to their socio-demographic characteristics was analyzed.

3.1. Descriptive Data on the Usage of Wearable Technologies and Digital Devices

Based on Table 1, 64.9% of the participants stated that they used smart phones to monitor their health indicators. While 23.9% of the participants stated that they did not use any digital scale, 23.9% of the participants stated that they used them. 20.3% of the participant stated that they used digital blood pressure device. To the question “how do you record measurements related to health such as weight, blood pressure, blood sugar, oxygen level?’, a great majority of the participants (80.6%) answered “I do not record and follow up, I take random measurements”. To the item ‘would you like these health-related data to be recorded and monitored regularly?”, 66.3% of the participants gave an affirmative response. 56% of the participants stated that they could recommend and use online examination and follow-up facilities for simple health problems or some chronic diseases. Only 4.8% of the participants stated that the data obtained from wearable and digital devices cannot be used in remote patient monitoring.

Table 1. Descriptive Data on the Usage of Wearable Technologies and Digital Devices

Variables		n	%
Select the devices you use to monitor your health indicators.	Smart phone	285	64.9
	Smart watch	42	9.6
	Smart wristband	43	9.8
	Digital blood pressure device	89	20.3
	Digital scale	105	23.9
	Blood pressure measuring device	22	5.0
	None	105	23.9
How do you record measurements related to your health such as weight, blood pressure, blood sugar, oxygen level?	Writing on a note by hand	17	3.9
	Save on smart phone	68	15.5
	I do not record or monitor. I measure randomly.	354	80.6
Would you like to regularly record and monitor your health-related indicators such as weight, blood pressure, blood sugar, oxygen level?	Yes	291	66.3
	No	148	33.7
Would you consider online examination and follow-up opportunities for simple health problems or some chronic diseases?	Yes, I recommend / use	246	56
	No, I would not recommend /or use	44	10
	Undecided	149	34
Data obtained from wearable devices (such as smart watches, smart wristbands, digital measurement devices) used for remote patient monitoring…	Can be used	199	45.3
	Can be used in certain diseases	219	49.9
	Can not be used	21	4.8

3.2. Opinions of participants from health care workers on the usage of wearable and digital devices

65% of the healthcare staffs participating in the study recommended traditional digital devices to their clients for sign monitoring. 36.5% recommended smart watches, 28.5% recommended smart wristbands and 24.8% suggested using biosensors (Table 2). According to 82.5% of the healthcare staffs reported that they would trust more the data obtained from pulse. However, only 5.1 of the healthcare staffs reported that they would not trust the data obtained from traditional digital devices nor wearable devices.

Table 2. Opinions of participants from health care workers on the usage of wearable and Digital Devices (n=137)

		n	%
Which device would you recommend to your clients for sign monitoring?	Traditional digital devices	89	65
	Smart watch	50	36.5
	Smart wristbands	39	28.5
	Biosensors	34	24.8
	None	11	8
Which data from the above devices would you trust more?	Oxygen level	74	54
	ECG	46	33.6
	Blood pressure	66	48.2
	Blood sugar	60	43.8
	Pulse	113	82.5
	I trust none	7	5.1

3.3. Chi-Square analysis

The differences in the responses of the participants regarding the use of wearable technologies and digital devices according to their socio-demographic characteristics were analyzed using Chi-square test. As a result of the Chi-square analysis performed, it was found that the responses obtained to the question "Considering online examination and follow-up opportunities for simple health problems or some chronic diseases" differed statistically according to the status of being a healthcare professional ($p < 0.01$) (Table 3). 16% of the healthcare personnel stated that they would not consider / recommend online examination and follow-up opportunities for simple health problems or some chronic diseases. 27.7% of them stated that they were indecisive. 7.3% of the

participants who are not health personnel stated that they would not consider / recommend online examination and follow-up opportunities for simple health problems or some chronic diseases. 36.8% of them stated that they were indecisive.

Table 3. Comparison of the responses obtained to the item concerning the consideration or recommendation of online examination and follow-up opportunities based on healthcare professional status

		Can you consider online examination and follow-up opportunities for simple health problems or some chronic diseases?					
Are you a healthcare staff?		Yes, I recommend / use	No, I would not recommend / use	Undecided	Total	Chi-Square	p
Yes	n	77	22	38	137	9.497	0.009
	%	56.20%	16.10%	27.70%	100.00%		
No	n	169	22	111	302		
	%	56.00%	7.30%	36.80%	100.00%		
Total	n	246	44	149	439		
	%	56.00%	10.00%	33.90%	100.00%		

It was determined that the answers to “the use of data obtained from wearable and digital devices (such as smart watches, smart wristbands, digital measuring devices) for remote patient monitoring” showed statistically significant difference ($p < 0.05$) (Table 4). When Table 4 is analyzed, it is seen that the difference between the groups is due to the graduate status of participants.

Table 4. Comparison of the situation of being able to use the data obtained from wearable and digital devices for remote patient follow-up according to education level.

		Data obtained from wearable and digital devices (such as smart watches, smart wristbands, digital measurement devices) in remote patient monitoring.					
Level of education		Can be used in certain diseases	Can be used	Cannot be used	Total	Chi-Square	p
High school	n	13	5	3	21	12.42	0.014
	%	61.90%	23.80%	14.30%	100.00%		
Graduate	n	58	54	3	115		
	%	50.40%	47.00%	2.60%	100.00%		
postgraduate	n	20	10	5	35		
	%	57.10%	28.60%	14.30%	100.00%		
Total	n	91	69	11	171		
	%	53.20%	40.40%	6.40%	100.00%		

In Table 5, according to the age groups of the participants, the desire of "wanting to regularly record and follow up your measurements related to your health such as weight, blood pressure, blood sugar, oxygen level" are given. According to the results of the Chi-square test, it was found that the answer given to this question differed statistically significantly according to age groups ($p < 0.01$). According to Table 5, as age increases, the desire to regularly record and monitor measurements such as weight, blood pressure, blood sugar, and oxygen level increases.

Table 5. Comparison of the desire for regular recording and monitoring of measurements such as weight, blood pressure, blood sugar, oxygen level by age groups

Would you like to regularly record and monitor your health-related measurements such as weight, blood pressure, blood sugar, oxygen level?						
Age groups		**Yes**	**No**	**Total**	**Chi-Square**	**p**
18-25 years	**n**	46	43	89	9.592	0.008
	%	51.70%	48.30%	100.00%		
26-33 years	**n**	40	15	55		
	%	72.70%	27.30%	100.00%		
34 years and above	**n**	21	6	27		
	%	77.80%	22.20%	100.00%		
Total	**n**	107	64	171		
	%	62.60%	37.40%	100.00%		

DISCUSSION

The increase in the healthy life expectancy of individuals and the increase in their level of consciousness about healthy life have also led to an increase in the demand for wearable technology products. However, there are various obstacles to the use of these technologies. These obstacles include concerns about data privacy, accuracy and reliability, cost of new technology, lack of wireless or spotty phone-network coverage impairs access, etc. (Carey, Klotz, & Kenny, 2015; Piwek, Ellis, Andrews, Joinson, 2016). In this study, the usage levels of wearable technologies, the perception of individuals and healthcare professionals about these technologies were examined.

According to the results of our study, the rate of using wearable devices was found to be low. It has been found that the use of traditional digital devices is more common than wearable devices. Only 9% of the respondents stated that they used smart watches and smart wristbands. The rate of using smart phones for tracking health indicators was at the level of 65%. The use of traditional digital blood pressure device was found to be 20%. According to a study conducted in China with 2,058 participants by Wen, Zhang, & Lei, (2017), 52.4% of participants reported that they used a wearable device and 94.7% of participants had one year of smart phone experience. However, the results of Tran, Riveros, and Ravaud (2019) are in line with our study. In the study of Tran, Riveros, and Ravaud (2019), there were 1,183 participants in the year of 2018 and only 5% of them reported that they used wearable devices. Schall, Sesek, and Cavuto (2018) also reported that 50.5% of 952 safety engineers used at least one weareble device. A consumer survey was applied to evaluate the current situation regarding wearable technology in the USA (PWC Health Research Institute 2014). According to the results of the research; 21% of participants stated that they had wearable devices. Also, most consumers did not want to spend much on wearables; rather they preferred to be paid to use these tools. 68% of the consumers reported that they would use the wearable technology provided from outside (PWC Health Research Institute 2014). Graham (2014) also indicated that the most common reasons for the participants not to monitor their health status were the lack of interest at 27.2% and the high cost at 17.7%. We found nearly similar results in our study.

Another result of our study is about the question of how the participants recorded measurements related to their health such as weight, blood pressure, blood sugar, oxygen level. A great majority of the participants (80.6%) answered “I do not record and follow up, I take instant measurements”. 15% of the participants stated that they recorded it on their smart phones, while 3.9% stated that they recorded it by noting them manually. Graham (2014), in his research with 900 participants in the USA, asked the participants whether they recorded their weight, diet and exercise programs. 25.1% of the participants in the study stated whether they used a fitness tracker or smartphone application, and 74.9% stated that they did not use or record these tools. When asked whether the participants who did not follow their health status or fitness practices, wanted a fitness recorder provided by the physician, it was revealed that 48.2% wanted it (Graham, 2014). In our study, 66.3% of the participants stated that they wanted to regularly record and follow health-related measurements such as weight, blood pressure, blood sugar, and oxygen level. According to study of Wen, Zhang, & Lei, (2017), the respondents were most interested in heart health monitoring. In their study, the order of health monitoring functions made by the respondents as follows: heart rate monitoring, ECG monitoring, oxygen saturation monitoring, professional sports recording, daily pedometer, body temperature analysis, blood glucose monitoring, and healthy lifestyle reminder (Wen, Zhang, & Lei, 2017). In our study, as

the participants' age increases, the desire to regularly record and monitor measurements such as weight, blood pressure, blood sugar, and oxygen level increases ($p < 0.05$). A study by Wu, Wu, and Chang (2016) showed also age difference in the use of wearable devices. In particular, those below 35 years of age tend to use their smartwatches to show off. Those above 34 years of age were able to truly enjoy the smartwatches they bought for themselves.

In our study, while 56% of the participants stated that they could recommend and use online examination and follow-up facilities for basic health problems or some chronic diseases, 34% were undecided on this issue. 45% of the participants stated that the data obtained from wearable and digital devices could be used for remote patient follow-up, and 50% for the follow-up of certain diseases. Similarly, Tran, Riveros, and Ravaud (2019) stated that 61% of participants thought that wearable health devices would improve the follow-up of patients with chronic illnesses. In our study, 16% of the healthcare personnel did not recommend online examination and follow-up opportunities for basic health problems or some chronic diseases, while 7% of other participants did not. Jacomet et al. (2020) analyzed the perceived of eHealth implementation among people with HIV and their physicians. They found three groups based on perception of physicians on eHealth implementation. First group of physicians (95/219, 43.4%) were "strongly confident in eHealth", who were eager to use and accept these technologies for diagnosis and treatment. Second group of physicians (80/219, 36.5%) were "strongly opposed to eHealth", who were against the collection of personal health data due to confidential problems of eHealth. Third group of physicians (44/219, 20.1%) were "open to eHealth", who thought that eHealth apps were useful for patient education and information. In our study, 65% of the healthcare personnel recommended traditional digital devices to their clients for tracking their health status. 36.5% recommended smart watches, 28.5% suggested smart wristbands and 24.8% recommended biosensors. 82.5% of the healthcare professionals stated that the heart rate data were the most reliable data among the data obtained from traditional digital devices and wearable technological devices. In addition, they found the oxygen data obtained from these devices as reliable by 54%, blood pressure data by 48%, blood glucose data by 44% and ECG data by 34%. Previous studies also have shown that the use of the data obtained from these devices in the diagnosis and treatment of patients will definitely contribute to health services (e.g. Jacomet et al.2020; Tran, Riveros, and Ravaud, 2019). However, there is still ongoing research on the accuracy of data obtained from wearable technologies.

CONCLUSION

Although it has been shown in our study that wearable technologies are mostly accurate and can have clinical use, they are not used enough in the healthcare sector today. Including smart wearable sensors in the routine care of patients can increase physician-patient relationships and increase patient participation in healthcare. With new remote monitoring techniques that will revolutionize health management and spending, these technologies can be used more. In our study, we presented examples from the existing literature in order to evaluate the reliability of wearable devices in monitoring health, and we discussed the level of knowledge and perception of the individuals and healthcare professionals on this issue with the survey study we conducted. These technologies do not currently have widespread use in the public health sector in Turkey. In addition, it is not known how healthcare workers will access data obtained from patients for now. For this reason, it is not possible to evaluate the effectiveness of these devices in public hospitals. However, demands can be determined by conducting research into what the health system, stakeholders and patients expect in this area. In addition, it is recommended to reveal studies on the knowledge levels, perceptions and attitudes of physicians and patients about wearable devices.

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Conflict of Interest:

The authors declare that they have no conflict of interest.

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Investigation of the Effects of Economic Indicators on Child Mortality: Panel Data Analysis

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ABSTRACT

The health level of society is an indicator of development as a whole, and it is monitored through various indicators. Among these indicators, infant and child mortality are followed by both countries and international organizations. The purpose of this study is to determine what effect economic variables have on infant and child mortality. A Panel data analysis was used as a method in the study. Eviews 10.0 and Stata 15.0 package programs were used for data analysis. While the research universe is composed of 132 countries in the middle-upper income and high-income groups in the World Bank classification; The sample of the research consists of 49 countries whose data are taken. The time dimension of the study constitutes the 2000-2019 periods and the data types of the variables were used annually. While variables representing child mortality are used as dependent variables in the study; Gini index value representing income distribution, Gross Domestic Product (GDP), per capita income, public expenditure level, and the unemployment rate were used as independent variables. As a result of the research, it has been revealed that there is a positive relationship between the unemployment rate and income inequality and under-five mortality and neonatal deaths. Also, it has been observed that there is a negative relationship between the increase in public expenditure, per capita income and the level of GDP, and under-five mortality and neonatal deaths. It has been observed that the neonatal mortality rate is affected by economic variables more than the under-five mortality.

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INTRODUCTION

The economic indicators of a country significantly affect many variables from the welfare and health level of the society, to employment opportunities and use of technology. The economic situation of the country is monitored through many indicators such as Gross Domestic Product (GDP), per capita income, unemployment rate, and Gini coefficient showing income distribution. Economic indicators and the health level of the society are in a mutual and strong relationship (Sachs, 2001; Gyimah-Brempong and Wilson, 2004; Dreger and Remers, 2005; Çetin and Ecevit; 2010; Pradhan, 2011; Mehrara and Musai, 2011). In economic development, the investment made on the individual, namely the human being, is considered important due to its effect on many direct and indirect factors (Çelik, 2016; Smith, 2006). In this context, Odrakiewicz (2012) emphasized in her study that health expenditures should be seen as an investment rather than a cost. The health level of the community is monitored with indicators such as life expectancy at birth, maternal mortality rate, under-five mortality rate, and infant mortality rate, and are used in studies showing the relationship between economic development and health. The increase in the health indicators of the society is an indicator of development in every sense and has also been included in international documents. The goals of increasing health indicators have always been included in the sustainable development goals and have been prioritized globally (United Nations, 2000; United Nations, 2015).

Countries make public expenditures to increase the health level of the society and aim to increase the health indicators. At this point, studies on the subject have revealed that health expenditures have a significant effect on reducing child mortality, infant mortality, and increasing life expectancy at birth (Çevik, 2013; Nixon and Ulmann, 2006; Berger and Messer, 2002; Heijink et al., 2013; Moreno-Serra and Smith, 2015; Deluna and Peralta 2014). In a different study, Kim and Lane (2013) showed that the increase in public health spending was the same directional relationship as the increase in health indicators.

Another economic indicator, the level of income per capita, also significantly affects health at individual and social levels. Studies conducted on this subject have revealed that an increase in the income level of individuals has a positive effect on health indicators (Easterly, 1999; Akram, 2009; Kim and Lane, 2013).

There is a strong link between unemployment, another of the economic indicators, and health indicators (Labonté, 2009). Unemployed individuals are negatively affected both physically and psychologically, and their health status is negatively affected due to worsening conditions such as nutrition, housing, and sanitation (Kessler et al., 1987; Jin et al., 1995; Dooley et al., 1996). Studies conducted in this context have also revealed that unemployment and health indicators are negatively correlated (Mathers and Schofield, 1998; Aydın, 2020).

Income distribution in the country is also one of the important indicators affecting the level of health. One of the most widely used tools to measure the income distribution of countries is the Gini coefficient. The Gini coefficient takes a value between zero and one and shows that as it approaches zero, the income equality, and the closer to one, the income inequality increases (Şenses, 2017). Studies examining the relationship between income inequality and health indicators have demonstrated that there is a strong relationship between these two variables and that increasing income inequality leads to adverse health consequences (Kawachi and Kennedy, 1999; Holcman et al., 2004; Materia et al., 2005; Çoban, 2008; Kim and Lane, 2013).

Economic growth also correlates with the health level of society. Growth has traditionally been measured in percentages of GDP or real GDP growth rate (Uçan ve Atay, 2016). Studies conducted in this context reveal that the positive course of health indicators affects the growth of countries positively. On the other hand, the negative course of health indicators such as infant and child mortality rates causes countries to slow down and/or negatively affect their economic growth (Bloom and Sachs, 1998; Bloom et al., 2001; Mayer, 2001; Chakraborty, 2004; Elmi and Sadeghi, 2012; Cooray, 2013).

The averages of neonatal and under-five mortality averages, which are the subject of the research, between 2000 and 2019 are presented in Table 1.

Table 1. Neonatal and under-five mortality averages of countries by income groups (2000-2019)

Variable	Low-income and low-middle-income countries neonatal rate	Low-income and low-middle-income countries under-five mortality rate	Upper-middle-high income countries neonatal rate	Upper-middle-high income countries five mortality rate	High-income countries neonatal rate	High-income countries five mortality rate
Avarage Values	28.26	75.3	22.93	24.61	4.3	7.71

As seen in Table 1, there are significant differences between income groups. The graphs of the neonatal and under-five mortality rates of the relevant income groups between 2000 and 2019 are presented in Chart 1 and Chart 2.

Chart 1. Neonatal rates of countries by income groups (2000-2019)

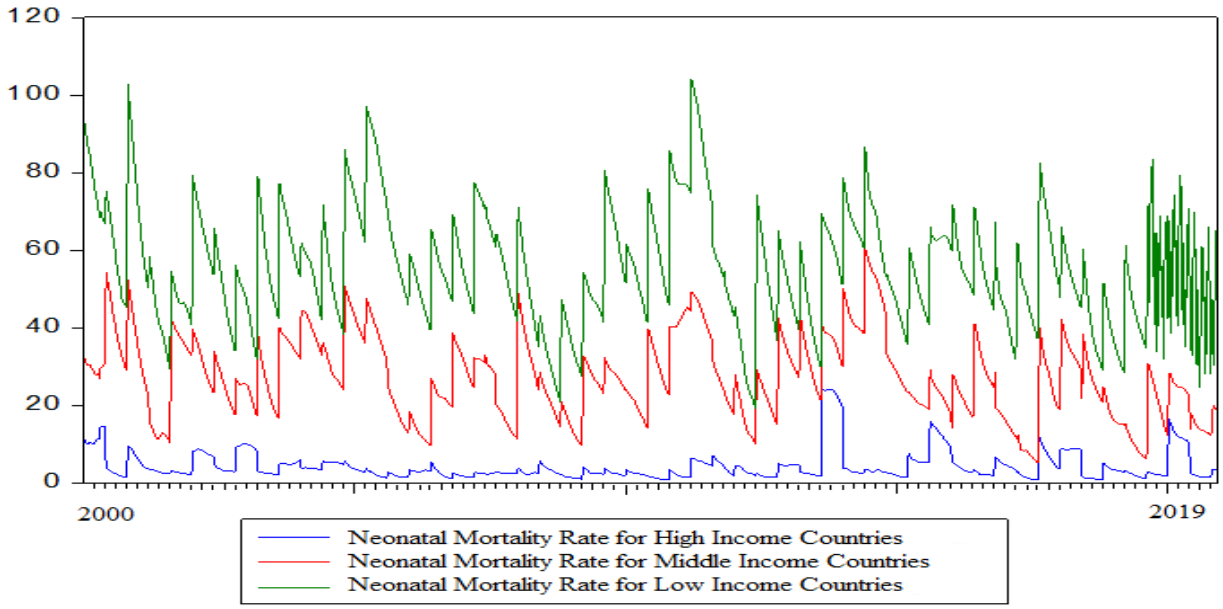
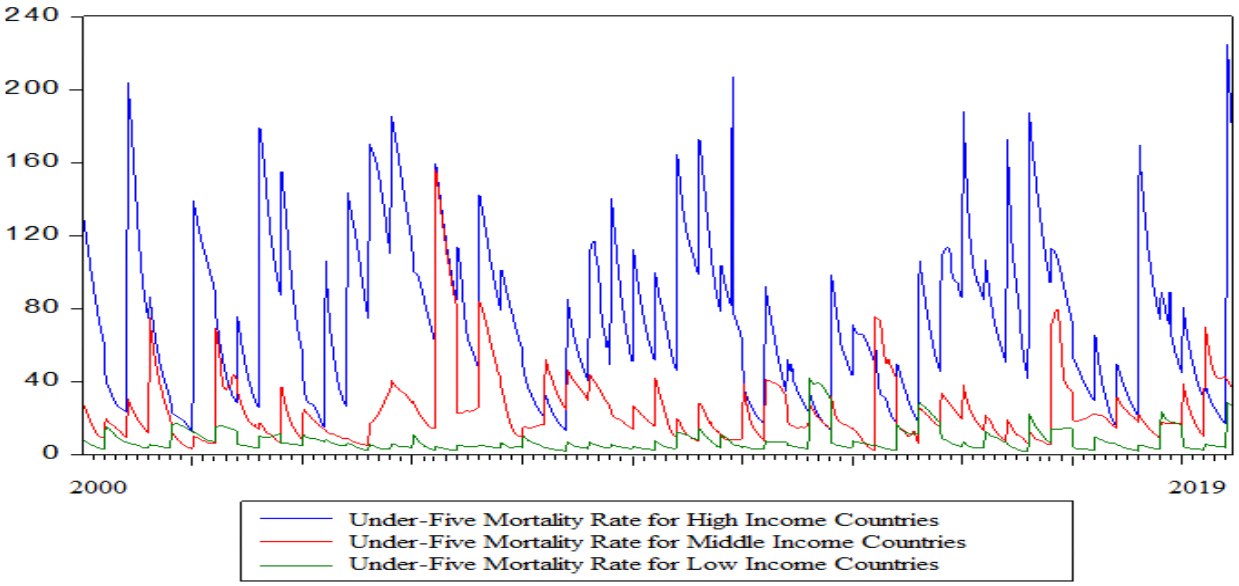


Chart 2. Under-five mortality rates of countries by income groups (2000-2019)



MATERIALS AND METHODS

Child mortality indicators for a country are the most important indicators that provide information about the development level of the country. Countries set various targets for reducing child mortality and implement projects on a global scale. The importance of child mortality reveals the need to examine all factors affecting the indicators related to this issue separately. The most important factor affecting child mortality, starting from the individual to the global scale, is the economic variables. In this regard, the purpose of this study is to determine how economic variables affect infant and child mortality. Panel data analysis method was applied for the research, Eviews 10 and Stata 15.0 analysis programs were used.

While creating the universe of the research, the World Bank's classification of countries according to their income was taken into consideration. The World Bank has classified countries according to 4 different income statuses. The classification in question is low-income countries, low-middle-income countries, upper-middle-income countries, and high-income countries. The universe of this research is upper-middle-income and high-income countries. According to the World Bank's grouping, although there are 132 countries in the universe group, the data of only 49 countries were reached and these countries were included in the analysis. Countries whose included in the study, 32 are developed, and 17 are developing countries. The choice of variables was chosen as a result of a wide literature review and to cover the purpose of the study in the most appropriate way, factors other than economic variables were ignored. The data types of the variables are annual and the time dimension of the study is between 2000-2019. The variables used in the model are presented in Table 2.

Table 2. Definition of Variables

Variables	Symbol
Gross Domestic Product	Lngdp
Gini Index Value	dlngini
Per Capita Income	dlnpci
Unemployment Rate	Lnunemploymentrate
Public Spending Amount	Lnpublicspending
Neonatal Death Rate	Lnneonatal
Under-five Mortality Rate	Lnunderfivemortality

The stationarities of all variables in Table 2 have been checked, except for the Gini index value and per capita income variables, other variables were found to be stable. Non-stationary series, on the other hand, were made stationary by taking their primary differences and included in the model with their stationary state. While variables representing child mortality are used as dependent variables in the study; other variables were used as independent variables to measure the effect on these dependent variables. A separate econometric model for each dependent variable was developed and the predictive coefficients of the independent variables were examined separately. The mathematical representation of the developed models is presented in Table 3.

Table 3. Mathematical Representation of Models

Model 1 (Lnunderfivemortality)	Lnunderfivemortality $i,t = c + \alpha1(dlngini)i,t + \alpha2(dlnpci)i,t + \alpha3(Lngdp)i,t + \alpha4(Lnunemploymentrate)i,t + \alpha5(Lnpublicspending)i,t + \varepsilon i,t$
Model 2 (Lnneonatal)	Lnneonatal $i,t = c + \alpha1(dlngini)i,t + \alpha2(dlnpci)i,t + \alpha3(Lngdp)i,t + \alpha4(Lnunemploymentrate)i,t + \alpha5(Lnpublicspending)i,t + \varepsilon i,t$

While the dependent variable is located on the left side of the equations for both models; The independent variables used in the aforementioned models are given on the right side. Other symbols on the right side of equality represent the constant variable "c", the estimator coefficients of the independent variables "α", the error term "ε", the horizontal section "i", and finally the period information "t". Although different variables are used when estimating a dependent variable in panel data analysis modelling, some variables affect this dependent variable but cannot be measured or are not included in the model. The effect of variables that cannot be predicted or not included in the model within the scope of the model is collected in the error term "ε".

