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Investigation of Individual Perception and Health Behavior towards Covid-19 Pandemic

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ABSTRACT

This study was conducted to determine the individual perceptions and health behaviors' during the COVID-19 pandemic. Study was designed as a cross-sectional and descriptive study. A total of 396 individuals living in different cities of Turkey participated in the study. Due to pandemic conditions, the online survey method created via Google Forms was used to collect data. The mean age of the participants in the study was 27.14 ± 9.17. The statement "Healthcare professionals have exaggerated the extent of the corona virus" had the lowest mean ($\bar{x}$=1.30), whereas "Everyone can be infected with the corona virus" had the highest mean ($\bar{x}$=4.73). According to the findings, during the pandemic, it was shown that 50.9% of the participants consumed foods that strengthen their immunity (fruits and vegetables), 35.8% of smokers declined smoking, 53.3% did not change their bedtime habits and 50.1% of them were engaged in physical activity by doing housework (cleaning, etc.) more. Also, 47.7% of the individuals stated that they followed the news and current information about the outbreak on TV. As a result of this study, the participants' perceptions, attitudes, and behaviors towards the disease were identified for the initial stage of the epidemic. In addition, it was determined how health behaviors changed during the epidemic. Behaviors and perceptions about the epidemic can contribute to measures to be taken. Also, giving correct information about the disease to people can have positive effects.

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INTRODUCTION

A new type of coronavirus (SARS-CoV-2) that causes disease in the human population has been detected in Wuhan, Hubei province, China in 2019. As the disease spread to many countries and reached more serious dimensions, the whole world faced a new pandemic known as COVID-19 (Özdin & Bayrak Özdin, 2020). Intense infectious disease periods constitute public health problems for society socially, economically, and culturally (Demiray & Çeviker, 2020; Yang & Wang, 2020).

It is necessary to reveal the effects of COVID-19 by investigating the characteristics of individuals such as age, gender, region of residence, attitude, and behavior. Studies mostly show that the disease is demographically more risky in elderly people and is associated with comorbidities in type-2 diabetes, hypertension, and cardiopulmonary patients, and preventive measures have to be taken more seriously in these conditions. Moreover, healthcare workers are more at risk as they come into contact with patients (Auwaerter, 2020; Budak & Korkmaz, 2020; Chen et al., 2020; Dong et al., 2020; Ferguson et al., 2020; WHO, 2020).

In studies involving the problems related to early predictions and responses regarding the COVID-19 epidemic, it was emphasized that the society should be informed correctly, the importance of the disease should be emphasized and the measures to be taken should be planned quickly and accurately. On the other hand, it was stated that due to the exaggerated information, non-evidence-based measures, and recommendations, the individuals in the community created either panic and fear or relaxation related to COVID-19 (Ioannidis, 2020).

There are many questions and theories regarding COVID-19. Why did this virus appear, who is involved? Some people think that the virus is not real. There are conspiracy theories against COVID-19 vaccine considering it as a Chinese biological weapon, or saying that the virus was accidentally released by China, or that the virus is part of global capital and population reduction projects (Khan et al., 2020; Miller, 2020; Yılmaz, 2020). These conspiracy theories can lead to harmful consequences for humans (Bavel et al., 2020). Bats are the natural hosts of this disease and some believe that if wild animals are not treated well, humans may be punished by nature (Yang & Wang, 2020). Environmental conditions such as climate, air and nature pollution are linked to this disease and even increase deaths. Although we have been trying to predict what the new world will be after the pandemic, we do not certainly know yet (Frontera et al., 2020; Isphording & Pestel, 2020).

Extensive studies are in progress evaluating the behavior and social response towards COVID-19 in humans. In these studies, issues that can help reduce the impact of the current epidemic such as emotion and risk perceptions, prejudice and discrimination, panic effect, social and cultural contexts, culture and information communication in individuals during the pandemic are discussed (Bavel et al., 2020). Measures taken against the epidemic differ in each country. Culturally individual effects of differences between countries in the number of cases and deaths, information sources, pandemic prevention policies, and many other similar issues should be revealed. At the same time, exposing and understanding social behavior mechanisms regionally can contribute to a better response to outbreaks at the national and local levels (Jarynowski et al., 2020). Individuals' perceptions of diseases that take pandemic-like life out of their normal course and their health behaviors in this process are very important in terms of protecting and improving health. In order to control the epidemic, besides the way individuals perceive the disease in the society, health behaviors such as smoking, sleep, physical activity and nutrition during the epidemic process are among the issues that should be taken into consideration in terms of public health. In this study, it is aimed to reveal the perceptions and behaviors of individuals in Turkish society during the pandemic period by analyzing them.

MATERIALS AND METHODS

Study design, setting, and sampling

This study aimed to examine individual perceptions and behaviors towards the COVID-19 outbreak. It was designed as a descriptive and cross-sectional study. The participants of the study group consisted of individuals residing in different cities of Turkey and over 18 years of age. This study was carried out by reaching only 396 individuals due to pandemic conditions. The data were obtained through the online survey method "*Google Forms*" between 1 April 2020 and 6 April 2020. The online survey link was delivered to the participants through social media channels (WhatsApp, Facebook, Instagram, etc.). The study also complies with the Helsinki Declaration (2013) ethical rules. Participants were included in the study voluntarily and willingly. Before accessing the questionnaire form, the participants were given information about the purpose of the study and were informed that they could refuse to fill in the questionnaire at any time and access the questionnaire if they give their consent.

Data collection and study procedure

In the research, an online questionnaire form was used as the data collection tool. The questionnaire form consists of two parts: demographic information and "COVID-19 Perception and Behavior Questionnaire".

Demographic Information: Demographic information included age, gender, marital status, place of residence, educational status, smoking status, and chronic illness of the individuals participating in the study.

COVID-19 Perception and Behavior Questionnaire: In order to determine the perceptions and behaviors of the participants towards COVID-19, a questionnaire form was created using Cirakoglu's (2011) study and literature knowledge. In this form, there were 31 statements regarding the following: the importance of COVID-19 disease and threat perception, perception of the causes of the emergence of the disease, beliefs about COVID-19, personal protection, and the effects of the disease. The level of agreement with these statements has a likert rating of "1=strongly disagree", "5=strongly agree". In addition, there are 5 questions in order to determine the behavior of individuals to follow the news about smoking, sleep patterns, diet, physical activity and the epidemic during the epidemic. In this study, the Cronbach Alpha value of 31 expressions was found to be 0.75. IBM SPSS version 24 statistical package program was used to analyze the data. The frequency, arithmetic average and standard deviation values of the obtained data are described. The arithmetic mean ranges based on the evaluation of the study results, 1.00-1.80; "strongly disagree", 1.81-2.60; "disagree", 2.61-3.40; "undecided", 3.41-4.20; "agree" and 4.21-5.00; "strongly agree" (Damgacı & Aydın, 2013; Ziemba, 2020).

RESULTS

The average age of 396 individuals participating in the study was 27.14 ± 9.17. 66.2% of the participants were women, 64.6% were single, 71.7% were undergraduate graduates, 32.1% were living at home with four people during the pandemic period, 23.2% were smoking, 61.6% were residing in the city center, 11.9% had a chronic disease and 29.3% had chronic patients who were over 60 years old in their family.

The responses of the participants to the statements in the questionnaire about "*Importance of COVID-19 and Threat Perception*" are presented in Table 1.

Table 1. Importance of COVID-19 and threat perception

Statements	$\bar{X}$	SS
The coronavirus is not as dangerous as it is said.	1.99	1.44
The media is exaggerating the coronavirus outbreak.	1.75	1.07
Healthcare professionals are exaggerating the coronavirus outbreak.	1.30	0.70
COVID-19 is a curable disease.	2.87	1.28
COVID-19 is a deadly disease.	3.83	1.14
COVID-19 can infect anyone.	4.73	0.62
COVID-19 is an easily transmitted disease.	4.69	0.66
COVID-19 affects women and men equally.	3.66	1.28

As shown in Table 1, the statement "*Healthcare professionals are exaggerating the coronavirus outbreak*" ($\bar{x}$ = 1.30 ± 1.44) has the lowest average value, while the expression "*COVID-19 can infect everyone*" is the statement with the highest average value ($\bar{x}$ = 4.73 ± 0.62). When the table is evaluated, the participants think that the coronavirus is dangerous and that the media or healthcare professionals do not exaggerate the epidemic. In addition, the participants responded at the level of agreeing to the statements that this disease is fatal, can be easily transmitted to anyone, and affects people regardless of gender. The statement "*COVID-19 is a curable disease*" has an average at the undecisive level.

The responses of the participants to the statements in the questionnaire regarding "*Perception of the cause of COVID-19 and beliefs toward COVID-19*" are presented in Table 2.

Table 2. Perception of the cause of COVID-19 and beliefs toward COVID-19

Statements	$\bar{X}$	SS
The coronavirus originated from wild animals such as bats that the Chinese ate.	3.47	1.34
The coronavirus was produced as a biological weapon.	2.90	1.36
This epidemic occurred naturally.	2.67	1.35
This pandemic is part of a large coronavirus trial.	2.78	1.29
This disease is a political game of developed countries.	2.82	1.35
The cause of this epidemic is the efforts of some countries to sell drugs and vaccines.	2.67	1.30
These kinds of epidemics are an effort to balance nature.	2.76	1.28
Such epidemics are a punishment given by the Creator against society's departure from religion.	2.87	1.49
This epidemic is a wrath of the Creator against social degradation.	2.93	1.45
The coronavirus is the new world order project of a higher mind in the world.	2.58	1.27
The coronavirus emerged to balance the world population and food sources.	2.48	1.24
The coronavirus emerged to liquidate the elderly who could not adapt to the digital world.	2.15	1.30

When Table 2. is evaluated, the statement "*The coronavirus originated from wild animals such as bats that the Chinese ate*" is the statement with the highest average ($\bar{x}$ = 3.47 ± 1.34) and the participants responded at the level of agree with this statement. On the other hand, the statement "*The coronavirus emerged to liquidate the elderly who could not adapt to the digital world*" has the lowest average ($\bar{x}$ = 2.15 ± 1.30) and reflects the opinion at the level of disagree. Statements about the new world order project and the balance of population-food resources among the beliefs about coronavirus were evaluated with the response at the level of disagree. Other statements have average values at the undecision level.

The responses of the participants to the expressions in the questionnaire regarding "*Personal protection measures from COVID-19*" are presented in Table 3.

Table 3. Personal protection measures from COVID-19

Statements	$\bar{X}$	SS
If I pay attention to my personal hygiene, the coronavirus will not infect me.	3.26	1.20
This disease will not affect me if I do physical activity.	2.43	1.17
If I pay attention to my diet, this disease will not affect me.	2.91	1.23
This disease will not affect me if I wear a mask.	2.32	1.12
This disease will not affect me if I wear gloves.	2.37	1.11
It is sufficient for everyone to wash their hands frequently to stop the epidemic.	2.75	1.19

According to Table 3, the average of the statement "*If I pay attention to my personal hygiene, the coronavirus will not infect me*" ($\bar{x}$ = 3.26 ± 1.20) is the highest, the average of the expression "This disease will not affect me if I wear a mask" ($\bar{x}$ = 2.32 ± 1.12) has the lowest value. The statements about wearing masks, wearing gloves and doing physical activity are at the level of disagree, and the average of the statements about paying attention to nutrition and washing their hands frequently to stop the epidemic is at the level of undecision.

The responses of the participants to the statements in the questionnaire about "*The effects of COVID-19 and the environment*" are presented in Table 4.

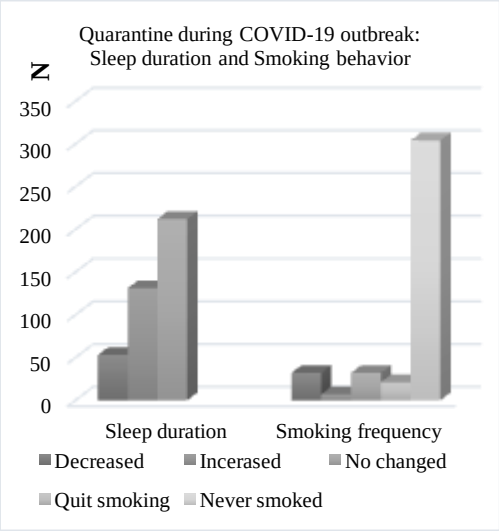
Table 4. Effects of COVID-19 and the environment

Statements	$\bar{X}$	SS
The coronavirus vaccine will prevent the spread of the disease.	3.40	1.18
A more digital world will emerge after this epidemic.	3.13	1.18
The effect of the coronavirus will decrease in the summer months.	3.11	1.13
The coronavirus will have a positive effect on cleaning the polluted nature and the environment.	3.72	1.17
The coronavirus will reduce air pollution.	3.68	1.25

According to Table 4, the average value of the statements "*The coronavirus will have a positive effect on cleaning the polluted nature and the environment*" is ($\bar{x}$ = 3.72 ± 1.17), while the average value of the expression "*The effect of the coronavirus will decrease in the summer months*" was determined as ($\bar{x}$= 3.11 ± 1.13). While the statement about the COVID-19 vaccine had an average close to the level of agree, the participants responded to the statements about the emergence of a more digital world than the epidemic and the decrease in the effects of the epidemic in the summer.

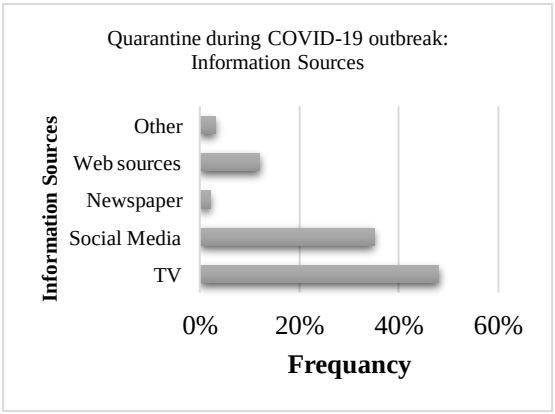
During the COVID-19 pandemic, participants' sleep patterns, smoking, feeding, and physical activity behaviors, as well as their behavior to follow the news about the disease, were shown in figures.

Figure 1. Quarantine during COVID-19 outbreak: Information Sources (N = 396)



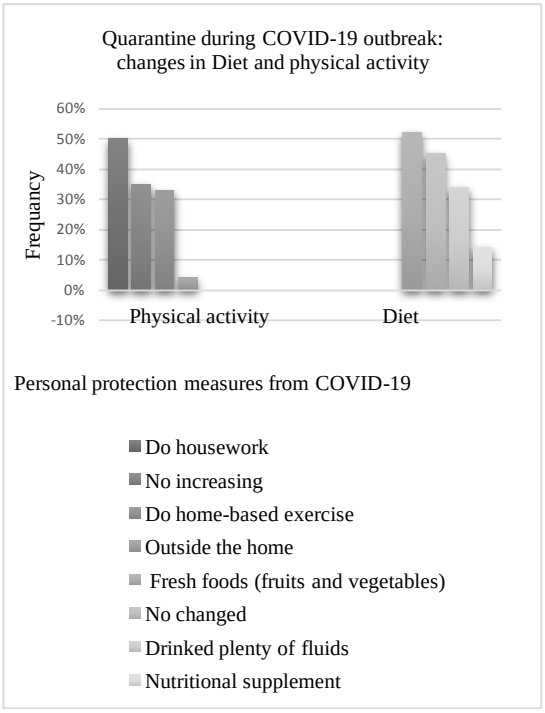
During the pandemic, 34.8% of participants reported reduced smoking, while 34.8% reported no change in the frequency of smoking. Furthermore, 7.6% of the participants stated that they increased smoking and 22.8% gave up smoking during the pandemic period. When the responses were examined, it was determined that 53.5% of the participants had no change in their sleep duration, 33.1% slept more and 13.4% slept less.

Figure 2. Quarantine during COVID-19 outbreak: Information Sources (N = 396)



Of the participants included in the study; 48% stated that they received news and developments about COVID-19 from TV, 35% from social media (Facebook, Instagram, Twitter, etc.), 12% from internet sources other than social media, 2% from newspapers, and 3% from other sources (magazines, etc.).

Figure 3. Quarantine during COVID-19 outbreak: changes in diet and physical activity (multiple options are marked)



During the pandemic period, the nutritional style was examined; 52.3% of the participants (N = 207) were eating more immune-strengthening foods (fruits, vegetables, etc.), 45.2% (N = 179) did not change diet style, 34.3% (N = 136) consumed plenty of fluids, 14.4% (N = 57) used supplements containing vitamins and minerals to strengthen immunity.

When physical activity behavior is examined during the COVID-19 period; 50% of the respondents (N = 198) stated that they did housework (such as cleaning) by paying more attention to physical activity, %33.3 (N = 132) by performing physical activity by doing exercises that can be done at home, 4% (N = 16) preferred to be out of the house to do physical activity, and 35% (N = 138) showed no effort to increase physical activity.

DISCUSSION

The COVID-19 pandemic is a global threat that can have biological, behavioral, emotional, and social impacts. Individual behavior and perception have been very important to control the spread of COVID-19, especially during the beginning of the epidemic. Determining the level of these behaviors and perceptions in people living in different cultures or countries provides valuable information for the protection of public health. In addition, individuals' perceptions and behaviors towards the pandemic can provide insight for the measures to be taken against new epidemics that may occur in the future.

In this study, the participants agreed that the coronavirus is a dangerous disease and that the media and healthcare professionals are not actually exaggerating the epidemic.In addition, participants stated that COVID-19 is a deadly disease, can be easily transmitted to anyone and affects people regardless of gender.The effects of COVID-19 on society began to be evaluated during the initial stages. In studies conducted in Hong Kong, it was determined that there was a high level of risk perception in the society against COVID-19 (Chan et al., 2020; Kwok, Li, Chan, et al., 2020). Individuals stated that they were worried about the COVID-19 outbreak, that the disease could be transmitted to them, that the symptoms caused by the disease were severe and their daily routines were disturbed (Chan et al., 2020; Kwok, Li, Chan, et al., 2020).

In our study, the participants stated that agree with the statement that COVID-19 disease is caused by wild animals such as bats that the Chinese eat. In addition, the participants replied that they do not agree with the statements about the coronavirus emerging for the purpose of liquidation of the elderly, the new world order and the balance of population-food resources. The average value of the other expressions remained at the level of indecision. Coronaviruses closely related to SARS-CoV are typically found in bats (Li et al., 2005). The coronavirus is believed to originate from wild animals in the Huanan market in Wuhan, China. It has been stated in studies that bats, snakes, and pangolins are potential coronavirus carriers (Yang et al., 2020). While bats are likely natural hosts of coronavirus, the specific bat species that serves as the natural host is not yet known. Moreover, bats and their droppings are often used in traditional Chinese Medicine (Wassenaar & Zou, 2020). On the other hand, many people believe that the virus was created in a laboratory or deliberately developed to “reduce the population” as the secret plan of the “new world order” (Imhoff & Lamberty, 2020). Another view is that COVID-19 is produced for the sale of vaccines and is a part of projects such as economic, biological, and psychological warfares or global capital and population reduction (Yılmaz, 2020). There are studies showing high levels of belief in conspiracy theories by society (Patsali et al., 2020). Seeing 5G as the reason for COVID-19 is a conspiracy theory that is especially pitched by social media users and popularized in January (Ahmed et al., 2020). In one study in Greece, 29% of participants believed that COVID-19 was a laboratory product, 25% believed that the spread was a covert action, and 24% believed that it had been developed as a biological weapon (Kaparounaki et al., 2020).

In this study, statements about wearing a mask, wearing gloves and doing physical activity are at the level of disagree; when paying attention to personal hygiene, the average of the statements about not contaminating the disease, paying attention to nutrition and washing their hands frequently to stop the epidemic had the answers at the level of indecision. Given the potential for airborne transmission of the virus, the necessity of wearing a protective mask arises. The indirect spread of the virus from contaminated surfaces is also possible. Frequent handwashing to prevent particles descending onto surfaces is a rational approach to wearing protective gloves, and disinfecting surfaces (Straif-Bourgeois & Robinson, 2020). Therefore, the surgical masks, eye protectors and gloves can be considered personal protective equipment (Balachandar et al., 2020). A study in the Philippines found that 82.2% of the participants washed their hands to prevent disease, 49% wore face masks, and 44.4% used hand sanitizer. Also in the pandemic, 89.9% of the participants were seen to wash their hands more often (Lau et al., 2020).