RESULTS

Three different approaches have been developed for each panel data model. Which approach is the most appropriate of each model is determined with the help of the tests to be made. These approaches are; fixed-effects approach, random-effects approach, and pooled model approach. Also, panels are divided into macro and micro, taking into account the size of the time they cover. Baltagi (2013), one of the leading names in panel data, defines panels with 20 periods or less time size as micro, more than 20 periods as macro panels. In the same study, Baltagi did not consider it necessary to provide stationary states due to the short time dimension of the variables used in micro panels; He stated that it is important to ensure the stationarity of macro panels. There are differences in the basic assumptions that the panels should provide according to their micro and macro status. Since the time

dimension of this research is 20 periods, the analysis continued under micro panel assumptions.

Models obtained in panel data analysis studies are required to provide certain assumptions. Both predictive values and analysis results of models that do not provide basic assumptions are misleading. In this direction, the basic assumption results for both models will be tested and the findings of the models created at the end of the section will be given.

One of the basic assumptions of panel data is the multiple linear connection problem. The variables used for panel data analysis studies are careful not to have variables with high correlation with each other. If this issue is not paid attention to, it is inevitable to have a multiple linear connection problem in the model. Different methods have been developed to determine the multiple linear problems in a model. One of these methods is to find Variance Inflation Factor (VIF) values of variables. Brien (2007) suggested using the ($1/1-R^2$) formula while calculating the VIF values of variables. As a result of the application of the formula in question, it has been stated that the VIF threshold value can be accepted up to 4 in some studies, up to 5 in some studies, and up to 10 in some studies (Açıkgöz, Uygurtürk, and Korkmaz, 2015). In this study, the VIF values of the variables to be used in the models should be calculated and the variables above the threshold value should be excluded from the model in order not to cause a multi-linear connection problem. VIF values for the variables of the study are presented in Table 4.

Table 4. Variance Inflation Factor Values of the Variables

Variable	R^2	VIF Value
dlngini	0.31	1.44
dlnpci	0.74	3.84
Lngdp	0.56	2.27
Lnunemploymentrate	0.16	1.19
Lnpublicspending	0.39	1.63
Lnneonatal	0.27	1.36
Lnunderfivemortality	0.49	1.96

VIF values of the variables were obtained by using the $1/1-R^2$ formula in Table 4. As can be seen in the table, it is seen that the VIF values of the variables are all lower than the most critical 4 values. With these results, it is seen that among the variables included in the model, no variable will cause a multiple linear connection problem. Since the VIF values of the variables were below the threshold value, all variables were included in the model and the analysis continued. The next step is to determine with which approach to estimate panel data models. Tests for determining panel data model approaches are shown in Table 5.

Table 5. Panel Data Model Determination Approach Tests

Model / Test	Model 1 (Lnunderfivemortality)		Model 2 (Lnneonatal)	
	Statistics Value	Probability Value	Statistics Value	Probability Value
F-Fixed Effects	71.52	0.000	23.98	0.000
Hausman Test	73.85	0.000	14.22	0.0142

During the panel data modelling process, it is first checked whether the model is suitable for the pooled model structure. The conformity in question is carried out by the F test. While the acceptance of the H_0 hypothesis in the F test indicates that the pooled model is appropriate; rejection indicates that the pooled model is not suitable. When the F test statistics results for both Model 1 and Model 2 are examined, it is seen that the models to be developed are not suitable for the pooled model structure. The next process is to determine whether the model will be estimated using the fixed-effects approach or the random-effects approach. The determination decision in question depends on the result of the Hausman test statistics. The Hausman test is based on the validity of the random effects approach and it is seen that the fixed effects approach is valid if it is rejected in the test result. As a result of Hausman test statistics made separately for both models, it was understood that H_0 hypotheses were rejected, in other words, models should be estimated with a fixed-effects approach. After determining which approach is valid in the models, it should be checked whether there is an autocorrelation problem or not.

The autocorrelation problem is one of the important problems in panel data studies. This problem should not exist in the developed models. If the existence of autocorrelation is detected in a model, it is understood that the error terms of the variables in the model are related to each other. In the presence of an autocorrelation problem in models, this problem should be resolved in order not to make wrong evaluations. Autocorrelation test results for the models are presented in Table 6.

Table 6. Autocorrelation Test Results in Models

Test	Model 1 (Lnunderfivemortality)		Model 2 (Lnneonatal)	
	Statistics Value	Probability Value	Statistics Value	Probability Value
Baltagi-Wu's Local Best Fixed Test	1.02	0.000	1.22	0.000
Durbin-Watson Test	0.46	0.000	0.55	0.000

Because the fixed effects approach is valid for both models, the H_0 hypothesis established that there is no autocorrelation is rejected and it is understood that there is an autocorrelation problem in the models. On the other hand, it is known that the fact that these test values in question have a value less than 2 indicates autocorrelation. The fact that the statistical values obtained for both models are quite smaller than 2 seems to be the problem of autocorrelation. After the problem of autocorrelation is detected in the models, the next step is to check whether there is a problem of varying variance. In Table 7, the results of the varying variance heteroskedasticity test are presented.

Table 7. Varying Variance Heteroskedasticity Test

Test	Model 1 (Lnunderfivemortality)		Model 2 (Lnneonatal)	
	Chi2	p	Chi2	p
Modified Walt Test	207.74	0.000	6.9	0.000

Models established using the panel data analysis method are built on fixed variance. The change in the variance value due to the changes in the units is seen as an important problem and is named as the varying variance. In the presence of varying variance, it causes to obtain incorrect estimators.

Different tests have been developed to check for varying variance in a model. Since the constant effects approach is valid in both models, the varying variance state was checked with the modified Walt Test. As a result of the test, it is seen that the H_0 hypothesis, which was established as there is no varying variance in both models, is rejected and there is a variance problem. Robust correction tests should be performed to eliminate these problems in models. After determining the horizontal cross-section dependence in the models, it will be decided which robust correction test to apply. Table 8 shows the results of the cross-section dependency test.

Table 8. Cross Section Dependency Test

Test	Model 1 (Lnunderfivemortality)		Model 2 (Lnneonatal)	
	Statistic	Prob	Statistic	Prob
Breusch-Pagan LM	1188.92	0.000	707.96	0.000
Pesaran Scaled LM	220.83	0.000	121.55	0.000
Pesaran CD	24.78	0.000	17.12	0.000

In Table 8, it was tested whether cross-sectional dependencies exist or not with three different tests for both models. H_0 hypotheses have been established that there is no cross-sectional dependency. When the test results are examined, it is seen that the H_0 hypothesis is rejected in both models and there is a cross-sectional dependency problem. When examining the basic hypothetical test results of the models, it is seen that there are problems with autocorrelation, varying variance, and horizontal cross-section adherence. Robust correction tests were applied to the models to eliminate these problems and get more accurate statistical results. The Driscoll and Kraay resistant robust correction test was applied, which was able to correct the effect of all three mentioned problems. More linear results were obtained thanks to the Driscoll and Kraay resistant robust correction estimator. In Table 9, the panel data results for Model 1 are presented.

Table 9. Panel Data Results for Driscoll and Kraay Standard Error Model 1

Dependent Variable: Lnunderfivemortality				
Method: Regression with Driscoll-Kraay standard errors				
Period: 2000-2019				
Horizontal Section: 49				
Total Number of Observations: 980				
Variable	**Coefficient**	**Standard Error**	**t-Statistic Value**	**Probability Value**
Lnunemploymentrate	0.106	1.4429	3.95	0.000
Lnpublicspending	-0.3060	1.2425	-11.20	0.000
Dlnpci	-1.284	5.342	-4.43	0.000
Lngdp	-1.318	1.187	4.11	0.000
Dlngini	3.382	6.600	2.02	0.058
C	35.47	23.73	9.45	0.000
R^2 : 0.27	**F-statistic:** 30.21		**Prob (F-Statistic):** 0.0000	

As seen in Table 9, the under-five mortality rate variable was used as the dependent variable in Model 1. As independent variables, GDP, per capita income, public expenditure level, unemployment rate, and Gini index value were used to represent income inequality. It was checked whether Model 1 provided the basic assumptions before reaching the estimation results. It has been observed that there are autocorrelation, variance, and cross-section dependency problems in Model 1. Driscoll and Kraay resistant robust correction test estimator was used to solving the mentioned problems from the model. After the robust correction test was done, the problems in the model were resolved. First of all, whether the model is meaningful in the holistic dimension was understood by looking at the F statistics and F probability value. While the F statistic value is 30.21 and the probability value of F is 0.000. In other words, it is seen that the model is meaningful as a whole. Another value to look at in the model is the R^2 value. R^2 value is the power of independent variables to explain the dependent variable in a model. It is seen that the R^2 value in the model is 0.27. The size or the smallness of the R^2 value in a model is affected by the specific properties of the dependent variable as well as the independent variable used. It is known that many variables other than those in the model affect the under-five mortality rate in a country. The aim of the study was that economic variables affected child mortality, so other variables were ignored. On the other hand, some variables are effective on the dependent variable but cannot be measured. Although it can be measured in panel data analysis, variables that are outside of the model or cannot be measured are collected in the error term.

In Model 1, all other variables except the Gini index value and unemployment rate variables appear to have a negative relationship with the dependent variable. In the event of a one-unit increase in the unemployment rate, under-five mortality is projected to increase by 0.10 units. On the other hand, a one unit increase in income inequality is predicted to cause an increase in the level of under-five mortality by 3.38 units. In the public expenditure variable, it is predicted that a one-unit increase in the amount of public administration's expenditure on society can lead to a 0.30 unit decrease in the under-five mortality level.

On the other hand, it is seen that income has an important effect on health indicators both in individual and national dimensions. It is predicted that a one-unit increase in per capita income level will result in a 1.28 unit decrease in under-five mortality level. Finally, it seems that the increase in the income level of a country has a negative relationship with the level of under-five mortality. In the event of a one-unit increase in GDP, it is assumed that 1.31 units can achieve a decrease in the level of under-five mortality. The results of Model 2, which examine the effects of these economic variables on neonatal deaths, are presented in Table 10.

Table 10. Panel Data Results for Driscoll and Kraay Standard Error Model 2

Dependent Variable: Lnneonatal				
Method: Regression with Driscoll-Kraay standard errors				
Period: 2000-2019				
Horizontal Section: 49				
Total Number of Observations: 980				
Variable	**Coefficient**	**Standard Error**	**t-Statistic Value**	**Probability Value**
Lnunemploymentrate	0.961	0.213870	4.49	0.000
Lnpublicspending	-0.244	0.8433	-3.32	0.001
Dlnpci	-1.64	1.0988	-2.13	0.033
Lngdp	-1.03	0.50	-2.04	0.000
Dlngini	4.31	2.5425	5.07	0.058
C	41.47	13.199	8.12	0.000
R^2 : 0.21		**F-statistic:** 178.88		**Prob (F-Statistic):** 0.000

As seen in Table 10, the neonatal infant mortality rate was used as the dependent variable in Model 2, and the independent variables are the same as the independent variables used in Model 1. In Model 2, the process followed in Model 1 was followed. First of all, it was checked whether the basic assumptions of the panel data were met. After the necessary control tests were performed, problems with autocorrelation, varying variance, and horizontal cross-section dependence were identified. A Driscoll and Kraay resistant robust correction test with resistance were used to eliminating these problems specified from the model. Whether or not Model 2 has a holistic significance can be understood by looking at the F statistic value and the F probability value. While the F statistic value of Model 2 was 178.88, the probability value of F was found to be 0.000. In other words, it is seen that Model 2 is meant as a whole. When the R^2 value is examined, it is seen that it is 0.21. When compared with similar studies in the literature (Aslan and Yapraklı, 2018: 170), it can be said that this rate is sufficient because the dependent variable is the neonatal mortality rate. Like under-five mortality, neonatal mortality can be affected by many factors. Since not all influencing factors can be included in the model, the value of R^2 is affected by this situation.

Parallel to Model 1, it is seen that the unemployment rate and Gini index variables are negatively related to the dependent variable and positively associated with the other variables in Model 2. Neonatal deaths are more sensitive compared to under-five mortality, so they can be more affected by economic variables. First of all, it is predicted that a one-unit of increase in the unemployment rate may affect the neonatal mortality level of 0.96 unit negatively. On the other hand, the existence of income inequality is seen to be effective in Model 2 in parallel with Model 1. It is predicted that a one-unit increase in income inequality in society may negatively affect the neonatal mortality level by 4.31 units. While it is estimated that a one-unit increase in public expenditure level may decrease neonatal deaths by 0.24 units. It is predicted that a one-unit increase in per capita income may decrease 1.64 units of neonatal deaths. Finally, a one-unit increase in GDP level is predicted to be a 1.03 unit decrease in neonatal deaths. Also, it is seen that the constant coefficient variables are significant in both models. The fact that the constant variable is significant indicates that the effect of the variables included in the model is also significant. According to Model 1 and Model 2, the possible effects of economic variables on infant and under-five deaths are presented in Table 11.

Table 11: The possible effects of economic variables on infant and under-five mortality according to Model 1 and Model 2

Economic Variable	**Change in Economic Variable**	**Change in under-five mortality**	**Change in neonatal mortality**
Unemployment Rate	1,00 ↑	0,10 ↑	0,96 ↑
Per Capita Income	1,00 ↑	1,28 ↓	1,64 ↓
GDP Level	1,00 ↑	1,31 ↓	1,03 ↓
Public Expenditure Level	1,00 ↑	0,30 ↓	0,24 ↓
Income Inequality	1,00 ↑	3,38 ↑	4,31 ↑

DISCUSSION

In this study, the relationship of child mortality with economic variables, one of the indicators that are closely related to the level of development of countries, was examined at a macro level to cover data sets of 49 countries. In the scope of the research, two dependent variables and five different independent variables were used. The time dimension of the research covers the periods 2000-2019. Since the time size covered by the study was 20 periods, the stasis of all series was studied, although it fell into the Micro-panel class. In this context, it was determined that income per capita and other variables except the Gini index value variable are stationary. The primary differences of non-stationary series were taken and made stationary and included in the model with these states.

As a result of the research, it has been revealed that there is a positive relationship between the unemployment rate and income inequality and under-five mortality and neonatal deaths, in line with similar studies on the subject. It was observed in Mathers and Schofield's (1998), and Aydın (2020) studies that unemployment and health indicators are negatively correlated. Also, Çoban (2008), Kim and Lane (2013), Collison et al. (2007), Ward and Viner (2017), and Araujo de Souza and Barbosa de Andrade (2020) revealed that income inequality causes negative health consequences. Also, it has been observed that there is a negative relationship between the increase in public expenditure, per capita income and GDP level, with under-five mortality, and neonatal deaths. In this context, Asumadu-Sarkodie and Owusu (2016), Moreno-Serra and Smith (2015), Deluna and Peralta (2014), Cooray (2013), and Akram (2009) concluded that the relevant indicators were positively correlated with health indicators in their studies. It has been observed in the study that the neonatal mortality rate is affected by economic variables more than the under-five mortality rate. Although it is seen that all variables affect child mortality, it has been determined that the greatest effect is the Gini index value used to represent income inequality. The important effect of income inequality in society on child mortality has also been revealed in the research findings.

Our research showed similarities with previous studies. Contrary to the studies on the subject, this study, in which we discussed child mortality with more than one economic indicator, provided a holistic perspective on the subject. In this study, 20 years of data from 49 countries and the relationship between economic indicators and infant and child mortality were examined using econometric models. Thanks to this research, it has been predicted to what extent and in what direction the changes that may occur in the economic indicators in the countries will affect infant and child mortality. In this research, child mortality indicators are examined at a more macro level thanks to panel data analysis models, as well as a guide for different health indicators.

CONCLUSION

An analysis of data from 49 countries that made up the sample of the study showed that economic indicators have a significant impact on many variables, as well as a significant impact on child mortality rates. On the other hand, the excess of child mortality has many effects on the development and economy of countries. A significant portion of child mortality can be reduced and/or eliminated by improving many issues. In particular, income inequality is even more pronounced in child mortality. It is thought that the steps that countries will take to reduce the income inequality in the society and spread the welfare to all segments of the society will affect many negative indicators as well as contribute to the health indicators and indirectly the development level of the country.

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Conflict of Interest:

The authors declare that they have no conflict of interest.

Ethical Approval:

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Bibliometric Analysis of Graduate Dissertations Written Based on Quality Function Deployment (QFD) Method: An Overview of Health Management Profile

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ABSTRACT

Innovative and distinctive ways of doing business have emerged in countless sectors from past to present. Organizations serving in the health sector have also aimed to continue their service offerings in the best way by keeping up with innovations and differences. For this purpose, Quality Function Deployment (QFD) emerges as a method used for health institutions. Postgraduate thesis studies carried out with the method of Quality Function Deployment (QFD) in Turkey, which were published between the years 1995-2020 in YÖK's Thesis search engine (Yöktez), were included in the research. Bibliometric analysis technique was used in this study and in order to analyze the postgraduate theses produced in the field of search was made with the in Turkish and English on these keywords "Kalite Fonksiyon Göçerimi", "Kalite Fonksiyon Yayılımı", "Kalite Evi", "Kalite Yayılımı", "Kalite Göçerimi", "Kalite İşlev Yayılımı", "Kalite Fonksiyon Açınımı", "Quality Function Deployment", "House of Quality" ve "Quality Function Evolution" in YÖK's Thesis search engine (Yöktez). Subsequently, 154 theses were reached and evaluated within the framework of bibliometric features. It is aimed to present a bibliometric analysis of Quality Function Deployment (QFD) studies for researchers and to reveal unstudied issues or shallower points on the subject.

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INTRODUCTION

The importance of time and quality is increasing day by day for health institutions and organizations are looking for new management and production techniques. When compared with traditional models the Quality Function Deployment (QFD) Method, which can provide numerous contributions to organizations, if can be fully implemented in processes, it plays a critical role in better understanding the wishes of the individuals receiving service, increasing the quality and the management of the organizations.

Academic studies related to quality in the field of health contribute and guide numerous professionals, especially health managers. The Quality Function Deployment (QFD) Method, which has a deep-rooted history among the studies related to quality, is only recently gaining popularity in the Turkish literature. There are different researches and studies in which the method has an application area in health services or institutions, albeit limited (Kolodinsky, 1995).

In this study, starting from the idea of examining the studies on Quality Function Deployment (QFD), it has been tried to examine how the method has a share in health services. It is aimed to provide researchers with a bibliometric analysis of Quality Function Deployment (QFD) studies and to reveal unstudied issues or shallower points on the subject. The importance of Quality Function Deployment (QFD) Method in health services and bibliometric analysis are mentioned and the analysis of the thesis studies on Quality Function Deployment (QFD) is included.

Literature Review: Conceptual Framework of Quality Function Deployment (QFD)

The constantly changing demands and needs of individuals have become one of the important points that different sectors and professionals serving in these sectors should focus on. Professionals have to build strategies focused on strong relationships and communication that create value for individuals. The Quality Function Deployment (QFD) Method is exactly what we encounter in these matters (Cohen, 1995). The method works on the basis of the "*Voice of the Customer (VoC)*" phenomenon, which is one of its unique concepts and is widely used in product, process or service design.

QFD is a planning and quality improvement tool that is used before the production phase of a service or product starts and is used until the final stage. The method is based on the wishes and needs of the customers from the first stage of the process, and thus, the process is completed with an application in which errors are relatively minimized (Lowe and Ridgway, 2000).

Although QFD is mostly used in organizations that offer production output, it is seen that organizations with service output also prefer and apply this method. QFD can be used to integrate the experience of the professionals, customers, or the real requests that are overlooked, with the product, who focus on technical details in the processes in the production enterprises. In addition, the QFD Method is an significant tool in increasing the existing service quality in service enterprises (Martins and Aspinwall, 2001).

QFD is a proactive quality improvement tool that takes customers' wishes and needs as input. The method has a unique working format. QFD works with the matrices system. A matrix has two basic spines horizontally and vertically (Azadi and Saen, 2013). Although there are various models of QFD developed by different people, the QFD implementation process generally consists of 4 stages. These stages are (Shrivastava and Verma, 2014);

- Stage 0, Planning
- Stage 1, Determination of Customer Requests and Needs
- Stage 2, Create the House of Quality
- Stage 3, Evaluation of Outputs

1. Stage 0, Planning

At this stage, where the first steps of QFD are taken, the organization and customers to which the method will be applied are defined. Full support from the organization regarding the work is provided, which is critical for the QFD method to work properly and for the process to progress. The product or service on which the QFD will be operated is decided. The QFD team and an implementation schedule are prepared. Matters such as the budget and materials that will be needed are determined and work is started for their supply.

2. Stage 1, Determination of Customer Requests and Needs

At this stage, where the concept of "*Voice of the Customer*" is based, the needs and wishes of the customers constitute the basic data. The most important stage of the QFD process is Stage 1, where the customer's voice is listened to. Because, the working subjects to be focused on are determined according to the wishes and needs of the customers and the process is started in QFD studies (Schubert, 1989).

3. Stage 2, Create the House of Quality

It has been stated before that the QFD Method has a unique working principle. Whichever of the models related to QFD is preferred, the first and basic matrix of the method is the "*House of Quality*". The data collected from the customers, that is expressed as "*Voice of the Customer*", are placed on the horizontal parts designed in this basic matrix. On the vertical sections, "*Technical Answers*" created for each customer requirement are placed. The relationships

between these parts form the output of the House of Quality matrix. Figure 1 shows the setup of the House of Quality Matrix and the sub-matrices involved.

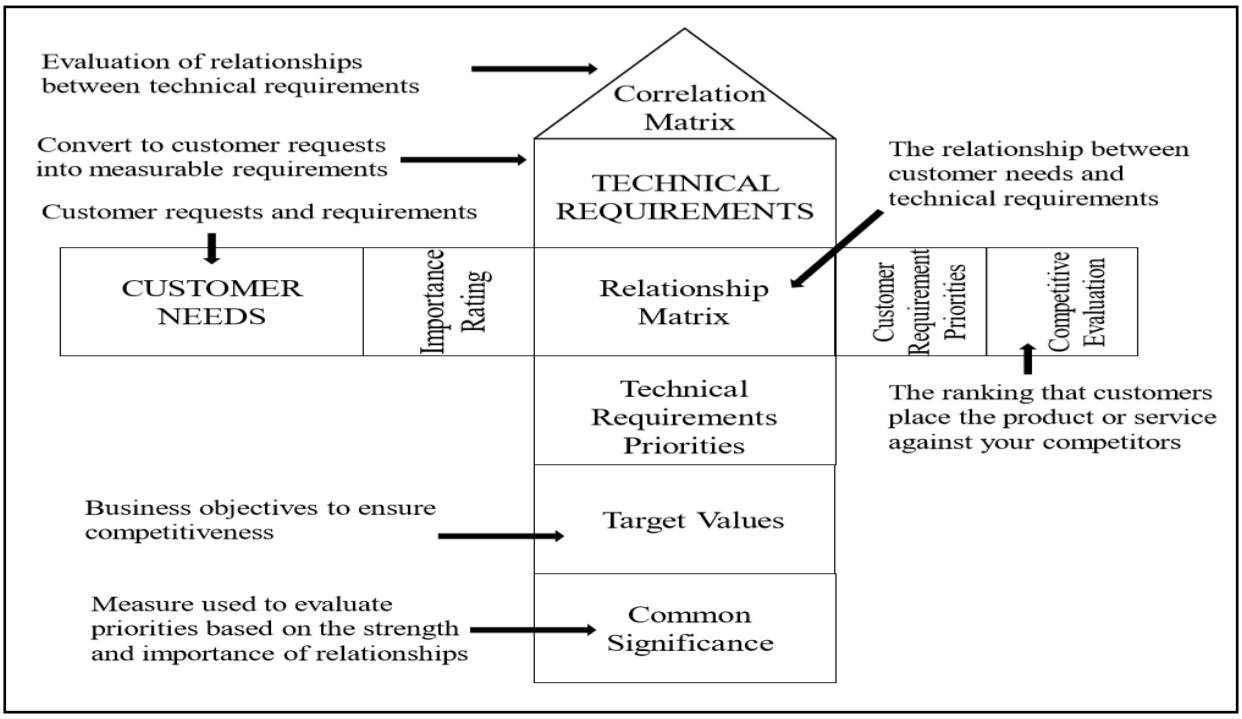


Figure 1. House of Quality (HOQ) Matrix (Fung, 1999)

4. Stage 3, Evaluation of Outputs

In the evaluation of the outputs, which is the final stage of the QFD method, the consideration of the transactions made throughout the process is made. However, the QFD method is not formed at this final stage. Outputs are evaluated and analyzed in every transaction made throughout the process. This minimizes possible errors.

MATERIALS AND METHODS

Purpose of the Research

The Quality Function Deployment Method (QFD) is a quality improvement tool generally used in production-based businesses. It is known that this method can also be used for service businesses. In both Turkish literature and foreign literature, there are studies in which the method is used for health institutions that are a service business. The main problem of this study is to determine the applications of the QFD method in service enterprises, where there are relatively few studies compared to production enterprises, and to determine the share of health services-related research in postgraduate theses.

The purpose of this research is to provide researchers with detailed information about the postgraduate thesis on the Quality Function Deployment (QFD) Method and to help researchers develop a new perspective on this method, which can be used in quality improvement tools in health services.

Scope, Method and Restrictiveness of Research

In line with the research problem and purpose stated above, YÖK's Thesis search engine (Yöktez) was used to analyze the postgraduate thesis produced in the field of Quality Function Deployment (QFD). Thesis studies published between 1995-2020 were included in the research. Yöktez has been chosen as a data source because it is the research area with the highest access to academic information on postgraduate thesis in Turkey. Postgraduate thesis studies published outside of Yöktez are excluded from the scope.

Within the scope of the study, all published thesis studies were transferred to the SPSS 22.0 (Statistics Program for Social Sciences) package program and all calculations were carried out through this program. When scheduling that research in order to analyze the postgraduate theses produced in the field of searched in Turkish on these keywords "*Kalite Fonksiyon Göçerimi*", "*Kalite Fonksiyon Yayılımı*", "*Kalite Evi*", "*Kalite Yayılımı*", "*Kalite Göçerimi*", "*Kalite İşlev Yayılımı*", "*Kalite Fonksiyon Açınımı*", also searched in English on these keywords "*Quality Function Deployment*", "*House of Quality*" and "*Quality Function Evolution*" in YÖK's Thesis search engine (Yöktez). Totally of 10 different keywords related to the subject were searched. While choosing these keywords, the previous studies in the academic literature were examined and the terms used there were compiled.

Analysis Methods of Research

The bibliometric analysis method was used on the thesis. Bibliometric analysis is one of the most convenient methods used in the analysis of resources in a field. Although the usage areas of bibliometric studies are extremely wide, they have been widely used by various disciplines for a long time. Because they make a significant contribution to the recognition of certain areas of interest, to draw attention to shallow issues in known study areas, and to identify unstudied areas as well as study areas. Bibliometric studies, provides a general picture of a research area that can be classified by elements such as articles, authors, or journals (Chun-Hao and Jian-Min, 2012). There are various definitions of bibliometrics put forward by different researchers. Bibliometrics is a method for the application of mathematics and statistics to the written communication environment in order to understand the nature and course of a discipline (Pritchard, 1969). In another definition, bibliometrics is the quantitative study of physically published units or bibliographic units, or both (Broadus, 1987). Bibliometrics can be expressed as the criterion of texts and knowledge in simpler definition (Norton, 2001).

Some features in the thesis discussed in this study were analyzed by creating categories. By examining the different features of the studies conducted in a field, a contribution is made to the academic literature thanks to the findings obtained. It is possible to make these evaluations thanks to bibliometric studies. Bibliometrics is a useful contemporary tool that enables researchers to examine research areas, evaluate outputs and research results (Grant et al. 2000). Various disciplines in economics and management have used bibliometric studies either to help us understand previously analyzed data or to show us possible hidden patterns that could be very interesting (Neely, 2005; Wagstaff and Culyer, 2012). Examining the publications that have been put forward in certain periods on any field is important in terms of revealing the developments and progresses. The findings obtained through bibliometric analysis not only provide information about the progress in the sciences and the stages they have gone through, but also enable future evaluations (Kalyane and Sen, 1995).

In this direction, the theses included in the study were analyzed in contexts such as the years they were published, genres, languages, universities, departments and institutes. The key word forming the backbone of the study was determined as "*Quality Function Deployment*". In addition, Turkish and English keywords related to the method were also searched. As a result of the research and the classifications created, the findings on QFD in health services and health management are also included.

RESULTS

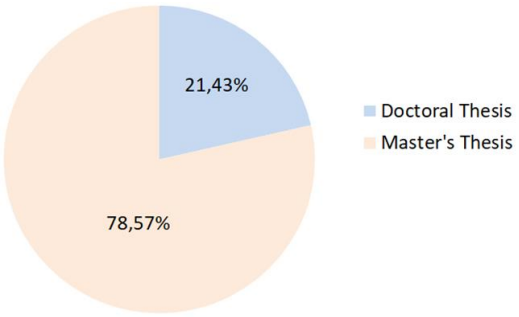
Findings about Thesis Studies

The yearly distribution of thesis studies between the years 1995-2020 included in the study is as shown in Table 1. As can be seen in the Table, the three years in which the most thesis studies were published were 2019, 2014 and 2007, respectively.

Table 1. Years of Thesis Studies

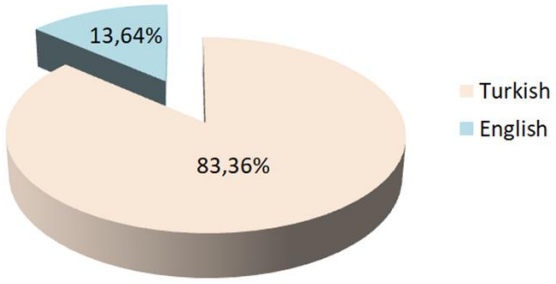
Years of Thesis	N	%
1995	1	0.64
1996	1	0.64
1997	1	0.64
1998	1	0.64
1999	4	2.59
2000	3	1.94
2001	2	1.29
2002	4	2.59
2003	6	3.89
2004	3	1.94
2005	8	5.19
2006	9	5.84
2007	11	7.14
2008	4	2.59
2009	9	5.84
2010	7	4.54
2011	7	4.54
2012	6	3.89
2013	3	1.94
2014	11	7.14
2015	9	5.84
2016	5	3.24
2017	7	4.54
2018	7	4.54
2019	18	11.68
2020	7	4.54
Total	**154**	**100.0**

When the types of thesis are examined. it is seen that 33 of them are doctoral thesis and 121 of them are master's thesis out of a total of 154 studies. Among the thesis included in the research. 21.43% of them are doctoral thesis and 78.57% of them are master's thesis. as seen in Graph 1.



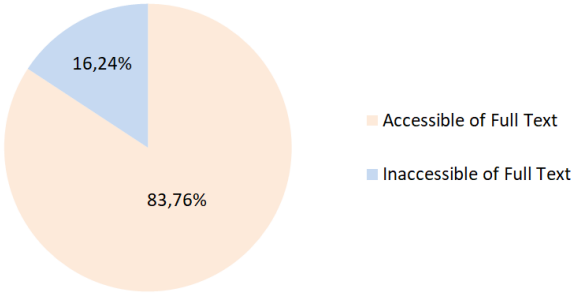
Graph 1. Types of Thesis

The written language of 133 of them is Turkish and the written language of 21 of them is English out of 154 studies. It is seen that 86.36% of the theses are written in Turkish. And 13.64% in English in Graph 2.



Graph 2. Written Language of Thesis

It has been determined that. 129 full texts are open to access and 25 full texts are not accessible of the 154 thesis studies reached. It is seen that the full text of 83.76% of the published thesis studies is open to access. and the full text of 16.24% is not accessible in Graph 3.



Graph 3. Accessibility Status of the Full Text

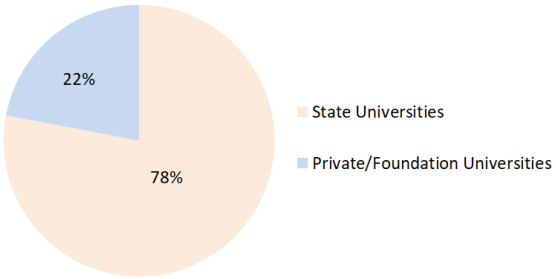
Thesis Studies by Universities

The distribution of the thesis studies on QFD according to universities is given in Table 2. According to this Table. the three universities with the highest number of studies on QFD were Istanbul Technical University. Dokuz Eylul University and Gazi University. respectively.

Table 2. Thesis Studies at Universities

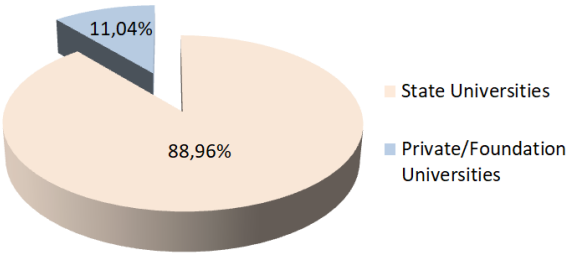
Name of the Universities	Number of Thesis (N)	Percentage of Thesis (%)
Akdeniz University	2	1.29
Anadolu University	1	0.64
Ankara University	1	0.64
Bahcesehir University	1	0.64
Balıkesir University	3	1.94
Baskent University	1	0.64
Beykent University	3	1.94
Bilecik Seyh Edebali University	1	0.64
Bogazici University	1	0.64
Çağ University	1	0.64
Çukurova University	1	0.64
Dokuz Eylül University	22	14.28
Dumlupınar University	4	2.59
Düzce University	1	0.64
Ege University	2	1.29
Eskişehir Osman Gazi University	5	3.24
Fatih University	1	0.64
Galatasaray University	3	1.94
Gazi University	11	7.14
Gaziosmanpaşa University	1	0.64
Gümüşhane University	1	0.64
Hacettepe University	2	1.29
İnönü University	1	0.64
İstanbul Arel University	1	0.64
Istanbul Technical University	23	14.93
Istanbul Commerce University	1	0.64
İstanbul University	2	1.29
İzmir University of Economics	1	0.64
İzmir Kâtip Çelebi University	1	0.64
İzmir Institute of Technology	1	0.64
Karadeniz Technical University	3	1.94
Kırıkkale University	1	0.64
Kocaeli University	3	1.94
Maltepe University	1	0.64
Manisa Celal Bayar University	8	5.19
Marmara University	7	4.54
Nevsehir University	1	0.64
Ondokuz Mayıs University	2	1.29
Middle East Technical University	2	1.29
Pamukkale University	1	0.64
Sakarya University	1	0.64
Selçuk University	3	1.94
Sivas Cumhuriyet University	1	0.64
Suleyman Demirel University	3	1.94
Uludag University	4	2.59
Yalova University	1	0.64
Yaşar University	2	1.29
Yeditepe University	2	1.29
Yıldız Technical University	5	3.24
Yüzüncü Yıl University	1	0.64
Total	**154**	**100.0**

Among 50 universities in total. 39 universities where thesis studies are conducted are State Universities and 11 universities are Private/Foundation universities. It is seen that 78% of the universities where the studies are conducted are State Universities and 22% are Private/Foundation Universities in Graph 4.



Graph 4. Types of Universities where Thesis Are Conducted

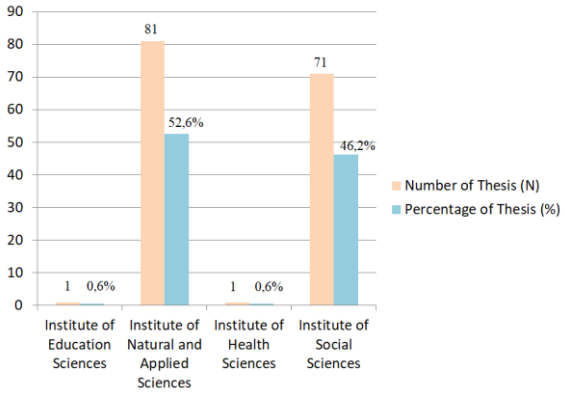
A total of 154 thesis have been published. 137 of which have been published within State Universities and 17 of which have been published Private/Foundation Universities. It is seen that 88.96% of the published thesis studies were done be within the structure of State Universities. and 11.04% of them were made within the structure of Private/Foundation Universities in Graph 5.



Graph 5. Distribution of Published Thesis According to University Types

Thesis Studies by Institutes and Departments

It can be found in which departments the thesis studies published on QFD are carried out in Graph 6. Accordingly. the Institute of Sciences ranks first with a rate of 52.6%.



Graph 6. Distribution of Published Thesis According to Institutes

It is seen in which departments the thesis studies are carried out in Table 3. Accordingly. the Department of Business Administration ranks first with 36.36%. the Department of Industrial Engineering ranks second with 29.2%. and the Department of Architecture ranks third with 5.1%.

Table 3. Distribution of Thesis According to the Departments

Departments	**N**	**%**
Actuarial Sciences	1	0.6
Computer Engineering	2	1.2
Maritime Transportation Management Engineering	2	1.2
Maritime Business Management	1	0.6
Education and Training	1	0.6
Econometrics	3	1.9
Industrial Engineering	45	29.2
Marine Engineering	1	0.6
Food Engineering	2	1.2
Clothing Industry and Fashion Design	1	0.6
Civil Engineering	5	3.2
Statistics	3	1.9
Business	56	36.4
Management Engineering	2	1.2
Business Administration	1	0.6
Quality Engineering	1	0.6
Mining Engineering	1	0.6
Mechanical Engineering/Machine Education	4	2.5
Metallurgical Engineering	3	1.9
Architecture	8	5.1
Health Management/Health Institutions Management	3	1.9
Total Quality Management	3	1.9
Tourism Management/Tourism Management and Hotel Management	3	0.6
International Logistics Management	1	0.6
International Trade and Business	1	0.6
Total	**154**	**100.0**

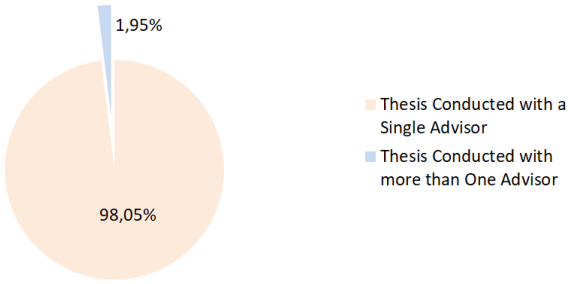
The department of business. where the most thesis studies are carried out. has 56 theses. 46.42% percentage of these studies are based on service output. while 53.58% are based on production output. Doctoral dissertations constitute 26.92% of the studies based on service output. Master's dissertations have a rate of 73.08%. On the other hand. doctoral dissertations have 30% percentage in the studies based on production output. while master's dissertations have 60% percentage. 28.27% of the dissertations prepared in the department of business on QFD are doctoral studies and 71.73% of them are master's studies. As a result of these rates. it is seen that the studies within the framework of the business department focus on the production output and also the doctoral dissertations in the field have a lower rate than the master's dissertations.

The second department in which the most studies have been carried out on QFD is Industrial Engineering with 45 dissertations. While 51.11% percentage of these dissertations belong to the studies based on the service output. 48.89% belong to the studies based on the production output. Among the studies based on service output. doctoral dissertations have a rate of 13.04%. while master's dissertations have a rate of 86.6%. Also. in studies based on production output. doctoral dissertations have a rate of 22.72%. while master's dissertations have a rate of 77.28%. 17.77% rate of the dissertations prepared in the department of Industrial Engineering on QFD are doctoral studies and 82.23% of them are master's studies. As a result of these rates. it is seen that the studies prepared within the framework of the industrial engineering department focus on the studies based on the service output. albeit with a by a hair of 2.22%. Also the doctoral dissertations in the field have a lower rate than the master's dissertations.

The third department in which the most studies have been carried out on QFD is architecture with 8 dissertations. While 47.61% of these studies are dissertations based on service output. 52.39% of them are studies based on production output. Of the studies based on service output. rate of 60% are doctoral dissertations and 40% are master's dissertations. In studies based on production output. rate of 63.63% belong to doctoral dissertations. while 36.37% belong to master's dissertations. 61.90% percentage of the dissertations prepared in the department of architecture on QFD are doctoral studies and 38.1% of them are master's studies. As a result of these rates. it is seen that there are more doctorate studies on QFD in architecture. unlike the departments of business and industrial engineering. In addition. it is seen that the dissertations prepared in the field. focus on the production output with a difference of 4.78% percentage.

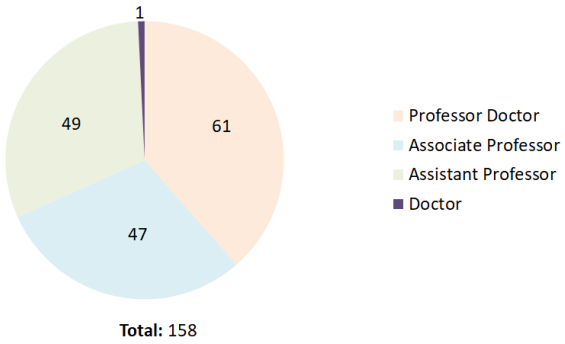
Findings Regarding Researchers and Academicians

In the 154 thesis studies analyzed. 55% of the researchers were women and 45% were men. There are a total of 158 academicians advising these thesis studies on QFD. 32% of these academicians are women and 68% are men. It is seen that the rate of theses conducted with one supervisor is 98.05% and the rate of studies conducted with more than one advisor is 1.95% in the Graph 7.



Graph 7. Number of Advisors of the Thesis Conducted

The titles of the academicians advising the thesis studies are reached in Graph 8. Of the 158 academicians who supervised the thesis studies. 61 were titled as "*Professor Doctor*". 47 of them as "*Associate Professor*". 49 of them as "*Assistant Professor*". and 1 of them as "*Doctor*" whose appears to be.



Graph 8. Titles of Academic Advisors

DISCUSSION AND CONCLUSION

The situations identified in this study. in which the theses on the Quality Function Deployment (QFD) Method were analyzed bibliometrically. can be summarized as follows;

- ✓ Although studies on the subject show a downward trend from time to time. it is seen that it has an upward trend especially after 2007.
- ✓ Thesis on Quality Function Deployment (QFD) are mostly concentrated in the Department of Business.
- ✓ QFD studies conducted in Departments of Industrial Engineering are also in the second rank.
- ✓ Thesis on Quality Function Deployment (QFD) in health services are limited compared to other fields. Among the 154 thesis published on QFD. the rate of those related to health services is 3.89%.
- ✓ The rate of thesis about of the Health Management/Health Institutions Management-Management departments is 1.94%.
- ✓ Regarding the subject. it has been determined that the number of theses from State Universities is higher than that of Private/Foundation Universities.
- ✓ There is no thesis study related to QFD. which came out of different departments. except for the aforementioned 25 departments. In addition. 40% of thesis studies from the departments were limited to a single study. That is to say. only one thesis was published between 1995-2020 by 25 different departments about of QFD.

As a result of the findings. it has been determined that the thesis studies prepared in the field of health management have a low rate. It is suggested to researchers that they can conduct studies in shallow areas related to QFD. As a result. researchers can contribute to the literature and health service providers by conducting various researches on QFD in Health Management.

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Conflict of Interest:

The authors declare that they have no conflict of interest.

Ethical Approval (Must be answered):

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Knowledge, Attitudes, and Skills Among Primary Health Care Workers in Developing Health Promotion Settings in a District of Sri Lanka

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Key Words

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ABSTRACT

The purpose of this study was to determine primary health care workers' knowledge, attitudes, and skills in establishing health promotion settings in the Kalutara district of Sri Lanka.

In this descriptive, cross-sectional study, data were collected from study participants using a structured, pre-tested, and self-administered questionnaire.The data was analysed using statistical tests and Chi-square values. The majority (215 people, or 70.0%) had "poor" knowledge. Knowledge was found to be significantly related to educational level, general certificate of education, advance level or higher (p = 0.012), and ability to read English (p = 0.021). Public health experience of less than five years for public health midwives (PHMs) was significantly associated with knowledge (p = 0.002). The attitude level was favourable (204, 69.4 %). The level of knowledge was found to be significantly related to the level of attitudes (p = 0.004). Only 25.1% (77) of those polled had adequate skills. The presence of health promotion settings in their fields was found to be significantly related to skill level (p = 0.000). The availability of healthy settings in the fields of PHMs with the extent of field areas less than the mean (p = 0.017) was significantly associated.

The current study concluded that primary health care workers had "poor" knowledge and skills in establishing health promotion settings, but "good" attitudes. The most common barriers identified were a lack of time and insufficient training in the field of health promotion.

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INTRODUCTION

Health promotion is the process of empowering people to take charge of their health and improve it. In 1986, Ottawa hosted the first international conference on health promotion, which resulted in the adoption of the Ottawa Charter for Health Promotion. This crucial conference sparked a series of health promotion conferences. The Ottawa Charter defined health promotion action means as "building healthy public policy, creating a supportive environment, strengthening community action, developing personal skills, and reorienting health services" (World Health Organization,1986).

The healthy setting movement was first described in the 1980 health for all strategy, and it was further defined in the 1986 Ottawa charter for health promotion. Following that, Sundsvall's 1992 statement emphasised the importance of creating a supportive environment with a focus on setting for health. A healthy setting is defined as "a place where people participate in daily events where environmental, organisational, and personal factors interact to affect health and well-being" (World Health Organization, 1998a). A setting is a place where people actively live, use, and exploit the environment, as well as where people create or solve health-related problems. The World Health Organization's Jakarta declaration emphasised the importance of settings for implementing strategies and providing infrastructure for health promotion. All over the world, various types of settings are used to implement health promotion for better health. Health promotion villages, schools, preschools, and workplaces were the most commonly used settings worldwide (World Health Organization, 1997).

Chronic non-communicable diseases (NCD) such as ischemic heart diseases, diabetes, hypertension, stroke, cancer, and respiratory diseases are the leading causes of death in the world, accounting for 60% of global deaths. Of the 41 million people who died from NCDs in 2019, 15 million were between the ages of 30 and 69 years (WHO, 2019). Promoting healthy living, "better diet, enough physical activity, tobacco cessation" and healthy societies, particularly for the poor, are very important to solve these problems (World Health Organization, 2010).

In Sri Lanka, the disease burden has shifted from communicable diseases to lifestyle and environmental-related non-communicable diseases, as well as emerging infectious diseases. Due to the present quickly changing demographic, social, and economic context, as well as the epidemiological pattern of diseases, earlier health programs that were beneficial in the past may not be effective enough anymore. These issues necessitate considerable adjustments in the health system toward "new effective health promotion," which is widely recognised as the most cost-effective way to reduce global disease burden (Ministry of Health Sri Lanka, 2016).

Furthermore, health promotion was identified as a priority issue by the Sri Lankan ministry of health, and it was included in the health master plan (Ministry of Health Sri Lanka, 2007b), health promotion policy (Ministry of Health Sri Lanka, 2009a), and Mahinda Chinthana's vision for the future of the policy document (Institute of Policy Studies of Sri Lanka, 2007). Community empowerment and health promotion were also acknowledged as effective instruments in Sri Lanka's national nutritional policy (Ministry of Health Sri Lanka, 2010).

According to the Health Promotion Association of Australia (2009), a successful health promotion programme requires five abilities from health care employees. The World Health Organization's expert group meeting in 2008 advised "doing a competency evaluation among health promotion practitioners in several sectors" (World Health Organization, 2010a). Because public health midwives and public health inspectors (PHIs) are the frontline professionals that work with the community to improve their health in Sri Lanka, their knowledge, attitudes, and skills in building healthy settings are critical. PHMs accept that health promotion is a function applicable to their profession, according to a survey performed to identify essential public health functions of public health staff in Sri Lanka. However, they stated that health promotion principles were difficult to grasp and that their skills were insufficient for executing good health promotion programmes (Fernando et al,2006). According to a study conducted in Sri Lanka's Kandy area, the majority of PHMs (65.4 percent) had a poor understanding of health promotion (Perera, 2012).

Because primary health care workers' knowledge, attitudes, and skills are critical in constructing health promotion settings, it's critical to analyse those criteria among primary health care workers (PHCWs) before developing training programmes. However, relatively little research has been done in this field in Sri Lanka. As a result, the goal of this study was to determine the current gaps in primary health care professionals' abilities in building health promotion settings in Sri Lanka's Kalutara area. The Kalutara district was chosen for this study because it represents all of Sri Lanka's communities, including rural, urban, and estate settings.

Aims

To determine the knowledge, attitudes, and skills of primary health care workers in developing health promotion settings and assess the managerial interventions needed to establish health promotional settings in the Kalutara district.

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted in all medical officer of health (MOH) areas of Kalutara district. The study population consisted of public health midwives and public health inspectors who worked in the Kalutara district. Public health midwives and public health inspectors of Kalutara district with a minimum 6-month service period in the public health field were included in the study. The PHMs and PHIs who were on leave for more than one month at the time of data collection were excluded from the study. All the PHMs and PHIs (n = 328) who consented and were eligible were included in the study. Therefore, the study did not need a sampling technique or a sampling size calculation.

The data was collected by using a structured self-administered questionnaire from the study participants. The questionnaire was pre-tested in the Induruwa MOH area of the Galle district.The questionnaire was comprised of six main parts to assess socio-demographics, basic training details, work experience details, language proficiencies, and working conditions. This broad group of factors were assessed for their association with knowledge, attitudes, and skills in developing health promotion settings. Eight questions with a five-point Likert scale were used to assess the attitudes and knowledge of skills were assessed by using open-ended questions. The frequency distribution of these factors was cross-analyzed against whether the PHMs/PHIs have a "good" or "poor" level of knowledge, attitudes, and skills. The chi-squared test was used wherever appropriate to assess their association. A P-value of less than 0.05 was used to determine the significance. Ethical clearance for the study was obtained from the ethical review committee of the Faculty of Medicine, Colombo.

RESULTS

In the study, 307 primary health care workers responded, with a response rate of 93.6% (307/328). According to participants' perceptions of their level of knowledge on health promotion settings, 84.8% (257) said they have "fair," "good," or "very good" knowledge, while only 15.2% (46) said their knowledge is "poor" or "very poor."

As per the scoring system described in the study, a participant who obtained a total of equal or more than 32 was grouped as having "good" knowledge and others as "poor". However, the knowledge among 70% (215) of the study participants was categorised as "poor" and only 30% (92) of the study participants were identified as having "good" knowledge.