In this study, the participants think that COVID-19 will contribute positively to air pollution, cleaning the polluted nature and the environment. In addition, while the participants responded with an average close to the level of I agree with the statement about the COVID-19 vaccine, they responded to the statements about the emergence of a more digital world than the epidemic and the reduction of the effects of the epidemic in the summer. In the current case, no vaccine or effective antiviral drug has been found that can be used worldwide to combat the disease. Currently, vaccine production and implementation are said to be on the agenda for the next few years (Anderson et al., 2020). Another issue that is difficult to predict in the early stages of COVID-19 is the environmental changes in the aftermath of the pandemic. On one hand, it is thought that the environment will be more polluted by the interference with nature due to the large consumption of medical material wastes such as disposed masks and gloves, and on the other hand, it is thought that the environment will be less polluted since people are staying at home due to isolation (Saadat et al., 2020). The high level of air pollution in northern Italy also has been assessed as an additional factor to the high mortality rates recorded in that region (Conticini et al.,

2020). The COVID-19 outbreak has changed the air quality in many cities around the world. It has been stated that in many countries such as USA, China, Italy, Spain and the UK, there was a decrease in carbon emissions due to the disruption of industrial activities and transportation systems and the decrease in coal use in factories during the epidemic period. This has led to an increase in the amount of better quality air (Ficetola & Rubolini, 2020; Saadat et al., 2020). In Venice, Italy, it is stated that as the number of tourists decreases, the water-polluting factors decrease and the water channels become cleaner (Saadat et al., 2020).

In our survey, 48% of the respondents reported that they followed the news and developments related to COVID-19 from TV, and 35% from social media (Facebook, Instagram, Twitter, etc.). In a survey conducted in the Philippines, 85.5% of the respondents reported receiving information about COVID-19 from TV, 56.1% from radio, 20.7% from social media (Facebook, Instagram, etc.) (Lau et al., 2020). In another study conducted in Nigeria, the major sources of information on COVID-19 came to the fore as internet/social media (55.7%) and TV (27.5%) (Reuben et al., 2020).

Our research found that during the COVID-19 pandemic, 53.5% of participants had no change in sleep duration and 33.1% slept more. Despite the many negative results of quarantine processes in the pandemic, it was stated that it might have a positive effect on improving sleep quality (Altena et al., 2020). It has also been noted that social isolation provided a window of opportunity for individuals to develop and maintain healthy and quality bedtime habits (Arora & Grey, 2020). A study in Italy reported that individuals spent more time in bed but had lower sleep quality (Cellini et al., 2020). Another study carried out in Italy found that individuals' sleep hours increased, especially during quarantine (Di Renzo et al., 2020).

During the COVID-19 pandemic, 34.8% of the participants reported a decrease in cigarette use, while 34.8% reported a change in the frequency of smoking. In a survey conducted in the Netherlands, 14.1% of the smokers overall reported smoking less due to the COVID-19 pandemic, while 18.9% of the smokers reported smoking more (Bommelé et al., 2020). On the other hand, a study conducted in Italy found that during the pandemic, 3.3% of the smokers quit smoking (Di Renzo et al., 2020). A survey in Poland reported that 40% of smokers did not change their smoking frequency during quarantine, 14.8% were unsure whether their smoking habits were affected and 45.2% smoked more (Sidor & Rzymski, 2020).

During the pandemic, 52.3% of the participants reported that they consumed immunity-enhancing nutrients (fruits, vegetables, etc.), 34.3% consumed plenty of fluids, and 14.4% used vitamin-mineral-containing reinforcing drug-like products to strengthen immunity. While nutrition strengthens the immune system, some vitamins such as Vitamin C, proper and healthy eating can help improve the immune system (Aman & Masood, 2020). In addition, during the pandemic period, it is emphasized that a balanced diet containing high amounts of antioxidants and vitamins is essential for human health. In some cases, taking vitamin and mineral supplements can also help (Mattioli et al., 2020). A study in Italy found that during quarantine, 37.4% of the participants ate more healthy foods (fruits, vegetables, nuts and legumes) (Di Renzo et al., 2020). Another study in the Philippines found that 32.7% of the participants took vitamins and herbal drugs (Lau et al., 2020).

It is noteworthy that in the pandemic, 50% of the participants did household chores (cleaning, etc.) with more interest in physical activity, 33.3% of them increased physical activity by doing the exercises can be done at home. Lack of access to gyms, parks, and a number of other recreational facilities due to quarantine and social isolation measures had a negative impact on individuals' physical activity levels (Arora & Grey, 2020). Home-based exercise practices, especially during the pandemic period, are among the types of physical activity that can be preferred (Peçanha et al., 2020). A study in Chile during the pandemic period found that 51.2% of men and 57.8% of women had reduced levels of physical activity (Reyes-Olavarría et al., 2020). In the outbreak, opportunities to exercise have been limited as most people are isolated in their homes. A study conducted in Wuhan reported that approximately 69.6% of participants had less physical exercise (Fu et al., 2020).

CONCLUSION

In this study, we aimed to demonstrate the perception of COVID-19 pandemic and health behaviors (such as physical activity, nutrition, smoking) of 396 participants living in different cities of Turkey. In our research, the participants stated that COVID-19 is a significant and life-threatening disease, that the virus is caused by wild animals such as bat, and that they did not adequately agree with the conspiracy theories directed at COVID-19. Furthermore, the participants think that environment and nature will be cleaner with the outbreak.

Our findings found that 33.1% of the respondents slept more and 13.4% slept less. During this period, 34.8% of the participants stated that they had reduced their smoking, while 22.8% stated that they had quit smoking. 48% of the participants watched the news and developments about COVID-19 on TV, while 207 participants viewed immunity-enhancing foods (fruits,

vegetables, etc.).) stated that he consumed. 198 participants are housekeepers (cleaning etc.) he was more interested in physical activity.

The COVID-19 outbreak has deeply and differently affected all segments of the society, especially the health. It may be necessary to measure the disease perception of individuals in various time periods while the pandemic continues. Because, since the beginning of the pandemic, people's perceptions about the disease can also determine the measures for the disease, although it varies personally. By measuring perceptions, policy makers can make more accurate decisions in controlling the pandemic.

It is seen that there are changes also in people's health behaviors during the COVID-19 process. In a process where human health is under threat like a pandemic, adopting positive health behaviors has become important. Positive behaviors such as adequate and proper nutrition, physical activity and adequate sleep are necessary to stay healthy. Revealing the health behaviors of individuals during the pandemic process guides the presentation of preventive and health-promoting services. In order to minimize the effects of the pandemic, it is recommended to inform individuals about physical activity, nutrition, sleep and increase awareness.

Limitations

This study had some limitations. It was conducted by reaching only 396 individuals due to pandemic conditions. The data was obtained through the online survey method "Google Forms". The average age of the individuals involved in our research could be described as young. Considering that young people and middle age groups use technological devices more, it can be stated that these groups were more likely to respond to the online survey.

We also tried to present the results through statements because there was no measurement scale that directly measured perceptions, and behaviors towards COVID-19. Our study also had some strengths. The first COVID-19 case in Turkey was reported on 10 March 2020. This investigation was carried out as soon as 20 days after the first case was reported. This is why it was valuable in terms of the perception and behavior of individuals at the beginning stage of the epidemic in Turkey.

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A Research to Determine the Ethical Climate Perception of Nurses Who Work In Private Hospitals

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ABSTRACT

Objective: It's imperative that organizations that want to exist in the business world where competition is intense and that want to ensure should create a positive ethical climate perception. The aim of this study was to determine the level of perceptions of the ethical climate of nurses who work in a private hospital and to determine whether ethical climate perceptions differ according to demographic characteristics.

Methods: This is a descriptive cross-sectional study. The study was conducted between July-September 2018 on 154 nurses working at two private hospitals (in Istanbul and Yalova). Research data were collected from nurses working in these hospitals. In data collection, Information Form and Hospital Ethical Climate Scale were used.

Results: According to findings, it was determined that the ethical climate perception of the participants was generally positive. In dimensions, ethical climate perception was found most positive in patient dimension, while most negative in physicians dimension. At findings, the perception of ethical climate according to the gender of the participants differed statistically in the managers dimension and perception of ethical climate according to working time in hospital differed in patients dimension($p<0.05$). Perception of ethical climate didn't differed significantly with age, educational and marital status of participants ($p>0.05$).
Conclusions: It was determined that the hospital ethical climate perceptions of the nurses in the study were highly positive, and this perception was influenced by gender and the year of work. The sub-dimension, where the ethical climate perception was the most negative, was the physician dimension. It's thought that the results obtained can be a guide in supporting positive ethical behavior.

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INTRODUCTION

Most of the today's enterprises are trying to integrate ethical understanding with all the activities of the organization. For that purpose, the enterprises try to continue their activities in accordance with the laws, regulations and the traditions of the society to which they serve (Ay et al., 2009). Within the last years, the scandals of the organizations and the lapses in corporate ethical behaviors have increased the awareness regarding the importance of the ethical climate (DeConinck, 2011). The progresses in information and communication technologies have enabled the individuals to have quicker access to information, better follow-up of the organizations and increase of the information sharing. This has caused all the shareholders, particularly the customers and the employees, to access to information and to react to the problems within the organizations very quickly. Thus, creating a positive ethical climate perception has become a must for the organizations seeking to exist and ensure sustainability within the business environment where the competition is intense.

The financial problems and pressures in the delivery of the healthcare services have confronted healthcare institutions with business-oriented ethical issues (Silverman, 2000).The creation of a favorable working environment and a positive ethical climate has also become very important for the hospitals in order to ensure high professional performance, increase the quality of the healthcare outcomes and provide sufficient medical care and nursing services to the patients (Shafipour et al., 2016).

Ethical climate is defined as a type of work climate that is best understood as a group of prescriptive climates reflecting the organizational procedures, policies, and practices with moral consequences (Martin and Cullen, 2006). According to a definition from the perspective of health institutions, ethical climate is "the organizational conditions and practices that affect the way difficult patient care problems, with ethical complications, are discussed and decided" (Hart, 2005).The ethical climate of hospitals is typical of the organizational atmosphere comprising of the interpersonal relations among the health care personnel as well as their relationships with patients and their families (Shafipour et al., 2016).

Ethical climate is the shared perception of what is allowed and what is prohibited regarding the moral issues within the organization (Fein et al., 2013). Ethical climates have many functions in the organizations. They help the employees by answering the question "What should I do?" when they encounter an ethical problem. Besides, ethical climates also help the employees by determining the ethical issues in the organization. In other words, ethical climates serve as a perceptive lens by serving the employees to identify and evaluate the issues (Cullen et al., 2003). The establishment of the ethical climate in an organization depends on the demonstration of the appreciation of ethical values by the management of the organization through their general policies and actions. The ethical sensitivity of the management will encourage the lower-level employees to adopt the ethical standards (Bahcecik and Öztürk, 2003).

The perception of ethical climate has either direct or indirect effect on both health sector and various sectors. When analyzed the researches in the literature, ethical climate perception has been found out to be correlated with job satisfaction, organizational commitment (Schwepker, 2001; Nafei, 2015), exhaustion (Çetinet al., 2015), job stress (Sert et al., 2014), turnover intention (Allari, 2016; Shafipour et al., 2016), organizational confidence, individual performance (Büte, 2011), financial performance and customer satisfaction (Moon and Choi, 2014).

The aim of this study was to determine the level of perceptions of the ethical climate of nurses who work in a private hospital and to determine whether ethical climate perceptions differ according to demographic characteristics.

MATERIALS AND METHODS

Study Aim and Design

The aim of this study was to determine the level of perceptions of the ethical climate of nurses who work in a private hospital and to determine whether ethical climate perceptions differ according to demographic characteristics. Results to be obtained are believed to serve as data for the fields of nursing practices and training. This is a descriptive (cross-sectional) study carried out to identify level of perceptions of the ethical climate of nurses.

Sample

The population of the study consists of 240 nurses working at two private hospitals in Turkey between July 2018-September 2018. One of these hospitals operates in Istanbul and other in Yalova. Two different hospitals in these two different cities in the Marmara region were included in the study due to reasons such as the larger population size of the population served and the fact that one of the cities is a metropolitan city. Research data were collected from nurses who work in these hospitals. The study was carried out with 154 nurses (91 from Istanbul and 63

from Yalova) who agreed to participate in the study upon being informed about the study, its aim, content and method.

The data were collected by face to face interviews with individuals and verbal permission was obtained from individuals.

Sample selection criteria of the study:

- Working at the relevant institution as a nurse for at least one year,
- Volunteering to participate in the study.

Study Questions

Q1: What is the demographic characteristics of nurses?

Q2: What is the level of ethical climate perceptions of nurses?

Q3:Is there any relationship between ethical climate perceptions and demographic characteristics of nurses?

Data Collection Tools

In data collection, Information Form and Hospital Ethical Climate Scale were used. The questionnaire used in the research consists of two parts. In the first part, questions are asked to determine the demographic characteristics of the participants. In the second part, there are statements about the determination of ethical climate perceptions of the participants.

Information form: Questioning the introductory characteristics, the form consists of 5 questions aiming to identify the demographic characteristics (age, gender, marital status of nurses), socioeconomic characteristics (level of education), professional characteristics (total duration of work in the profession).

Hospital Ethical Climate Scale (HECS): "Hospital Ethical Climate Survey", which developed by Olson (1998), was used. Turkish validity and reliability study of the scale was performed by Bahcecik and Öztürk (2003).The scale consists of five dimensions and a total of 26 items: Peers (4 items), Patients (4 items), Managers (6 items), Hospital (6 items) and Physicians (6 items). The expressions in the scale are measured by the 5-point Likert scale. The lowest score to be taken from HESC is 26, and the highest score is 130. The increase in the total score obtained from the scale indicates that the perception of the hospital ethical climate has increased positively. Olson (1998) found the scale's Cronbach alpha value of 0.91, while Bahçecik and Öztürk (2003) found it to be 0.89.According to this result, the reliability of the scale was found to be high. In our study, the Cronbach's Alpha value of the scale was found to be 0.75.

Data Analysis

SPSS 18.0 statistical package program was used in the analysis of the obtained data. Descriptive statistics were calculated to determine the distribution of demographic characteristics. Compliance with normal distribution was tested through the Kolmogorov-Smirnov test. The result of the test showed that the data did not come from normal distribution ($p<0.05$). Therefore, Mann Whitney-U test was used to compare two independent groups. The findings were evaluated at 95% confidence interval and 5% significance level.

Ethical Aspect

This study was carried out upon the permissions of the Ethics Committee of Non-Interventional Research (Decision No: 2018-12/6) and of the provincial directorate of health. The "Informed Permission Form for Volunteers", prepared by the researchers to inform the participants, was adopted in the study, in every step of which ethical principles were observed.

RESULTS

Findings Related to Demographic Characteristics of Nurses

Table 1 shows the demographic information of the participants. 123 (79.9%) were female and 31 (20.1%) were male. When the distribution of the participants in the age ranges was examined, 90 participants (58.4%) were in 25 years or younger and 64 participants (41.6%) were in 26 years or older. 103 participants (66.9%) have associate's degree or lower degree and while 51 (33.1%) had bachelor's degree. 79 of total participants (51.3%) were single and 75 (48.7%) were married. Looking at the length of work of the participants in the hospital where the study was conducted, it was determined that 120 participants (77.9%) worked for 5 years or less and 34 participants (22.1%) for 6 years or more.

Table 1. Distribution of Demographic Characteristics (N:154)

Variables	Frequency	Percentage
Gender		
Female	123	79.9
Male	31	20.1
Age		
≤ 25 Years	90	58.4
≥ 26 Years	64	41.6
Educational Status		
Associate's Degree or Lower Degree	103	66.9
Bachelor's Degree	51	33.1
Marital Status		
Single	79	51.3
Married	75	48.7
Work Time in Hospital		
≤ 5 Years	120	77.9
≥ 6 Years	34	22.1

Findings Related to the Hospital Ethical Climate of Nurses

According to Table 2, participants' perception of ethical climate was generally positive (3.57±0.34). In dimensions, ethical climate perception was found most positive in patients dimension (3.94±0.49), while most negative in physicians dimension (3.10±0.55).

Table 2. Hospital Ethical Climate Scale (with subscales) (N:154)

Variable	n	Mean	SD
Peers	154	3.85	0.52
Patients	154	3.94	0.49
Managers	154	3.55	0.62
Hospital	154	3.63	0.48
Physicians	154	3.10	0.55
Perception of Ethical Climate	**154**	**3.57**	**0.34**

Findings Related To Comparison Of Ethical Climate Perception By Sociodemographic Characteristics Of The Nurses

Table 3 shows the comparison of ethical climate perception level according to the demographic characteristics of the participants. According to the table, it was determined that the level of ethical climate perception related to managers dimension was statistically different according to gender ($p<0.05$). This difference is attributed to the fact that female participants' perception of ethical climate is more positive than male participants. The ethical climate perception level was not statistically different in other dimensions ($p>0.05$).

Table 3 presents the comparison of the ethical climate perception level of the participants according to the working time in the hospital. The level of ethical climate perception in the patients dimension differed statistically according to the working time in the hospital ($p<0.05$). This difference was attributed to the fact that the participants working in the hospital for 5 years or less were more positive about the ethical climate perception of the patients than the participants who worked in the hospital for 6 years or more. The ethical climate perception level of the other dimensions was not statistically different according to the working time in the hospital ($p>0.05$).

According to the age, educational status and marital status of the participants, the level of ethical climate perception was not statistically different ($p>0.05$).

Table 3. Comparison Of Ethical Climate Perception By Sociodemographic Characteristics.

DIMENSIONS			Peers		Patients		Managers		Hospital		Physicians	
Variables		**n**	**Mean±SD**	**U/p**	**Mean±SD**	**U/p**	**Mean±SD**	**U/p**	**Mean±SD**	**U/p**	**Mean±SD**	**U/p**
Gender	Female	123	3.87±0.54	1,723 0.40	3.91±0.51	1,528 0.08	3.62±0,64	**1,437 0.03***	3.64±0.51	1,705 0.36	3.13±0.59	1,7330 .43
	Male	31	3.78±0.45		4.06±0,38		3.29±0,48		3.57±0.34		2.99±0.30	
Age	≤ 25 Years	90	3.85±0.54	2,878 1.00	3.97±0.50	2,742 0.61	3.57±0.67	2,878 0.99	3.61±0.50	2,8600 .94	3.07±0.61	2,5410 .21
	≥ 26 Years	64	3.86±0.50		3.91±0.47		3.53±0.56		3.65±0.45		3.15±0.46	
Educational Status	Associate's Degree or Lower	103	3.88±0.52	2,388 0.35	3.94±0.49	2,539 0.73	3.53±0.58	2,595 0.90	3.63±0.47	2,4870 .59	3.06±0.49	2,3150 .23
	Bachelor's Degree	51	3.80±0.52		3.96±0.49		3.59±0.71		3.62±0.49		3.18±0.65	
Marital Status	Single	79	3.86±0.49	2,855 0.69	3.99±0.53	2,618 0.21	3.61±0.67	2,745 0.43	3.61±0.51	2,9600 .99	3.08±0.59	2,8620 .72
	Married	75	3.84±0.56		3.90±0.44		3.49±0.56		3.64±0.44		3.12±0.51	
Work Time in Hospital	≤ 5 Years	120	3.87±0.51	1,843 0.38	3.99±0.50	**1,585 0.04***	3.55±0.62	1,961 0.73	3.60±0.46	1,778 0.25	3.07±0.55	1,769 0.23
	≥ 6 Years	34	3.79±0.55		3.79±0.42		3.56±0.65		3.73±0.53		3.21±0.53	

(p<0,05)*

DISCUSSION

According to the research findings, it was determined that the ethical climate perception of the participants was generally positive. In dimensions, ethical climate perception was found most positive in patients dimension, while most negative in physicians dimension (Table 2). According to the findings of similar studies in the literature, it is determined that ethical climate perception is generally positive, ethical climate perception is positive for patients dimension, and ethical climate perception was the most negative in physician dimension (Ghorbaniet al., 2014; Shafipour et al., 2016). Ethical climate perception is related to many factors such as job satisfaction, productivity, organizational commitment, burnout, work stress and organizational success (Thakre and Shroff, 2016; Lee al., 2018).

In this study, the ethical climate perception was statistically different in the managers dimension by gender of participants. However, he ethical climate perception level in other dimensions did not differ statistically with participants' gender (Table 3). In the study of Shafipour et al. (2016), ethical climate perception did not show a statistical difference by gender. Similarly, in the study conducted by Ekinci (2017), faculty members' perceptions of ethical climate do not differ significantly according to gender and academic title. When the findings of the research were examined in general, the ethical climate perception of the female participants was more positive than the male participants. Similarly, ethical climate perception of the female participants is more positive than the male participants in study of Karagözoğlu et al. (2014). In addition, in a study conducted by Karakuş (2018), it was determined that teachers' commitment levels were more strongly influenced by ethical leadership behaviors than men. In the study, it was thought that the positive dimension of the ethical climate perception of female participants compared to men might be due to the effect of gender on values, working life and behavior styles.