The proportion of PHCW with a "good" level of knowledge of health promotion settings was 32.1% when the educational level was general certificate of education advanced level (GCE A/L) or higher, and it was 10% when the highest achieved educational level was GCE O/L (ordinary level). The educational level of GCE A/L or higher was significantly associated with having a good level of knowledge in health promotion settings ($p< 0.05$).

The knowledge level was not significantly associated with whether the PHCW resided in their field or not, with the respective proportions of 29.6% and 29.9% having good knowledge of health promotion settings ($p = 0.962$).

Of primary health care workers with the ability to read English (can manage, good, and excellent), a higher proportion (34.5%) had a "good" level of knowledge, while those with less ability (not at all or very little) to read English were 19.9%. The self-assessed ability to read English was significantly associated with having 'good' level of knowledge ($p = 0.021$). (Table 1)

Table 1. Distribution of the study participants by knowledge on health promotion settings and selected background characteristics

Characteristic	Knowledge "Poor" N	%	Knowledge "Good" N	%	Significance
Education Level					$x^2 = 6.136$
G.C.E O/L	27	90.0	3	10.0	df = 1
G.C.E A/L or higher	188	67.9	89	32.1	$p = 0.012$
Reside in the Field					$x^2= 0.02$
Yes	57	70.4	24	29.6	df = 1
No	157	70.1	67	29.9	$p = 0.962$
Ability to read English					$x^2 = 5.355$
Not at all, very little	177	80.1	44	19.9	df = 1
Good, excellent and can manage	36	65.5	19	34.5	$p = 0.021$

The distribution of PHMs by knowledge of health promotion settings and selected characteristics in training and public health experience is described in Table 2. The year of graduation from nursing school had no significant relationship with knowledge of health promotion settings (p = 0.535).There was no significant association between the level of knowledge of health promotion settings and whether or not the PHMs got their basic training from the Colombo nurses' training school.

The PHMs who had public health experience of fewer than 5 years had a significantly higher 'good' level of knowledge (53.3%) compared to those who had more than 5 years (25.7%) of public health work experience (p = 0.002).

Table 2. Distribution of public health midwives by knowledge on health promotion settings and selected characteristics in training and public health experience

Characteristic	Knowledge "poor" N	%	Knowledge "good" N	%	Significance
Year of passing out					$x^2 = 3.519$ df = 1 $p = 0.061$
Before 2004	124	75.6	40	24.4	
2004 or after	71	65.1	38	34.9	
NTS / RTC of basic training					$x^2 = 0.022$ df = 1 $p = 0.881$
Colombo	82	70.1	34	29.9	
Other	113	71.5	45	28.5	
Public health working experience					$x^2 = 9.958$ df = 1 $p = 0.002$
Less than 5 years	14	46.7	16	53.3	
5years or more	182	74.3	63	25.7	

Most study participants (204, 69.4%) were categorised as having "good" attitudes in developing health promotional settings according to attitude score. Only 30.6% (90) of the participants were categorised as having "bad" attitudes.

The distribution of study participants by level of attitudes towards health promotion settings and level of knowledge is described in Table 3. There was a statistically significant association between the level of knowledge and the level of attitudes (p = 0.04). The participants with a good level of knowledge had better attitudes.

Table 3. Distribution of study participants by level of attitudes on health promotion settings and level of knowledge

Level of knowledge	Level of attitudes 'Poor' N	%	'Good' N	%	Significance
Poor	73	81.1	17	18.9	$x^2 = 8.392$ df = 1 p = 0.04
Good	131	64.2	73	35.8	

Most study participants (206, 67.5%) declared that they hadn't had health promotional settings in their fields. Only 32.5% (99) of participants developed health promotional settings in their fields.

As per the scoring system described earlier, a study participant who obtained a grand total of equal or more than 30 was grouped as having "good" skills and others as "poor". According to the scoring system, the majority of study participants (230, or 74.9%) were categorised as having poor levels of skills in developing health promotional settings.

The distribution of study participants by the presence of a health promotion setting and their level of skills is shown in Table 04. There was a statistically significant association between the existence of a health promotional setting and the level of skills (p = 0.00).

Table 04. Distribution of study participants by existence of health promotion settings and level of skills

Level of skills	Existence of health promotion settings				Significance
	Yes		No		
	N (N = 306)	%	N	%	
Bad	47	20.5	182	79.5	$x^2 = 56.18$
Good	52	67.5	25	32.5	df = 1
Total	99		207		P = 0.00

The distribution of public health midwives by the existence of health promotional settings in the field and working conditions is described in Table 5. The population of less than the norm was not significantly associated with the existence of health promotional settings in their field (P = 0.975). A significantly higher proportion of PHMs (35.7%) working in areas less than the mean size had health promotional settings in their field compared to those who worked in areas with larger surface areas (P = 0.019). There was no significant association between the presence of health promotional settings and performing cover-up duties (p = 0.549).

Table 5. Distribution of public health midwives by existence of heath promotional settings in the field and working conditions

Working conditions	**Existence of health promotional setting**				**Significance**
	"Yes"		**"No"**		
	N	**%**	**N**	**%**	
Population of the field[1]					$x^2 = 0.01$
Less than 3000	39	29.5	93	70.5	df = 1
3000 or more	42	29.4	101	70.6	*p* = 0.975
Size of the field area[2]					$x^2 = 5.51$
Less than 6.5 km^2	50	35.7	90	64.3	df = 1
6.5 km^2 or more	30	22.7	102	77.3	*p* = 0.019
Doing cover up duties in another field					$x^2 = 0.359$
Yes	14	33.3	28	66.7	df = 1
No	67	28.8	166	71.2	*p* = 0.549

The managerial interventions depend on the identification of barriers and gaps in developing health promotional settings. Most study participants (181, 59%) declared that 'Not enough time' was a barrier in developing healthy settings. One hundred and thirty-nine (45.3%) PHCW perceived "not enough training" as a barrier. The other most common barriers for any grass-roots level health care worker in developing health promotional settings were "insufficient support from other sectors" and "lack of interest from the community."

DISCUSSION

The purpose of this study was to assess primary health care workers' knowledge, attitudes, and skills in health promotion settings, as well as to determine the managerial interventions required in health promotion settings in the Kalutara area.

According to the scoring system, 70 percent (215) of the study participants' knowledge was classified as "bad," while only 30 percent (92) of the study participants' knowledge was classified as "good." 87.8% (257) of primary health care providers said they had "good" knowledge of healthy settings, according to their self–assessed level of expertise. The disparity between the self-assessed and calculated levels of knowledge implies that most primary health care providers are unable to appropriately judge their degree of actual understanding of health promotion settings. Because of this erroneous view, they may be unable to participate in training programmes. According to a survey of PHMs in Kandy district, 65.4 percent of them had "poor" knowledge of health promotion (Perera, 2012).

The highest achieved educational level (p = 0.012) and the ability to read English (p = 0.021) were the background characteristics that were significantly associated with knowledge of health promotion settings. The basic qualification to enter PHMs training changed from GCE O/L to GCE A/L during the last decade. The significant association may be due to recently graduated PHMs receiving health promotion training as part of their basic training, which can have a confounding effect on their level of knowledge on health promotion.There were no books on health promotion written in either Sinhala or Tamil languages. Therefore, the ability to read English might have helped the primary health care workers improve their knowledge. Whether or not they reside in their field (p = 0.962) was not significantly associated with knowledge of health promotion settings. Perera (2012) found in his study conducted in the Kandy district that the highest achieved educational level, ability to access the internet, and ability to read English were significantly associated with knowledge of health promotion.

The year of qualifying as a PHM, the year 2004 or after, was not significantly associated with knowledge of health promotion settings (p = 0.061) or whether they obtained basic PHM training from Colombo Nursers training school or other centres was not significantly associated with knowledge of health promotion settings (p = 0.881). This finding indicated that the PHMs who were trained on health promotion had a similar level of knowledge and that the quality of training on health promotion was not differing to a greater extent between training centers. The PHMs who had public health work experience of less than five years had a good level of knowledge compared to those who had public health experience of more than five years (p = 0.002). These results may be due to the confounding effect of recently passed out PHMs being trained in health promotion during their basic training. According to Perera (2012), the qualifying year as a PHM, 2004, or earlier, was significantly associated with knowledge of health promotion.

Health promotion knowledge was not acceptable a decade after it was introduced to the curriculum of primary health care professionals in Sri Lanka and a bigger number of training sessions were conducted. This fact raises concerns regarding the quality of health promotion training, which should be taken into consideration.

The attitudes of primary health care providers in developing health promotion settings were positive (69.4%, 204), which is consistent with other worldwide studies. Peltzer (2001) reported that 63.3 percent of South African primary care nurses and midwives had positive attitudes. In another study, most of them expressed positive attitudes about health promotion as a core aspect of primary care (Douglas et al., 2006). According to the study conducted by Geense et al. (2013), the attitudes of primary care nurses on health promotion were rated as good.

Most study respondents (251, 81.6%) expressed positive attitudes about the importance of health promotion settings. In this study, there was a significant relationship between primary health care workers' knowledge of health promotion settings and their level of attitudes (p = 0.004). Better knowledge of health promotion was associated with more positive attitudes towards health promotion. This finding was on par with the study conducted in South Africa (Peltzer, 2001).

Although primary health care workers had a high level of attitudes towards health promotional settings, there were no health promotional settings in their fields of majority. Only 32.5% (99) of participants developed health promotional settings in their fields.

The level of skills in developing health promotional settings was also poor among study participants. Only 25.1% (77) of study participants possessed good skills. There was a statistically significant association between the existence of a healthy setting and the level of skills among primary health care workers (p = 0.000). The existence of a healthy setting among participants with 'good' level of skills was significantly higher than those with 'poor' skills.

The existence of a healthy setting was significantly associated with the size of the field area (p = 0.019). The existence of a healthy setting among PHMs who had been working in field areas less than 6.5 km2 was significantly higher than those who worked in areas larger than that. PHMs who worked in larger field areas had to travel more and had less time to engage in activities such as health promotion.The population size was less than the norm or performing cover-up duties was not significantly associated with the existence of a healthy setting.

Identification of barriers, gaps, and facilitators was important to deciding the managerial interventions. The main areas identified as barriers in this study are consistent with the results of other studies. Time limitation, lack of training, and lack of community interest were identified as the commonest barriers by the participants of this study. Perera (2012) in his study identified lack of training, unavailability of resources at the MOH level, and no recognition for health promotion in the current performance appraisal system as the commonest barriers. Douglas et al (2006) identified lack of time as the commonest barrier to health promotion. The study conducted by Jacobsen et al (2005) found a lack of confidence in primary health care workers as a common barrier.

Lack of interest in the community and inadequate support from other sectors were identified as barriers outside the health sector by the larger number of study participants. This may be due to the lack of skills of primary health care workers to advocate and mediate with the other sectors to make a health impact. This fact

suggests that both inadequacies in knowledge of health promotion as well as a lack of skills needed for effective application of health promotion should be addressed in future training programmes.

CONCLUSIONS

A majority (215, 70.0%) of primary health care workers in the Kalutara District had poor knowledge of developing health promotion settings.

The knowledge of health promotional settings was significantly associated with educational level and the ability to read English. Those who obtained GCE A/L or a higher educational level had better knowledge of health promotional settings than others. Similarly, primary health care workers with the ability to read English demonstrated a better level of knowledge than others. The other factor that was significantly associated with knowledge of health promotion settings was the public health experience of PHMs. The recently passed out PHMs with public health experience of fewer than five years had higher knowledge when compared to others.

The level of attitudes among primary health care workers in the Kalutara District was good. Of them, 69.4% (204) of the participants had good attitudes toward developing health promotional settings. Most of them had positive attitudes about the importance of health promotional settings. The level of knowledge about health promotional settings was significantly associated with the level of attitudes of participants. The participants with higher levels of knowledge had better attitudes when compared to the other groups.

A majority (206, 67.5%) of study participants declared that they hadn't had health promotional settings in their field. Only 25.1% (77) of primary health care workers had adequate skills in developing health promotional settings. The level of skills was significantly associated with the existence of health promotional settings in their fields. Those who had healthy settings in their fields possessed a higher level of skills than others. There was a statistically significant association between the availability of healthy settings in the fields of PHMs and the extent of field areas. The PHMs with smaller PHM areas than the mean (6.5 km^2) had a higher percentage of healthy settings than others.

Most of the participants stated that limited time, inadequate training, lack of community interest, poor support from other sectors, the inadequacy of monetary allocation, and lack of guidance from supervisors were barriers that needed quick managerial interventions.

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Conflict of Interest:

The authors declared that they have no conflict of interest on this study.

Ethical Approval (Must be answered):

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Examining The Relationship Between The Population Characteristics And Telerehabilitation Requirement- Turkey Study

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ABSTRACT

This study was planned to estimate the population characteristics of people who may need physiotherapy and rehabilitation and face barriers in accessing services in Turkey, and to discuss the suitability of telerehabilitation services for these people and the necessity of integrating them into health services. In October 2020, information pages of official institutions and organizations in Turkey were scanned. The general demographic indicators of the Turkish people by years, dependency and mobilization levels, major diseases in the population and the number of hospital admissions were investigated and recorded. In Turkey, the elderly population is increasing every year, and with the increase in the elderly population, the dependency ratio and the incidence of chronic diseases increase. While hospital admissions have increased each year, they have decreased during the COVID-19 period. According to the characteristics of the Turkish population, the number of people who need physiotherapy and rehabilitation is likely to be high. It is expected that the need will increase and there will be problems in accessing rehabilitation services in the coming years. In societies that are aging and have barriers to access to health services, the need for telerehabilitation applications will increase. In these societies, telerehabilitation practices should be integrated into the health system.

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INTRODUCTION

The ageing of societies, increasing longer and higher quality life expectancy, advances in technology, rapid political, economic and socio-cultural transformations, increase in costs, epidemics and changes in disease tissue bring along new dynamics in the provision, organization and financing of health services. The best way to understand and respond to these dynamics is to develop multidisciplinary, bio-psycho-social approaches. One of the mentioned approaches is telerehabilitation services.

Telerehabilitation refers to the use of information and communication technologies such as telephone, internet and video conferencing to provide remote rehabilitation services to people in their homes or other setting. Such services include therapeutic interventions, remote monitoring of progress, education, counselling, training, and a networking tool for people with disabilities (Brennan et al., 2009; Wiley & Cory, 2013).

Studies have shown that telerehabilitation gives significant results in many different disease groups. Frederix et al. reported that telerehabilitation is a feasible and practical additional and/or alternative rehabilitation approach compared to traditional in-hospital rehabilitation (Frederix et al., 2015). Telerehabilitation interventions in stroke patients have been associated with significant improvements in recovery of motor deficits, higher cortical function, and lower depression (Sarfo et al., 2018). Hwang et al. reported that telerehabilitation is not inferior to an outpatient rehabilitation program in the hospital in patients with chronic heart failure and encourages more participation in their sessions in patients (Hwang et al., 2017). The addition of telephone information to usual physiotherapy care for people with chronic and non-specific low back pain has led to clinically significant improvements in activity and recovery expectations (Iles et al., 2011). Telerehabilitation, which is found easy, safe and convenient by patients, increases the efficiency of rehabilitation clinics by providing patients with more access to services (Covert et al., 2018; D. Leochico, 2020; Soopramanien et al., 2020). In addition to all these, it has been shown that telerehabilitation is a practical, time-saving and cost-saving alternative method (Cox et al., 2018; Ihrig, 2019; Nelson et al., 2019).

This study aims to identify people who may need physiotherapy and rehabilitation in Turkey and who may face obstacles in reaching the service based on data published by public institutions and organizations, especially the Ministry of Health, and to discuss the suitability and necessity of telerehabilitation services for these people.

MATERIALS AND METHODS

In this study, Turkey's general data was used. Data was taken from the publications of official institutions; Turkey Statistical Institute, Turkey Social Security Institution, the Republic of Turkey Ministry of Health. In our study, it is aimed to discuss the demographic data obtained from official institutions and organizations, general health indicators, the number of applications, their distribution according to various sub-parameters and their changes over the years, and to reach multiple results in this direction.

RESULTS

The first findings of our study are concerned with Turkey's General demographic indicators by years that are shown Turkey's general demographics data according to years is given in Table 1.

Table 1. General demographic indicators by years

	1990	2000	2015	2016	2017	2018
Total Population	56.473,035	67.803,927	78.741,053	79.814,871	80.810,525	82.003,882
Rural Population Rate (%)	48.70	40.80	12.40	12.10	11.80	12.10
Urban Population Rate (%)	51.30	59.20	87.60	87.90	88.20	87.90
0-14 Age Rate (%)	35.00	29.80	24.00	23.70	23.60	23.40
65 and Over Rate (%)	4.30	5.70	8.20	8.30	8.50	8.80
Young Dependency Rate (0-14 Years) (%)	57.60	46.30	35.40	34.90	34.70	34.50
Elderly Dependency Rate (65 + over) (%)	7.10	8.80	12.20	12.30	12.60	12.90
Total Dependency Rate (%)	64.70	55.10	47.60	47.20	47.20	47.40
Annual Population Growth Rate (‰)	21.70	18.30	13.40	13.50	12.40	14.70
Crude Birth Rate (‰)	24.10	21.60	17.10	16.60	16.10	15.30
Crude Death Rate (‰)	7.10	7.30	5.20	5.30	5.30	5.20
Total Fertility Rate (‰)	2.90	2.50	2.20	2.10	2.10	2.00

Resource: Health Statistics Annual 2018, (https://dosyasb.saglik.gov.tr/Eklenti/36134,siy2018trpdf.pdf?0, Accessed 20 October 2020)

Table 1 shows that the total population, which was 56.473,035 in 1990, increased to 82.003,882 in 2018, according to 2018 data. Between these years, a serious decrease was observed in the rural population and an increase in the urban population, while the proportion of the population aged 0-14 decreased and the rate of the population aged 65 and over increased. Also, indicators such as annual population growth rate (‰), crude birth rate (‰), crude death rate (‰) and total fertility rate (‰) decreased between these years. According to Table 1, when we come to 2018, it is seen that the elderly dependency rate has reached 12.90% and the young dependency rate has reached 34.50%. While the elderly dependency rate tended to increase every year, the young dependency rate showed a downward trend every year.

Percentage rates of those who cannot walk without any assistance or assistive device and who cannot climb stairs are given in Table 2.

Table 2. Population who cannot walk without any assistance or assistive device and who cannot climb stairs, %, 2016

Age (years)	Can not walk%	Can not climb stairs%
15-44	1.30	1.90
45-54	5.10	8.80
55-64	10.80	15.40
65-74	23.40	29.30
75 and over	48.00	55.40
Ratio in total population	6.50	8.70

Resource: Turkey Health Survey,2016 (http://www.tuik.gov.tr/PreTablo.do?alt_id=1017, Accessed: 13.10.2020)

According to Table 2, it has been founded that the rate of those; in the 45-54 age group who cannot walk without any help or using an assistive device is 5.10% and the rate of those who cannot climb stairs is 8.80%, the proportion of those who cannot walk in the 55-64 age group is 10.80% and the proportion of those who cannot walk up and down stairs is 15.40%, the proportion of those who cannot walk in the 65-74 age group is 23.40% and the proportion of those who cannot go up and down stairs is 29.30%, the proportion of those who cannot walk in the age group

of 75 and over is 48 and the rate of those who cannot go up and down stairs is 55.40%.

Distribution of the major diseases / health problems experienced by individuals aged fifteen and over in the last 12 months by gender is given in Table 3.

Table 3. Distribution of major diseases/health problems experienced in the last 12 months by individuals aged fifteen and over by gender, %, 2016

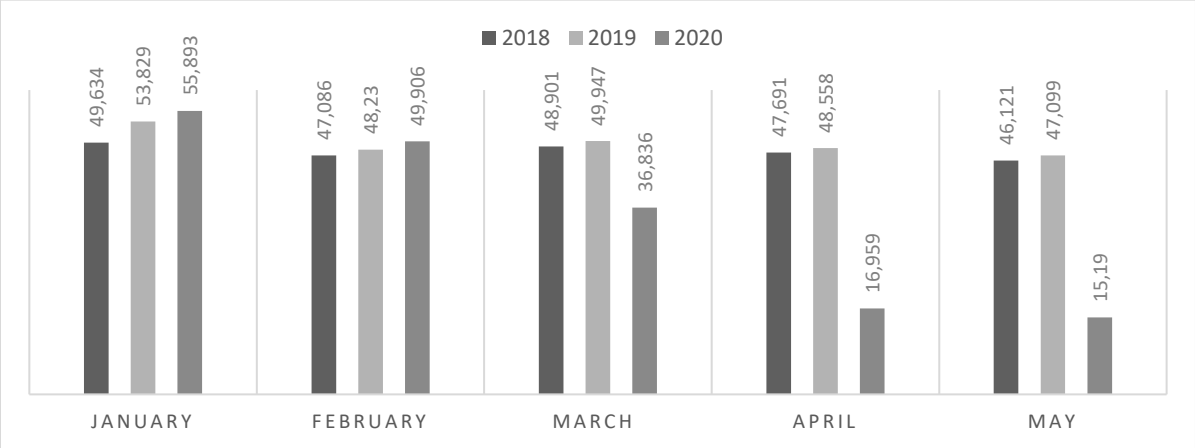
Disease/health problem	Male	Female	Total
Lower Back Problems (Low Back Pain, Lumbar Hernia, Other Lumbar Defects)	21.40	32.80	27.10
Neck Problems (Neck Pain, Neck Hernia, Other Neck Defects)	11.50	24.60	18.10
Hypertension	11.10	20.50	15.80
Allergia (Allergic Rhinitis, Dermatitis, Allergy to Food etc.- Excluding Allergic Asthma)	7.50	13.90	10.80
Asthma (Including Allergic Asthma)	5.20	10.30	7.80
Arthrosis	4.90	10.50	7.70
Chronic Obstructive Pulmonary Disease (Chronic Bronchitis, Emphysema)	5.70	88.00	7.30
Depression	4.90	9.40	7.20
Coroner Hearth Disease (Angina, Chest Pain, Spasm)	5.90	7.10	6.50
Kidney Problems	5.20	7.50	6.40
Urinary Incontinence	3.90	7.80	5.90
Alzheimer*	5.10	6.10	5.60
Myocardial Infarction (Heart attack)	2.10	2.00	2.10
Liver Cirrhosis, Liver Failure	1.10	1.80	1.50
Stroke (Brain Hemorrhage, Cerebral Thrombosis)	1.00	0.80	0.90

Resource: Health Statistics Annual 2018, p.50 (https://dosyasb.saglik.gov.tr/Eklenti/36134,siy2018trpdf.pdf?0, Accessed: 20 October 2020)

*Alzheimer's was evaluated for individuals aged 65+.

According to the data of the Health Statistics Annual of Turkey 2018, the main diseases/health problems experienced by individuals aged fifteen and over in the last 12 months in 2016, with 27.10% of the lower back problems in the first place. It is followed by neck area problems with 18.10%. Hypertension is ranked third with 15.80%. Especially in women, these problems are seen at a higher rate than in men, and the same condition persists in diseases such as asthma, arthrosis and COPD.

Number of hospital application by years in Turkey is given at Table 4.



Resource : http://www.sgk.gov.tr/wps/portal/sgk/tr/kurumsal/istatistik/aylik_istatistik_bilgileri (Accessed: 21 October .2020)

Graph 1. Total number of hospital applications in the first five months in 2018, 2019, 2020

January and February 2020 are the months in which the highest number of patient applications are recorded, with 55,893,000 and 49,906,000, respectively in the table that gives the number of patient applications for the first five months of the last three years. These numbers are far above the number of applications January and February of 2018 and 2019. In April and May 2020, hospital admissions were at their lowest levels and remained below the 2018 and 2019 data**.**

DISCUSSION

In this study, people who may need physiotherapy were identified based on the data of official institutions in Turkey, and the obstacles that these people may face in accessing physiotherapy services were examined in the light of official institution data. According to official data, the proportion of the elderly population in our country seems to have entered an upward trend since the late 90s, and it is expected that this increase will continue in the coming years. The rate of population growth has fallen in recent years along with the decrease in the rate of rough birth, and the rate of the elderly population has increased with the increase in the rate of rough death. Along with the rise in the rate of elderly population, the rate of elderly dependence has also increased. Although there is no exact data on the impact of age dependency on access to health care, it cannot be ignored that dependency is challenging in this regard. It has been observed that disability increases with age, and this is most often encountered in transfer activities(Liang et al., 2015).

In the Turkish Health Survey 2016, the proportion of "those who cannot walk without help or aid device " in the 65-74 age group was 23% and 48% in the over-75 age group was consistent with this information in the literature. In the same study, the proportion of "those who cannot climb stairs" was 29.30% in the age group of 65-74 and 55.40% in the age group of 75 and above. These data are seen as another indicator of dependency in the elderly. An excess of elderly dependency can be interpreted as an increase in the need for physiotherapy services. It is inevitable that dependent elderly people have more difficulty in accessing physiotherapy and rehabilitation services than their independent peers. It can also be seen as the reason for the increase in costs due to requirements such as the provision of assistants or assistive devices.