In this study, level of ethical climate perception did not differ statistically with the age of the participants (Table 3). The results of similar studies in the literature also support this finding (Karagözoğlu et al., 2014; Aydın Tükeltürk et al., 2015; Türe Yılmaz and Yıldırım, 2019). According to the findings of this study, it was determined that the level of ethical climate perception did not differ by educational status of the participants (Table 3). The results of Bahcecik and Öztürk (2003) are similar to the findings of this research. The level of ethical climate perception was not statistically different according to the marital status of the participants (Table 3). The results of similar studies in the literature also support this finding (Karagözoğlu et al., 2014; Shafipour et al., 2016).In this study, ethical climate perception of the participants according to working time in hospital was significantly different in patient dimension; however there was no significant different for other dimensions (Table 3). Korkmazer et al. (2020), in the study in which nurses investigated the effect of their perceptions of hospital ethical climate on their

performance, stated that the hospital ethical climate perception score was the highest among those who had a working period of 0-1 years in the profession and that there was a significant difference between the groups. It was thought that this result may be due to the fact that, as the professional experience of nurses increased, the patients took more responsibility for care, more respect for patient requests and increased problem solving skills. According to the results of similar studies in the literature, the perception of ethical climate did not differ according to the duration of the study in the hospital (Bahcecik and Öztürk, 2003; Aydın Tükeltürk et al., 2015).

CONCLUSION

As a result of this study, it was concluded that the ethical climate perception of the participants was generally positive. Considering the effects of ethical climate perception on employees, institutions and society, it is of great importance that the perception of ethical climate is positive. In order to have a positive perception of ethical climate, all professionals should be trained on ethical issues during their vocational education; institutions should support the ethical atmosphere, take measures to prevent unethical attitudes and behaviors and to implement sanctions on violations of ethical issues. Although this study has not been conducted with a large number of participants, it is important to reveal level of ethical climate perception in nurses working in private hospitals and whether ethical climate perception level differs according to demographic characteristics.

Limitations: The data obtained from the research is based on the self-reports of nurses participating in the study. Therefore, the research findings cannot be generalized.

Conflict of Interest: The authors declare that they have no conflict of interest.

Ethical Approval: This study was carried out upon the permissions of the Ethics Committee of Non-Interventional Research (Decision No: 2018-12/6).

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Risk Assessment in Uşak University Laboratories

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ABSTRACT

Laboratories are working areas that enter the dangerous workplace class and contain many risks. These risks can be listed as chemical, biological, physical and ergonomic. Chemistry laboratories, especially in the universities, are the areas where many students and academicians carry out their experimental studies. Although academics are more conscious and cautious about the possible risks, it is not possible to make the same assumption for students. Therefore, especially the risk assessment of university laboratories is very important.

In this study, risk analysis was done in Uşak University chemistry laboratories. The L-type matrix (decision-making matrix) has been used because it can be assessed quickly by a single researcher based on different severity levels. As a result of the examinations and observations made, the possible and potential risks that may arise from these dangers were tried to be determined independently in four chemistry laboratories. In the risk analysis prepared, 48 risks were determined for four laboratories and the risks and their severities were determined and the risks were graded. When the risks are grouped according to their grades, 12 high-grade risks, 30 medium-grade risks and 6 low-grade risks were identified, and these risks and preventive measures were presented in the study.

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INTRODUCTION

Occupational health and safety is the performed studies in order to eliminate or reduce the effects of the situations that the employees encounter in the workplace and affect their health negatively and to improve the existing health and safety conditions. In the occupational health and safety approach, the basic steps of risk analysis are the identification of the dangers that exist or may have the potential to occur in the work environment, the determination of the risks that may arise from these dangers, the grading of risks and the determination of precautions. All these studies are based on protecting the health of the employee and are carried out to ensure that he or she is in a healthy and safe working environment (Occupational Health and Safety Law No. 6331, 2012, Occupational Health and Safety Risk Assessment Regulation, 2012).

Laboratories are defined as "places where experimental studies, tests, analysis and observations are made using various tools and devices within a field of science or working area" (Laboratory Services Module, 2015). Due to the activities carried out in the laboratories, it is classified as hazardous workplaces with the NACE code 72.119.01 (Notification on Workplace Hazard Classes Regarding Occupational Health and Safety, 2012). Laboratory studies are enable students to develop research and problem solving skills. In addition to these, it is known that it contributes to students' use of their hands and communication skills. On the other hand, awareness of the negativities and dangers that may occur during these studies is provided by laboratory safety studies (Hafstein & Lunetta, 2004). The whole studies conducted to determine the dangerous situations that may occur for students and teachers during laboratory studies, to take precautions and to provide a regular laboratory environment is called laboratory safety (Aydoğdu & Şener, 2016). Academic stuff and students gain detailed information and experience about the dangers and structures of the substances they synthesis or work with during their education and professional life. Working in a safe condition is part of the job and it is as important as learning new information and techniques. During the education of students, the following skills should be given importance (Canel, 2002);

- Working safely without creating danger with chemical substances.

- To protect himself and his colleagues from dangers.

- To be responsive and sensitive to environmental pollution.

In the chemistry laboratory, the dangers affecting human health can be classified under 5 sub-headings. These are (Karabulut, 2016);

Chemical risks: Chemicals are the source of most of the hazards in laboratories. Toxic gases and vapors, chemicals released from containers by spillage or splashing could be caused poisoning, respiratory problems, allergies and even cancer. Acid or bases exposed by contact or inhalation may also cause irritation of the skin, eyes or trachea.

Biological hazards: Chemical agents, viruses, bacteria, fungi and parasites commonly found in chemistry laboratories can cause various diseases.

Risks arising from explosive substances: Situations that cause explosion or fire are experiments performed in closed systems, studies with high-pressure gases, experiments carried out in vacuum environments and autoclaves.

General hazards: Tripping or slipping due to improper floor, cuts and injuries due to broken glass materials, hair or clothing stuck to the centrifuge or mixers, vibration and noise caused by the centrifuge or mixers in the laboratory can be listed under the heading of general hazards.

Ergonomic hazards: prolonged standing or bending, repetitive movements such as continuous pipetting, ergonomically unsuitable stools or chairs negatively affect the musculoskeletal system.

Accidents that may occur in the laboratory can cause serious damage due to their location in the university (proximity to classrooms and corridors). Most of the accidents that happen in these areas are caused by human mistakes. Human mistakes are meant by lack of knowledge and attention. Another factor that disrupts safe working is wrong habits. Individuals who work carefully early in their professional life may tend to follow safe working rules less as they gain experience. Some examples of accidents occurring in laboratories can be listed as follows (Canel, 2002);

- 0.5 ml cyclohexanone and 30% hydrogen peroxide mixed in a glass tube to obtain cyclohexanone peroxide. As a result of its heating, it reacted and the tube was shattered and caused facial and hand injuries. Eyes are not damaged due to the protective glasses. Therefore, caution should be taken during experiments with glass tubes.

-After drying the silver perchlorate formed as a result of the reaction in the desiccator, an explosion occurred while discharging with a spatula and resulted in death and resulted in death while discharging with a spatula. The properties of the chemicals used should be well known.

- Contrary to the laboratory rules, vaporized hydrogen cyanide caused the student's death as a result of one student pouring waste material containing

cyanide into the sink, and then another student pouring hydrochloric acid into the same sink. Care should be taken while removing waste materials from the laboratory environment.

- Chemicals with easy combustion properties were placed in the household refrigerator and the steam leaking from the containers mixed with the air in the refrigerator and explosive atmosphere occurred. The refrigerator thermostat, which opened automatically, was a source of ignition and caused an explosion. It should be noted that an ignition source may occur anywhere in the working environment.

Due to all these risk factors, Uşak University Laboratories were chosen as a field of study and examined in terms of Occupational Health and Safety. Risk analysis was performed using 5x5 L type matrix method for 4 selected laboratories and recommendations were made to reduce the risk levels as a result of the analysis.

MATERIALS AND METHODS

The L-type matrix is a quantitative research method in which cause-effect relationships are evaluated. This method is the most preferred risk analysis method in the occupational health and safety sector since it is simple and can be performed by one person. This method is the technique in which the probability of an event and its effect after it is realized is analyzed as a binary variable. The risk score is obtained by multiplying the probability and degree of severity and written in its place in the table. The values between 1-5 are given for probability and severity values (Table1 and Table2). The risk score is obtained by multiplying the probability and severity values. If the risk score is less than 8, this risk is at an acceptable risk level. If the risk score is equal to 8 and less than 15, it is at medium risk. If the risk score is equal to 15 and less than 20, it is at a high risk level, and finally if the risk score is greater than 20, it is at an unacceptable risk level. If the risk is at the highest level, the study is stopped and cannot be started without taking precautions (Özkılıç, 2005; Selçuk & Selim, 2018).

Risk Score = Probability x Intensity

Table 1. 5x5 L-Type Matrix method intensity assessment table (Özkılıç, 2005)

Level	Intensity	Score
Insignificant	No Loss Of Working Hours – First Aid Only	**1**
Minor	No loss of working days – First Aid or medical treatment	**2**
Moderate	Accident with working day loss - minor injury	**3**
Major	Limb Loss, Severe Injury - Long-Term Treatment	**4**
Catastrophic	Death, Environmental Disaster	**5**

Table 2. 5x5 L-Type Matrix method probability assessment table (Özkılıç, 2005)

Level	Probability	Score
Very low	Rare (Once a year)	**1**
Low	Unlikely (Several Times a Year)	**2**
Medium	Possible (Once a month)	**3**
High	Likely (Once a week)	**4**
Very high	Almost certain (Everyday)	**5**

Table 3. 5x5 L-Type Matrix method risk assessment table (Özkılıç, 2005)

Level/ Intensity	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
Very low 1	NEGLIGIBLE 1	LOW 2	LOW 3	LOW 4	LOW 5
Low 2	LOW 2	LOW 4	LOW 6	MEDIUM 8	MEDIUM 10
Medium 3	LOW 3	LOW 6	MEDIUM 9	MEDIUM 12	HIGH 15
High 4	LOW 4	MEDIUM 8	MEDIUM 12	HIGH 16	HIGH 20
Very high 5	LOW 5	MEDIUM 10	HIGH 15	HIGH 20	EXTREME (Unacceptable) 25

Explanations of the risk scores are given below;

1 Point: Considered as unimportant. They are acceptable risks that do not matter much.

2-6 Points: Considered as bearable. It is a tolerable risk group that requires attention in the long period of time. However, existing controls should be maintained and it should be checked.

8-12 Points: Considered as intermediate level. These are the risks that are important and need to be taken precautions in the short term. Actions should be initiated to reduce the identified risks.

15-20 Points: Considered as important. It is an extremely important risk group that requires immediate action.

25 Points: Considered Unbearable. It is a risk group in which starting work is not accepted without taking any precautions.

RESULTS

The risk analysis data obtained by examining the chemistry laboratories of Uşak University are given in Table 4. Although the four laboratories studied are different from each other, four separate risk analysis tables prepared for this study are presented as a whole in a single table because of many common risks. The hazards and risks obtained by examinations and observations are evaluated taking into account in similar studies and the precautions to be taken are given in this Table.

Table 4. Table of Risk Assessment

Score	Unit	Hazard	Hazard Source	Risk	Exposure/ Affected	Assessment Of Risk				Precautions To Be Taken To Maintain An Acceptable Level	Photos
						P	I	Risk Score			
						Probability (1-5)	Intensity (1-5)	Risk = P X I	Importance Level		
1	All Lab.	Fire	Absence of fire extinguishers	Early intervention may be delayed in the event of a possible fire hazard.	Academic stuff and students	4	5	20	High	Fire extinguishers should be placed in the interior of the laboratory and plates indicating the locations of these tubes should be hung.	
2	All Lab.	Electricity	Lack of insulating mats suitable for current in front of electrical panels.	Risk of getting caught in electric current, electric shock, injury and death from electrical leakage.	Academic stuff and students	4	5	20	High	An insulating mat should be placed in front of the electrical panels.	
3	All Lab.	Electricity	The front of the panel is not empty.	Electric shock, fire, delay of early intervention.	Academic stuff and students	4	5	20	High	The front of the electrical panels in the laboratory should not be filled with any material up to the ceiling. Extension part of the bench under the Electrical Panel should be removed and an insulating mat should be placed on the floor.	
4	All Lab.	Irregularity of crossing paths	Scattered leaving of stools in the lab in the transitions between benches.	It can cause tripping and falls during transpassing.	Academic stuff and students	3	2	9	Medium	After the lessons in the laboratory, excess stools can be collected in an empty corner. Thus, unnecessary space is not taken.	
5	All Lab.	Lack of local ventilation system	Lack of local ventilation to immediately remove poisonous and toxic gases from the interaction of chemicals used.	Respiratory irritation, poisoning.	Academic stuff and students	3	3	9	Medium	A local ventilation system should be installed in the appropriate part of the laboratory.	

6	**All Lab.**	Difficulty accessing to the eye shower	Positioning the eye shower on the wall part of the counter and leaving other tools in front of it	Eye irritation, eye loss.	Academic stuff and students	**2**	**3**	**6**	**Low**	Eye shower access should be placed in an easier spot and no other items should be placed in front of it.	
7	**All Lab.**	Failure to provide adequate ventilation	Inhalation of dust and odors from chemicals used in the laboratory.	In case of inhalation of the dusts in the laboratory and odors from the chemicals used, various health problems may occur.	Academic stuff and students	**3**	**3**	**9**	**Medium**	It is important to remove harmful dust and chemicals from the laboratory by regularly venting the working area at regular intervals.	
8	**All Lab.**	Absence of MSDS charts of chemicals	Accidents may happen as a result of students taking the course not knowing the necessary information about the used chemicals	Unconscious use, injuries	Academic stuff and students	**3**	**4**	**12**	**Medium**	MSDS charts are forms prepared for information purposes for each chemical. Documents include not only the nature of the chemicals, but also the methods of disposal in the event of an accident or the hazards that may arise when mixed with other chemicals. MSDS charts of the chemicals used must be requested by the supplier company and kept in the laboratory.	
9	**All Lab.**	Flooding	Lack of water drain under the body shower for use as a result of chemical exposure	Falls and injuries due to slippery ground	Academic stuff and students	**2**	**3**	**6**	**Low**	A drain should be made for the water that will flow under the body shower.	
10	**All Lab.**	Chemical disposal	Lack of drain for the water to be used during the removal of any chemicals that may spill on the laboratory floor.	Chemical residue in the laboratory and slippery ground	Academic stuff and students	**3**	**3**	**9**	**Medium**	A drain should be put to the appropriate area for cleaning the laboratory floor.	
11	**All Lab.**	Waste disposal	Lack of different garbage for waste that may come out during laboratory experiments	Injury during waste removal	Cleaning staff	**3**	**3**	**9**	**Medium**	Different bins should be placed for laboratory and domestic wastes, broken glass and chemicals.	
12	**All Lab.**	Chemical mixtures	Chemical mixture preparation	Chemicals contact with eyes, inhalation, ingestion, and skin irritation	Academic stuff and students	**3**	**3**	**9**	**Medium**	Warning signs about the use of personal protective equipment should be posted on the walls of the laboratory and could be seen from every angle. Spare personal protective equipment should be kept in the laboratory in case you forget it while coming to the laboratory.	

13	**All Lab.**	Chemical solutions	Chemical mixture preparation	Inhaling harmful gases while preparing chemical solutions	Academic stuff and students	**4**	**3**	**12**	**Medium**	For convenient preparation of solutions, local ventilation should be placed in the appropriate part of the laboratory. Mixtures and solutions should be prepared in this section. Masks, glasses and gloves should be used when working with chemicals.	
14	**All Lab.**	Fire	Absence of fire detectors	Property damage, injury, death.	Academic stuff and students	**4**	**5**	**20**	**High**	Fire detectors should be installed inside the laboratory. Smoke detectors play an important role in early detection of fire.	
15	**All Lab.**	First aid supplies	Expiry date of the materials in the first aid cabinet, inability to intervene in case of any injury or improper handling with expired materials	Infection risk	Academic stuff and students	**3**	**4**	**12**	**Medium**	The materials in the first aid cabinet should be renewed and checked at regular intervals to prevent such a situation again.	
16	**All Lab.**	Bench disorder	Unused equipment and items left on the benches	It may cause minor injuries while working on the bench.	Academic stuff and students	**4**	**1**	**4**	**Low**	Laboratory devices and items should be put into cabinets after their use, and bench tops should be left empty whenever possible.	
17	**I.F.A.L.**	Cables	The extension cable attached to the refrigerators is stuck between the refrigerator and the wall.	It may cause electrical leakage due to the wear and tear of the cable.	Academic stuff and students	**3**	**4**	**12**	**Medium**	More distance should be kept between the wall and the cabinet to prevent the cable from getting stuck. More devices should not be connected to extension cables at the same time.	
18	**I.F.A.L.**	Irregular stacking	Mixed and irregular stacking of chemicals and samples placed in the refrigerator	When a chemical is asked to be taken from the refrigerator, it can cause spill and break to the unstable samples and chemicals stored in glass containers.	Academic stuff and students	**5**	**2**	**10**	**Medium**	Shelves inside refrigerators should be shared by academic stuff. By this way, confusion and accidents are prevented.	
19	**I.F.A.L.**	Waste disposal	Leaving bottles on the hose ends to accumulate waste from the laboratory equipment	It can cause snagging while walking and waste spills by breaking bottles.	Academic stuff and students	**4**	**2**	**8**	**Medium**	It should be ensured that the waste discharge is drilled into the bench, not into the bottle located on the ground, and the hoses pass through these holes and are transferred to the bottles located on the benches.	
20	**I.F.A.L.**	Using a display device	Looking at the computer screen for a long time	Eye disorders	Academic stuff and students	**3**	**3**	**9**	**Medium**	Regular eye examinations should be performed.	

21	**I.F.A.L.**	Using a display device	Because computers are located on experimented high benches, they create ergonomic problems caused by posture disorders.	The occurrence of physical health problems.	Academic stuff and students	**4**	**3**	**12**	**Medium**	A separate desk for computers and chairs suitable for ergonomic sitting should be provided.	
22	**I.F.A.L.**	Chemical exposure	Chemical bottles found on the experimental devices are poured into computers located on the same counter as the devices.	Electric shock	Academic stuff and students	**2**	**4**	**8**	**Medium**	For computers, there must be separate work desks from the counters where the devices are located.	
23	**I.F.A.L. - F.T.L.**	Electric	Contact of water that may leak from the geyser with an electrical switch nearby.	Electric shock	Academic stuff and students	**4**	**4**	**16**	**High**	The geyser should be moved to a another place that will not cause a risk.	
24	**I.F.A.L.**	Lack of warning signs	Absence of warning signs for P.P.E. which used in the laboratory.	Accidental injuries	Academic stuff and students	**3**	**3**	**9**	**Medium**	For each P.P.E., warning signs should be hung so that they can be seen from all over the laboratory.	
25	**I.F.A.L.**	Electrical cables	Devices and computers ' cables are left unevenly behind the counter.	Electric shock, injury	Academic stuff and students	**3**	**3**	**9**	**Medium**	Electrical cables must be enclosed in a protective cable box. .	
26	**I.F.A.L.**	P.P.E.	Leaving personal protection P.P.E. indiscriminately in the lab.	Accident, injury	Academic stuff and students	**3**	**3**	**9**	**Medium**	Personal protective equipment that is not properly maintained may pose a risk in itself because it loses its protection. For this reason, PPE should be stored properly and care should be taken to clean it.	
27	**I.F.A.L.**	Pipette	Use of pipettes by mouth.	Chemical ingestion, poisoning	Academic stuff and students	**3**	**4**	**12**	**Medium**	Pipette by mouth should not be used. Puar should be used.	
28	**I.F.A.L.**	Injectors	Leaving injectors on the table.	Injury	Academic stuff and students	**3**	**2**	**6**	**Low**	Injectors should not be reused. For those used, waste bins where cutting tools are collected should be kept and collected in it. In this way, it prevents cleaning workers from getting injured while collecting garbage.	