Data on how much a percentage of the dependent group needs physiotherapy and rehabilitation services could not be reached. But in the report "Increasing the Efficiency of Health Services and Financial Sustainability" published in 2014 by the Ministry of Development, it was stated that rehabilitation services delivered to specific groups that can be considered dependent (people with special needs due to their physical, mental, social or economic conditions) are insufficient. In this report, it is foreseen that the inadequacies and problems in these services will increase in the coming years with increasing aging (https://www.sbb.gov.tr/wpcontent/uploads/2018/10/10_SaglikHizmetlerininEtkinligininArtirilmasiveMaliSurdurulebilirlik .pdf accessed: 31.10.2021) With ageing, muscle mass decreases, balance, falling problems and a predisposition to chronic disease increase; exercise programs are known to give significant results in reducing these problems seen in the elderly (Aguirre & Villareal, 2015; Galloza, 2017; Marzetti et al., 2018). In the light of all these data, it should not be forgotten that this group is in the rehabilitation target group. When these people development need preventive rehabilitation or primary phase physiotherapy and rehabilitation services, telerehabilitation practices that are easier to access and financially equitable may be preferred. Thus, it is thought to produce more cost effective results

Although it has been decreasing from past to present, it is seen that the dependency ratio of 0-14 years of age in 2018 has reached a not underestimated percentage with 34%. People in the dependent group of 0-14 years of age need parents, resulting in the labour force and economic loss of parents. It also disrupts their education. It would be useful to consider telerehabilitation programs for this group in health management policies

There is a significant difference in the number of healthcare workers and beds per 100,000 people in our country, according to the regions. The elderly population and dependency rates found by region are not parallel to these numbers. Although dependecy rates do not reflect the number of people in need of physiotherapy and rehabilitation services, these data can be accepted as an indicator that not every region has equal opportunities in accessing to physiotherapy services. The necessity of alternatives that do not require space, such as telerehabilitation, can eliminate the problem of access to rehabilitation services. Telerehabilitation is a viable alternative to achieve universal access to rehabilitation care and to overcome barriers to in-clinic visits among poor people with disabilities in a country with limited resources (Leochico & Valera, 2020). The inclusion of telerehabilitation among health applications will allow patients living in remote places where traditional rehabilitation services are not easily accessible to be treated using technology (Peretti et al., 2017).

According to the data of the Health Statistics Annual of Turkey 2018, the problems of the lower back and neck region are the first two when looking

at the main diseases/health problems experienced by individuals aged fifteen and over in the last 12 months in 2016. Lower back and neck pain is cited as the leading global cause of disability in most countries (Vos et al., 2016). Physiotherapy methods are widely used in low back and neck pain. Exercise reduces pain and disability in patients with lower back, neck problems, and improves the quality of life (CalvoMuñoz et al., 2013; Groeneweg et al., 2017; Rushton et al., 2015). Frogner et al. stated that people with low back pain who received physical therapist support in the first part of their treatment used fewer opioids as well as less need for high-cost medical services (Frogner et al., 2018). Telerehabilitation-based exercises for nonspecific low back pain provide more cost savings than clinical exercise (Fatoye et al., 2020). It is believed that the high costs caused by these problems will decrease with the introduction of telerehabilitation.

Since 95% of hospital applications in the country occur through Social Security Institution (SSI) it is considered reliable to use SSI's data in our study. The number of hospital applications, declined after March 2020, when COVID-19 cases were first seen in Turkey. In April and May, the number of hospital admissions increased every year from 2018 to 2020. The increase in the demand for hospital services due to chronic diseases, changes in the texture of the disease and increasing expectations with the aging population are thought to cause this. Although the number of physiotherapy and rehabilitation applications is not in the table, it is thought that there are people who cannot reach physiotherapy and rehabilitation services among the decreasing applications. When the table is viewed from the framework of continuous time series analysis, one of the demand forecasting methods; the number of hospital applications in April and May 2020 is compared with the number of applications in April and May between 2018 and 2019, it is seen that the number of applications expected to take place in April and May 2020 is far below expectations. According to the analysis, while the expected number of hospital applications in April 2020 was 49,713,45 (thousand), this number remained at 16,595, while the number of hospital applications was 50,731,53 in May, this number remained at 15,190. With COVID-19 pandemic, the first 5 months of 2020, In Turkey, the number of applications in hospitals, has been shown to enter into a serious downward trend.

Due to COVID-19, people experience difficulties in accessing physiotherapy and rehabilitation services as well as in other health services. This situation has revealed the necessity of telerehabilitation practices in our country, which has a high elderly and dependent population and a high rate of chronic diseases such as diabetes, HT and COPD. Negrini et al. demonstrated telemedicine is feasible and acceptable to replace outpatient rehabilitation services in the case of COVID-19 emergency in Italy, thus eliminating the access problems of patients and the risk of contact with the virus that may be experienced during face-to-face treatment. Studies conducted in different countries during the pandemic period revealed the need to adapt face-to-face physical therapy consultations to the telerehabilitation model, given the spread of the COVID19 pandemic. Telerehabilitation is the driving force for a multicenter practice study that could prove to have significant results, especially during the period of combating the covid-19 epidemic (D. Leochico, 2020; Negrini et al., 2020).

Telerehabilitation is now seen as a possible solution to the issues that healthcare systems are confronting as a result of aging populations, better therapies, and limited resources. But patients must take an active role in their own treatment for telerehabilitation to be effective (de la Cal et al., 2021). Therefore, the patient must be able to collectively acquire and use the technology for which the current technical support is given. Technology must also be chosen so that it is broadly accessible and usable by a variety of individuals with different backgrounds, experiences, and functional and cognitive abilities (Pramuka & Van Roosmalen, 2009). It is essential to emphasize the need of proper training and education for those involved in this new and emerging form of intervention in order to provide more effective treatment. In order for telerehabilitation practices to be successful, facilitating access to services and educating the target group about the use of telerehabilitation systems should be included in health policies. Adoption of emerging technologies to support dynamic, individualized therapy models must be accelerated.

CONCLUSIONS

The elderly population in Turkey is increasing every year, with the increase of the elderly population, the rate of dependency and the incidence of chronic diseases are increasing.

Besides, diseases of the musculoskeletal system, especially in young and middle-aged people, are also faced with health problems that lead to labour loss. All this shows the need for physiotherapy and rehabilitation services in our country. But reasons such as dependency, the fact that hospital rates are not evenly distributed according to the regional population, the COVID-19 pandemic, and the high cost of treatment pose various barriers to access to physiotherapy services. Telerehabilitation is an alternative method that is effective in facilitating

access to services, eliminating disadvantages in access and entitlement, and improving diseaserelated outcomes. Telerehabilitation services will ensure the sustainability of physiotherapy and rehabilitation programs in response to increasing health care needs and demands, especially in cases such as pandemics. For patients who cannot access a standard plan, telerehabilitation should be included in the physiotherapy services provided by health organizations.

Conflict of Interest:

The authors whose names are listed immediately below certify that they have NO affiliations with or involvement in any organization or entity with any financial interest or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript

Ethical Approval

All procedures were carried out in conformity with the Helsinki Declaration and its subsequent revisions, or comparable ethical standards.

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Evaluation of digital healthcare services and satisfaction level of outpatients at the City Training and Research Hospital in Turkey during Covid-19 pandemic

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ABSTRACT

The purpose of the study was to evaluate the type and use of digital healthcare services by the healthcare professionals and determine the satisfaction level of outpatients with the services they received during their visit to hospital. The study was a cross-sectional study and was carried out in the City Training and Research Hospital located in the South of Turkey between March 13-23, 2021 when the Covid -19 Pandemic was the most intense. The hospital received a level of 6 digital certificate in 2019. In addition to socio-demographic questionnaires developed for healthcare professionals and patients, specific questionnaires were developed for the study. Total 308 respondents participated in this research. Among the existing digital healthcare services at the hospital, the majority of the healthcare professionals reported "electronic digital health care records" (66.7%), "nursing information system" (61.1%) and "patient imaging system" (50.9%). Others were mentioned by the less than half of the respondents. Patients reported satisfaction with the services they received during their visit to hospital.

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INTRODUCTION

Rapid developments in mobile technology (m-health) positively affect healthcare services. Especially during Covid-19 pandemic people access to mobile health technologies has increased significantly. Digital health applications help individuals to monitor his/her health status, compliance with the treatment protocols, and improve communication between individual and healthcare professionals [1]. Due to widely use of smartphones doctors can easily monitor their patients to find out if the patients are complied with their prescribed medications and the patients' vital data, body temperature and movement patterns [2].

Rapidly evolving technologies, along with demographic and economic changes, are expected to change the concept of hospitals worldwide. In general, a digital hospital means the full integration of all information systems including medical and non-medical in the hospital with a variety of technologies and the determination of standards of a safe data flow and easy access to patient data from anywhere by health care professionals by spending less professional time and energy, no-manual operation, paperless and filmless, the control of right medication and medical treatment and can be defined as a hospital system with advanced technology and a hospital operation where all operations are carried out, controlled and managed with a full automation system [3]. Digital hospital applications provides some benefits such as to facilitate access to hospitals [4], increase the efficiency of the physician using technology and the level of health information and satisfaction of the patients [5], save it from unnecessary costs due to repetitive procedures associated with the patient and hospital [6], understand the medical benefits of Picture Archiving and Communication System (PACS) used in the digital hospital system and its benefits reducing cost and increasing profits towards future [7], enable patients access to their own health information from anytime and anywhere. [8].

The level of digitalization of the hospital is measured by the Electronic Medical Record Compliance Model (EMRAM), which is developed by Health Information and Management System Society (HIMSS) [9].

In parallel to development of technology globally, the number of digital hospitals is increasing in Turkey. The Turkish Ministry of Health has developed a target to initiate and expand "digital hospital applications" in all public health institutions that was emphasized in the 2013-2017 strategic plan [10].

Hospitals are evaluated by using an EMRAM model to determine their level of digitalization. According to the level, HIMMS is giving an accreditation certificate to hospitals that are awarded for the certificate of 6 and 7 levels [11].

Patient satisfaction research is the key instrument of evaluating and improving the quality of healthcare in the hospital. The purpose of patient satisfaction studies is to better understand a patient's views on healthcare services they receive, and the factors affecting satisfaction of patients, expectations of the hospital, and issues with healthcare services and how to design healthcare services to meet expectations of patients [12]. One criticism of patient satisfaction ratings has been the inability to account for expectations about medical care, which may be influenced by prior experiences with the health-care system [13].

MATERIALS AND METHODS

The research was carried out in the City Research & Training Hospital located in the South of Turkey between March 13-23, 2021 when the Covid 19 Pandemic was the most intense.

The purpose of the research was to better understand the type and benefits of digital healthcare services existing at the hospital and determine the level of satisfaction of outpatients with the services they received during their visit to the hospital.

In addition to the approval of the Ethics Committee of the University, we got an approval from the Turkish Ministry of Health and Adana Provincial Health Department.

In order to determine the type and benefits of digital healthcare services, a questionnaire was developed based on the qualitative research conducted previously [3]. The questionnaire with socio- demographic questions was sent to a large group of healthcare professionals via online in the hospital. However, the response rate was far below than the expected level due to patient load of healthcare professionals during Covid-19 pandemic. One hundred and eight healthcare professionals responded to the survey. In order to determine the level of outpatient satisfaction, a questionnaire with a 5 -likert scale was used. Overall patients' satisfaction results from the summation of the scores of individual questions (1 = extremely dissatisfied to 5 = extremely satisfied). The patient satisfaction questionnaire was randomly administered to outpatients via face to face by the interviewers. For the data analysis, the SPSS 21 package program was used. Validity and reliability of the patient satisfaction questionnaire were tested using factor analysis. The Kaiser-Meyer- Olkin method was used for sampling adequacy which was found to be very high (0.932), meaning the matrix was well suited for factor analysis

[14]. Seventeen satisfaction items of the survey were submitted. Factor loadings of 0.40 or greater were considered significant for defining the factors. As a result of factor analysis, two statements for scoring less than 0.40 were excluded from the satisfaction scale. For those remaining 15 factors explanatory factor analysis was applied and the scale was compiled under a single dimension, with a total variance of 61.9%. Although many techniques were used to test the validation of scale, the most common one was Cronbach's alpha [15]. Typically, Cronbach's alpha reliable coefficient gets a value between 0 and 1. If Cronbach's alpha was found to be greater than 0.90, the scale was considered very reliable [16]. The Cronbach alpha coefficient of the satisfaction survey was found to be 0.955, meaning the validity of the scale was extremely high.

RESULTS

1.Healthcare Professionals

Table 1 represents socio-demographic characteristics of the respondents.

Table 1: Socio-demographic characteristics of healthcare professionals

	Variable	%
Gender	Female	71.3
	Male	28.7
Age Groups (years)	20-29	30.6
	30-39	29.6
	40-49	25.9
	50-59	13.9
Profession	Nurse	63.0
	Doctor	17.6
	Administrative or technical staff	11.1
	Others	8.3
Length of employment in this hospital (year(s))	4	29.6
	3	24.1
	2	15.7
	1	7.4
	<1	23.1
Attended digital healthcare services trainings in the hospital	Yes	63.0
	No	37.0
Evaluation of trainings on digital healthcare applications (in terms of length and effectiveness)	Yes	49.1
	No	23.1
	Not sure	27.8
Use of digital healthcare applications during Covid-19 pandemic	Often	62.0
	Rarely used	29.6
	Frequency of use has not changed	8.3
Patient types suitable for digital healthcare services	All patients	83.0
	Inpatients	6.5
	Outpatients	4.6
	Patients requiring home care	0.9
	Other	4.6

As noticed in Table 1, the majority of the respondents were female (72%). Regarding age, all respondents were below the age of 60. In terms of specialty, the sample consisted of 63% nurse, 18% physicians, 11% management or technical staff. Nearly, 63% received trainings on digital health applications. Of those who received training programs 49% found them sufficient in terms of length and effectiveness. Sixty-two percent reported using digital health applications frequently during Covid-19 pandemic. Concerning the experience with digital healthcare applications, 65% reported using those less than 2 years. All patient profiles were considered suitable for digital healthcare services.

Table 2 illustrates existing digital healthcare services in the hospital by the time research was being conducted.

Table 2: Existing digital healthcare services at the hospital

	n	%
Electronic Medical Records	72	66.7
Nurse Information System	66	61.1
Patient Imaging Systems	55	50.9
Hospital Information Management System	51	47.2
Tele Medicine	36	33.3
Clinical Decision Support Systems	34	31.5
Clinical Practice Guidelines	31	28.7
Smart Card Applications	29	26.9
Clinical Communication Systems	27	25.0
Standards and Classification System.	22	20,4
Hybrid Operating Room	17	15.7
Clinical Care Maps	17	15.7
Case Composition	10	9.3
Virtual Reality Applications	7	6.5

As seen in Table, 2, nearly 67% chose "electronic medical records", 61% "nurse information system", 51% chose "patient imaging systems". Other services were mentioned less than 50% of the respondents. Table 3 outlines the benefits of digital healthcare services to healthcare professionals.

Table 3: Benefits of digital healthcare services to healthcare professionals

	n	%
Accessing patient data from anywhere	66	61.1

Providing easy archiving	63	58.3
Speed, safety and convenience in medical procedures	62	57.4
Accelerating coordination between units	36	33.3
Reducing errors in administrative processes	35	32.4
Prevention of repetition of radiological imaging	35	32.4
Immediate patient intervention opportunity	28	25.9
Accessing patient private information from anywhere	27	25.0
Easy communication opportunity with the patient	25	23.1
Giving orders without going to service	22	20.4
Others	8	7.4

Among all the benefits of digital healthcare services, "accessing patient data from anywhere" (61%), "providing easy archiving" (58%,) "speed, safety and convenience in medical procedures" (57.4%) were mentioned by more than 50% of the respondents.

Table 4 illustrates the contribution of digital healthcare services to patient care delivery.

Table 4. Contribution of digital healthcare services to patient care delivery

	n	%
Possibility to follow treatment regimen	69	64.9
Speed in accessing laboratory and radiological data	68	63.0
Ability to share patient information with another hospital specialist	65	60.2
Speed in accessing patient files	64	59.3
Speed in diagnosis and treatment planning	59	54.6
Prevention of misuse of medication	56	51.9
Opportunity to get to know healthcare professionals	33	30.6
Opportunity to get to to know the hospital and physician	31	28.7

According to the Table 4, many digital healthcare services were selected for their contribution to patient care delivery. More than 50% chose the following services: "possibility to follow the treatment program" (65%), "speed in accessing laboratory and radiological data" (63%,), "ability to share patient information with another hospital specialist" (60.3%), "speed in accessing patient files" (59.3%), "speed in diagnosis and treatment planning" (54.6%), and "prevention of misuse medication" (52%).

Table 5 summarizes the opinions of healthcare professionals on patients' attitudes towards healthcare applications in the hospital.

Table 5: Views of healthcare professionals on patients' attitudes towards use of digital health applications

(I THINK…….)	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree	$\bar{x}$	σ
patients use mobile health applications effectively	4	19	38	37	10	3.278	.984
patients use mobile health applications more frequently during Covid-19 pandemic	3	11	23	53	18	3.667	.967
patients admit to hospital less frequently during Covid-19 pandemic	9	19	27	37	16	3.296	1.170
Inpatient satisfaction has increased due to digital healthcare services	4	8	42	38	16	3.500	.962
Outpatient satisfaction has increased due to digital healthcare services	4	11	38	37	18	3.500	1.009
patients benefit from digital healthcare services at our hospital	5	8	44	37	14	3.435	.969

$\bar{x}$:=3.446 **σ**= .825

As outlined in Table 5, three statements were evaluated at a higher rate than the others. Those were "I think patients use mobile health applications frequently during Covid- 19 pandemic" ($\bar{x}$= 3.66)", followed by "I think inpatient and outpatient satisfaction has increased in our hospital due to digital healthcare services" with a 3.5 mean score respectively.

Table 6 summarizes the contribution of digital healthcare services to the efficiency of the hospital.

Table 6. Contribution of digital healthcare publications to hospital efficiency

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree	$\bar{x}$	σ
Our hospital fully uses digital healthcare applications	4	13	17	52	22	3.694	1.045
Sufficient number of training programs on digital healthcare services held in our hospital	4	19	29	35	21	3.463	1.106
due to digital healthcare applications……							
Costs have decreased	1	12	30	41	24	3.694	.971
Personnel productivity has increased	3	15	30	41	19	3.537	1.032
Quality of healthcare service has increased	5	8	27	46	19	3.667	1.082
Shortage of doctors has decreased	5	6	34	37	26	3.676	1.049
Speed in diagnosis and treatment services have been accelerated	2	5	17	55	29	3.963	.885
Malpractice has decreased	5	5	33	44	21	3.657	.997
Employee satisfaction has increased	6	9	28	47	18	3.574	1.043

$\bar{x}$:=3.661 **σ**: =839

In Table 6, the mean scores of almost all statements were above 3.5. While "speed in diagnosis and treatment services have been accelerated due to digital healthcare services" received the highest mean score ($\bar{x}$=3.96)**,** "sufficient number of trainings provided by the hospital" received the lowest mean score ($\bar{x}$=3.4).

In order to determine the association between socio-demographic characteristics and the factors contributing to hospital efficiency, the ANOVA test was used. Among the healthcare professionals participating in this research, male respondents evaluated the contribution of digital healthcare services to hospital efficiency at a higher rate than female healthcare professionals. This difference was found statistically significant ($p<0.05$). Regarding age break down, the respondents who fell into the age category of 50-59 evaluated the contribution of digital healthcare applications to hospital efficiency at a higher rate than those whose ages were between 20-29. This difference was found statistically significant ($p<0.05$). In terms of profession, physicians rated contribution of digital health applications to hospital efficiency at a higher rate than the rest. The lowest mean score was observed among the nurses. However, this difference was found statistically insignificant ($p>0.05$).

Regarding the length of employment, the respondents who worked at the hospital for a year evaluated the factors contributing to hospital efficiency at a higher rate than those who worked at the hospital for 3 years. This difference was found statistically significant ($p<0.05$). Among the healthcare professionals who received training on digital healthcare services rated the contribution of factors to hospital efficiency at a higher than those who did not receive training at all. This difference was found statistically significant ($p<0.05$).

2. Outpatient Satisfaction

The study was carried out at the City Training & Research Hospital located in the South of Turkey. The questionnaire was developed using a 5-likert scale to measure the level of satisfaction of outpatients with the services they received during their visit to hospital. Validity and reliability of the questionnaire were tested and found to be very high (Cronbach's alpha coefficient value 0.955).

Socio-demographic characteristics of outpatients were displayed in Table 7.

Table 7: Socio- demographic characteristics of outpatients

Variable	n	%
Gender		
Men	105	52.5
Women	95	47.5
Age Breakdown (years)		
20-29	54	27.0
30-39	47	23.5
40-49	31	15.5
50-59	36	18.0
= >60	32	16.0
Education Level		
Illiterate	7	3.5
Literate	20	10.0
Primary education	60	30.0
High school	39	19.5
Undergraduate	64	32.0
Graduate	10	5.0
Employment Status		
Public	25	12.5
Private	27	13.5
Self-employed	33	16.5
Student	32	16.0
Retired	31	15.5
Other	52	26.0
Income (in local currency (TL))		
<1500	18	9.0
1501-2000	21	10.5
2001-3000	20	10.0
3001-4000	38	19.0
4001-5000	24	12.0
>5000	13	6.5
No income	66	33.0
Hospitals preferred by the patient		
Public	67	33.5
University	11	5.5
City Research & Training	97	48.5
Private	17	8.5
Family health center	8	4.0
Number of visits to any hospital (times)		
2-3	84	42.0
4-5	57	27.5
6-7	28	14.0
8-9	6	3.0
= >10	25	12.5
Frequency of hospital admission during Covid-19 pandemic		
Never been to hospital	28	14
Frequency not changed	64	32
Frequency decreased	97	48.5
Frequency increased	11	5.5
Type of health insurance		
General health	144	72.0
Green card	28	14.0
Private health	7	3.5
No health insurance	21	10.5
Number of visits to City Training & Research Hospital		
First time	55	27.5
Several times (1-4)	83	41.5
Many times (5-10)	39	19.5
Frequently	23	11.5
TOTAL	**200**	**100**

According to the Table 7, 52.5% of the respondents were male, 47.5 were female; almost 84% of the respondents were under the age of 60, only 16% percent were the aged 60 and above. Regarding the level of education, about 30% of the respondents either have a high school or a bachelor's degree, while only 3.5% were illiterate. Regarding type of employment, nearly 16% of the respondents were either self-employed or students respectively and 15.5% were retired. In terms of income, about 33% claimed no income. Regarding source for health information, 42.5% patients reported using internet and 40.5% reported hospital. Concerning the type of hospital, patients mostly admit to City Training & Research hospital (48.5%) and followed by public hospitals (33.5%). With regard to number of visits to any hospital, 43.0% of the respondents claimed 2-3 times. Concerning the frequency of admitting to any hospital during Covid-19 pandemic, 48.5% reported a reduction in the number of hospital admissions, while 32% reported no change. In terms of health insurance, 72% of the patients claimed having "general health insurance" 10.5% claimed having "no insurance", 7% reported carrying a green card that is given to those who cannot afford healthcare services in Turkey. In terms of number of visits, 41.5% of the respondents reported several visits to this hospital (1-4 visits), 28% reported first visit.

Table 8 illustrates the type of health information patient searched for on the internet and the type of applications patient used for doctor appointment.

Table 8: Type of health information patients searched on the internet and applications used

Type of health information searched for	n	%
Doctor appointment	84	42.0
Pharmaceuticals	64	32.0
Healthcare services	55	27.5
Diseases	55	27.5
Physicians	36	18.0
Type of mobile health applications used		
e-pulse	86	43.0
Central Hospital Appointment System	83	41.5
Life Fits Home	73	36.5
Do not use	62	31.0
Step counter	58	29.0
Others	21	10.5
Applications used when making an appointment at the hospital		
ALO 182	136	68.0
Central Hospital Appointment System	72	36.0
e-pulse	19	9.5

Nearly 42.4% of patients reported searching for physician appointment and 32% reported searching

pharmaceuticals on the internet. The types of mobile health applications used were: e-pulse (43.5%) and Central Physician Appointment System (41.5%). Sixty-eight percent of patients used ALO 182 application and 36% used Central Hospital Appointment System when making a doctor appointment.

Table 9 illustrates the type of specialty visited by the patient at the hospital.

Table 9: Type of specialty visited by the patient at the hospital

Specialty	n	%
Ophthalmology	53	26.6
Internal Medicine	40	21.0
General Surgery	39	19.6
Orthopedics & Traumatology	35	17.6
Ear, Nose, Throat	25	12.6
Cardiovascular Surgery	24	12.1
Cardiology	23	11.6
Gyn/OBS	20	10.1
Others	49	24.5

Regarding the type of specialty, 26.6% contacted ophthalmologist, 21% internal medicine specialist, and 19.6% general surgeon.

Table 10 illustrates the type of services patients received remotely and when they were actually being at the hospital.

Table 10: Services patients received remotely and at the hospital

Services patients received remotely	n	%
I did not receive any support remotely	88	44.0
I was able to access my X-ray results	56	28.0
I was able to get my test results	42	21.0
I was able to get my e-prescription	34	17.0
I was able to connect with the doctor	20	10.0
My doctor was able to follow my treatment plan	16	8.0
The services patients received in this hospital		
Biochemistry	115	57.8
Radiology	67	33.7
Pathology	44	22.1
Microbiology	41	20.6
Others	19	9.5

Nearly 44% of the respondents reported not getting any support remotely. The rest indicated receiving many services remotely. Nearly, 58% received services from the biochemistry lab while they were at the hospital.

Table 11 shows the descriptive findings of the scale.