29	**I.F.A.L. - F.T.L.**	Broken glass materials	Continued use of broken materials.	Injury	Academic stuff and students	**3**	**3**	**9**	**Medium**	Broken glass materials should not be used. It must be removed from the laboratory environment so that it does not cause injuries.	
30	**I.F.A.L.**	Mislabeling of chemicals	Changing the inscription on the methanol bottle by not methanol.	Accident, injury	Academic stuff and students	**3**	**4**	**12**	**Medium**	Bottles of chemicals should not be used for each other. Labels with specific warning signs for each chemical should be affixed, and care should be taken not to stick hand-written paper to bottles. Improper use of chemicals can lead to confusion and accidents..	
31	**F.B.L.**	Unlabeled experimental studies.	Lack of labels on the date of preparation of their solutions and what their content is.	Chemical exposure	Academic stuff and students	**3**	**2**	**6**	**Low**	Yapılan çalışmalar sonrasında ürünlerin üzerlerine ne zaman üretildiği ve içeriğinde ne olduğunu belirten etiketler yapıştırılmalıdır.	
32	**F.B.L. - F.M.L. - F.T.L.**	Dropping material from shelves	The shelves are narrow and there is no elevation at the ends to prevent materials from falling.	Chemical exposure, injury	Academic stuff and students	**4**	**2**	**8**	**Medium**	Elevations should be made to prevent materials from falling on the edges of the shelf.	
33	**F.B.L.**	Putting laboratory devices on the ground	Placing unused devices on the laboratory floor.	Falling, injury, property damage	Academic stuff and students	**3**	**3**	**9**	**Medium**	To protect both devices and students, devices should be stored inside cabinets that are safer than on the ground.	
34	**F.B.L. - F.M.L.**	Fume cupboard	Open the cover of the fume cupboard.	Vapor or dust to the eye due to vacuum.	Academic stuff and students	**3**	**3**	**9**	**Medium**	The cover of the fume cupboard should be opened carefully. Before opening, glasses should be worn and warning signs should be hung near the device for these hazards.	
35	**F.B.L. - F.M.L. - F.T.L.**	Hot material	Hot materials removed from the study oven.	Burning	Academic stuff and students	**4**	**3**	**12**	**Medium**	Heat resistant gloves should be used. Instructions for use in ovens heat-related warning signs or signs should be hung.	
36	**F.B.L. - F.M.L.**	Possibility of material drop	Irregular and overlapping of the materials contained in the dish.	Injury	Academic stuff and students	**3**	**2**	**6**	**Low**	No more material should be placed in the dish than it can take. Overlapping materials can slip and fall, causing injuries.	

37	**F.B.L.**	Heavy Metals	Heavy metal waste box on the counter	Chemical exposure, injury	Academic stuff and students	**3**	**3**	**9**	**Medium**	Chemical waste should be disposed of in separate waste bins that should be present in the laboratory. It should not be kept on counter tops. Empty bottles of chemicals should also not be left on the floor at the edges of the door..	
38	**F.M.L - F.T.L.**	LPG tubesi	Gas leak	Explosion, fire, injury	Academic stuff and students	**3**	**5**	**15**	**High**	The laboratory should not be abandoned without checking that the gas cylinders are closed or not. A gas alarm must be in tle labs. An excessive number of LPG tubes should not be kept. Appropriate instructions should be found where the gas cylinders are located..	
39	**F.M.L**	Gas burner	Burning of materials on the bench.	Fire, injury	Academic stuff and students	**3**	**5**	**15**	**High**	Gas burner must be placed that do not have shelves on top. Instructions for the use of gas burner should be hung in the appropriate places where they can be seen.	
40	**F.M.L - F.T.L.**	P.P.E.	Leaving P.P.E. irregular in the working environment.	Accident , injury	Academic stuff and students	**3**	**3**	**9**	**Medium**	Personal protective equipment that is not properly maintained may pose a risk in itself because it loses its protection. For this reason, P.P.E. should be stored properly and care should be taken to clean it.	
41	**F.M.L**	Collapse on the ground	A collapse on the lab floor.	Fall, injury	Academic stuff and students	**3**	**3**	**9**	**Medium**	During the transport of chemicals, it is important that the passage paths are empty and the floor is regular, smooth. Floor collapse should be repaired as soon as possible.	
42	**F.M.L**	Gas leak	A warning is written on the expectation that there is a gas leak.	Explosion, flare	Academic stuff and students	**3**	**5**	**15**	**High**	Broken gas burner must be removed from laboratory benches to avoid use.	
43	**F.T.L.**	Chemicals	An irregular presence of chemicals on the bench.	Chemical exposure, injury	Academic stuff and students	**3**	**3**	**9**	**Medium**	Chemicals should be stored on separate shelves in cabinets with ventilation in accordance with their chemical structure. It should not be left in a laboratory environment after the labstudy is finished.	

44	**F.T.L.**	Failure to see warning signs	The signs are not visible due to the presence of a blackboard in front of the warning signs that hang against Laboratory hazards.	Injury	Academic stuff and students	**3**	**3**	**9**	**Medium**	Because the writing board is wheeled, it can be easily moved to another location. The blackboard should be taken somewhere else that will not block the boards.	
45	**F.T.L.**	Laboratory hygiene	Dirty lab floor.	Chemical exposure, injury, falling	Academic stuff and students	**3**	**3**	**9**	**Medium**	Laboratories should be cleaned regularly.	
46	**F.T.L.**	Rusty nail	Finding rusty nails under a deionized water device.	Tetanus, stinging, injury	Academic stuff and students	**3**	**4**	**12**	**Medium**	Rusty nails should be removed from the laboratory.	

ABBREVIATIONS:
I.F.A.L.: Instrumental Food Analysis Laboratory
F.B.L.: Food Biotechnology Laboratory
F.M.L.: Food Microbiology Laboratory
F.T.L.: Food Technologies Laboratory
P.P.E.: Personal Protective Equipment
MSDS: Material Safety Data Sheet

RESULTS AND SUGGESTİONS

In this study, 5x5 L type matrix method was used for the determination of hazards in the environment and the risks that may arise from these dangers in a public university Chemistry Laboratories. However, in order to reduce each identified risk to an acceptable level, measures that can be taken in accordance with the legislation have been recommended.

As a result;

A total of 48 risks were identified, including 12 high-level risks, 30 medium-level risks and 6 low (acceptable) levels of risks. Among these identified risks, serious problems such as especially deficiencies in emergency management, lack of waste management, keeping chemicals in inappropriate conditions and non-compliance with electrical panels, lack of material safety data sheets are highlighted. In this article, some recommendations have been made to eliminate these deficiencies and for creating a healthy and safe laboratory environment. These advise are listed below for the Chemistry Laboratories (Özkılıç, 2005; Kürkçü ve ark., 2011; Laboratuvar Güvenlik Kılavuzu; Ersoy ve Kaya, 2019).

- A laboratory safety policy should be generated and laboratory responsible persons should be identified and authorized for security issues within the framework of this policy. Also, a laboratory hygiene plan should also be created and checked whether it is being implemented.

- The chemicals should be stored and labeled under different appropriate physical conditions depending on their type. For each chemicals, MSDS must be supplied for and placed within the reach of everyone.

- Waste management procedures should be created, and everyone who can be in the laboratory should be informed about these rules. The waste from each laboratory should not be confused with each other when being removed from the environment. Chemical waste should not be dumped in the sink.

- Personal protective equipment should be dressed from the moment of entry into the laboratory, not only when working. Attention should be paid to the cleanliness of personal protective equipment.

- Urgent action plans should be prepared and everyone, including students, should be informed about these plans.

- In the laboratory enough fire extinguishing tubes should be kept and position in accordance with the legislation.

- For each equipment in the laboratory, instructions must be written and hung in visible places.

- Emergency and eye showers should be located in easy-to-access areas and periodic control should be made.

-Since most of the chemicals are toxic, flammable, corrosive and reactive, the more they are stored, the higher the risk they will have. Therefore, care should be taken to ensure that they are stored at the minimum required level.

- Laboratory assistants should be educated on subjects such as what materials are in the medicine cabinet, how to intervene in simple injuries and how to use fire extinguishers.

- Since laboratories are the environments where serious studies take place, jokes etc. that will disrupt the order and cause danger movements should be avoided.

- Laboratory materials should not be taken out of the laboratory in any way, and materials such as food and beverages should not be brought into the laboratory environment.

- An apron must be worn during laboratory studies, and open shoes should not be worn against the danger of spilling chemicals.

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A Survey of Knowledge and Practices in Generic Prescribing Among Doctors in Kurunegala District, Sri Lanka

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ABSTRACT

Generic prescribing is promoted by most governments and insurers as a measure of reducing health care cost. Doctors are key player's health care provision and powerful deciders in drug market. The practice of doctors in prescribing is critical in determining both clinical and economic efficiency and effectiveness of a health system. The study aimed to assess the doctors' knowledge and practices in generic prescribing. The study was questionnaire based and conducted in Kurunegala district in Sri Lanka with the participation of government doctors. It was revealed that most doctors were engaged in generic prescribing and they had a satisfactory knowledge regarding the concept. Practice of generic prescribing among doctors was not significantly associated with their work experience, gender, engagement in private practice or post graduate qualifications. It was depicted that the promotional visits by representatives of pharmaceutical companies mainly focused at doctors who did part time private practice. Yet it was claimed that most doctors did not consider brand name when purchasing drugs for their practices.

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INTRODUCTION

State health sector is the key provider in health care in Sri Lanka through which health services are provided free at the point of delivery. In addition, private sector provides care charging user fees. Doctors employed in the state health sector are allowed to carry out private practice after hospital duty hours (De Silva, 2017).

Drugs are a vital and expensive component in provision of healthcare. Ensuring an adequate supply of safe and effective drugs of acceptable quality is a priority in a country's health system. Rational prescribing is certainly a primary and essential step in ensuring rational use of drugs. Inappropriate prescribing is potentially harmful for both the individual and society (Carthy et al., 2000). Over the years, pharmaceutical expenditure has risen globally which has been a reason for concerns among policymakers to consider measures to guarantee the sustainability of health care systems. Awareness of factors influencing physician behavior in prescribing could be useful in policy development and thereby ensuring clinical and economic effectiveness and efficiency (Theodorou et al., 2009).

Although drugs are provided to patients free of charge in government hospitals in Sri Lanka, patients would need to purchase some from private pharmacies spending out of pocket, which may not be available in the hospital. Drugs are available in the market in generic and branded versions. A generic medicine is a pharmaceutical product usually intended to be interchangeable with the originator brand product, manufactured without a license from the originator manufacturer and marketed after the expiry of patent or other exclusivity rights (World Health Organization, 2016; "WHO Definitions of Generics," 2012). Generics are equal to the relevant innovator drug/ brand name counterpart in terms of bioequivalence, dose, dosage form and the composition of active ingredients.

Generic medicines are marketed either under a non-proprietary name rather than under a proprietary or brand name and can be available in the market in parallel with the originator brand product. As generic medications are less expensive than brand-name counterparts, many governments and private insurers have promoted or mandated the use of generics (Keenum et al., 2012). With the implementation of the National Medicines Regulatory Authority Act of Sri Lanka – 2015, the prescribers were encouraged to use the generic names of drugs with an option of writing the brand alongside (National Medicines Regulatory Authority Act 2015. (No.5), 2015).

Though generic and brand-name medications produce similar clinical outcomes, there are differences in shape, colour, taste, and name that can lead to patient confusion and nonpersistent use of medications (McCormack & Chmelicek, 2014). The global market of pharmaceutics is vast, ever growing, and competitive and the huge significance of pharmaceutical companies in a country's economy is very much evident. However, unlike the traditional buying decision process in non-health markets, the agents, gatekeepers and deciders in the prescription medicine market are doctors (Sharifnia et al., 2018). The influence of physician- pharmaceutical industry interactions in prescribing and professional behavior have been questioned in world literature (Wazana, 2000) which is starkly contrasted in the doctors' choice of generic vs branded medications.

The prescribing patterns and behavior of doctors are strongly related to their knowledge in which generic prescribing represent a considerable segment. In a developing country like Sri Lanka where population could be benefitted with availability of low-cost quality drugs, enhanced by generic prescribing, can be promoted, and ensured with well-chosen strategies. Selection and implementation of such is supported and guided by understanding of health professionals' knowledge and practices generated by scientific researches like the current study.

Current study intended to assess the knowledge and practices in generic prescribing among doctors employed in state health sector in the Kurunegala district, Sri Lanka.

MATERIALS AND METHODS

The study was descriptive and cross-sectional. Out of the doctors employed in state hospitals in Kurunegala district 274 were selected randomly for the study.

A self-administered questionnaire was used to assess the knowledge and practices in generic prescribing among doctors. The questionnaire had nine questions which checked the knowledge of the participants in selected aspects regarding generic medicines. The questions covered the following aspects.

- ✓ Comparison of chemical entity in generic medicines and innovator drugs / brand name medicines
- ✓ Whether generic medicines are manufactured after the patent expiry of originator/innovator medicine.
- ✓ Whether generic medicines are not available in developed countries

- ✓ Comparison of safety of generic medicines vs. brand name medicines
- ✓ Whether generic medicines are therapeutically equivalent to brand name medicines
- ✓ Whether brand name medicines produce less side effects than generic medicines
- ✓ Whether brand name medicines are required to meet higher safety standards than generic medicine
- ✓ Whether generic medicines must be in the same dosage form (such as tablet, capsule) as brand name medicines
- ✓ Whether only the branded drugs need to be registered with drug regulatory authority in Sri Lanka

The accuracy of answer to each was assessed to calculate the cumulative percentage of total correct responses. Both "do not know" and blank responses were considered as incorrect. If the cumulative percentage of total correct responses of a participant for knowledge related questions were equal or more than 50% it was considered as satisfactory. The practice of prescribing among doctors was assessed through the questionnaire itself with a Likert scale with 'Always' 'Often' 'Sometimes' 'Occasionally' and 'Never' responses. During analysis, the 'Always' and 'Often' were counted for common and the others for less common practice.

The questionnaires along with the information sheet and the consent form were posted to the randomly selected doctors together with an envelope addressed to principal investigator to mail the filled questionnaire back. The mobile number of the principal investigator was noted in the information sheet so that those who had any concerns could clarify same if any.

Data was analyzed using SSPS software, Pearson's Chi-Squared test was used to find the associations between variables. Due administrative approval was obtained from relevant authorities.

RESULTS

Among the total questionnaires returned, only 238 were eligible for the study as the others were filled incompletely.

Among the doctors, 55.5% did not know that the chemical entity in generic medicines and innovator / brand name medicines were similar. Majority of 79.4% were not aware of the fact that the generic medicines were manufactured after the patent expiry of originator/innovator medicines. Although 77.7% of doctors knew generics were as safe as innovator drugs, 51.7% had responded contradictorily when questioned about the therapeutic equivalence of generic and innovator drugs. Among them, 43.3% believed branded drugs could give rise to less side effects than their generic counterparts and another 45% were under the false impression that the branded medicines need to go through higher safety requirements than the generic drugs. A majority 76.9% knew correctly that registration requirements for generics were like those of branded drugs.

Of the doctors, 64.3% depicted a satisfactory overall knowledge regarding generic prescribing.

It was noted that 89.8% doctors claimed that they commonly used generic prescribing in clinical documentation.

The relationship between the practice of generic prescribing with the parameters of gender, service experience, post graduate qualifications and engagement in part time private practice was tested but none showed a statistically significant association (Table 1).

Table 1. Association between selected sociodemographic characteristics of doctors and practice of generic prescribing

Attribute		Commonly used	Less commonly used	Total	Statistical analysis
Gender	**Female**	75 (89.29%)	9 (10.71%)	84	χ^2= 0.36 df = 1 P = 0.850
	Male	136 (90.07%)	15 (9.93%)	151	
Experience	**< 10 years of service**	161 (89.94%)	18 (10.06%)	179	χ^2= 0.020 df = 1 P = 0.887
	> 10 years of service	50 (89.29%)	6 (10.71%)	56	
Postgraduate qualifications	**Yes**	38 (88.37%)	5 (11.63%)	43	χ^2= 0.115 df = 1 P = 0.735
	No	173 (90.10%)	19 (9.9%)	192	
Private practice	**Not engaged**	131 (91.61%)	12 (8.39%)	143	χ^2= 1.321 df = 1 P = 0.250
	Engaged	80 (86.96%)	12 (13.04%)	92	

Regarding prescriptions written for out of pocket purchases by patients, the factors most considered by doctors were, availability of the drug, generic name and price. Only 28% of doctors considered brand name in prescribing.

The association between practice and knowledge of doctors on generic prescribing was found to be statistically significant (χ^2= 12.232, df = 1, P = 0.001).

Among the sources the doctors relied upon to get drug information, the most popular choice was British National Formulary and the least was drug representatives (Table 2).

Table 2. Sources of information the doctors used to obtain information on drugs

Source	Never	Occasionally	Sometimes	Often	Always	Not Responded	Total
British National Formulary	1 (0.4%)	22 (9.2%)	47 (19.7%)	98 (41.2%)	67 (28.2%)	3 (1.3%)	238 (100%)
Internet	5 (2.1%)	29 (12.2%)	86 (36.1%)	94 (39.5%)	21 (8.8%)	3 (1.3%)	238 (100%)
Drug Representatives	79 (33.2%)	88 (37%)	52 (21.8%)	14 (5.9%)	0	5 (2.1%)	238 (100%)
Superiors and colleagues	5 (2.1%)	25 (10.5%)	85 (35.7%)	105 (44.1%)	15 (6.3%)	3 (1.3%)	238 (100%)

It was revealed that among generic name, brand name, price and availability, the least considered factor by doctors when purchasing medicines for private practices was the brand name (Table 3).

Table 3. Factors considered by doctors when purchasing drugs for private practices

	Never	Occasionally	Sometimes	Often	Always	Not Responded	Total
Generic Name	2 (2%)	11 (12%)	29 (32%)	46 (50%)	3 (3%)	1 (1%)	92 (100%)
Brand Name	1 (1%)	18 (20%)	45 (49%)	23 (25%)	3 (3%)	2 (2%)	92 (100%)
Price	2 (2%)	7 (7.8%)	19 (21.2%)	49 (53%)	14 (15%)	1 (1%)	92 (100%)
Availability	0	3 (3%)	20 (22%)	42 (46%)	26 (28%)	1 (1%)	92 (100%)

DISCUSSION

It was found that among the doctors who were engaged in part-time private practice 91.30% were visited by representatives of drug companies, whereas among the other doctors only 37.41% were visited by them. there is a statistically significant association between being visited by drug companies' representatives and the fact whether the doctor was engaged in Private practice (χ^2= 66.411, df = 1, P = 0.001).

Generic drug use has been widely recognized to reduce patients' out-of-pocket expenditure and payer costs (Gagne et al., 2014). In general, international studies have shown that important drug-related considerations in prescribing decisions of doctors included efficacy, safety, administration, and cost (Schumock et al., 2004).

Generic substitution of brand prescriptions is an accepted practice in many countries. (Banahan, 1997) Although generic prescribing seemed not be a universally accepted practice among doctors who participated in the current study a majority (89.8%) of them claimed to practice it.

In this study, it was observed that 55.5% did not know that the chemical entity in generic medicines and innovator / brand name medicines were similar while 51.7% did not believe the therapeutic equivalence of generic and innovator drugs. This finding is rather discouraging since public faith in generic formulations too is not universal. Although wider gaps were recognized when analyzing each component of knowledge, altogether 64.3% doctors had a satisfactory overall knowledge regarding the concept which was better than the findings of similar studies in the South Asian region (Kembhavi et al., n.d.; Jamshed et al., 2012).

Majority of doctors in the present study (89.8%) reported that they commonly practiced generic prescribing in clinical documentations, where a survey published in 2011 revealed that over 75% prescriptions were written in generic names (Menik et al., 2011). Still, the pharmacists having the possibility of brand substitution of prescribed drugs could have played a considerable role in the outcome of pattern of drug consumption and sales.

Although it was indicated that doctors were aware of the role of generic drugs in the improvement of universal access to drugs, they had different views in quality of generic drugs. It could be attributed to the inadequacy of strong and reliable public control routines for drugs with better bioequivalence requirements.

The recognized scholarly knowledge base has been highlighted as one of the sources used by clinicians to gather information on drugs among other options such as face- to- face communication, hard copy and telephone calls which were still prevailing in the clinical setting (Davies, 2007). The current study depicted that doctors mostly relied upon British National Formulary and less depended on drug representatives. In contrast, commercial sources of information have been recognized to influence general practitioners' prescribing behavior than scientific sources, in under developed and developing countries (Vancelik et al., 2007).