Table 11: Descriptive findings of satisfaction scale

	$\bar{x}$	σ
Examination and test results sent to your physician electronically	4.01	1.095
Guidance provided by the front-desk personnel	3.99	1.148
Convenience and comfort of the unit you are being examined	3.97	1.034
Examination and test results sent to a patient's smart phone	3.95	1.085
Ease of moving around in the hospital	3.89	1.144
Physician's interest and attitudes towards you	3.86	1.139
Quality of services of employees in patient admission	3.84	1.154
Efficiency of diagnosis and treatment processes	3.83	1.227
Getting examined by your physician on time	3.83	1.106
Nurses' interest and attitudes towards you	3.83	1.184
Duration of tellers process	3.82	1.170
Ease of access to the hospital	3.82	1.095
Attitudes and behaviors of the health personnel to wards you (laboratory, x-ray technician, etc.)	3.82	1.148
Attitudes of other staff towards you	3.81	1.034
The time allocated to you by your doctor	3.78	1.085

n= 200 $\bar{x}$=3.870 σ=0.872

Overall, the outpatient satisfaction score was found to be high ($\bar{x}$=3.870). Among all the services, "results of examination and tests sent to a physician electronically" received the highest mean score ($\bar{x}$ =4.01), and closely followed by "guidance provided by front desk personnel" ($\bar{x}$ = 3.99). On the other hand, "the time allocated to you by your doctor" was rated slightly lower than other statements ($\bar{x}$ =3.78).

Table 12 outlines the patient satisfaction scale items that were scored higher than the mean ($\bar{x}$=3.5) by the majority of patients.

Table 12: Satisfaction scale items that were scored above average by the majority patients

	n	%
Convenience and comfort of the unit you are being examined	155	78
Guidance provided by the front-desk personnel	153	77
Quality of services provided by admission staff	148	74
Results of examination and tests sent to your physician electronically	147	74
Physician's interest and attitude towards you	144	72
Getting examined by your doctor on time	140	70
Ease of moving around in the hospital	140	70
Results of tests and examinations sent to a patient's smartphone	140	70

The majority of the patients reported high satisfaction with the services listed in Table 12. Seventy-eight percent patients reported high satisfaction for the convenience and comfort of the unit in which they were being examined and closely followed by guidance provided by the front personnel in the hospital.

The difference test for outpatient satisfaction according to demographic variables

To see the association between the demographic variables and level of patient satisfaction, the ANOVA test was applied to the study. Table 13 illustrates the relationship between the level of satisfaction and education.

Table 13: Association between patient satisfaction and education

	EDUCATION	n	x̄	σ	F value	Significance
Patient Satisfaction	Illiteral	7	3.66	.9034	2.414	0.038*
	Literate	20	3,76	1.407		
	Primary School	60	4,15	.7222		
	High School	39	3.89	.6861		
	Bachelor's Degree	64	3.70	.8091		
	Graduate Degree	10	3.48	1.054		

*p<0.05

According to the Table 13, there was a statistically significant relationship between the patient satisfaction and the various level of education. To show the differences among the groups, the Games Howell test [17] was used and the results of the tests of homogeneity of variances were shown in Table 14.

Table 14: Multiple comparison of satisfaction based on education

Satisfaction	Education		Mean Difference	Significance
Patient Satisfaction	Primary School	Bachelor's Degree	0.45576	0.015*

*p<0.05

As seen in Table 14, the level of satisfaction of patients with a primary school education had a higher average of satisfaction compared to the patients with a bachelor's degree.

To see how number of visits to the hospital were associated with the patient satisfaction, the Anova test was used. The results of the test were shown in Table 15.

Table 15: Association between patient satisfaction and the number of hospital visits

Satisfaction	Number of hospital visits	n	x̄	σ	F value	Significance
Patient Satisfaction	First time	55	4.099	.7500	2.939	0.034*
	Few times (1-4)	83	3.859	.8254		
	Multiple times (5-10)	39	3.565	1.049		
	Continuously	23	3.875	.8695		

*p<0.05

The satisfaction level of the patients showed significant differences according to the number of visits made to the hospital. According to homogeneity of variance test [Levene], the variance of satisfaction scale was found to be homogeneous. In order to see the differences within groups, the Gabriel test was used [17]. The results of homogeneity of variances were shown in the Table 16.

Table 16: Multiple comparison of satisfaction based on number of hospital visits

Satisfaction	Number of hospital visits		Mean Difference	Significance
	First time	Multiple times (5-10)	0.5335	0.019*

*p<0.05

The patients who paid a first visit to hospital were more satisfied than those who visited hospital multiple times. This difference was statistically significant (p<0.05).

DISCUSSION AND CONCLUSION

The research for assessing digital healthcare services in the hospital was the first study in quantitative nature in Turkey. Therefore, there was no opportunity to compare the results with other research studies. The questionnaire was developed based on qualitative and review research studies previously done by other researchers. This research indicated that digital healthcare applications were suitable for all type of patients. Our findings were in line with the findings of the qualitative research that was conducted by Bayer, Kuyrukcu and Akbas in the public hospital in Turkey [3]. Among the benefits of digital healthcare applications to health care professionals, only three benefits were stood out. Those were accessing patient data from anywhere, providing easy archiving and speed, safety, and convenience in medical procedure. Accessing patient data from anywhere was also found to be an advantage of digital healthcare services in the qualitative research conducted by Bayer, Kuyrukcu and Akbas [3].

In this study, healthcare professionals "agreed on" a decrease in overall hospital costs and misuse of medications by the patients, and an increase in personnel efficiency and quality of service as a result of digitalization of healthcare services. Similar information were also reported in the review article written by Peker, Giersbergen, Biçersoy [18].

Although level of satisfaction was considered to be a subjective evaluation of the patient or care giver, it was an important indicator of the quality of healthcare services. Therefore, measuring patient satisfaction was a fundamental need of hospitals to improve the quality of patient care and services (10). Most patients tend to give positive answers if they are asked how satisfied they were even though if they have complaints about specific aspects of the received care [19].

Among all the socio-demographic variables, the level of satisfaction of outpatients showed significant differences according to education level and the number of visits to hospital. The patients who had primary school education tended to be more satisfied than the patients who had a bachelor's degree.

Regarding number of visits, the patients who paid a first visit to this hospital tended to be more satisfied than the patients who made multiple visits to the same hospital. In other difference tests conducted within the scope of the research, the satisfaction levels of the patients did not differ significantly in other demographic variables.

Our research did not show any association between age and satisfaction; however, patient characteristics may also have an impact: for example, older patients and those with lower levels of education appear to be more satisfied [19]. Nearly, 80% of patients reported satisfaction regarding convenience and comfort of the units in which they were being examined in the hospital, while 69% patients reported satisfaction for the same attribute in the study by Tasliyan and Akyuz at Malatya public hospital [12]. Regarding attitudes and behaviors of the healthcare professionals (laboratory and x-ray technicians), 65% of patients reported satisfaction in this study, nearly 83% reported satisfaction in the study by Tasliyan and Akyuz in Malatya public hospital [12]. Regarding interests and attitudes of nurses towards patients, 69% reported high satisfaction in our research while 64% reported high satisfaction in the research study conducted at Malatya Hospital.

Limitation of the Study

The study was limited to one hospital and had a relatively small sample size compared to other patient satisfaction studies due to the difficulty of doing research in a hospital during Covid-19 pandemic.

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Conflict of Interest

No conflict of interests needs to be reported.

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An analysis of preventive behaviour: Identifying the factors affecting voluntary self-isolation during COVID-19 pandemic

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ABSTRACT

Background: *There has been limited research in revealing the socioeconomic determinants of self-isolation during COVID-19 pandemic.*

Aim: *This study aims to identify preventive behaviours of adults in Turkey. To do this, the research examines socioeconomic factors affecting voluntary self-isolation status during COVID-19 pandemic.*

Methods: *The study exploits the virtually collected data of 933 individuals living in Turkey. The survey was conducted when the people (at 20 - 65 years of age) were not in compulsory isolation and/or compulsory curfews were not in force. A hierarchical multivariate regression design is used to identify the factors affecting voluntary self- isolation status.*

Results: *It is found that gender, marital status, region, occupation and distance working opportunity have significant impacts on voluntary self-isolation status. In contrast, age, income, education and vulnerability against pandemic (i.e., having a chronic disease, pregnancy and living with someone older than 65 years of age) do not have associations with voluntary self-isolation status.*

Conclusion: *People living in large cities are less likely to be isolated voluntarily. Hence the policies restrict outing in the large cities may be influential on controlling the spread of coronavirus. Additionally, public employees are considerably less likely to be isolated voluntarily. Given that the clear effects of distance working on voluntary self- isolation status, it is believed that distance working policies especially for public employees may influence the spread of coronavirus.*

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INTRODUCTION

On December 31, 2019, the cases of pneumonia with unknown ethology were reported in Wuhan City, Hubei Province of China (Who, 2020a; European Centre for Disease Prevention and Control, 2020a: 1; Paules et al., 2020: 708) which was named as the novel coronavirus disease 2019 (COVID-19) later on (Who, 2020b; European Center for Disease Prevention and Control, 2020a: 1). The new coronavirus disease has spread not only to other provinces of China, but also many countries all over the world (Ministry of Health, 2020a). At the time of this study, approximately 268 million cases and 5.3 million deaths are detected over the 216 countries (WHO, 2021c).

Generally, coronaviruses are a large family of viruses that can cause disease in humans or animals (Fehr & Perlman, 2015: 1; Fenner et al., 1987: 505; Dhama et al., 2014: 170; La Rosa et al., 2013: 126; Ministry of Health, 2020a). The available evidence for COVID-19 is thought to be of zoonotic origin for SARS-CoV-2 (Rothan & Byrareddy, 2020: 1; Ministry of Health, 2020b: 11). In addition, it is widely stated that the source of the disease is wild animals sold in the "Huanan Seafood Wholesale Market" (Parr, 2020: 1; Hui et al., 2020: 264; Tan et al., 2020: 62; Ministry of Health, 2020b: 11). Although the coronavirus family is thought to be transmitted from animal to human (Rohde, 2020), it is reported that direct person-to-person transmission is the primary means of transmission of coronavirus disease (McIntosh et al., 2020: 4).

Several vaccines have been developed to prevent the spread. However, avoiding the exposure still plays critical role to prevent the transmission of the virus (Centers for Disease Control and Prevention, 2020: 5). Due to this, self-isolation is suggested by the World Health Organization (Who, 2020c: 6) as one of the key actions against COVID-19 (WHO, 2020d; Hellewell et al., 2020: e492). It is widely suggested that voluntary self-isolation can reduce contact between community members and limit the transmission (WHO, 2005: 42-46; Zhang and Wang, 2015: 9751; Qualls et al., 2017: 2; European Centre for Disease Prevention and Control, 2020b: 2-3; Hellewell et al., 2020: e492-e494).

The term of “isolation” generally implies separating people with symptoms of COVID-19 from public to prevent the spread of the disease. Additionally, isolation also refers to separate people who are not infected themselves but may have been exposed to COVID-19 or to restrict activities to prevent the spread (Who, 2020d; Salathé et al., 2020: 2-3).

The concept of self-isolation implies to stay home (Brooke & Jackson, 2020: 2045) when someone (i) has symptoms of an infectious disease (e.g., COVID-19) (Bodas and Peleg, 2020: 936), (ii) had a contact with someone with symptoms (Cava et al, 2005: 343; Blendon et al., 2006: 15-16), or (iii) returned from abroad (Pradana et al., 2020: 4; Alam et al. 2020: 205). Self-isolation is generally recommended for 14 days rather than a long or continuous period (Brooke & Jackson, 2020: 2045). In this context, self-isolation is widely advised for the individuals even they do not carry the aforementioned conditions to prevent to be exposed to coronavirus (COVID-19) (NHS, 2020; Thienemann et al., 2020: 5). Hence voluntary self-isolation refers to stay at home consciously to prevent the spread of the virus regardless of these conditions.

Isolation and quarantine applications are two of the major instruments in tackling with coronavirus (Shaw et al. 2020: 1). There is a great deal of research exploring the beneficial and/or detrimental effects of self-isolation or quarantine. In this context, Nussbaumer-Streit et al. (2020: 2) identify the associations between self-isolation and the reductions in mortality and morbidity rates. In addition, Anderson et al. (2020) and Patel et al. (2021) state that self-isolation decreases the disease rates through the reductions in the contact between people. Further, Dehning et al. (2020) and Anderson et al. (2020) report that the quarantine measure delays the peak point of the influenza pandemic. Therefore, it is stated that in a case of infectious diseases fundamental strategy is to minimize contact with infected and potentially infected individuals (Dehning et al. 2020; Anderson et al., 2020; Patel et al., 2021).

On the other hand, several studies in the literature draw attention to the adverse effects of the self-isolation measure. LGA and ADPH (2020) and AIHW (2021) report increased loneliness and poor mental health outcomes after isolation. Weinstein and Nguyen (2020: 8) and Mattioli et al. (2020: 853-854) state that self-isolation results in loneliness, which may cause anxiety, stress and depression. Armitage and Nellums (2020: e256) also depict worsened mental health of isolated elderlies due to the decreases in their social activity. In addition, Cacioppo et al. (2002: 411) and Gonzalez et al. (2021) express poorer sleep quality, losing emotional control and increasing hopelessness among isolated individuals. Further, Wang et al. (2020), Clair et al. (2020) and Roychowdhury (2020: 4-5) confirms the negative impacts of self-isolation on mental health, life satisfaction and well-being. Apart from mental health issues, Mattioli et al (2020: 853-854) discuss worsened physical health and increased cardiovascular risks due to unhealthy diet and the reduction of physical activity during self-isolation.

There are also several studies examining the factors affecting individuals' voluntary isolation decisions. Bezerra et al. (2020) indicate that income, education, age, and gender have impacts on self-isolation decision during COVID-19 pandemic. Lima et al. (2020) confirm the age effect on voluntary self-isolation

decision in Brazil whereas Atchimson et al. (2020) find income effects in the United Kingdom. It is stated that the individuals with low income are less likely to be isolated due to their type of work (Atchimson et al., 2020). This is in line with Bodas and Peleg (2020: 938) that explore respondents' intent to quarantine and report that 94% of the participants accept voluntary isolation applications if their wage loses are state-sponsored. Senghore et al. (2020: e884) confirm that people are happy to be isolated voluntarily in case of financial support. Additionally, Machida et al. (2020) confirm that the individuals who are unable to work remotely are less likely to isolate themselves voluntarily. Finally, Escandon-Barbosa et al. (2021) and Farooq et al. (2020) reveal that perceived severity and self-efficacy are associated with increased self-isolation intention.

To the best of our knowledge, there has been limited research in revealing the socioeconomic determinants of self-isolation during COVID-19 pandemic in Turkey. Therefore, this study aims to contribute the literature by revealing these factors. The research is important since it depicts the isolation behaviour of Turkish society purely since the data were collected before the compulsory curfews enacted in Turkey. By doing this, the research aims to enlighten public health policies in terms of responsiveness of the Turkish society to preventive measures in cases of future epidemics (or pandemics).

MATERIALS AND METHODS

This study aims to examine the preventive behaviours of adults in Turkey. To do this, the paper identifies the factors affecting voluntary self-isolation status during coronavirus pandemic. A hierarchical multivariate regression analysis is exploited to understand the factors determining the voluntary self-isolation status. The data of the study is obtained in the period between 06 -12 April. In other saying, the data has been collected after the first case of coronavirus has been observed in Turkey and before the compulsory curfews at the weekends enacted.

All procedures were in accordance with ethical standards of the institution and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The data used contains 933 adults living in Turkey. The survey was applied online according to snowball sampling methodology. The questionnaire is formed by three sections in total. First section examines the socioeconomic and sociodemographic characteristics of adults. Second section collects the information about their health and isolation status. The last section applies altruistic behaviour scale that is constructed and validated by Ersanlı and Doğru Çabuker (2015)[1] in Turkey. The scale bears 20 questions and its values vary from (-10) to 70 where higher scores of the scale imply better altruistic behaviour.

The questionnaire also bears a pseudo question to eliminate unreliable responses. Accordingly, the individuals were asked to leave blank the pseudo question. As a result, 70 individuals who replied to the pseudo question instead of leaving blank are excluded from the research. Therefore, the analyses are conducted using the data of 933 individuals.

Ordinary least squares estimations have been performed to detect the factors affecting voluntary self-isolation status of the individuals. Five hierarchical models have been regressed in total to identify the effects of interest. First model contains socioeconomic and sociodemographic characteristics of individuals like age, gender, marital status, income and education levels. In addition to these, regional variables have been included in the second model. Vulnerability indicators against pandemic (e.g., having a chronic disease, living with someone pregnant or baby etc.) have been added into the third model. Additionally, occupational variables have been counted in the fourth model. Finally, the last model bears an additional continuous variable indicating the altruistic behaviour scores of the individuals. The models can also be illustrated via the formulas presented below:

Model 1:

$$VSI_i = \sum x_1\, Age_i + x_2 Gender_i + x_3 Mar.Stat.Vars_i + x_k Inc.Vars_{i,k} + x_l Edu.Vars_{i,l} + \varepsilon_i$$

which can be shortened as:

$$VSI_i = \sum A + \varepsilon_i$$

Model 2:

$$VSI_i = \sum A + x_m Reg.Vars_{i,m} + \varepsilon_i$$

[1] The Cronbach Alpha was found as 0,76 implying that the scale is validated and reliable among Turkish population.

Model 3:

$$VSI_i = \sum A + x_m Reg.Vars_{i,m} + x_n Vul.Vars_{i,n} + \varepsilon_i$$

Model 4:

$$VSI_i = \sum A + x_m Reg.Vars_{i,m} + x_n Vul.Vars_{i,n} + x_o Occ.Vars_{i,o} + \varepsilon_i$$

Model 5:

$$VSI_i = \sum A + x_m Reg.Vars_{i,m} + x_n Vul.Vars_{i,n} + x_o Occ.Vars_{i,o} + x_p Alt.Beh.Var_{i,p} + \varepsilon_i$$

where VSI implies voluntary self-isolation status of the individuals, $x_1$to x_p demonstrates the effects of regressors exploited in the models, A is a bunch of weighted regressors used in the first Model, and finally ε_i is the error term.

Voluntary self-isolation status has been measured by a binary variable indicating whether the individuals isolated themselves voluntarily or not. Age and altruistic behaviour are measured by continuous variables. Income variable indicates familial monthly income which is measured by five categories varying from the lowest to the highest monthly income level. Educational status is also measured by five categories where the lowest category bears the individuals whose educational level are below than high school; and the highest category includes the individuals hold master's degree or above. The region is measured by (i) whether the individual live in a large city (or not); and (ii) whether the individual living in urban, suburban, and rural area. The vulnerability is measured (i) whether the individual has a chronic disease, (ii) whether the individual live with someone with a chronic disease, (iii) whether the individual live with someone at or above 65 years of age, and (iv) whether the individual live with baby or someone pregnant. Occupational status is measured by (i) four categories depicting the situations whether the individual is unemployed or retired or working in private or public sector and (ii) whether the individual has an opportunity to work remotely. The summary statistics of the variables used in the models can be seen in Table 1 below.

Table 1. Summary Statistics

Variable		Number of Observation	Mean	Min	Max
Name	**Description**				
Outcome Variable					
ISOLATION	Voluntary Isolation Status	933	0.817	0	1
Demographic Variables					
AGE	Age of Respondent	933	26.625	18	65
FEMALE	Gender of Respondent = Female	933	0.723	0	1
MARRIED	Marital Status of Respondent = Married	933	0.307	0	1
Income Variables					
INCOME1	Lowest Income Category (Reference Category) Monthly Income = 0 – 2324 TL	933	0.204	0	1
INCOME2	Lower Income Category Monthly Income = 2325 – 4000 TL	933	0.239	0	1
INCOME3	Middle Income Category Monthly Income = 4001 – 6001 TL	933	0.186	0	1
INCOME4	Higher Income Category Monthly Income = 6001 – 8500 TL	933	0.091	0	1
INCOME5	Highest Income Category Monthly Income = 8501+ TL	933	0.127	0	1
Educational Variables					
EDUCATION1	Lowest Education Category (Reference Category) – Lower than High School	933	0.059	0	1
EDUCATION2	Lower Education Category – High School	933	0.353	0	1
EDUCATION3	Middle Education Category – Associate Degree	933	0.214	0	1
EDUCATION4	Higher Education Category – Bachelor's Degree	933	0.248	0	1
EDUCATION5	Highest Education Category – Master's Degree and above	933	0.124	0	1
Regional Variables					
LARGECITY	Living in a Large City	933	0.795	0	1
URBAN	Living in Urban (Reference Category)	933	0.472	0	1
SUBURBAN	Living in Suburb	933	0.422	0	1
RURAL	Living in Rural	933	0.105	0	1
Vulnerability Variables					
CHRONIC	Having a Chronic Disease	933	0.110	0	1
CHRONIC2	Living With Someone With a Chronic Disease	933	0.413	0	1
ELDERLY	Living With Someone at 65 years of age (or older)	933	0.169	0	1
PREGNANT	Living With Someone Pregnant or Baby	933	0.169	0	1
Occupational Variables					
UNEMPLOYED	Being Unemployed (Reference Category)	933	0.668	0	1
PUBLIC	Working in Public Sector	933	0.159	0	1
PRIVATE	Working in Private Sector	933	0.153	0	1
RETIRED	Being Retired	933	0.018	0	1
DISWORK	Having Distance Working Opportunity	487	0.383	0	1
Altruistic Behaviour Variable					
ALTRUISTIC	Altruistic Behaviour Score	933	55.246	22	70

RESULTS

It seems that voluntary self-isolation is remarkably high among Turkish population at the beginning of the pandemic since over 80% of the participants were isolated themselves voluntarily before the compulsory curfews enacted in Turkey. This is consistent with existing literature as it is reported that %74 (Machida et al., 2020) and 76% (Datafolha, 2020) of the individuals are self-isolated voluntarily in Japan and Brazil respectively.

The results of the estimations performed are presented in Table 2 below. Accordingly, it seems that gender, marital status, region, occupation and distance working opportunity have significant impacts on voluntary self-isolation status.

It seems that women are approximately 12% more likely to be isolated voluntarily. In addition, married individuals are about 10% less likely to isolate themselves on average compared to their non-married counterparts. It is important to note that the marital status indicator loses statistical significance after the occupational variables have been added into the models. It is believed that may be the case if most of the married individuals are employed, in other saying, if the variations in marital status are vanished after the occupational variables included into the models.

For the regional impacts, on the one hand the people living in large cities are almost 10% less likely to be isolated voluntarily. On the other hand, rural and suburban individuals are less likely to be isolated in comparison with the urban ones (who are the reference category in the models). There seems a considerable effect that rural people are almost 20% less likely to be self-isolated voluntarily than their urban counterparts. This may because lower risk of spread in rural areas as rural people have broader spaces for living.

As for the occupational impacts, it is identified that public employees are almost 25% less likely to be voluntarily isolated compared to unemployed. Further, the people with distance working opportunities are 15% more likely to be isolated. The findings provide clear intuitions of the effects of obligation to go to work for living purposes.

Surprisingly, age, income and education do not have associations with voluntary self-isolation status. Besides, no significant impacts of vulnerability (e.g., having a chronic disease, pregnancy etc.) against pandemic are observed in the estimations. These may because the higher isolation rate among the society. In other saying, since more than 80% of the population were in self-isolation voluntarily no variations are observed according to age, income, education and vulnerability.

Finally, even though the statistically significant impact of altruistic behaviour is observed on the voluntary self-isolation status, the effect can be negligible.

Table 2. Results

VARIABLES	MODELS				
	1	2	3	4	5
Demographic Variables					
AGE	-0.002	-0.002	-0.002	-0.004	-0.004
FEMALE	**0.136*** **	**0.129*** **	**0.127*** **	**0.108*** **	**0.101*** **
MARRIED	**-0.101** **	**-0.107*** **	**-0.120*** **	-0.076	-0.076
Income Variables					
INCOME2	0.019	0.008	0.005	-0.022	-0.022
INCOME3	0.023	-0.004	-0.005	-0.029	-0.028
INCOME4	**0.098** **	**0.073* **	**0.073* **	0.056	0.055
INCOME5	0.067	0.046	0.046	0.050	0.047
Educational Variables					
EDUCATION2	-0.006	-0.014	-0.019	0.041	0.040
EDUCATION3	-0.012	-0.006	-0.012	0.010	0.010
EDUCATION4	0.051	0.042	0.036	0.131	0.137
EDUCATION5	0.013	-0.009	-0.017	0.054	0.066
Regional Variables					
LARGECITY		**-0.056* **	**-0.058** **	**-0.083* **	**-0.082* **
SUBURBAN		**-0.047* **	**-0.051** **	**-0.024**	**-0.028**
RURAL		**-0.198*** **	**-0.197*** **	**-0.176** **	**-0.172** **
Vulnerability Variables					
CHRONIC			0.042	0.058	0.049
CHRONIC2			0.001	-0.059	-0.053
ELDERLY			-0.046	-0.004	-0.007
PREGNANT			0.011	-0.023	-0.028
Occupational Variables					
PUBLIC				**-0.224*** **	**-0.230*** **
PRIVATE				-0.073	-0.074
RETIRED				-0.001	-0.010
DISWORK				**0.153*** **	**0.151*** **
Altruistic Behaviour Variable					
ALTRUISTIC					**0.003* **
CONSTANT	0.780***	0.902***	0.910***	0.935***	0.763***
OBS	933	933	933	487	487
R^2	0.06	0.08	0.08	0.17	0.17

*p<0.01=***, p<0.05=**, p<0.1=**

CONCLUSIONS

This paper examines preventive behaviour during coronavirus pandemic in Turkey with the aim of understanding public reaction to preventive measures. By doing this, the research aims to enlighten future policies tackling with the spread in case of epidemic (or pandemic). In this context, the paper identifies the factors affecting voluntary self-isolation status of the individuals. The effects obtained depicts the effects on preventive behaviour purely since the data used were collected after the first case of coronavirus was observed in Turkey and before the compulsory curfews at the weekends enacted.