The fact that the visits by representatives of pharmaceutical companies were significantly associated with doctors' engagement in private practice could be a proxy indicator of market influences in prescribing behavior. The pharmaceutical industry had spent nearly $30 billion dollars in 2005 in United States on marketing and promotion, of which 84% had been diverted toward physician detailing and free samples, with less devoted to professional and direct-to-consumer advertising (Donohue et al., 2007; Rosenthal et al., 2002). Although the current study revealed that the influence of brand names did not play a major role in prescribing and purchasing decisions of doctors, the possible guilt of accepting if there were any, because of knowledge in benefits in generic prescribing may have had a masking effect on the real facts which cannot be denied. The picture generated by self-reporting may not completely agree with the real-life practice which is a limitation of the current study as well, which could have been remedied by an audit of prescription notes. The influence of patient's socio-economic status and the choice of patients to opt for branded medicines, upon the practice of generic prescribing of doctors was not captured by the current study which is another weakness noted. Further research is warranted to assess the impact of patients' factors affecting the practice of generic prescribing.

CONCLUSIONS

Although the knowledge among doctors regarding generic prescribing had several gaps, majority of doctors had a satisfactory understanding. The knowledge and practice of generic prescribing among doctors depicted a significant association. Mostly the doctors relied for drug information on recognized scholarly sources. Most doctors claimed that they did not consider brand name as a priority for drug purchasing decisions. But efforts of branded drug promotions through agents' visits were mostly targeted at doctors who were engaged in private practice.

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Conflict of Interest:

The authors have no conflicting interests regarding the research.

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Determining the Possible Effect of Diabetes on the Nutritional Status of Hemodialysis Patients.

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ABSTRACT

Objective: Failure to maintain blood sugar control over a long period of time in diabetic patients may cause impairment of kidney functions. In addition to uremic symptoms, impaired glucose metabolism causes difficulties in obtaining adequate nutrition. The aim of this study is to determine the possible impact of type 2 diabetes (T2DM) on the nutritional status of hemodialysis (HD) patients.

Methods: Patients between the ages of 18-65 who received HD treatment regularly were included in this study. A demographic characteristics questionnaire was applied to the patients and two 24-hour food recall records were obtained. The patient's height, dry weight and fluid gain were taken from their files.

Results: This study was conducted with a total of 275 HD patients, 33.1% with and 66.9% without diabetes. The median values of dietary energy (18.2 kcal/kg), carbohydrate (2.1 g/kg), protein (46.2 g/kg) and fat (0.7 g/kg) intake of the non-diabetic group was found to be higher ($p<0.05$). The median of BMI was found higher in the T2DM group than the non-diabetic group ($p<0.05$). A weak positive correlation was found between the duration of HD (years) and carbohydrate intake in patients with T2DM ($p<0.05$) and a very weak positive correlation between the hemoglobin levels and duration of hemodialysis in the non-diabetic group ($p<0.05$).

Conclusions: In this study, it was determined that although HD patients with T2DM have less energy intake, their BMI was higher; in addition, over time, a decrease in dietary compliance triggers a deterioration in biochemical parameters.

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INTRODUCTION

Chronic kidney disease (CKD) is the irreversible, gradual and progressive loss of kidney function (Width and Reinhard, 2009). The most common causes of CKD are diabetes, hypertension, glomerulonephritis and polycystic kidney diseases. At stage 5, when the patients glomerular filtration rate is <15mL/min/1.72m2, end-stage renal disease (ESRD) occurs, and the patient has to undergo renal replacement treatment (RRT); that is, dialysis or transplant. Dialysis is a method in which a machine filtrates the blood, serving as an artificial kidney. The most common dialysis method that has been used is hemodialysis (Mahan, 2011).

The incidence in the US of kidney failure that requires dialysis or transplant for ESRD ranks among the highest in the world (Saran et al., 2020). Since 2006, in the US the number of ESRD patients. has increased by 20,000 cases per year (4). In Turkey, there are approximately 30,000 dialysis-dependent patients with CKD (Akal Yıldız, 2012). The most commonly used treatment in patients with ESRD in Turkey is hemodialysis (76.1%); this is followed by transplant (19.2%) and peritoneal dialysis (4.7%) (Seyhani et al., 2018).

Failure to control blood sugar over a long period of time in diabetic individuals causes a deterioration in kidney functions and often diabetic nephropathy. Diabetic nephropathy causes an acceleration of deterioration in kidney functions and can lead to ESRD. Indications of ESRD include abnormal albumin/protein excretion in the urine in patients, hypertension (HT) accompanying gradually decreasing renal functions, and continuous decrease in GFR (Turker, 2019). Diabetic nephropathy (DNP) is an important cause of mortality in patients with diabetes. This complication can develop in patients with type 1 diabetes mellitus (T1DM) or type 2 diabetes mellitus (T2DM). Approximately 40% of the newly diagnosed ESRD patients in the USA are diabetic patients (Amos et al., 1997). According to National Nephrology, Dialysis and Transplantation Registry Report of Turkey 2018, when the etiology of patients starting HD in the last year was investigated it was found that 36.77% of the patients were diabetic (32.3% T2DM, 4.44% T1DM) (Suleymanlar et al., 2019). Thus, it can be seen that the most common cause of ESRD is diabetic nephropathy (DNP). In Europe and the USA, DNP develops in 30-50% of patients with T1DM and 5-15% of patients with T2DM (Newman et al, 2005).

Nutritional problems in patients are caused by impaired glucose metabolism and the development of uremic symptoms arising from DNP. The restricted diet plans of kidney patients may result in the patient getting insufficient energy and nutrients. In this case, attempts to provide the necessary energy are met with high energy and low protein diet patterns. However, the presence of diabetes in addition to kidney damage causes difficulties in sufficient energy intake. Impaired insulin metabolism may accompany a loss of appetite, caused by uremic symptoms (Molitch et al., 2004). The aim of this study is to investigate the effects of T2DM as the etiology of kidney failure on the patient's nutritional status and related biochemical parameters.

MATERIALS AND METHODS

Study Design and Sample Size

This research is a cross-sectional descriptive study carried out in 8 centers - 5 separate dialysis centers and 3 hospitals with dialysis patients between January - June 2018 in Istanbul/Turkey. This study was approved by the Ethics Committee of Marmara University School of Medicine (Ethics committee number: 09.2017.033) and the research was conducted following the principles stated in the Helsinki Declaration. Before starting data collection, the necessary permission was obtained from the hospitals and centers.

Patients between the ages of 18 and 65, who regularly received treatment (2 or 3 times a week) were included in the study. A total of 275 volunteer patients were included and all questionnaires were filled out by the researchers in face-to-face bedside-patient interviews.

Demographic Characteristics Questionnaire

The questionnaire on the demographic characteristics of the patients consists of 5 parts. Demographic information and questions about the patients' diseases were included in the first part of the questionnaire, with questions determining nutritional habits being included in the second part, anthropometric measurements in the third part, biochemical parameters being recorded in the fourth part, with the fifth part consisting of a 24-hour food recall record.

Assessment of Anthropometric Measurements and Nutritional Status

After obtaining the necessary permission, the patients height, dry weight and fluid gain were taken from their files. Using height and dry weight values, body mass index (BMI) was calculated for each patient.

BMI was determined according to the World Health Organization classification. Patients were divided into three groups; underweight if BMI was <18.50 kg/m2, normal if BMI was 18.50-24.99 kg/m2, overweight if BMI was >25.00-29.99 kg/m2, obese if BMI was >30 kg/m2 (WHO, 2020).

In order to evaluate nutritional status, a non-dialysis 24-hour food recall record was obtained from the patients and this was repeated 15 days later. In this study, the average of two 24-hour food recall records was calculated per patient.

Biochemical Parameters

Routine blood tests of dialysis patients are carried out every month. After obtaining the necessary permission, the results of the blood tests performed in the preceding month were recorded from the patients' files.

Statistical Analysis

The data obtained was analyzed with the SPSS (Statistical Package for Social Sciences Version 16.0) program. Normal distribution of the variables was checked by using the Kolmogorov Smirnov test. Categorical variables were described as frequency distributions and analyzed with the Chi-square ($\chi 2$) test. It was determined that the data did not show a normal distribution. Differences of non-normal distributed continuous variables were compared by using the Mann-Whitney U test and Kruskall-Wallis test. A correlation between the groups was detected by using Spearmen Correlation tests. A p value of 0.05 or less was considered statistically significant. Energy and nutrient intakes were evaluated with the Nutrition Information System (BebiS 7.1) program.

RESULTS

This study was conducted with a total of 275 patients, 91 (33.1%) with and 184 (66.9%) without diabetes. The patients were separated into two groups; T2DM and Non-Diabetic. Women made up 40% of the patients and men 60%. Only 13.8% of 275 patients were in the normal BMI range (18.5-24.9 kg/m2). The education level of the majority of the patients (81.9%) was primary school education and below. Sociodemographic distributions of the T2DM and non-diabetic groups were compared in Table 1. While there was no difference between the gender distribution of the patients with and without diabetes, there was a difference between the distribution according to body mass index and educational status ($p<0.05$). A statistically significant difference was observed between the BMI values of the T2DM and non-diabetic groups. The median (27.4 kg/m2) of the BMI values of the T2DM group was statistically significantly higher than the non-diabetic group (24.6 kg/m2) ($p<0.05$) (not shown in table).

Table 1. Comparison of socio-demographic characteristics of the groups.

	T2DM		Non-Diabetic		
	n	%	n	%	*p*
Gender					
Female	38.0	41.8	72.0	39.1	.69
Male	53.0	58.2	112.0	60.9	
BMI (kg/m^2)					
<18.5	7.0	17.5	39.0	45.9	
18.5-24.9	15.0	37.5	23.0	27.1	**.00****
25.0-29.9	10.0	25.0	15.0	17.6	
>30.0	8.0	20.0	8.0	9.4	
Education					
Primary school or less	76.0	83.5	149.0	81.0	
Secondary and High School	6.0	6.6	18.0	9.8	**.03***
University or above	9.0	9.9	17.0	9.2	
Duration of CKD (median value)	4.0		8.0		**.00****
Min-max	0.2-26.0		0.1-42.0		
Duration of hemodialysis	3.0		4.0		**.00****
	1.0-21.0		1.0-30.0		
Total	91.0	100.0	184.0	100.0	

*$p<0.05$; **$p<0.01$

The comparison of dietary intake of macro and micronutrients of T2DM and non-diabetic patients is shown in Table 2. The median values of dietary energy are 1296.1 kcal and 18.2 kcal/kg (U=692.9; $p<0.05$ and U=605.6; $p<0.01$), carbohydrate intake is 142.3 g and 2,1 g/kg (U=653.0; $p<0.01$ and U=574.2; $p<0,01$), protein intake is 0.6 g/kg (U=6939.0; $p<0.05$) and fat intake is 0,7 g/kg (U=689.3; $p<0.05$) in non-diabetic patients which were found to be higher than diabetic individuals.

When the meal frequencies of the two groups were compared, no statistically significant difference was found between the groups (p>0.05).

Table 2. Comparison of macro and micronutrients dietary intake levels, fluid consumption, and body edema of the groups.

	T2DM			Non-Diabetic			*p*
	Median	**Min.**	**Max.**	**Median**	**Min.**	**Max.**	
Energy (kcal)	1090.2	525.3	2544.5	1296.1	501.2	3602.5	**.02***
Energy (kcal/kg)	14.0	6.9	35.8	18.2	5.3	73.5	**.00****
Carbohydrate (g)	118.3	38.1	394.8	142.3	11.3	450.0	**.00****
Carbohydrate (g/kg)	1,5	0,3	4,7	2,1	0,1	8,4	**.00****
Protein (g)	41.3	10.0	130.1	46.2	8.40	123.7	.25
Protein (g/kg)	0.5	0.1	1.6	0.6	0.1	2.4	**.02***
Dietary Fat (g)	49.2	12.5	142.7	53.8	13.6	159.1	.38
Dietary Fat (g/kg)	0,6	0,1	2,0	0,7	0,1	3.2	**.01***
Iron (mg)	6.6	2.0	20.0	7.0	2.0	19.0	.53
Calcium (mg)	438.3	144.0	1057.0	437.4	91.0	1394.0	.46
Phosphor (mg)	682.0	266.0	1617.0	722.3	207.0	1790.0	.56
Potassium (mg)	1219.7	249.0	4451.0	1247.9	227.0	4084.0	.81
Zinc (mg)	5.20	1.70	15.70	6.10	1.10	19.0	.09
Magnesium (mg)	129.0	42.4	404.4	142.4	29.6	435.3	.39
Sodium (mg)	2592.6	479.3	8282.5	2780.9	526.3	8813.5	.52
Vitamin B_{12} (mcg)	2.0	0.0	9.6	2.3	0.0	71.7	.36
Fluid Intake (L)	1.0	1.0	4.0	1.0	0.0	5.0	.63
Body Edema (kg)	3.0	1.0	7.0	2.75	1.0	6.0	.182

Mann Whitney U Test was used *p<0.05; **p<0.01

Table 3 includes the comparison of biochemical parameters between the groups. Accordingly, it was found that the HbA1c and glucose values of the T2DM patients were higher than the non-diabetic patients (U=169.0; p=0.01) while the creatinine and hemoglobin levels were higher in the non-diabetic group; this difference was statistically significant (respectively; U= 583.7, p=0.01 and U=6815.5, p=0.02). The correlation of patients' daily fluid intake and the patient's body edema between two dialysis session had a weak positive correlation (r=0.24; p<0.05) (not shown in table).

Table 3. Comparison of the biochemical parameters between the groups

	T2DM			Non-Diabetic			*p*
	Median	**Min.**	**Max.**	**Median**	**Min.**	**Max.**	
Iron (ml/ng)	58.0	8.0	195.0	58.5	5.0	192.0	.47
Calcium (mg/dl)	8.80	5.0	10.0	9.0	4.0	14.0	.13
Phosphorus (mg/day)	5.0	3.0	9.0	5.0	2.0	53.0	.13
Potassium (mEq/L)	5.0	3.0	8.0	5.0	3.0	6.0	.97
HbA1c (%)	7.0	4.0	11.0	5.0	4.0	6.0	**.00****
Glucose (mg/dL)	146.0	70.0	538.0	88.0	53.0	235.0	**.00****
BUN (mg/dl)	68.0	17.0	246.0	65.0	6.0	119.0	.13
Creatinine (mg/dl)	8.0	5.0	51.0	8.8	2.0	49.0	**.00****
Uric acid (mg/dl)	6.0	3.0	12.0	6.4	3.0	13.0	.60
Hemoglobin (g/dl)	11.0	2.0	15.0	11.2	6.0	16.0	**.02***
Albumin (g/dl)	4.0	3.0	7.0	4.0	2.0	8.0	.07

Mann Whitney U Test was used *p<0.05; **p<0.01

The evaluation of the relationship between the duration of CKD diet and the duration of hemodialysis and the intake of energy and macronutrients is shown in Table 4. According to this data, there was no statistically significant relationship between the duration of a diet for CKD and the energy and micronutrients intake (p>0.05). A weak positive correlation was found between the duration of hemodialysis and dietary carbohydrate levels of the T2DM group (p<0.05). On the other hand, in both the T2DM group and the non-diabetic group, no relationship between hemodialysis duration and

energy or with other macronutrients was found (p>0.05).

Table 4 also demonstrates the evaluation of the relationship between the duration of a diet for CKD and the duration of hemodialysis and biochemical parameters of the diabetic and non-diabetic groups. A weak correlation was found between the blood potassium level and duration of a diet for CKD of the patients with T2 DM (p<0.05). A negative correlation was found between the uric acid levels and duration of hemodialysis of the patients with T2 DM (r=-0.23; p<0.05). A positive correlation was observed between the hemoglobin levels and duration of hemodialysis in the non-diabetic patients (r=0.18; p<0.05).

Table 4. Correlation of the durations of CKD diet and hemodialysis with the dietary energy, macronutrient intake and biochemical parameters

		Duration of a diet for CKD				**Duration of hemodialysis**			
		T2DM		**Non-Diabetic**		**T2DM**		**Non-Diabetic**	
		r	***p***	**r**	***p***	**r**	***p***	**r**	***p***
Dietary Intake	Energy (kcal)	.18	.19	.11	.28	.14	.17	-.02	.75
	Energy (kcal/kg)	.19	.18	.14	.17	.19	.06	.05	.43
	Carbohydrate (g)	.13	.37	.06	.55	.20	.05	.00	.99
	Carbohydrate (g/kg)	.22	.12	.12	.26	.26	**.01***	.04	.52
	Protein (g)	.00	.96	.04	.65	-.01	.90	-.01	.86
	Protein (g/kg)	.11	.43	.06	.52	.05	.64	.04	.57
	Dietary Fat (g)	.20	.16	.12	.25	.08	.43	-.02	.69
	Dietary Fat (g/kg)	.17	.22	.12	.26	.01	.20	.03	.60
Biochemical Parameters	Iron (ml/ng)	.16	.26	-.02	.79	.01	.92	-.00	.92
	Calcium (mg/dl)	.17	.22	-.17	.10	.12	.23	.08	.26
	Phosphorus (mg/day)	-.02	.87	.02	.83	-.09	.39	.04	.50
	Potassium (mEq/L)	.32	**.02***	.05	.63	.01	.91	-.04	.52
	HbA1c (%)	.00	.99	-.06	.54	.09	.39	.04	.58
	Glucose (mg/dL)	-.06	.66	.17	.10	-.08	.43	.04	.53
	BUN (mg/dl)	.04	.76	-.06	.57	-.07	.52	-.09	.20
	Creatinine (mg/dl)	-.01	.91	.00	.99	.06	.54	.02	.78
	Uric acid (mg/dl)	-.22	.12	-.00	.96	-.23	.02*	.05	.49
	Hemoglobin (g/dl)	.03	.79	.05	.61	.12	.24	.18	**.01***
	Albumin (g/dl)	.23	.09	-.18	.08	.03	.76	-.01	.83

Spearman correlation test was used. *p<0.05

DISCUSSION

In this study, the nutritional status of diabetic kidney patients was evaluated and the affecting parameters were highlighted.

When kidney damage occurs, comorbidity of diabetes is common. It is known that diabetes is an important cause of ESRD, and nearly half of the patients undergoing hemodialysis have a history of diabetes (8). This study was carried out with 275 hemodialysis patients, 91 (33.1%) with and 184 (66.9%) without diabetes.

In a study in which CKD prevalence and gender comparison were evaluated by region, CKD prevalence in the 3rd and 5th stages were higher in women than men (China, Beijing, Germany, Tibet, Finland, China, Korea, Turkey, Canada, Delhi, Portugal, Austria, Stockholm, Thailand, Poland, Italy, Spain, United States, Britain, France, Urumqi). On the other hand, it has been determined that in Singapore and Japan, there is a higher prevalence in men than women (Carrero et al., 2018). According to the United Nations database, 58% of CKD patients in the 3rd and 4th stages are women and 42% are men (Murphy et al., 2016; USRDS, 2016). The Turkey Chronic Kidney Disease Prevalence Survey (CREDIT) study demonstrates that chronic kidney disease (CKD) is more common in women (18.4%) than men (12.8%) and that the risk significantly increases with age (Suleymanlar et al., 2010). In our study groups, the distribution of genders was similar (p>0.05), however, unlike the CREDIT study, the majority of our study group was male (60.0%); 58.2% of the T2DM group and 60.9% of the non-diabetic group was male.

The number of patients receiving renal replacement therapy in Turkey is gradually increasing; at the end of 2016, 74,475 patients were receiving renal replacement therapy. The prevalence of end-stage renal disease is 933 per million populations and its incidence is 140. Diabetes is seen as the most important cause of end stage renal failure.6 Studies have emphasized that controlling blood sugar and body weight of kidney patients with diabetes is important in controlling patients' filtration levels. Changes in glomerular filtration rate can be seen in

obese patients (Anders, 2018; Alicic et al., 2017). In a cohort study that collected 14 years of data, an association was found between increased BMI and progressive CKD (Herrington et al., 2017). In a study conducted by Biesenbach et al. it was shown that diabetic CKD patients had a BMI mean of 30±7 kg/m2 and non-diabetic patients had a BMI mean of 24±3 kg/m2, it was found that the BMI was significantly higher in patients with T2DM (Biesenbach et al., 1999). Our T2DM group had higher percentages of overweight and obese patients than the non-diabetic group and the BMI mean of the T2DM group was 27.4 kg/m2 as compared to 24,6 kg/m2 for the non-diabetic group ($p<0.05$). The important mechanism here is that the levels of adipokine in the bloodstream increase with obesity, and this is associated with an increased filtration load, an increase in GFR and induction of nephron hypertrophy (D'Agati et al., 2016).

Another body weight problem is malnutrition. Patients may have a poor nutritional status due to dietary restrictions, loss of appetite or nausea. Nutritional deficiencies characterized by imbalances in protein energy expenditure can be triggered (Han et al., 2019). In a study it was found that only 7% of the patient in the diabetic group and 6% of the non-diabetic group had a BMI under 21 kg/m2 (Biesenbach et al., 1999). In our study, 17.5% patients in the T2DM group and 45.9% in the non-diabetic group had a BMI under 18.5 kg/m2. It was found that the BMI distribution in the groups was significantly different, with BMI being higher in the T2DM group ($p=0.00$). Obesity is known to play an important role in the etiology of T2DM. Therefore, it is not surprising that the mean BMI of T2DM patients was higher than that of the non-diabetic group.

According to the KDOQI, the recommended energy (kcal/kg/day) intake for adults, whether diabetic or not, is 30-35 kcal/kg/day for patients 60 years of age and under, 35 kcal/kg/day for patients over 60 years of age; and the recommended protein consumption is 1.2 g/kg/day (KDOQI, 2012). In a study conducted with CKD patients, it was emphasized that these patients suffer poor appetite, nausea and vomiting and have a poor quality of life when compared to the control group (Brown et al., 2015). In a study, it was found that energy intake was significantly lower than the level recommended by dietitians in both diabetic and non-diabetic kidney patients. On the other hand, protein intake was higher than recommended in both groups. It is emphasized that non-compliance with diet triggers decreases in GFR rate. A strong correlation was found between the dietary non-compliance of non-diabetic kidney patients and the decrease in GFR rate (Chen et al, 2017). In our study, there was no statistically significant relationship between the duration of a diet for CKD and the energy intake with the diet both T2DM and non-diabetic groups. Since low protein intake levels increase carbohydrate and fat intake, there is a risk of hyperglycemia and cardiovascular complications, especially for diabetic hemodialysis patients. The data obtained in a previous study found the energy intake of HD patients was 20.2±5.9 kcal/kg/day while the protein intake was 0.8±0.25 g/kg/day. These values reveal that the energy and protein intake of hemodialysis patients in Turkey is much lower than the recommended level (Celik et al., 2019). Similarly, in a study conducted by Vijaya et al., it was found that before intervention the baseline protein consumption of HD patients was 0.7 g/kg/day and 0.78 g/kg/day (Vijaya et al., 2019). In this study we found that energy intake was 14.0 kcal/kg/day for T2DM group and 18.2 kcal/kg/day for non-diabetic group ($p<0.01$), while protein intake was 0.5 g/kg/day for the T2DM group and 0.6 g/kg/day for the non-diabetic group ($p<0.05$). These findings show that the energy and protein intake of the hemodialysis patients was lower than recommended; due to complications, this situation was even lower in the T2DM group.

Studies have emphasized that diabetic ESRD patients with diet adjustments have more edema than non-diabetic patients. Albumin, which is important in regulating the oncotic pressure in the bloodstream and maintaining fluid balance in the intracellular area, frequently decreases in diabetic nephropathy due to insufficient protein intake. For this reason, kidney patients with T2DM often experience edema (Mann et al., 2010; Gan et al., 2005; Nakagawa et al., 2009). However, in our study, no difference was found between the groups in terms of fluid intake or edema. We think that this is due to the higher sodium consumption of the non-diabetic group as compared to the T2DM group (2780.9 mg/day and 2592.6 mg/day, respectively); there was also no difference between the albumin levels in either group.

Chronic under hydration and malnutrition are associated with irreversible kidney damage. In a study examining the relationship between meal frequency and CKD risk, those who consumed <15 meals/week had a higher risk of CKD than the group with >15 meals/week (Kim et al., 2020). In the current study when the meal frequencies of the two groups were compared, no statistically significant difference was found between the groups ($p>0.05$).

Urea and creatinine levels are associated with an increase in blood glucose levels, which in diabetic patients indicates a decrease in kidney function (Pandya et al., 2016). Studies have shown that diabetic patients have high serum urea and creatine levels (Kamal, 2014; Deepa et al., 2011). However, in our study creatinine levels were found to be higher ($p<0.05$) in the non-diabetic group. Also, a negative correlation was found between the uric acid levels and duration of hemodialysis of the patients with T2DM ($p<0.05$). As an expected result, blood glucose and HbA1c were higher in the T2DM group ($p<0.05$).

The limitation of this study is that it was not an intervention study, so the nutritional status of HD patients was determined only by their diabetic and non-diabetic status. In addition, biochemical parameters were collected from patient files after necessary permissions were obtained and were limited to routine parameters.

CONCLUSIONS

In conclusion, it was determined that although HD patients with T2DM have a lower energy intake, their BMI was higher than the non-diabetic group. In addition, it has been observed that those who received HD treatment over many years developed dietary incompatibilities over time. It has been determined that the decrease in dietary compliance over time triggers the deterioration in biochemical parameters. In future studies, it is thought that determining the factors that make dietary compliance difficult for diabetic kidney patients and focusing on which components of the diet can be changed sustainably to optimize biochemical parameters will be beneficial.

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Inactive SARS-COV-2 Vaccine Adverse Effects Among Hospital Workers

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ABSTRACT

Covid-19 is a contagious viral infection with serious complications. Since a proven treatment for such a disease with high mortality has not yet been found, vaccination studies are important for preventative measures and rapid herd immunity. In a period when the whole world urgently needed vaccines, objective scientific data about the safety of the vaccine were requested by the employees of Ufuk University Faculty of Medicine, and the adverse effects they encountered in the early period were requested. 173 participants completed the survey. When systemic and local adverse events were reported within the first seven days after the first and second vaccination, most of the side effects observed were mild. One participant developed anaphylaxis. The most common local side effect was pain in the vaccinated arm (38.2%), and the most common systemic side effect was fatigue (24.7%). No grade 4 reaction or death was observed, except for one patient who developed anaphylaxis requiring urgent medical attention. Since studies evaluating the effects and side effects of vaccines, which are of great importance in the fight against the pandemic, are necessary for public health, we share the early post-vaccine side effects of the hospital staff who first started the vaccination.

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INTRODUCTION

SARS-CoV-2, the causative agent of COVID-19, has become the third coronavirus to infect humans in the current century. The Middle East Respiratory Syndrome Coronavirus (MERS-CoV), which was diagnosed in 2012, and the Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV), which emerged in 2003, caused hundreds of life-threatening epidemics (Sağlık Bakanlığı Covid Rehberi, 2020).

Sars-Cov-2, which has spread rapidly all over the world since December 2019 and has become a serious public health problem, Covid-19 is a highly contagious viral infection with potentially serious complications. In a study involving more than 44,000 people in China; 81% were mild-moderate, 14% severe (shortness of breath, hypoxia or more than 50% lung involvement in imaging), 5% critical (respiratory failure, shock or multi-organ system dysfunction). For all cases, the mortality rate was 2.3% (Wu & McGoogan, 2020). Since a proven treatment for such a disease with high mortality has not yet been found, vaccination studies have gained importance in order to ensure rapid prevention and herd immunity. Studies on the side effects and efficacy of vaccines were done quickly. Side effects observed in the most frequently used vaccines; For the Pfizer-BioNTech COVID-19 vaccine, a local reaction was observed in 84.7% of all individuals in a placebo-controlled study in which individuals aged 18-55 and over 55 were evaluated 7 days after vaccination. Pain at the local injection site was the most common side effect with 83.1% in individuals aged 18-55 and 71.1% in individuals over 55 years of age. However, none of them were considered as grade 4 side effects. Fatigue was the most common side effect observed with a rate of 47.4% in individuals aged 18-55 years and 34.1% in individuals over 55 years of age. These side effects were not evaluated as grade 4 (CDC,2021).

In the phase 1-2 study of 320 people evaluating the inactivated COVID-19 vaccine, the most common adverse reaction was injection site pain, followed by mild and self-limiting fever, although the side effects varied depending on the dose and time between vaccination; no serious adverse reactions were reported (Shengli et al., 2020).

No serious adverse effects were encountered in clinical studies conducted to date. Adverse effects seen after vaccination were often mild (Wu, et al., 2021, Zhang, et al., 2021).

In our country, the vaccination program started with the inactivated vaccine CoronaVac, produced by a Chinese biopharmaceutical company, on January 14, 2021, with the vaccination of healthcare workers.

We aimed to evaluate the adverse effects that were reported in the early period, after seven days following the first and second dose of CoronaVac.

MATERIALS AND METHODS

After the first dose Sars-Cov-2 vaccine (CoronaVac) was administered to the staff of Ufuk University Faculty of Medicine, the adverse effects they encountered in the first seven days were questioned by face-to-face questionnaire method. After the second dose administered 28 days after the first vaccine, the same questionnaire was applied to the patients again.

The questionnaires were prepared by scanning the evidence-based literature. The questionnaire was administered by the researchers in the form of face-to-face interviews. Participation in the survey was on a voluntary basis, and the surveys were applied after the participants were informed and verbal consent was obtained.

One hundred and seventy-three personnel people over the age of 18 who agreed to participate in the survey were included in the study. PCR positive for SARS-CoV-2, pregnancy, breastfeeding, alcohol or drug use; and those with any confirmed or suspected autoimmune or immunodeficiency disease were excluded from the study. Seven days after the second dose of vaccine, the questionnaire was administered to the same staff again. One person was excluded from the study because of an anaphylactic reaction, one person was diagnosed with Covid-19 after the first dose of vaccine, and one person did not want to have the second dose of vaccine. Data from 170 people were used for comparison between the two vaccine doses.

Ethical approval was obtained from the Ufuk University Clinical Research Ethics Committee (2021-02-01).

The research data were evaluated using the SPSS 27.0 program. The descriptive statistics were presented as mean ± standard deviation, frequency distribution and percentage. McNemar test was used to compare the first and second dose The results were evaluated $p<0.05$ was accepted as significant.

RESULTS

The average age of participants was found to be 40.12 ± 12.23. 94 people (54.06%) were female, 79 people (54.06%) were male. The number of people with mild adverse effects in previous vaccination applications was 7 (4.10%) and there was no history of severe adverse effects. Among the participants, 22.7% (n:39) were physicians, 23.2% (n:40) nurses, 22.1% (n:38) caregivers ,32% (n:55) were administrative staff.

When systemic and local adverse effects seen in the first seven days after vaccination are questioned; the most common local side effect was pain in the arm in which the vaccine was administered (38.2%), the most common systemic side effect was fatigue (24.7%). While a general decrease was observed in side effects seen after the second dose of the vaccine, a significant decrease was observed in local pain, fatigue, heat and headache (p: 0.004, p <0.001, p: 0.021, p <0.001, respectively) (Table 1).

Most of the adverse effects observed after vaccination were mild. Anaphylaxis with dyspnea and syncope developed in only one person after vaccination.

Table 1. Adverse Effects After First and Second Dose Inactive Sars-Cov-2 Vaccine.

Local adverse effects	First Dose		Second Dose		p
	n	%	n	%	
Pain at the vaccination site	65	38.2	41	24.1	**0.004**
Numbness at the vaccination site	11	6.5	14	8.2	0.678
Redness at the vaccination site	3	1.8	6	3.5	0.508
Systemic adverse effects					
Fatigue	42	24.7	16	9.4	**<0.001**
Nausea or Vomiting	11	6.5	5	3.0	0.210
Throat ache	6	3.5	6	3.5	1.000
Heat	13	7.6	3	1.8	**0.021**
Tremor	5	2.9	5	2.9	1.000
Headache	35	20.6	12	7.1	**<0.001**
Dizziness	7	4.1	5	2.9	0.727
Loss of smell	0	0.0	0	0.0	NA
Loss of taste	0	0.0	0	0.0	NA
Muscle pain	21	12.4	13	7.7	0.200
Joint pain	14	8.2	7	4.1	0.143
Diarrhea	4	2.4	1	0.6	0.375
Abdominal pain	5	2.9	2	1.2	0.375
Itching	9	5.3	6	3.5	0.549
Swelling of the lips and throat	3	1.8	0	0.0	NA
Dyspnea	4	2.4	1	0.6	0.375
Tachycardia	4	2.4	2	1.2	0.625

*McNemar test was used to compare the first and second dose. Values were calculated over 170 individuals. p <0.05 means there is a significant change. NA is used to mean could not be calculated.

DISCUSSION

Main results of this study; we evaluated early adverse effects with a limited number of participants, we found local and systemic mild, transient symptoms after injection in healthcare workers. Anaphylaxis with dyspnea and syncope developed within the first half hour after vaccination was observed in only one case.

It is known that vaccines are the most effective and economical way to prevent and control infectious diseases instead of treating people (Remy et al., 2015). For this reason, preclinical and clinical studies of many Covid-19 vaccine studies are ongoing. In addition to the old known methods, many new vaccine trials are carried out with technological developments (Callaway, 2020).

According to the results of the randomized, double-blind, placebo-controlled, Phase I-II clinical study of CoronaVac in healthy adults aged 60 and over conducted in China, no serious adverse effects were observed in either phase. The most common adverse reaction was pain at the injection site followed by mild and self-limiting fever (Wu, et al., 2021). In another randomized, double-blind, placebo-controlled, phase I- II study conducted in China, including cases 18-59 years, reported that the most common symptom was pain at the injection site; four (17%) in the 3 µg group, five (21%) in the 6 µg group, and one in

placebo arm (4%). Most adverse reactions were mild and the participants resolved within 48 hours. Only one case of acute hypersensitivity was observed in the 6 µg group 48 hours after the first dose of the study drug, in which urticaria developed (Zhang, et al., 2021)

When the results of the placebo-controlled phase 3 study, which used 3 µg of inactivated SARS-CoV-2 virion in Turkey, in which 10214 individuals were evaluated, the frequency of any side effects was 1259 (18.9%) in the vaccine group and 603 (16.9%) in the placebo group (p=0.0108). No deaths or Grade 4 adverse events were observed. Pain at the injection site was the most common local adverse event, 157 (2.4%) subjects in the vaccine group and 40 (1.1%) subjects in the placebo group, (p<0.0001). The most common systemic adverse event was fatigue 546 (8.2%) subjects in the vaccine group and 248 (7.0%) subjects in the placebo group, (p=0.0228).

In a study conducted with hospital staff in Turkey in which 2277 people were evaluated, the three most common systemic adverse reactions were observed as headache, fatigue, nausea and vomiting, respectively, when evaluated in terms of side effects three days after vaccination (Kaya et al., 2021).

In our study, when individuals were evaluated seven days after the first dose of vaccine administered at the standard dose and the second dose administered on the 28th day; the most common local side effect was pain in the arm in which the vaccine was administered (38.2%), the most common systemic side effect was fatigue (24.7%). No grade 4 reaction or death was observed, except for one patient who developed anaphylaxis requiring urgent medical attention.

The study has some limitations; first it was a unicentric study including limiting number of cases, the second late side effects were not evaluated.

As a result, it is clear that safety studies on vaccines, our strongest weapon in the fight against the pandemic, should continue for a longer time and with more participants.

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Analysis of HIV/AIDS Reports in Turkey from Disaster Management Perspective

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ABSTRACT

HIV/AIDS is among the ten diseases that cause the most deaths in the world. WHO aims to eradicate AIDS by reducing the number of new HIV infections and the number of AIDS-related deaths by 90% by 2030. Although targets are set for the eradication of HIV/ AIDS, it does not seem possible to realize these targets in the near future. There is a risk of HIV/ AIDS becoming an epidemic in the society and reaching the level of disaster. This disaster situation threatens the young population and brings the risk of causing possible secondary social disasters.

This research is a descriptive and retrospective cohort research. The data of the study were obtained from the "statistical annuals" published by the Ministry of Health between 1985 and 2020. The data were analyzed by computer.

This research by analyzing HIV/AIDS notifications in Turkey from a disaster management perspective, is planned in order to contribute to the minimization of the damage to the society caused by the epidemics that may be seen in Turkey, and to contribute and guide the relevant institutions to take the necessary precautions.

The first case in Turkey was reported in 1985. The course of HIV/AIDS disease was tried to be determined by examining the statistical annuals regularly published by the Ministry of Health. The number of cases in Turkey followed a horizontal course between 1985 and 2000. After the 2000s, a rapid increase was observed and in 2014, this increase continued exponentially. The number of HIV/AIDS cases reported to the Ministry of Health from 1985 to 2019 in Turkey is 24,881. 1,884 of these cases are AIDS and 22,977 of them are HIV(+).The period with the highest ten-year average is between 2010-2019. This increase between 2010 and 2019 indicates that the HIV/AIDS trend is upwards.

As a result, it is proposed to develop an HIV/AIDS management system to analyze the risk and take the necessary measures by including all stakeholders from a cultural, economic and sociological point of view in the fight against HIV/AIDS.

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INTRODUCTION

There is no definitive cure for The Acquired Immune Deficiency Syndrome (AIDS). The drugs used aim to increase the lifespan and life quality of the infected individuals. It brings along problems such as social, economic, human rights and discrimination in society. AIDS is an important infectious disease that should be studied from the point of view of disaster management, since the rapid increase in HIV/AIDS case reports in the world and the risk of reaching unexpected dimensions.

The Acquired Immune Deficiency Syndrome (AIDS) epidemic, which is caused by the immunodeficiency virus (HIV), has caused the death of approximately 39 million people since the first case (1981). The HIV virus, which seems to have passed from monkeys to humans, was first detected in Congo in 1959, but AIDS was diagnosed and named in 1981. HIV is thought to be transmitted to humans as a result of interspecies transfer of monkey immunodeficiency viruses. Although the first reported cases of AIDS were among homosexuals in the United States in the early 1980s, it is estimated that it probably first infected humans in the late 1940s. Today, the HIV-1 virus is found all over the world, but HIV-2 is mostly found in West Africa and is considered less deadly than HIV-1. There is still no solution to the epidemic, which has caused approximately 70 million cases and 40 million deaths in the last 40 years. Approximately 980,000 new cases were reported in 2017. he fact that 180 thousand of these cases are children, is an indication that the goal of eliminating new HIV infections among children in 2018 was not succeeded. Although new HIV infections have decreased by 40% since the peak in 1998; in 2020, 1.5 million people were newly infected with HIV. The number of people living with HIV rose to 37.7 million, and 680,000 people died from HIV-related causes. About half of the cases were in Africa, and more than half of the deaths were in three countries (Mozambique, South Africa and the United Republic of Tanzania). The Middle East and North Africa has the lowest HIV prevalence (0.1% among adults aged 15-49 years) (WHO, 2021c).

In recent years, epidemics have been observed in some countries. Eastern Europe and Central Asia are the only regions in the world where the HIV epidemic continues to increase rapidly. There has been a 30% increase in new HIV infections since 2010. It is seen that the epidemic is especially concentrated among intravenous drug users. The lack of harm reduction services, homosexuals, intravenous drug users and low condom use have increased the spread of the disease. Stigma, discrimination and criminalization are the main reasons for the spread of HIV, especially in Eastern Europe and Central Asia: most people living with HIV and AIDS suffer from stigma. The consequences of stigma and discrimination are profound. People are more afraid of unfair sexual behavior (sin), blame, shame, rejection and stigma than of dying as a result of HIV/AIDS. Many women fear discrimination, violence and even murder if they are found to be infected with HIV. For this reason, many people living with HIV and AIDS do not get tested because they fear of the results. People hide that they are sick because they are stigmatized as "immoral" and cause the spread of a deadly disease. Also, sexual relations or drug use are often taboo. That is why society is vulnerable to the silent spread of HIV. Women are often accused of spreading sexually transmitted infections (STIs), including HIV, even if they are infected by their husbands or partners. Mother-to-child transmission can be prevented by antiretroviral (ARV) prophylaxis and not breastfeeding (WHO, 2021c).

While life expectancy has remained relatively high in high-income countries, life expectancy has decreased significantly in most low- and middle-income countries with the burden of HIV and AIDS (Merson et al. 2011).

Acquired Immunodeficiency Syndrome (AIDS) is a serious, life-threatening disease caused by the human immunodeficiency virus (HIV). HIV can affect the T lymphocyte cells of the human immune system and leave these cells vulnerable to possible infections and diseases in the body, leading to various opportunistic infections and death (Web 1, 2021).

Even though there is a 59% decrease in deaths from HIV/AIDS from 2000 to 2019, HIV/AIDS is still one of the ten infectious diseases that cause the most deaths (WHO, 2021a).

People with HIV (+) make up about 0.5% of the world's population (WHO, 2020). In virus-induced pandemics, those with HIV+ are considered as a risk group. In the H1N1 influenza pandemic (2009- 2010), it has been reported that there is a higher rate of transmission and illness among HIV+ persons (Sheth at al., 2011). It has been noted that HIV infection does not cause an increase in the severity of the disease in SARS and MERS epidemics (Al Omari at al., 2019; Moni and Lion, 2014). It is stated that with the Covid-19 pandemic affecting the world, the risk of causing negative consequences may increase in people with HIV-related immune dysfunction (Williamson at al., 2020). Studies have revealed that the risk of dying from COVID-19 among people with HIV is twice as high (Web 2, 2021). However, among the studies conducted, there are also studies stating that the Covid-19 pandemic does not affect individuals with controlled HIV infection more negatively than other individuals.