Using the data of 933 individuals, the study performs OLS estimations in a hierarchical multivariate regression design to understand the effects on voluntary self-isolation status in Turkey.

The study identifies significant impacts of gender, marital status, region, occupation and distance working opportunity on voluntary self-isolation status. As a result, the paper concludes with two concrete outcomes. The first is about occupational issues. Accordingly, having a distance working opportunity is associated with the increases in self-isolation voluntarily. In addition, working in public sector is associated with the reductions in voluntary self-isolation. Therefore, it is obvious that providing a distance working opportunity to public employees will

lead to increases in voluntary self-isolation which may also play a role in preventing the spread.

The second is about regional issues. Accordingly, rural individuals are less likely to isolate themselves voluntarily. This may relate to (i) broader spaces for living in rural areas and/or (ii) higher risk of spread in urban areas. However, the individuals living in large cities are less likely to isolate themselves voluntarily. Hence, the policy restricted outing in large cities at the weekends might have important effects on the course of spread. Therefore, the studies particularly investigating the effects of compulsory curfews in the large cities on the course of the spread in Turkey may have important contributions to the literature. Acknowledgments: There is no a thank you explanation.

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Assessment of the Trust Placed By the Practices of the Ministry of Health during the Coronavirus Pandemic Process in Turkey

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ABSTRACT

This research aims to evaluate the level of Turkish people's trust in the measures taken by the Ministry of Health to contain Covid 19. In the study, which was planned in a quantitative research design, Total of 931 people from 62 provinces in Turkey participated in the study. The data collection tool consisted of 31 questions. The questionnaire form was elaborated by Altstadt's authors and created using the freely available online Google Docs application. The questionnaire was sent to participants via social media networks from February 1, 2021 and February 20, 2021. Citizens over the age of 18 living in Turkey participated in the research. The research has a young participant population. According to the analysis results obtained from the research, it was concluded that participants' trust in the Ministry of Health was at a moderate level. Suggestions were made for future work.

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INTRODUCTION

The new type of Coronavirus disease, which deeply affects the whole world, first appeared in the People's Republic of China in 2019. Research has been understood that this virus that causes the disease is from the Coronavirus family such as SARS (2002) and MERS (2012). Because of these properties, this disease has been named 2019-nCoV (www.ecdc.Europa.eu, 2021; www.who.int/emergencies, 2021). The new type of coronavirus can pass from person to person. The disease, seen in Taiwan on January 13, soon spread to Asia, Europe, and America outside China. The World Health Organization Emergency Committee announced its emergency declaration globally on 30 January 2020 (www. gisanddata.maps.arcgis.com, 2021). With the new type of virus seen in almost all countries, the World Health Organization declared COVID-19 a "pandemic" on March 11, 2020 (www.who.int/emergencies, 2021).

The covid-19 disease has caused death in many people since its emergence on December 1, 2019. According the World Health Organization data, it is seen to be that there were nearly 3 million deaths as of March 2021 (www.who.int, 2021). Covid-19's first cases in Turkey saw on March 11, 2020. An increase in the number of cases had been observed in the ongoing processes as in other countries. Turkey followed thirty thousand deaths as of March 2021 (www. covid19.saglik.gov.tr, 2021).

With the emergence of the Covid-19 disease, countries have started to take many measures to prevent increasing cases and get rid of the disease. However, no matter how many precautions are taken, it has been a difficult to avoid the rapid spread of the disease. Countries have taken various measures to prevent Covid-19 disease. To prevent the disease, the World Health Organization first every individual's actions, such as regular hand washing, closing the mouth and nose during sneezing, avoiding people with symptoms of the disease, and avoiding contact (web.archive.org/web, 2021).

Due to the first occurrence of the Covid-19 disease in China, various measures have been taken China. Transport is restricted in certain cities. Events such as meetings have been canceled. Educational institutions have been closed (www.dw.com, 2021; www.scmp.com, 2021). When the first case was seen in France on January 24, 2020 and in Montenegro on March 17, 2020, patients were seen in all countries in Europe and similar measures were started to be taken (web.archive.org, 2021).

Considering the European, American and Asian countries in the Covid-19 process, it is seen that restrictions and normalization steps are applied in similar ways. Fashion shows, sports competitions, art events were canceled (web.archive.org, 2021), education was suspended in educational institutions, and restaurants and cafes were closed in France, where the youngest death case was observed (web.archive.org, 2021). In Italy, which was on the world's agenda at the beginning of the Covid-19 process, measures taken in every country were implemented (tr.wikipedia.org, 2021). The same bans continued in Estonia and entries into the country were restricted on March 14, 2020 (news.err.ee, 2021). Restrictions have been imposed compulsorily in Germany like other European countries. Individuals were allowed to leave their living spaces only for specific activities (tr.wikipedia.org, 2021). Considering the United States, the restrictions in the Covid-19 process have been made in a planned manner with local governments, businesses and educational institutions. Most of the rules applied in other countries have also been used in the USA (tr.wikipedia.org, 2021). In these countries, normalization steps have started to be implemented gradually. A striking statement came from France. A one-month curfew has been decided as of 19 March 2021 (www.birgun.net, 2021).

In Asian countries, the situation was not different from Europe and America and other continents. The first measures to combat the pandemic in Azerbaijan have been to impose some restrictions on imports and exports. Since the virus is transmitted from animals in China, attention has been paid to this (www.ticaret.gov.tr, 2021). The Covid-19 pandemic emerged in Uzbekistan on March 15, and it was announced that flights were canceled in the country on March 16, and it was stated that non-Uzbek people were prohibited from entering the country. Similar restrictions imposed by other countries have been taken in Uzbekistan (tr.wikipedia.org, 2021). Interestingly, official institutions did not have any statements regarding the Covid-19 outbreak in Turkmenistan (tr.wikipedia.org, 2021).

The first Covid-19 outbreak cases in Turkey on March 11, 2020, have been taken. Obligation to wear masks, interruption of education, curfews on weekends and holidays, curfews at night, closure of many workplaces, especially restaurants, suspension of collective events, postponement of sports competitions or playing without spectators, abroad and Restrictions on intercity travel, flexible working, changing working hours, informing citizens through public service announcements are some of these practices (tr.wikipedia.org, 2021).

In our country, the Ministry of Health has undertaken significant responsibilities in managing the pandemic process since the first Covid-19 case was seen, carried out essential activities, and signed many decisions. Some of the activities carried out in the process can be listed as follows:

- Diagnosis and treatment of Covid-19 cases,

- Follow-up of those who contact the cases
- Quarantine studies,
- Studies to prevent and control the spread of the pandemic,
- Vaccination studies,
- Raising the awareness of the society about the Covid-19 outbreak,
- Following up-to-date risk maps with the “Life Fits in the House” application,
- Opening of pandemic hospitals.

MATERIALS AND METHODS

In this study, the Covid-19 process in the Republic of Turkey aims to measure trust against the Ministry of Health application. The research universe consists of all citizens over the age of 18. The survey technique was used in the research and the surveys were created with the Google Docs program and distributed over social media networks. The survey was conducted between February 1, 2021 and February 20, 2021, and 931 people participated.

The researchers created a questionnaire form as a data collection tool in the research. The questionnaire, form consists of two parts. In the first part of the questionnaire, there are questions to determine the socio-demographic characteristics of the participants. In the second part, there are 31 questions regarding the determination of trust in the practices of the Ministry of Health in the Covid-19 process. The answers given to the questions are graded as 1-Strongly disagree / 5-Strongly agree. While creating the questions, and the literature information, expert opinions, opinions of Ministry of Health employees, and opinions of citizens affected by the Covid-19 outbreak were taken into account. Since the measurement tool used in the study was developed by the researchers, it is not a scale but an inventory. The purpose of the measurement tool is to measure the trust in the Ministry of Health during the epidemic process. Exploratory and confirmatory factor analysis, such as scale development studies, was not performed. Because the questions in the measurement tool only cover the Covid-19 process.

The data analysis obtained as a result of the study was made with the SPSS 22.00 package program. Descriptive statistics were made on the data obtained from the research, and the results obtained were transferred with the help of tables and graphics. The Cronbach Alpha coefficient of the "Ministry of Health Practices Confidence Inventory" questions created by the researchers was calculated as 0.95.

RESULTS

In this section, findings related to the research are given. In this section, the socio-demographic information of the participants, the mean and standard deviations of the survey questions are included. In this descriptive study, the Ministry of Health's assessment in the Covid-19 process was made based on the answers given by the participants to the questionnaire questions.

Table 1. Socio-Demographic Characteristics of the Participants

	Variable	Number	Percent
Age	Between the ages of 18-24	474	50,9
	Between the ages of 25-31	200	21,5
	Between the ages of 32-38	92	9,9
	Between the ages of 39-45	78	8,4
	46 Years and Above	87	9,3
Gender	Woman	557	59,8
	Male	374	40,2
Marital status	The married	303	32,5
	Single	628	67,5
Education status	Literate	3	0,3
	Primary school	13	1,4
	Middle School	20	2,1
	High school	108	11,6
	Undergraduate	303	32,5
	License	267	28,7
	Postgraduate	217	23,3
Profession	Government Official	205	22
	Workers in the Public	14	1,5
	Private Sector Employee	85	9,1
	Health personnel	45	4,8
	Housewife	42	4,5
	Student	355	38,1
	Unemployed	142	15,3
	Self-Employed Individual	43	4,6
Monthly Income	Between 0-100 ₺	273	29,3
	Between 101-3000 ₺	240	25,8
	Between 3001 - 6000 ₺	240	25,8
	6001 ₺ and Above	178	19,1
Household Person	0-4 Person	575	61,8
	5 People and Above	356	38,2
Chronic Disease	Yes	119	12,8
	No	812	87,2
Medication Used	Yes	148	15,9
	No	783	84,1
Total		931	100

According to the age distributions examined within the scope of the research, 50.9% of the participants are between the ages of 18-24. 21.5% of the participants are between the ages of 25-31. It is observed that the majority of the participants are in the young age range. 27.6% of the participants consist of other age groups as seen in Table 1. According to the marital status distributions examined within the scope of the research, it is seen that 67.5% of the participants are single and 32.5% are married. According to the educational status distributions examined within the scope of the research, it is seen that 32.5% of the participants received associate degree education with the most significant number of participants. Participants who receive associate degree education are followed by undergraduate education with 28.7%. The number of graduate students is 23.3%. The remaining 15.5% constitute another educational status, as seen in Table 1. According to the distribution of professions examined within the scope of the research, 38.1% of the participants were determined as students, 22% as civil servants, 15.3% as unemployed and 9.1% as private sector employees. The remaining 15.5% constitute other occupational groups as seen in Table 1. According to the monthly income distributions examined within the scope of the research, it has been observed that the participants have almost no income with 29.3%. While 25.8% of the participants have an

income between 101-3000 TL, 25.8% have an income between 3001-6000 TL. 19.1% of them have an income of 6001 TL and above. According to the distribution of the number of people living in the household examined within the scope of the research, 61.8% of the participants have homes in the range of 0-4 people. In comparison, 38.2% have five or more families. According to the distribution of chronic conditions examined within the scope of the research, 87.2% of the participants do not have a chronic disease. 12.8% have a chronic illness. 84.1% of the participants do not use a drug continuously, according to the distribution of drug conditions constantly used within the scope of the research. 15.9% of the participants stated that they use a drug continuously.

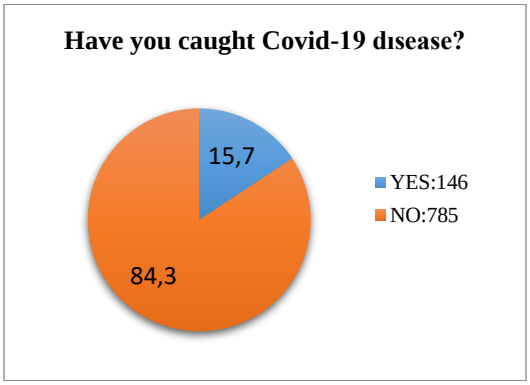

Figure 1. Conduct of the COVID-19 Outbreak

According to the distribution of Covid-19 disease conditions examined within the scope of the study, 84.3% of the participants did not get the disease. 15.7% of the participants had Covid-19 disease.

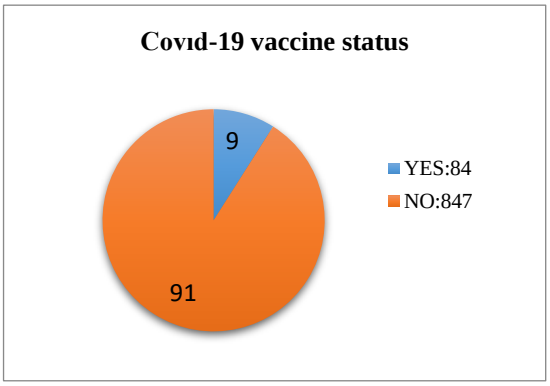

Figure 2. Distribution of Participants Being Vaccinated with COVID-19

According to the distribution of Covid-19 vaccine status examined within the scope of the research, 91% of the participants did not have the Covid-19 vaccine. 9% of the participants stated that there is no Covid-19 vaccine.

Table 2. Descriptive Statistics on "Ministry of Health Practices Trust Inventory"

Ministry of Health Practices Trust Inventory	Mean	Standard deviation
COVID-19 statistics announced daily by the Ministry of Health reflect the reality.	2,69	1,19
I think the number of people vaccinated is sufficient.	2,70	1,14
The Ministry of Health is responsible for the wawes in the Covid-19 outbreak.	2,76	1,19
Strict measures and taken steps to return to normal life during the pandemic were expedient in 2021	2,90	1,17
Strict measures and taken steps to return to normal life during the pandemic were expedient in 2020.	2,96	1,18
The Ministry of Health was transparent enough during the Covid 19	2,96	1,23
I trust the effectiveness of the Sinovac (Chinese vaccine) vaccine used in our country.	3,00	1,04
I find the cooperation with local governments is sufficient in the pandemic management process.		1,08
The Ministry, pressure groups, media, etc. it is not affected by things.	3,07	1,13
I think the vaccine, having been applied is the right one for our country.	3,16	1,00
I think the Ministry of Health has been successful in managing the COVID-19 pandemic.	3,20	1,14
I think the decisions of the Covid-19 Scientific Advisory Board are in line with the realities of our country.	3,22	1,06
The society has been properly guided by the Ministry of Health during the COVID-19 pandemic.	3,24	1,15
The measures carried out by the Ministry of Health in relation to the COVID-19 were as they should have been.	3,28	1,12
The Ministry of Health has taken the necessary measures in our country as soon as the COVID-19 outbreak has emerged in the world.	3,29	1,18
The Ministry of Health pays attention to the health and safety of healthcare professionals.	3,29	1,21
The Ministry of Health has acted fairly in regard to vaccination.	3,30	1,15
The government units are used effectively in the Covid-19 process.	3,39	1,00
I think the vaccination groups are determined correctly.	3,41	1,12
The Ministry of Health cooperates with international organizations in the Covid-19 process.	3,41	0,99
I think the treatment protocol applied by the Ministry of Health to COVID-19 patients is correct.	3,42	1,01
I think the decisions of the Covid-19 Scientific Advisory Board are scientific.	3,44	1,06
The capacity of our country's health system has been sufficient so far to cope with the pandemic.	3,46	1,14
Supporting the practices of the Ministry of Health with the government authority in the Covid-19 process has produced positive results.	3,48	0,93
The studies of the Ministry of Health to identify the contacts of Covid-19 patients were effectively managed.	3,49	0,99
Covid-19 scientific board consists of experts in the field.	3,59	1,03
The health system has been used effectively in the Covid-19 process.	3,61	1,01
1The Ministry of Health has been effectively using the state media, social media and public service announcements to manage the COVID-19 process.	3,64	0,93
HES Code application provides benefits in combating the pandemic.	3,71	1,07
I think the "(HES)" application created by the Ministry of Health in the Covid-19 process is useful.	3,78	1,06
The Ministry of Health's motto «Masks-Social Distance-Hygiene» has been expedient.	4,15	0,88
General	3,25	0,72

Table 2 contains the means and standard deviations of the answers given by participants to the research questions. According to the ansprovided given by the respondents, " COVID-19 statistics announced daily by the Ministry of Health reflect the reality." question ($\bar{x}$ = 2.69) and "I think the number of people vaccinated is sufficient." The average of the answers given to the question ($\bar{x}$ = 2.70) was the lowest. " The Ministry of Health's motto «Masks-Social Distance-Hygiene» has been expedient." question ($\bar{x}$ = 4.15), "I think the "Hayat Eve Sığar (HES)" application created by the Ministry of Health during the Covid-19 process is beneficial." ($\bar{x}$ = 3.78) and "HES Code application provides benefits in combating the pandemic." The average of the answers given to the question ($\bar{x}$ = 3.71) was the highest.

DISCUSSION

The study includes the Covid-19 pandemic process which profoundly affects the world. It is also carried out to determine the confidence level of the Republic of Turkey Ministry of Health practice. As it is known, the Covid-19 outbreak occurred in China on December 1, 2019 and spread rapidly worldwide. Since the Covid-19 epidemic is a health issue, the countries' health ministries are the first to take action. Therefore, the Ministry of Health in Turkey has begun to take the necessary measures together with the emergence of this pandemic. Restrictions have been applied since 11 March 2020 in Turkey. With the decrease in Covid-19 cases, countries have started to take normalization steps.

Another focus of the study is that such research has not been revealed before in the Covid-19 process. This study aims to present various explanations for the future, different from other studies. First, the researchers received opinions from experts, healthcare professionals and citizens. Then they determined the framework of the research. Therefore, a holistic approach aims to assess the citizens' opinion of the practices during the Covid-19 pandemic.

As stated in Table 1 and Table 2, when the responses of 931 people from different regions, professions, and characteristics are examined, the question with the lowest average, "The statistics announced daily by the Ministry of Health reflect reality" is the question. Another question with common standard is, "I think the number of vaccinations is sufficient." This was determined as the question. This situation reveals the public's concern about vaccination, more intensively in the number of vaccinations performed in developed countries. To mind that citizens in Turkey, "Why not be more than the number of vaccinations in Turkey?" brings the question. It may not be suitable to hold the Ministry of Health or the public authority is responsible here. Because no country's government knowingly and willingly allows its citizens to be affected by the pandemic. The state gives both cultural characteristics and some values importance in a country where Muslims constitute most of society. In addition, the Universal Declaration of Human Rights (1948) (www.ohchr.org, 2021). is evidence of how the state should behave towards its citizens.

On the other hand, the question, which is one of the questions with the highest average according to the answers given by the participants in the research, "The application of Cleaning-Mask-Distance by the Ministry of Health was the right decision." it was the question that the participants reached a consensus again. The World Health Organization has stated that attention should be paid to hygiene in this process. Likewise, this practice in Turkey, has been recognized by citizens as a right decision. These questions, which have high averages, were accepted by the citizens as correct. "I think the" (HES) "application created by the Ministry of Health during the Covid-19 process is useful." and " Life Fits Into Home (HES) Code application provides benefits in combating the pandemic." "HES" application is an application that shows the risk status of individuals and can see the case density with a map. Also, the normalization process in Turkey must deliver the code at the entrance of palaces where people stay inside was introduced.

When the results obtained from the research are examined in general, it can be said that the questions with an average of over 3 reflect the reality of the country. "The Ministry of Health effectively uses the national press, social media and public spots to manage the Covid-19 process." According to this information, it can be concluded that citizens frequently see the Ministry of Health advertisements in areas such as television, internet and social media. Some of the questions in the questionnaire were also found to be correct by the citizens. Citizens, for example, rely on scientific board decisions. The opinions of scientists on this issue are essential for the accurate and rapid management of the process. As a result of the pandemic process of Turkey's health system is effective. But only those who participated in this research think this way. In general, no country's health system has been influential in the pandemic process. No country has corrected its health systems, taking into account the pandemics in the past. The slightest loss of outbreaks depends on the prediction of some situations.

When the origin of the Covid-19 pandemic was examined, the news transmitted from an animal first came to the fore widely. The statements made later were similar. However, the theory that this pandemic was produced in a laboratory environment reflects the truth. Although this is put forward as a theory, the view that the Covid-19 epidemic is a biological weapon is common (www.dw.com, 2021; www.hurriyet.com.tr, 2021). Various sources want to hide this information. In addition, according to the research report of the World Health Organization in China between January 14 and February 10, four different scenarios have been put forward. These scenarios are the transmission of the virus from an animal, its transmission through food, its transmission from a bat, and its accidental production in the laboratory (www.ntv.com.tr, 2021). The World Health Organization has revealed the possibility of the Covid-19 outbreak being produced in the laboratory as a scenario in its latest research. Shortly, designs similar to the Covid-19 episode are created. One of them, the SPARS pandemic, is a pandemic that may appear soon. The article published by Brunson et al. (2020) suggests that a virus named SPARS will emerge between 2025 and 2028. Considering there was scientific foresight before The Covid-19 outbreak, the research claiming that the SPARS virus would appear the healthcare

management systems of countries take precautions in advance.

CONCLUSIONS

This study described the application of the Republic of Turkey Ministry of Health's Covid-19 process. Different researches can be done by developing these issues. In particular, the psychological effects of the pandemic can be examined. Qualitative and quantitative studies can be done too. In addition, it is recommended that the Ministry of Health take this research as a basis for its applications in future outbreaks.

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Evaluation of Resorting To Traditional Practices by Elderly People during the Covid-19 Pandemic

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ABSTRACT

Background: *The COVID-19 pandemic has been affected all age groups, especially the elderly people. Individual measures are taken by elderly people to protect from the disease.*

Objective: *This study aims to determine the status of resorting to traditional practices by elderly people during the COVID-19 pandemic.*

Method: *This descriptive and cross-sectional study was conducted with 453 elderly individuals residing in Tunceli in eastern Turkey, between May and October 2021. The research data were collected online using a survey form. The obtained data were analyzed by numbers and percentiles in the SPSS 24 package program.*

Results: *Of the elderly individuals with an average age of 73 years, 65% had one or more chronic diseases. Of the elderly, 43% had health problems during the COVID-19 pandemic, 25% was on a diet for protection against COVID-19, 83% had life changes, and 63% was resorting to herbal methods.*

Conclusion: *The elderly individuals were observed to resort to traditional practices for protection from the COVID-19.*

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INTRODUCTION

Diseases such as Cholera, Plague, Smallpox, Spanish Flu, Human Immunodeficiency Virus (HIV/AIDS**)**, Avian Flu, Swine Flu, Mad Cow, Ebola, Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS) have led to a pandemic in the world, causing significant health problems along with mass mortalities. Today, the new type of COVID-19 that emerged in Wuhan, China in December 2019 and caused a pandemic threatens the lives of all people worldwide (Ertaş, 2021; Türk, 2020; WHO, 2020). The coronavirus epidemic has spread rapidly to all countries since 2019, causing the death of millions of people, and still negatively affects the economic, social, and political structures of countries, especially the health systems. In order to reduce the effects of this rapidly transmitted disease, restriction, and prevention measures are being applied all over the world (Kaya, 2020; Wang & Tang, 2020). The coronavirus pandemic affects all age groups, but mostly the elderly people are at risk for the disease. Mortality rates due to disease are usually high in elderly who have chronic respiratory, cardiovascular, cancer, diabetes diseases, and so on. Most countries implement some measures in the fight against the epidemic, such as physical distancing, isolation, and quarantine. It is emphasized that it is of importance to comply with quarantine and preventive measures to protect the health of elderly people who are the group at the most risk (UNFPA, 2020). In addition to preventive measures, it has been emphasized that nutrition and lifestyle habits are important for the protection and maintenance of elderly health (Bauer & Morley, 2021; Ceolin et al., 2020). It is seen that one of the methods used by the elderly for protection against the disease is traditional practices (Dedeli & Karadakovan, 2011). According to the World Health Organization (WHO), 25% of people around the world use complementary and alternative treatment methods (Sağkal et al., 2013). The concept of traditional and complementary medicine is considered the knowledge, skills, and practices with or without an explanation, but based on theories, beliefs, and experiences specific to various cultures, which are used for healing or treatment and maintaining well-being through the diagnosis of the diseases, and physical and mental protection from the diseases (Republic of Turkey Ministry of Health, 2017). An increase is observed in chronic degenerative diseases that are difficult to treat and care for in the elderly due to an increase in life expectancy. Increased costs in the treatment of diseases, difficulties in accessing health care, distrust of treatment methods, search for a cure for terminal illnesses, and cultural reasons have increased interest in alternative treatment methods (Dedeli & Karadakovan, 2011; Sağkal et al., 2013). So far, no effective methods for the fight against COVID-19, other than vaccination, have been reported. However, it has been stated that herbal medicine of countries such as China, India, and Iran, which have experience in preventing pandemic and endemic infectious diseases, together with the therapeutic drugs of western medicine, may have positive effects against the coronavirus disease. It is emphasized that medicinal plants can be used in combination with modern medicine through appropriate follow-up until the exact treatment of the disease is found. Since medicinal plants and a healthy diet will strengthen immunity against infection in the fight against the epidemic, it has been stated that it will be useful to apply it as a complementary treatment (Dudani & Saraogi, 2020; Mirzaie et al., 2020; Panyod et al., 2020). This study was conducted to determine the status of resorting to traditional practices by elderly people during the coronavirus (COVID-19) pandemic.