The World Health Organization (WHO) HIV 2016-2021 global health sector strategy aims to reduce the number of new HIV infection cases and AIDS-related deaths below 500,000 by 2020. In the AIDS 2021-2026 global health sector strategy, it is aimed that the number of new HIV infections will fall below 370,000 by 2025, and AIDS-related deaths will fall below 250,000 by 2025. The 2030 goal is to reduce both the number of new HIV infections and the number of AIDS-related deaths by 90%. As the WHO 2030 sustainable development goal, it aims to eradicate the HIV epidemic in all countries (WHO, 2021b).

It is estimated that there are 38 million people living with HIV worldwide in 2019. About 1.7 million people are infected with HIV. In the same year, approximately 690,000 people died due to HIV-related diseases. These data reveal that the goals set by WHO have not been achieved.

The fact that there is no definitive treatment method yet, the drugs used aim to increase the life expectancy and quality of life of the infected individual and the fact that it brings together problems such as social, economic, human rights and discrimination in society causes AIDS to reach unexpected dimensions. This shows that HIV/AIDS will continue to be one of the major social, economic and health problems in the world.

HIV/AIDS cases were first reported in Turkey in 1985. Factors such as the young population of the country, the lack of sufficient information about sexually transmitted diseases, improved tourism opportunities, the high number of Turkish population abroad have increased the number of HIV/AIDS cases in Turkey (Akın, 2007).

In line with the notification and notification system of communicable diseases, HIV/AIDS has been added to the notifiable diseases category and infection-specific surveillance has been initiated since 1994. HIV/AIDS surveillance is important to identify the need for HIV/AIDS intervention programs, allocate resources during planning, monitor the effectiveness of prevention and controll measures and response strategies, identify target population groups at high risk, lead studies on risk factors for the spread of the virus and progression to AIDS. Within the scope of the developed Turkey HIV/AIDS Control Program, reducing the number of HIV/AIDS new cases and deaths due to infection, improving the capacity of health services for HIV/AIDS, and preventing discrimination and violations of privacy against individuals living with HIV have been determined as the main objectives (T.R. Ministry of Health, 2019).

By combining surveillance data in one center, it will be possible to prevent possible outbreaks by determining the epidemiology and risk points of infection. It should not be forgotten that surveillance studies are also a source of motivation in health studies. However, diseases such as AIDS, which started in developed countries and spread rapidly to other countries, should be followed with special attention before they reach the epidemic level in the society. The importance given to the surveillance of HIV infection will make it easier to detect the changes in its spread early and to take it under control. Therefore, WHO recommends the use of a second generation surveillance system in the surveillance of HIV infections. The purpose of this type of surveillance, which is a mixed system is;

- To make sense of trends for future periods
- Directing studies to groups at high risk of infection
- Identifying behaviors that will facilitate the spread of infection
- Effective use of surveillance data in planning

This system allows surveillance to be carried out on relevant people or groups representing the community and uses it as a method of obtaining data (Güler and Akın, 2006).

However, the surveillance system, which is the most important way of combating infectious diseases, cannot function properly due to not believing in its necessity in case reporting steps, seeing it as an increase in workload, political obstacles or drudgery (Kaya and Şahinöz, 2021) .

The aim of the research is to analyze the number of reported HIV/AIDS cases in Turkey from the perspective of disaster management and to contribute and goide the minimization of the damage caused by the epidemics in the society and to take the necessary precautions.

MATERIALS AND METHODS

This study is a descriptive and retrospective cohort study. The data of the study were obtained from the statistical annuals published regularly by the Ministry of Health (between 1985 and 2019) by the registry scanning method. The ethics committee permission was not obtained because it was not required.

This study was carried out between 09.07.2021-17.09.2021. In this study, the number of cases of HIV/AIDS disease, incidence rates (number of cases proportional to the population), case averages and incidence rates for each decade were calculated. Obtained HIV/AIDS data are presented in

groups in tabular form. Graphs have been drawn to make the data better understandable.

RESULTS

When the health statistics annuals published in Turkey are examined it is seen thatonly the number of AIDS cases and the incidence rate are published. There is no information about the age, gender, occupation, educational status, travel history, source of contamination, place of residence, treatment status, death and other characteristics of the cases. In addition, the fact that the number of HIV+ cases is not given in the statistical annuals published after 2010 also causes difficulties in determining the course of the disease. The total number of cases (new+old) in the country is unknown. Due to this lack of data, it is not possible to conduct a risk analysis for the country and society.

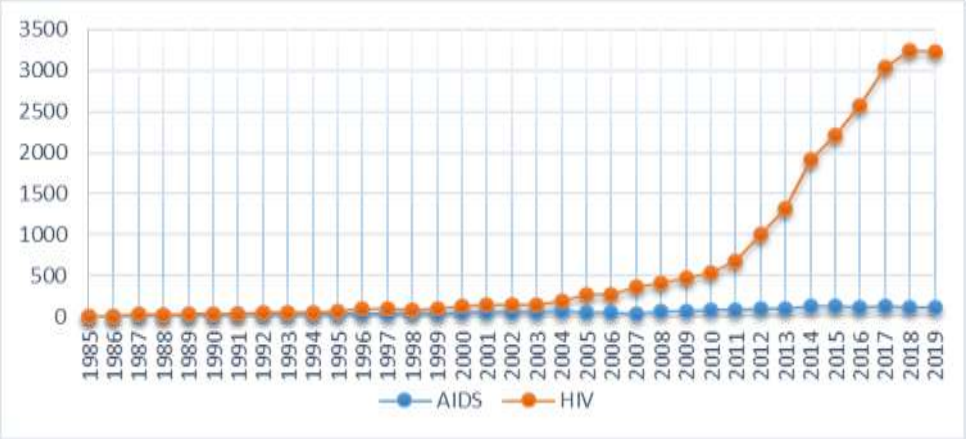
Table 1 shows the distribution by years and 10-year averages of a total of 24,881 HIV/AIDS cases reported by the Ministry of Health in all statistical annuals.

Table 1. Number of New HIV/AIDS Cases Reported Between 1985 and 2019 and Ten-Year Averages.

Years	AIDS	HIV	Total	Years	AIDS	HIV	Total
				2000	45	123	
				2001	45	145	
				2002	43	144	
				2003	47	142	
				2004	60	183	
1985	3	0		**2005**	48	262	
1986	1	2		**2006**	46	269	
1987	9	35		**2007**	25	365	
1988	11	22		**2008**	55	406	
1989	11	25		**2009**	69	468	
Average	**7**	**17**		**Average**	**48**	**251**	
1990	13	24		**2010**	73	539	
1991	24	30		**2011**	80	676	
1992	32	41		**2012**	97	997	
1993	34	50		**2013**	101	1315	
1994	37	50		**2014**	131	1917	
1995	28	60		**2015**	122	2216	
1996	35	98		**2016**	105	2567	
1997	38	101		**2017**	125	3044	
1998	42	84		**2018**	108	3248	
1999	29	100		**2019**	112	3229	
Average	**31**	**64**		**Average**	**93**	**1884**	
				Overall Total	**1884**	**22977**	
				Total Average	**45**	**554**	

The number of HIV/AIDS cases reported to the Ministry of Health from 1985 to 2019 in Turkey is 24,881. Of these cases, 1,884 are AIDS, and 22,977 are HIV (+). The period with the highest ten-year average (average of 93 cases) is between 2010-2019. The trend between 2010 and 2019 is upwards. In terms of disaster management, this trend should be evaluated and AIDS should be fought effectively.

For the last 20 years, 5-year HIV/AIDS Strategic Plans have been prepared in Turkey. However, the increasing number of new cases suggests that this plan is insufficient in the action phase.



Graph 1. Distribution of Reported HIV/AIDS Cases by Years

When the total HIV/AIDS cases reported to the Ministry of Health between 1985-2019 were examined, the number of cases, which remained horizontal until the beginning of the 2000s, increased rapidly in the following years. 2014 was a year with rapid rises in both HIV (+) and AIDS.

DISCUSSION

HIV/AIDS is one of the diseases that threaten human life. It is likely to threaten the world population for a long time to come, as there is still no cure. When the course of HIV/AIDS in Turkey is examined, it is seen that the number of cases has increased rapidly from the first case (1985) to 2019. When the trend of the number of cases reported in Turkey is examined, a rapid increase has been observed in the number of cases, which remained horizontal until the 2000s. The number of reported cases after 2014 continued to increase exponentially. When the ten-year average of reported cases is taken, the years with the highest average are between 2010-2019. Although the number of cases in many parts of the world is on a downward trend, the increase in the number of cases in Turkey makes HIV/ AIDS mandatory in terms of disaster management. In the event of a possible epidemic in the society, it has the risk of reaching the size of a disaster by causing great social, economic and health problems.

Countries with a high incidence (more than 20 per 100,000) of newly diagnosed HIV in 2019 are the Russian Federation (54.9), Ukraine (39), the Republic of Moldova (22.8) and Belarus (22.6) (WHO, 2020b).

Newly diagnosed AIDS cases vary widely between countries. The countries with the highest incidence (3 per 100,000 and above) in 2019 are Ukraine (17.9), Republic of Moldova (7.0), Georgia (6.6), Armenia (5.8), Latvia (4.7) and Belarus (4.0). Countries with low incidence (less than 0.3 per 100,000) are Slovakia (0.1), Germany (0.1), Ireland (0.1), Bosnia and Herzegovina (0.2) and Poland (0.2). In 2019, there were 0 reported cases in Malta and San Marino. Turkey AIDS data for 2019 includes only those (0.1) who were diagnosed with AIDS at the time of HIV diagnosis (WHO, 2020b).

According to the findings we obtained in our study, HIV/AIDS incidence in Turkey is well below the general average of WHO European Region countries, OCED countries and European Union countries. This situation reveals that Turkey has a lower risk of HIV/AIDS epidemic compared to WHO European Region countries, OCED countries and European Union countries.

Increases in HIV/AIDS cases in East-Central Asia and Eastern Europe are noteworthy. The number of HIV carriers in East Asia increased by 50% between 2002 and 2004. In this increase, China's contribution to the expanding HIV epidemic seems to be great. A 40% increase was observed in Eastern Europe and Central Asia. The reason for this increase is the re-emergence of the epidemic in Ukraine and the increase in HIV carriers in Russia. The region with the highest HIV epidemic is Sub-Saharan Africa.

In 2009, WHO reported that the AIDS pandemic was declining (Tümer and Ünal, 2016). However, when the 2016 data of the USA is considered, it has been reported that the HIV diagnosis rate is 5.4 per 100,000 for the total population (CDC, 2016). In the data of the study, the HIV diagnosis rate for the same year is approximately 3.21 per 100,000. This reveals that the incidence of HIV is lower than in the USA.

In Brazil, where the first AIDS case was detected in 1980, more than 900,000 AIDS cases were reported by June 2018. As of 2017, 866,000 people were living with HIV/AIDS. Considering the incidence of HIV in 2017, this rate is 400 per 100,000 in the general population. While the incidence of AIDS in Brazil was 21.7 per 100,000 in 2012, this

rate decreased to 18.3 per 100,000 in 2017 (Benzaken at al., 2019). This situation can be considered as positive responses to policy changes of the Department of Sexually Transmitted Diseases (STD), HIV/AIDS and Viral Hepatitis (DIAHV) of the Brazilian Ministry of Health. In the data of our study, the incidence of AIDS in 2016 is approximately 0.1 per 100,000. This situation shows that the incidence of AIDS in Turkey is lower than in Brazil. In other words, the risk of HIV/AIDS becoming a disaster in Brazil is higher.

According to the European HIV/AIDS Surveillance Report for 2020, HIV continues to spread in countries in the WHO European Region. In 2019, 136,449 new HIV+ cases were reported in the WHO European Region, with a ratio (incidence) of 15.6 per 100,000 population. The number of new AIDS cases in the same year is 12,535 and its ratio (incidence) per 100,000 population is 2. When the data are examined, the incidence of HIV/AIDS in Turkey remains below the WHO European average.

Since the beginning of the epidemic, 36.3 million (27.2 million-47.8 million) people have died from AIDS-related diseases. In 2020, there were 37.7 million people living with HIV, of which 36 million were adults. In 2020, about 6.1 million people in the world did not know that they were living with HIV (Web 2,2021).

The population of Turkey has a younger population compared to the European Union countries. While the young population between the ages of 15-24 is 15.4 % in Turkey, this rate is 10.6% in the European Union countries (TUİK, 2021). According to the WHO's 2020 report, 1.3 million of the 1.5 million newly diagnosed with HIV constitute the population older than 15 years of age. In the case of the spread of the disease between the ages of 15-24, it will cause serious workforce losses. This situation may invite social disasters by causing economic damages in the society.

It is stated that the Covid 19 pandemic affects HIV/AIDS patients more. However, no study has been found in Turkey investigating the effects of the Covid 19 pandemic on HIV/AIDS patients.

CONCLUSIONS

There has been a rapid increase in HIV/AIDS cases in Turkey since the beginning of the 2000s. By 2014, the increase in the number of cases continued exponentially. While the number of cases in the world has a decreasing curve, there is an increase in Turkey. The young population of Turkey brings the risk of a possible epidemic. HIV/AIDS is not only a health problem, but also a social problem that concerns the whole society and every individual in the society. For this reason, it is important to be informed correctly about the disease, to be conscious, and to learn how to prevent it. Although targets are set for the eradication of HIV/AIDS, it does not seem possible to realize these targets in the near future. There is a risk that HIV/ AIDS may become an epidemic in the society and reach the level of disaster. This disaster situation also poses a risk of causing possible secondary social disasters by threatening the young population. All relevant stakeholders should be included in the fight against the epidemic, taking into account the cultural, economic and socioeconomic conditions. HIV/AIDS patients should be included in the risk group for new and reoccurring epidemics. The HIV/AIDS management system needs to be developed in order to be fully aware of the threat posed by the disease and, consequently, to take necessary measures to combat it.

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Examination of Efficiency Change of Provincial Hospitals in Azerbaijan with Malmquist Index

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ABSTRACT

The level of development in health is an important criterion for countries. In a study aimed at measuring the performance of the health system in Azerbaijan on a provincial basis, the change in health efficiency of 56 cities between 2015-2019 was analyzed with the Malmquist Total Factor Productivity Index (MPI). As an input variable, the number of hospital beds, the number of health workers and the number of physicians were used in the provinces. The values used in input variables are figures per 10,000 people. As an output variable, the number of deaths of infants (under 1 year old), the number of deaths and the number of outpatient clinics were determined. The values used in the output variables are figures per 1000 people. The average MPI scores of the provinces covered by the study were 0.998 in 2015-2016, 1.002 in 2016-2017, 1.036 in 2017-2018 and 1.027 in 2018-2019. Out of the sample cluster of 56 provinces, Total Factor Productivity (TFP) increased in 36 (64.29%), remained constant in 1 (1.79%) and decreased in 19 (33.93%). Furthermore, TFP values were highest in Gazakh (20.6%), Aghdam (12,7) and Dashkesen (12,2). As a result of the study, it was found that there was an increase in productivity levels during the time period when the health performance of the provinces in Azerbaijan was evaluated. For this reason, it is proposed to develop actions and policies aimed at improving performance in low-productivity provinces and to allocate resources taking into account social needs.

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INTRODUCTION

Health as an important service area is directly related to human and community life. On the other hand, it also affects economic performance as a whole through investment, employment and production. When the direct and indirect effects are calculated, the value of knowing the efficiency levels of hospitals that are enterprises of the health sector is revealed. Because public hospitals use public resources. It is necessary to determine how efficiently they use this resource and to know their efficiency by comparing them with the increasing number of private health organizations. The data obtained will contribute to the evaluation of policies (Kutlar and Salamov, 2016). In developing countries, 30-50 percent of health spending should be used in hospital services. In addition, factors such as diversity in per capita service use, population growth and prices lead to an increase in hospital spending (Raei et al., 2017).

Performance measurement and control in health can achieve success with a good understanding of the role of the systems used, development by experienced people and participation of the entire organization (Tengilimoglu et al., 2017). There is little consensus on the philosophy of measurement, analysis techniques, or how to report data on health performance. Although measurements add new costs to the health system, demands for data and information are expected to increase in the future (Loeb, 2004). By measuring the organization, it can be understood how good or bad performance is based on internal and external criteria. Then necessary steps must be taken to meet the goals (Henri, 2004). Maximum attention should be paid to creating performance criteria, and variables that best reflect goals should be selected.

High productivity means being able to produce more with equivalent resources (Prokopenko, 2011). The main indicator of performance in Normal businesses is profit. In non-profit public sector organizations, performance criteria vary due to the fact that they have subunits located throughout the country, work for the purpose of serving the public, differences in management and supervision. For these reasons, analysis needs to be done in more detail (Şahin, 1999).

There are various studies in the literature on the analysis of hospital productivity changes with MPI. Among them, some studies conducted in recent years have been studied. TFP analysis of hospitals in Azerbaijan with data from 2009-2013 was conducted by Kutlar and Salamov (2016). Yildirim, Kaçak and Yildirim (2018), they performed MPI analysis in 260 hospitals in Turkey in 2011-2013. Dirik and Sahin (2020) calculated the productivity change of health services in Turkey in the period 2012-2016 by MPI analysis. Yüksel and Yiğit (2020) conducted TFP analysis of 46 oral and dental health centers in Turkey in 2014-2018. Mollahaliloglu et al. (2018) conducted a study with MPI analysis to examine the results of the health transformation program in Turkey. Efficiency measurements of hospitals in the USA for the period 1985-1988 were made by Burgess and Wilson (1995) using MPI analysis. Similarly, China made various reforms in the health system and public hospitals in 2009 and 2012. Li et al. (2017) conducted a study in Anhui province with DEA and MPI analyzes to examine the results of these reforms. A study was conducted by Raei et al. using DEA and MPI to examine how 11 hospitals in Yazd province in Iran were affected by the health transformation program between 2011 and 2016.

Improving the quality of health services (within the limits of acceptable cost) is one of the responsibilities that countries must achieve. performance in health care needs to be evaluated closest to the objective. When the literature is examined, it has been seen that there are a limited number of studies in which the health efficiency changes in recent years have been studied specifically in Azerbaijan. In this study, it was aimed to compare the health performance of Provinces in Azerbaijan with the Malmquist total factor productivity index (MPI) technique using the latest data.

The research consists of 5 sections. After the introduction part of the study, there is a material and method section where information about the variables used in the research is also included. In the third section, the findings obtained as a result of the analysis are interpreted. In the discussion area, which is the fourth section, this study is compared with other articles in the literature. In the fifth and last section, the results are presented.

MATERIALS AND METHODS

In the health needs of the population living in cities, service providers perform important tasks. The level of development in the health sector is one of the important conditions in their relationship between countries. In order to compare health service assessments, performance measurement tools are needed in addition to reliable data.

The study examined 56 provinces in Azerbaijan. It is aimed to compare the provinces over the years with the health indicators between 2015-2019. Data is taken from the website of the State Statistical Committee of the Republic of Azerbaijan (ACDIK, 2020). Ethics committee approval was not required, as data from the statistical agency was used retrospectively in the study. In the study, the number of hospital beds, the number of health workers and the number of physicians were used as input variables. The values used in input variables are figures per 10,000 people. As an output variable, the number of deaths of infants (under 1 year old), the number of deaths and the number of outpatient clinics were determined. The values used in the output variables are figures per 1,000 people. In order for the difference between large cities and small cities not to affect the results of the research, the variables were selected to be 1,000 and 10,000 per person. In addition, since the increase in infant death and overall death numbers reflects a negative state, the opposite (1/output variable) was included in the analysis. In determining input and output variables, past studies found in the literature were examined and cities whose data could be accessed over a 5-year period were selected. When determining the input and output variables, it was based on the research conducted using the MPI method of changing the effectiveness of the health sector. A brief summary of the input and output variables used in the literature is presented in Table 1.