MATERIALS AND METHODS

Study Design

This study has a cross-sectional and descriptive research design. For this study a qualitative-quantitative method was used. For this purpose, Creswell's concurrent transformative mixed-model research design was utilized (Creswell, 2003). In this design, which helps to better understand the facts and alternative approaches, the qualitative and quantitative data were collected concurrently and analyzed together.

Study Sample

The study population was consisted of people aged 65 and over who lived in the central neighborhoods of Tunceli in eastern Turkey. Without a sample selection, 453 elderly individuals, who could be contacted between the dates of the study, who agreed to participate voluntarily in the study were included in the sample of the study.

Study Place

The research was carried out in the central neighborhoods of Tunceli, located in the eastern Turkey. The research data were obtained in the Atatürk, Cumhuriyet, Alibaba, Yeni Mahalle, İnönü, Moğultay, Aktuluk center neighborhoods of Tunceli.

Data Collection

Data were collected using a questionnaire developed by researchers in accordance with the literature (Kaya, 2020; UNFPA, 2020; Wang & Tang, 2020; WHO, 2020). In central neighborhoods of Tunceli in the east of Turkey, between May 3rd and October 15th, 2021. The questionnaire consists of two parts. The first part of the 28-item questionnaire

consists of eight items on socio-demographic characteristics (age, gender, education status, working status etc.) and the second part consists of 20 items that determine the status of resorting to traditional practices (life style habits change, nutritional changes, diet usage, herb usage etc.) by the elderly. The research data were collected online using the form, developed digitally by the researcher, through Google forms.

Data Analysis

SPSS Version 24.00 for Windows (IBM, Armonk, New York, USA) was used for the statistical analysis of the study data. Data were entered into the SPSS package program in a computer environment and analyzed by numbers and percentiles.

Ethical Dimensions

Before starting the study, ethical approval was obtained from the Munzur University of Non-Interventional Research Ethics Committee with decision No: 2 on 03.11. 2020 (05/11/2020-E.15446-30603717-050.01.04). During the time interval of the study, the children of the elderly were contacted and the purpose of the study was explained. After obtaining their consent for the research, the questionnaires were sent on the digital platform. They were informed that the information provided by the elderly participants in the study will be kept confidential, will not be used anywhere else except for the research, and can leave the research at any time.

RESULTS

The average age of the participants was 72.84±7.76, 51.4% was female, and 22.3% was primary school graduate. Of the participants, 9.2% was working in a job for income, and 57.4% had an average monthly income less than expenses. Of the participants, 64.9% had a chronic disease (Table 1).

Table 1. Descriptive characteristics of the elderly individuals

Characteristics	N	%
Age (X±SD)	72.84±7.76 (Min =65, Max=95)	
Gender		
Female	233	51.4
Male	220	48.6
Education status		
Illiterate	40	8.8
Literate	99	21.9
Primary school	101	22.3
Secondary school	67	14.8
High School	94	20.8
Bachelor's degree and above	52	11.4
Employment status		
Working	42	9.2
Nonworking	411	90.8
Perceived average monthly income		
Lower than expenses	260	57.4
Balanced	160	35.4
Higher than expenses	33	7.2
One or more chronic illnesses		
Yes	294	64.9
No	158	35.1

During the coronavirus pandemic, 43.0% of the elderly had health problems, only 13.0% could be examined by a specialist physician, and 25.3% could be examined by a primary care physician. Of the participants, 32.6% had learned about COVID-19 prevention measures from a physician, 67.1% had learned from the media, and 56.5% had learned from his/her close circle (Table 2).

Table 2. Access to health services by elderly people during the corona pandemic

Characteristics	N	%
The status of experiencing health problems during the epidemic		
Yes	195	43.0
No	258	57.0
The status of examination by a specialist physician		
Yes	59	13.0
No	394	87.0
The status of examination by a primary care physician		
Yes	115	25.3
No	338	74.7
The status of getting information about protection from the COVID-19		
Yes	395	87.1
No	48	12.9
Information source [a]		
Media	304	67.1
Close circle	256	56.5
Physician	148	32.6

[a] Number of respondents giving more than one answer

In this study, 83.9% of the elderly reported that COVID-19 caused a change in their lives, 83.4% of them made a change in their diet, 77.5% of them had a changed in movement, 84.3% of them had a changed in their social life. Of the participants, 24.9% was found to follow a diet for protection against COVID-19. Most of them stated that they consume fruits and soups instead of fatty and solid nutrition. Of the participants, 92.9% stated that the diet was beneficial. Almost all the participants reported that yogurt was included in their diet (Table 3).

It was observed that the elderly had limited movement during the COVID-19 process and changed their eating habits. The statements of the elderly regarding lifestyle changes are given below.

"I am cautious to eat 1 bowl of yogurt a day. I always put a clove of garlic in it. This protects me from the disease" (Female, Age 80).

"I am cautious to eat natural foods. I do not consume fatty dishes, I take care to consume soup and yogurt" (Male, Age 84).

"We used to not go to a physician, and there were no physicians in this area where we live. There were herbs that were a remedy for everything when I got sick. The healers knew these herbs growing in the mountains, they were almost talking to them and when someone got sick, they gave them mixtures prepared from various herbs" (Male, Age 92 and 94).

Of the participants, 82.7% stated to have a life change to protect themselves from COVID-19 (Table 3).

"There was lockdown order for the elderly for a long time. I haven't been out on the streets for six months. And the disease is still present. Although there is no lockdown anymore, I only go out for a short time in places that are not crowded" (Male, Age, 82).

"I try not to enter crowded places. When I go out on the street, I wear a mask and pay attention to social distancing" (Female, Age 72).

"I used to not wash my hands very often. However, now I often wash my hands. And I pay attention to not to touch around" (Male, Age 76).

Of the participants, 63.1% was using herbal methods for protection against the coronavirus, and 91.6% was considered these methods beneficial (Table 3).

Table 3. Some of the methods used for protection against COVID-19

Characteristics	N	%
Did Covid-19 change your life?		
Yes	380	83.9
No	73	16.1
Living area affected by Covid-19[b]		
Nutrition	379	83.4
Movement	351	77.5
Social	382	84.3
Lifestyle changes		
Yes	375	82.7
No	78	17.3
Diet application		
Yes	113	24.9
No	340	75.1
The status of considering the diet useful (n=113)		
Yes	105	92.9
No	8	7.1
Using a herbal method		
Yes	286	63.1
No	167	36.9
The status of considering the herbal method useful (n=286)		
Yes	262	91.6
No	24	8.4

[b] Number of respondents giving more than one answer

It was found that the elderly used herbs such as *Rosa canina* L. (25.8%), *Origanum acutidens* (16.3%), *Allium tuncelianum* (14.6%), *Gundelia armeniaca* (12.3%), *Crataegus monogyna* (10.8), *Urtica* (8.2%), *Rubus armenicus* (7.9%), *Eremurus spectabilis* (7.5%), *Helichrysum arenarium* (7.3%), *Mentha piperita* (7.3%), *Zingiber officinale* (6.4%), *Viscum album* (6.0 %) and *Anchusa azurea* (4.9%), respectively, for protection against coronavirus. The participants stated that they brew these plants in boiled water and consume them as tea. In addition, they stated that they make vinegar of hawthorn, consume garlic in yogurt, and make marmalade of *Crataegus monogyna, Rosa canina L*, and *Rubus armenicus* (Table 4).

"I make and consume tea from natural herbs every day. It makes me stronger. I feel good this way" (Female, Age 79).

"I don't know when I visited a physician the last time when I got sick. Nettle, rosehip, and thyme are what heals diseases. In order not to get sick, we drink these teas" (Male, Age 81).

Table 4. Herbs that the elderly use for protection against the coronavirus

Herb	n	%
Rosa canina L (Rosehip)	117	25.8
Origanum acutidens **(**Oregano)	74	16.3
Allium tuncelianum (Tunceli garlic)	66	14.6
Gundelia armeniaca (Cardoon)	58	12.3
Crataegus monogyna (Hawthorn)	49	10.8
Urtica (Stinging nettle)	37	8.2
Rubus armenicus (Blackberries)	36	7.9
Eremurus spectabilis (Affodill)	34	7.5
Helichrysum arenarium (Sandy everlasting)	33	7.3
Mentha piperita (Mint)	33	7.3
Zingiber officinale (Ginger)	29	6.4
Viscum album (Mistletoe)	27	6.0
Anchusa azurea (Italian bugloss)	22	4.9
Mons fungus (King trumpet mushroom)	15	3.3
Matricaria recutita (Chamomile)	12	2.9
Tussilago farfara (Coltsfoot)	12	2.9

DISCUSSION

The body's resistance to diseases decreases and diseases increase with aging, along with psychological and physiological changes in individuals. As the average life expectancy increases worldwide, chronic diseases increase in the aging population, which poses an economic burden for countries. It has been reported that two-thirds of the individuals aged 65 and over living in European countries have at least two or more chronic diseases (Bakır & Akın, 2019). In people aged 65 and over in Turkey, 90% has at least one chronic disease, 35% has two, 23% has three, and 14% has at least four or more chronic diseases (Gümüştakım & Ayhan Başer, 2019). It has been reported that chronic diseases rank first (78.7%) among the causes of death in the elderly in Turkey (Altın, 2020). In this study, it was also found that two-thirds of the elderly (64.9%) have at least one chronic disease. This finding is in line with the literature.

It has been reported that the elderly become more dependent as their health, economic, and social problems increase due to the measures implemented during the coronavirus pandemic (isolation, quarantine, lockdown, etc.). Since the risk of death is high in the elderly who are diseased during the pandemic, it has been emphasized that the health and care services and the social support to be provided for the elderly have become even more important (Ekici, 2020; Petretto & Pili, 2020). During the COVID-19 pandemic, almost half of the elderly reported having problems accessing health services, and more than half reported not being able to see a specialist physician or a primary care physician. They reported that they received information from the media, close circle, and physicians to protect themselves from the virus during the coronavirus pandemic. Continuous access to health services is of great importance in maintaining the health of the elderly, for treatment of their chronic diseases, follow-up, and routine checks. Situations such as disruptions in health services for the elderly due to the pandemic and lack of care and social support in the lives of the elderly may further increase their problems. Therefore, the introduction of multidimensional supportive policies by the public that will improve the health of the elderly will have a positive impact on their quality of life.

Lifestyle, diet, age, medical conditions and environmental factors are taken important roles in combating COVID-19 (Gasmi et al., 2021). The concept of culture includes approved and disapproved situations in a society and is considered behaviors, practices, and values shared by the members of a society (Baş et al., 2019). Although the concept of health and disease is generally a field of medical science, it has been emphasized that health and disease are also evaluated within the socio-cultural system in all societies (Konak, Akın; Aktar, 2009). Although the use of traditional methods has been limited after the introduction of modern medicine, it has been stated that traditional treatment methods have continued to the present day through cultural transfers in societies. Today, however, it has been emphasized that traditional and beneficial treatment methods are used for complementary therapy in medical sciences (Yılmaz, 2020). It has also been stressed that it is important to use medicinal plants and develop new antiviral drugs using these plants to control diseases such as coronavirus (Boukhatem, 2020). Foods, herbs, and diet therapy have been reported to be important in strengthening immunity against coronavirus disease, and it has been emphasized and suggested the use of herbs or mixtures in the prevention and treatment of disease, within the scope of preventive and protective treatment, but it has also been stressed that their use should be under the supervision of modern medicine in case of any side effects (Balkrishna et al., 2020; Dudani & Saraogi, 2020; Panyod et al., 2020). It has been reported that the studied region is located in the plant geography of Iran-Turan and is rich in plant diversity. It has been stated that there were 1523 plants around the province and 46 species of these plants were endemic (Cakilcioglu, 2020; Koyuncu & Arslan, 2009). It has been emphasized that these plants are medicinal and this healing tradition has been passed on to generations and that diseases have been treated with 27 healing plants (Konak, Akın; Aktar, 2009; Yürür, 2016). In this study, more than half of the elderly experienced a change in lifestyle and it is seen that elderly people resort to traditional methods to protect themselves from the coronavirus. In a study, it was stated that 80% of the participants used medicinal plants as a preservative during the COVID-19 process (Villena-Tejada et al, 2021). It is reported that the most frequently used herbs were *Eucalyptus, Zingiber officinale (ginger), Capsicum annuum L.* (*green pepper), Allium sativum L.(garlic)* and *Matricaria recutita* (chamomile)for treatment and prevention. It has been reported that as the age progresses, individuals who have had COVID-19 in their relatives were used plants more frequently (Villena-Tejada et al, 2021). It has been reported that the compounds used in the prevention of COVID-19 and reported to be effective are obtained from *Anethum graveolens L.(parsley), Capsicum annuum L.* (Pandey et al., 2020) and *Zingiber officinale* (Dibakar et al., 2020). In a study conducted in Nepal, it was reported that the rate of herbal usage has increased during the COVID-19 process and the commonly used plants were *Zingiber officinale, Curcuma L., Cinnamomun tamala, Citrus L, Allium sativum L., Tinospora cordifolia,Mentha piperita and Ocimum basilicum L.* It has been reported that the most common type of use was grinding or boiling (Khadka et al., 2021).

Similar to the results of the researches, this study also nearly half of the elderly were found to use herbs such as *Rosa canina L, Origanum acutidens*, and *Rubus*

armenicus in order to strengthen their immunity for protection against the coronavirus, whereas the other half were found to use *Allium tuncelianum* (*Tunceli garlic*), *Crataegus monogyna*, *Urtica*, *Eremurus spectabilis*, *Mentha piperita*, *Gundelia armeniaca* , *Mons fungus*, *Helichrysum arenarium*, *Zingiber officinale*, *Viscum album*, *Anchusa azurea*, *Tussilago farfara*, and *Matricaria recutita*. Almost all the elderly people (91.6%) reported that this herbal method was beneficial. This study and other studies show that herbal methods are significantly preferred for protection during the COVID-19 process.

In one study, it was noted that the coronavirus is more severe in the elderly who are malnourished and do not have a strong immune system, and the mortality rate is also high in this population (Yiğitalp, 2021). Considering the research findings, it was found that the participants used medicinal herbs to protect themselves from the coronavirus pandemic and strengthen their immune systems. It has been found that medicinal herbs are generally widely used in traditional and complementary practices in Turkey, where people resort to some traditional practices for treatment and protection against coronavirus disease (Thakur et al., 2020). In another study, it was reported that 35 different ailments are treated with 64 plant species by traditional healers in the Lahaul valley of India (Thakur et al., 2020). It has been reported that the natural healing method based on Ayurveda in India has the potentials for both prevention and treatment of COVID-19 (Rastogi et al., 2020). In India, it has been reported that some herbal compounds are strong SARS-CoV-2E protein inhibitors and that these herbal compounds can play a role in the design of antiviral therapeutics against the COVID-19, on the other hand, some medicinal plants have been shown to have potential advantages for the treatment coronavirus disease (Alam et al., 2020) Traditional Chinese medicine (TCM) and Indian medicinal plants have been stated to be hope against COVID-19, and the importance of evaluating their healing aspects and supporting them with experimental studies was emphasized as the epidemic was brought under control (Ahmad et al., 2021; Ren, Zhang, Whang, 2020). In addition, it has been stated that traditional Chinese medicine can reduce the severe symptoms of patients in the treatment of COVID-19 and that Chinese Medicine is effective in strengthening the individual's resistance against the COVID-19 disease (Dai et al., 2020; Xu & Zhang, 2020). In African countries, on the other hand, it has been reported that "COVID-organics", an elixir based on *Artemisia annua* extract, is used for traditional treatment against COVID-19 (Garcia, 2020). As can be seen in other studies as well as this study, traditional practices such as herbal practices are among the preferred practices for disease prevention. Although the herbs used to protect against COVID-19 in different places differ, this study and other studies show that ginger, mint, garlic, chamomile and citrus are used more frequently.

CONCLUSION AND RECOMMENDATIONS

According to the findings obtained in the study, it was found that the elderly people resort to traditional methods to protect themselves from COVID-19 and use herbs, especially endemic ones, in their culture and geography to strengthen their immune system.

The fact that the settlement and the surrounding area of the studied place are rich in plant diversity facilitates access to traditional herbs and allows participants to use them as an immune system booster against the epidemic. However, to be known the effects and consumption conditions of plants are important. It should not be forgotten that beneficial plants that are not consumed properly can threaten health. So, further studies are needed to evaluate the effect of herbs on diseases in order to make the desired utilization of medicinal herbs in the studied region for the treatment of diseases along with their positive contribution to health.

LIMITATIONS

This study has some limitations. The limitations of the study are that the study was conducted in a province and it was based on the self-reports of the participants. The results of the study can be generalized to this group. By this reasons more studies on this subject are needed.

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Ethical Aspects of Uterus Transplantation

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ABSTRACT

Important developments in transplantation in recent years have brought uterine transplantation to the agenda. Transplantation has been a glimmer of hope for many patients with uterine factor infertility. Most women only want to have a child they gave birth to. However, the most important feature that distinguishes uterus transplantation from other transplantation surgeries is that it is performed not to save people's lives, but to increase the quality of life. This situation raises many question marks. Despite the medical and scientific complexity that uterine transplantation has created in the medical world of our time, ethical questions about it perhaps pose more challenges. This review was made to reveal the ethical dimension of uterus transplantation.

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INTRODUCTION

Uterus Transplantation

The history of uterine transplantation in experimental animals began with studies carried out in the 1960s and 1970s and became widespread in the 20th century (Brannstrom et.al., 2003). That they used female dogs to perform the first successful uterine autotransplantation. Despite subsequent breakthroughs, uterine transplant research appears to have lost relevance with the onset of in-vitro fertilization in the 1970s, with similar experiments not occurring until 2000 (Lefkowitz, 2012).

UTx (Uterine Transplantation) is currently the subject of research in many centers in the USA and Europe. Uterine transplantation attempts have been made in rabbits, sheep, non-human primates, and mice with varying success rates (Brannstrom et.al., 2010). It has been prepared for human experiments in line with uterine transplantation studies in animals. The feature that distinguishes his study from Del Piore's study is that he stated that uterine grafts can be obtained from living donors (mother or sibling) who are closely related to the recipient, with appropriate donor tissue compatibility. It is stated that with such a graft, the recipient can avoid some of the risks associated with anti-rejection drugs, while at the same time trying a natural pregnancy and not requiring a postpartum hysterectomy. Theoretically, the Brannström approach has been defined as a permanent uterine graft (Mirkes, 2008). At the same time, thousands of women have undergone uterine transplantation, based on fecundity rates. It is anticipated that he may be a candidate for Ongoing studies, uterine transplantation potential buyers who are on the "waiting list", who have registered for; Rokitansky syndrome, revealed that she had a prior hysterectomy, endometriosis, and cervical cancer (Nair, 2008).

Over the past three years, scientists have made great efforts to address existing infertility problems. Indeed, achievements and advances in this area have had a significant clinical impact. The first successful uterus transplant in the world, Akdeniz University Medical Faculty Hospital Plastic Reconstructive Surgery Department Head Assoc. Dr. It was performed by Ömer Özkan and his team, but the pregnancy did not continue. Uterine transplantation from cadaver was performed in a 21-year-old patient with congenital absence of uterus. Pregnancy was terminated at the 8th week after transplantation, when the heartbeat of the embryo was not monitored (Catsanos et.al., 2012).

Uterus Traplantation Indications

In the last 10 years, there have been significant developments in the treatment of both male and female infertility. It is estimated that 8% to 30% of couples of reproductive age in the Western world are infertile (Brannstrom et.al., 2003), while this rate is between 10-20% in Turkey (Kılıç et.al., 2011). It is stated that approximately 40% of the couples seeking medical consultation in infertility have female causes. The introduction of IVF treatment has led to the treatment of causes of female infertility, such as ovulatory disorders and tubal factors. However, most of the underlying abnormalities in uterine factor infertility are not treatable. In the UK alone, it is estimated that 15,000 women (3% of infertile women) are infertile due to uterine factor (Diaz et.al., 2010; Sieunarine et., 2005). It may be due to congenital mullerian anomalies such as infertility, agenesis, hypoplasia due to uterine factor, or it may be acquired later (Brannstrom et. al., 2003). It is a congenital aplasia of the upper 2/3 of the uterus and vagina. In MRKH cases, the external genitalia has a normal appearance, and secondary sexual characteristics develop normally in adolescence, but it can lead to primary amenorrhea (Üstüner et.al., 2008; Bedaiwy et.el., 2010).

Importance of Uterus Transplantation

Although reproductive potential may seem meaningless for some individuals, it is absolutely vital for some individuals Therefore, infertility can be devastating for many women (Catsanos et.al., 2012). Although advances in ART have helped many infertile couples achieve their dreams, until recently; Women with uterine factor infertility had two options: adoption and gestational surrogacy. Currently, uterus transplantation constitutes a third option (Nair et.al., 2008). Uterus transplantation and tissue transplantation has become an accepted part of modern medicine in the last fifty years (Catsanos et.al., 2012). Organ transplantation is performed as a life-saving approach in critically ill patients due to the complications of organ rejection and post-transplant immunosuppressive treatments (Nair et.al., 2008). For this reason, transplantation is considered by many of us simply as a life-saving procedure. However, besides being a life-saving alternative, transplantation surgery also increases the quality of life of patients (Altchek, 2003).

The uterus provides both menstruation and the formation of pregnancy in a woman. Menstruation may not be important to many women, but the ability to conceive is very important. For women, childbearing fills a deep emotional and social need. For many women, the desire to become pregnant is thought to be an innate trait with evolutionary biology. But this desire also has a strong social component (Altchek, 2003).

In Turkish society, the child is an indispensable element with economic, psychological and social

value dimensions. Childlessness is seen as a humiliating situation (Brännström ve ark., 2007). Our society; The high expectations of married couples to have children increase the importance of uterus transplantation even more (Kılıç et.al., 2011).

Uterus Transplantation and Ethics

There are ethical, social and legal problems with uterus transplantation (Kisu et.al., 2011). Therefore, issues related to the donor (cadaver or living donor) with the current family, the recipient as well as the spouse of the prospective recipient and the child to be born should be addressed, and ethical principles should be thoroughly analyzed considering the benefits and risks associated with uterine transplantation (Díaz-García et.al ., 2012).

Another critical question is to identify a suitable donor for uterine transplantation (Kisu et.al., 2011). It is thought that the mother or an elderly sister will be the most suitable living donor, and it is stated that in this case, the probability of suitable tissue compatibility will increase (Fageeh et.al., 2002).

Although the clinical significance of living without a uterus is minor, uterine donation has emotional and practical consequences such as effects on gender, loss of identity, and sexuality. There are data suggesting that after hysterectomy, women may experience increased sexual dysfunction and decreased sexual satisfaction. For such an important and irreversible decision, the potential donor should be given time to think and given comprehensive information about the delivery of a healthy uterus; make sure donors make informed, autonomous decisions (Lefkowitz et.al., 2015; Fageh et.al., 2002).

The risks taken by the donor would be similar to hysterectomy, which is the most common surgical procedure in women today. It is extremely important that the donor is aware of these risks, that the potential risks are evaluated during interviews prior to transplant donation, and that they are understood by the individual (Brannstrom et.al., 2003).To maximize childbearing ability, the ideal living donor is someone of reproductive age with no history of uterine disease or trauma. A woman of reproductive age may agree to be a uterus transplant donor. If he takes this decision, the realization of the uterine transplant will be completely irreversible. In such a case, it should not be forgotten that the woman may regret it at a later date There are also psychological risks associated with uterine transplantation. The complex relationship that develops between the donor and the recipient may contribute to their embarrassment, anxiety, and more guilt, including a healthy donor. In the light of this, it is even more important to secure the principle of not knowing the identities of the donor and the recipient in cases where the donor is not a friend or family member or is not wanted to be known (Lefkowitz et.al., 2012).

Until recently, surrogacy was the only option for patients with absolute uterine factor infertility to become genetic mothers. However, in surrogacy, a woman can become a mother genetically and socially, but pregnancy cannot be achieved (Üstüner et.al., 2008).

Motherhood is believed to be the nurturing of the baby in the uterus and the experience of birth. For this reason, it is thought that maternal feelings are more nurturing in uterus transplantation than surrogacy, because the woman will have experienced both pregnancy and childbirth. In addition, it will strengthen mother-baby interaction and communication after birth (Golombok et.al., 2006).

From this point of view, it is thought that uterus transplantation will increase mother-infant interaction, and adaptation to the role of motherhood will be more than surrogacy. At the same time, surrogacy requires the existence of a relationship of trust between all parties involved. The sense of trust required for such arrangements is easily shaken due to surrogate pregnancy agreements, which are currently insecure, and negative public perception (Catsanos et.al., 2012).

sSurrogacy; raises questions about the definition of parenting, the autonomy of the surrogate mother, the potential risks to the embryo (alcohol intake, smoking, drugs) and the risks of the surrogate mother(pregnancy-related thromboembolism, hypertension, diabetes, preeclampsia), as well as the psychological effects on the surrogate mother and the prospective child (Díaz-García et.al., 2010).

CONCLUSION

Uterus transplantation has been a beacon of hope for many patients with uterine factor-related infertility. It is certain that it will lead to significant changes in the lives of couples who have been expecting a child for a long time and cannot have children despite treatment. However, during uterine transplants, it also rotates and all risks for the recipient should be carefully considered. Both parties should be informed in detail about this. In case of pregnancy, the risks that the fetus and herself will be exposed to and the harm to the donor should be clearly demonstrated. It is seen that more studies are needed especially for the complications that may occur in the mother and baby during pregnancy. In case the transplants are performed using a living donor, the donor should not be adversely affected by this situation.

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