Table 1. Input and Output Variables in the Literature

Authors	Input Variables	Output Variables
Burgess and Wilson (1995)	The number of acute-care hospital beds, Number of long-term hospital beds, Registered nurses, Measured in full time equivalents, Licensed practical nurses, Measured in full-time equivalent, Other clinical labor, Nonclinical labor measured in full-time equivalents, Long-term care labor measured in full-time equivalents	Acute care inpatient days, Case-mix weighted acute care inpatient discharges, Long-term care inpatient days, Number of outpatient visits, Ambulatory surgical procedures,Inpatient surgical procedures
Kutlar and Salamov (2016)	Number of physicians, Number of medical practitioner, Number of auxiliary medical personnel, Total number of hospital beds, Number of occupied hospital beds	Number of patients examined, Total number of operations, Number of patients discharged
Raei et. al. (2017)	Number of physicians, Number of nonphysician staff, Number of hospital beds	Number of admissions, Number of mortalities per hospital
Li et al. (2017)	Number of actual doctors, Number of actual nurses, Actual number of beds, Total expenditure	Number of emergency visits, Number of discharged, Number of hospitalized patients
Yildirim et al. (2018)	Number of specialist physicians, Number of medical practitioners, Number of auxiliary medical personnel, Number of hospital beds	Number of patients discharged, Day of hospitalization, Number of operations
Mollahaliloglu et. al (2018)	Number of beds, Number of specialists, Number of practitioners	Number of outpatient visits, Number of inpatient days (1/GDR), Total adjusted surgical procedures
Şahin and İlgün (2019)	Number of hospital beds, Number of doctors, Number of nurses and midwives, Number of other health care personnel	Number of polyclinic admissions, Number of inpatients, Number of surgeries, Crude mortality rate
Çağlar ve Keten (2019)	Number of specialist physicians, Number of practitioners+assistant physicians, Number of dentists, Number of pharmacists, Number of nurses, Number of midwives, Number of other health personnel	Life Expected at Birth, Brute Death Rate, Infant Mortality Rate
Dirik and Şahin (2020)	Number of specialist physicians, Number of general practitioners, Number of nurses and midwives, Number of other health personnel, Number of beds	Number of operations, Number of inpatients, Number of outpatients
Yüksel and Yiğit (2020)	Number of units, Total number of dentists	Number of tooth extractions, Number of conservative treatments, Number of endodontic treatments, Number of fixed prosthetic patients, Number of removable prosthetic patients
Torun, Ayanoğlu and Atan (2020)	Raw materials and supplies costs, Personnel salaries and benefits, Outsourced benefits and services costs, Other miscellaneous costs, Public shares, Amortization and depletion allowances	Outpatient revenues, Inpatient revenues, Other revenue

Authors	Input Variables	Output Variables
Torun, Atan, and Ayanoğlu (2020)	Raw materials and supplies costs, Personnel salaries and benefits, Outsourced benefits and services costs, Other miscellaneous costs, Public shares, Amortization and depletion allowances	Outpatient revenues, Inpatient revenues, Other revenue
Dirik and Sahin (2020)	Number of specialist doctors, Number of medical practitioners, Number of nurses, Number of auxiliary health workers	Number of operations, Number of inpatients, Number of outpatients
Baş Kaman and Yücel (2021)	Population density, The ratio of health expenditures to Gross Domestic Product, The total number of health workers per 1000 people	deaths of healthcare workers per million people, Number of cases
Ömürbek, Altin, Şimşek, and Eren (2021)	Number of hospitals, Number of beds, Number of intensive care beds, Number of family medicine units, Total number of physicians, Number of dentists, Number of nurses, Number of midwives, Number of other health personnel	Primary care application, Second and tertiary applications, Number of hospitalized patients, Number of hospitalized days, Number of operations, Bed occupancy rate, crude death rate

In this study, it was assumed that the efficiency levels of the provinces can be measured by determined variables. In addition, the period 2015-2019 covered by the study was considered sufficient in terms of being able to reveal time-dependent productivity changes. Efficiency change scores were obtained using input and output variables used in the scope of the research. It should be noted that the results may also change according to the variables that will be included or subtracted from the analysis.

It is possible to collect performance measurement methods under three main headings: ratio analysis, parametric methods and nonparametric methods (Kutlar et al. 2004). In this study, input-oriented and constant return to scale MPI analysis were used. In the health sector, input oriented technique is preferred due to the difficulties and complexity of changing outcomes.

Detecting performance changes over time is very important in health care. MPI is a method that allows performance in healthcare facilities to be compared from one period to another (Ozcan, 2014). This method, which follows the change of decision-making units (DMUs) in total factor efficiency (TFP), is divided into catch-up/recover and Frontier-shift (at the production limit). The capture (recovery) component refers to the level the DMU needs to reach in order to increase its effectiveness. The frontier shift component reflects the change in the effective production boundary surrounding the DMU between two time periods (Tone, 2004). Table 2 shows the codes and meanings used in MPI.

Tablo 2. MPI Codes and Meanings

Code	Meaning of Code
effch	Technical Efficiency Change
techch	Technological Change
pech	Pure Technical Efficiency Change
sech	Scale Efficiency Change
tfpch	Total Factor Productivity Change

Source: (Coelli, 1996).

When a technology treats the t period as a reference technology, it can be written as follows for the output-oriented Malmquist TFP change index s (base period) and t periods. X input, y output shows the yield change from t time zone to t+1 time (Coelli, et al., 2005);

$$m_0^t(y_s, x_s, y_t, x_t) = \frac{d_0^t(y_t, x_t)}{d_0^t(y_s, x_s)} \quad (1)$$

Alternatively, if the period s is examined, the calculation changes as follows:

$$m_0^s(y_s, x_s, y_t, x_t) = \frac{d_0^s(y_t, x_t)}{d_0^s(y_s, x_s)} \quad (2)$$

As can be seen from the above equations,the notation $d_0^s(y_t,x_t)$ shows the production from the t period to the s period. The change in efficiency refers to the ratio of technical efficiency in the t period to technical efficiency in the s period (Candemir and Deliktas, 2006).

$$\text{efficiency change (effch)} = \frac{d_0^t(y_t, x_t)}{d_0^s(y_s, x_s)} \quad (3)$$

$$\text{Technological Change (techch)} = \left[\frac{d_0^s(y_t, x_t)}{d_0^t(y_t, x_t)} x \frac{d_0^s(y_s, x_s)}{d_0^t(y_s, x_s)}\right]^{1/2} \quad (4)$$

The technical change in MPI is due to the change in pure technical efficiency and the change in scale efficiency (effch=pech*sech) (Flokou, Aletras, & Niakas, 2017). In the equation below, obtaining the TFP change by multiplying the technical efficiency change and the technological change (Fare, Grosskopf, Norris, & Zhang, 1994) is expressed mathematically. MPI can be expressed as the effect of catch-up the best production limit for each observation between periods s and t (Özcan, 2014).

tfpch=effch*techch (5)

In MPI, the change index in TFP in the period from s to t indicates that it is greater than 1, its efficiency increases, and this value is less than 1.

RESULTS

Minimum, maximum, average values and standard deviation statistics of input and output variables used in the study are presented in Table 3.

Table 3. Input and Output Variables Statistics

Year	Items	Inputs			Outputs		
		Number of physicians	Number of health workers	Number of hospital beds	Number of outpatients	Number of deaths	Number of deaths of infants
2016	Max.	89,70	96,90	96,10	234,40	8,00	21,50
	Min.	6,50	19,00	7,80	33,20	4,20	1,50
	Avg.	17,13	46,32	30,64	93,99	5,98	9,06
	Std. Dev.	12,56	17,46	18,22	40,56	0,81	3,69
2017	Max.	88,96	98,82	94,74	231,60	8,10	20,00
	Min.	6,16	19,01	7,76	32,96	4,10	1,50
	Avg.	16,51	45,54	30,18	93,07	6,09	9,98
	Std. Dev.	12,53	17,43	18,23	39,92	0,84	4,02
2018	Max.	88,82	90,76	93,64	229,24	8,30	18,80
	Min.	6,35	18,45	14,19	32,76	4,40	1,60
	Avg.	15,88	43,62	29,20	90,05	6,06	10,38
	Std. Dev.	12,26	17,05	16,56	36,70	0,82	3,62
2019	Max.	91,60	96,30	92,60	227,90	8,10	19,70
	Min.	6,10	18,30	14,00	32,60	4,40	2,30
	Avg.	15,56	42,96	28,64	88,91	6,01	10,92
	Std. Dev.	12,61	17,17	16,56	36,86	0,83	4,19
2020	Max.	89,10	98,70	91,60	225,70	7,90	28,30
	Min.	5,40	19,10	13,80	32,40	4,20	2,10
	Avg.	15,08	43,70	28,49	88,18	5,81	11,05
	Std. Dev.	12,41	17,22	16,47	36,81	0,76	5,30

In MPI analysis, productivity scores and averages of cities in Azerbaijan were examined separately. Changes in cities over time have been determined with consecutive 5-year data for 2015-2019 years. The summary of the MPI analysis is shown in Table 4.

Table 4. MPI Averages by Year

Year	effch	techch	pech	sech	tfpch
2015-2016	1,015	0,983	1,01	1,005	0,998
2016-2017	1,073	0,934	1,026	1,045	1,002
2017-2018	0,958	1,082	0,986	0,971	1,036
2018-2019	1,055	0,974	1,04	1,014	1,027
Mean	1,024	0,992	1,016	1,008	1,016

In other periods other than 2017-2018, the decrease in technological change appears to have contributed to the change in TFP. In the 2017-2018 period, there was only a positive shot in technological change, while there was a decrease in all other factors. The 3.6% increase in TFP over the period 2017-2018 is due to technological change. Similarly, the decrease in TFP over the period 2015-2016 was due to the approximately 2% decrease in TFP. The average values of all time periods were; technical efficiency change 1.024, technological change 0.992, pure technical efficiency change 1.016, scale efficiency change 1.008 and TFP 1.016. There is no period when all activity values are above 1. Since the 0.2% change observed in TFP in 2015-2016 and 2016-2017 is very close to 1, it can be interpreted as stagnation in the activity change.

Table 5. MPI Summary of City Means

Cities	effch	techch	pech	sech	tfpch
Absheron	0,957	0,892	0,969	0,987	0,853
Agdash	1,105	1,004	1,125	0,983	1,110
Aghdam	1,116	1,009	1,091	1,023	1,127
Agjabedi	0,968	1,026	0,99	0,978	0,994
Agstafa	1,015	0,984	0,976	1,040	0,999
Agsu	0,949	1,021	0,990	0,959	0,969
Astara	1,007	1,001	0,997	1,010	1,008
Baku	0,979	1,004	0,981	0,997	0,983
Balaken	1,014	0,987	0,995	1,019	1,001
Barda	1,033	1,017	1,049	0,986	1,052
Beylagan	1,027	1,019	0,996	1,031	1,046
Bilasuvar	0,993	1,035	1	0,993	1,028
Dashkesen	1,046	1,073	1,029	1,017	1,122
Fizuly	1,030	1,022	1,029	1,001	1,053
Gabala	1,031	0,953	1,017	1,013	0,982
Gakh	1,092	0,990	1,066	1,025	1,081
Ganja	1,007	0,994	1,006	1,001	1,001
Gazakh	1,290	0,935	1,255	1,027	1,206
Gedabey	1	0,919	1	1	0,919
Gobustan	0,998	1,021	0,994	1,004	1,020
Goranboy	1,041	0,986	1,003	1,038	1,026
Goychay	1,080	0,953	1,060	1,019	1,029
Goygol	0,991	1,031	0,990	1,001	1,022
Guba	1,001	1	0,989	1,012	1
Gusar	1	0,98	1	1	0,980
Hajigabul	1,074	1,036	1,060	1,013	1,113
Imishly	0,970	1,038	0,997	0,973	1,006
Ismayilly	0,982	1,029	0,971	1,011	1,010
Jalilabad	1,011	1,010	1	1,011	1,021
Khachmaz	0,992	1,009	0,984	1,009	1,001
Kurdamir	0,944	1,036	0,943	1,001	0,978
Lankaran	1,048	0,932	1,040	1,008	0,977
Lerik	1	1,025	1	1	1,025
Masally	1	0,963	1	1	0,963
Mingechevir	0,985	0,985	0,963	1,023	0,970
Nakhchivan AR	1	0,935	1	1	0,935
Neftchala	1,018	0,982	1,011	1,007	0,999
Oghuz	0,989	0,999	0,992	0,997	0,987
Saatly	1,011	0,978	1,010	1	0,988
Sabirabad	1	1,006	1	1	1,006
Salyan	1,002	1,012	1,006	0,996	1,014
Samukh	1,060	0,966	1,006	1,054	1,025
Shabran	1,018	1,022	0,984	1,035	1,04
Shamakhy	1,039	0,986	1,027	1,012	1,024
Shamkir	0,944	0,968	0,927	1,019	0,914
Sheki	0,989	1,022	0,988	1,001	1,011
Shirvan	0,990	0,996	0,989	1	0,986
Siyazan	1,050	0,897	1,068	0,984	0,942
Sumgait	1,051	0,964	1,043	1,007	1,013
Terter	1,064	0,99	0,999	1,065	1,054
Tovuz	1,170	0,941	1,107	1,057	1,101
Ujar	1,003	0,998	1,014	0,989	1,001
Yardymly	1	1,016	1	1	1,016
Yevlakh	1,072	0,975	1,057	1,015	1,045
Zagatala	1,081	0,993	1,079	1,002	1,073
Zardab	1,104	1,011	1,076	1,026	1,116
MEAN	**1,024**	**0,992**	**1,016**	**1,008**	**1,016**

Table 5 summarizes the 5-year MPI score averages of the provinces. In 37 of the 56 provinces, tfpch values are greater than 1 or 1. In Absheron, Mingechevir and Oghuz provinces, all efficiency scores were below 1. In Absheron, the province with the lowest TFP score-there is a decrease in TFP by -14.7%. The provinces with the greatest increase are Gazakh (20.6%), Aghdam (12.7%), Dashkesen (12.2%), Zardab (11.6%), Hajigabul (11.3%), Agdash (11%)) and Tovuz (10.1%). The increase or decrease in technological change in Nakhchivan, Gedabey, Gusar, Masally, Sabirabad, Yardymly and Lerik directly affected TFP change. There is a decrease in technical efficiency change in 16, technological change in 29, in pure technical efficiency change in 22, and in scale efficiency change in 12 provinces.

DISCUSSION

There are many studies in the literature on the analysis of hospital efficiency changes with MPI. Among them, some studies conducted in recent years have been studied. TFP analysis of hospitals in Azerbaijan with data from 2009-2013 was conducted by Kutlar and Salamov (2016). According to the study results, the score of TFP in 2009-2010 and 2011-2012 is above 1. In 2010-2011 and 2012-2013, it was below 1. There are 8 provinces with the highest TFP score. These provinces; Beylagan (20.3%), Gazakh (20.3%), Saatly (20.6%), Tovuz (21.1%), Agstafa (24.0%), Neftchala (25.8%), Oghuz (26.1%) and Astara (27.8%). In the study, which examined 55 provinces, it was found that TFP increased in 50 provinces (90.9%) and decreased in 5 provinces (9.1%). In this study, in which a more up-to-date time period was investigated, 56 provinces were examined and the number of provinces examined is approximately the same. It was found that TFP increased in 36 out of 56 provinces (64.29%). In more provinces, there is a decrease in TFP. In addition, it was similarly observed that TFP increases in Gazakh and Tovuz provinces continued in both studies. In addition, in this study, it was found that TFP significantly increased in the cities of Aghdam, Dashkesen, Zardab, Hajigabul and Agdash. It can be said that the positive developments in the health outcomes of these provinces are continuing. Additionally, it was found that there was no increase in TFP in Baku and Ganja, the major cities of Azerbaijan, on the contrary, there was a decrease in Baku. As the main reason for this, it can be said that the vast majority of the population is concentrated in these cities. In addition, the presence of many public and private hospitals in Baku also leads to this result. The findings of this study coincide with the results of the research conducted earlier in Azerbaijan by Kutlar and Salamov (2016).

Yildirim, Kaçak and Yildirim (2018); they performed MPI analysis in 260 hospitals in Turkey in 2011-2013. In the study results, it was understood that TFP increased in 146 hospitals (56%), 6 (2%) remained stable and decreased in 108 (42%). Dirik and Sahin (2020) calculated the productivity change of health services in Turkey in the period 2012-2016 by MPI analysis. In the findings determined by the radial MPI model, it was observed that health care TFP scores decreased for the provinces in the first and second group in the period 2012-2016. During the same period, it was found that it did not change for the provinces in the third group. In the non-radial MPI model, it was determined that the TFP scores of the provinces in the first group remained constant, and the scores of the provinces in the second and third groups fell.

Yüksel and Yiğit (2020) conducted TFP analysis of 46 oral and dental health centers in Turkey in 2014-2018. As a result of the study, which included 46 oral and dental health centers, TFP scores increased in 34 (73.9%) and decreased in 12 (26.1%). It was also found that the TFP average was below 1 in 2014-2015 and above 1 in other periods. Mollahaliloglu et al. (2018) in the study conducted with MPI analysis to examine the results of the health transformation program in Turkey; the results were found to have a positive effect on hospital efficiency. The years 2001-2009 were researched. In the study; it has been found that reforms that change hospital payments and physician compensation systems help efficiency, productivity and equity.

It has been determined that the data on the number of patients who have regained their health will benefit from obtaining healthier results (Burgess and Wilson; 1995). A similar study by Raei et al. to examine the before and after (2011-2016) of the health transformation program in Iran. The study was carried out in 11 hospitals of Yazd province. Input-oriented DEA and MPI analyzes were used. The results showed that there was a positive change in productivity in the majority of hospitals (%66) during the study period, except for the years 2014-2015. The geometric mean of the MPI showed a positive change in 2011-2012 and 2015-2016, and a negative change for the remaining periods.

In the article investigating various reforms in the health system and public hospitals in China in 2009 and 2012, Liv et al. (2017); It surveyed 12 hospitals in Anhui province with DEA and MPI analysis. TFP score of 5 out of 12 hospitals between 2010 and 2015 was found to be greater than 1. Over the same period, the average overall production efficiency is 0.983. It was concluded that the total factor productivity could not be improved. Compared to the research in China, it can be said that more negative results were obtained according to the results of our study, which examined the provinces in Azerbaijan.

In this study conducted in 56 provinces, it was observed that TFP increased in 36 (64.29%), remained constant in 1 (1.79%) and decreased in 19 (33.93%).

In addition, Gazakh (20.6%), Aghdam (12,7) and Dashkesen (12,2) are the provinces with the highest TFP value.

CONCLUSIONS

Due to increasing health expenditures in many countries every day, the concept of efficiency is gaining importance. Countries strive to provide their citizens with the highest quality health care services. The findings of this study, which attempts to draw attention to productivity differences between provinces, contain important information from the point of view of policy makers and health managers.

In this study, it was attempted to reveal the change in health efficiency of the provinces in Azerbaijan in the 2015-2019 period with the most current data available. Examining the results of the study, it was found that the decrease in TFP from the 4 periods between 2015-2019 was only in 2015-2016. The average MPI scores of the provinces covered by the study were 0.998 in 2015-2016, 1,002 in 2016-2017, 1,036 in 2017-2018 and 1,027 in 2018-2019. The TFP scores of the provinces in Azerbaijan have an average productivity increase of 0.16%.

Positive developments in health technologies, increase in the number of health workers, decrease in mortality rates and correct allocation of resources can be achieved by attracting productivity increases to higher levels. In addition, at the micro level, it may be recommended that those who hold executive positions in provinces retrospectively evaluate the health indicators of cities. By identifying the main problems that cause inefficiency, actions and policies should be developed to correct them. Based on the findings of the study, it can be said that the reform movements in the Azerbaijani health system in the period 2015-2019 had a positive effect on the efficiency of the provinces. In the study, the results were tried to be obtained with the help of determined input and output variables and a certain time period. In the future, studies can be conducted that investigate the performance levels of provinces in the Azerbaijani health system using empirical methods such as time series analysis.

It is believed that this research with current data will make various contributions to the literature. It is important for managers in the provinces or policymakers in the country to reveal the positive and negative consequences of their practices and policies.

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Examining of Health Policy in Rare Diseases in Terms of Historical Perspective in Turkey

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ABSTRACT

Compared with other common diseases in the general population, a rare disease is a health condition that affects a small number of people. The progressive, life-threatening and multi-dimensional nature of these diseases requires the development of an effective health policy. The aim of this study is to examine health policy for rare diseases from a historical point of view in Turkey. Public Health Law No. 1593 provides the basis for policies developed in the field of rare diseases. In the early 2000s, genetic screening programs have been launched (neonatal metabolic and endocrine disease, inherited blood diseases, biotinidase deficiency, phenylketonuria, congenital hypothyroidism, adrenal hyperplasia, cystic fibrosis, etc.). Since 2007, Turkey has been a member of Orphanet. The Draft Guide to Orphan Drugs was published by the Ministry of Health in 2009. Since 2014, the public authorities, universities and NGOs have been particularly interested in rare diseases. The civil society initiative 'Rare Diseases Network' was established in 2018 under the leadership of patients and their families. Some reports on rare diseases were published by TÜHKE and the TAÇESE in 2019. The Parliamentary Investigation Commission has been set up to determine the situation of some rare diseases. The Rare Diseases Department was established within the Ministry of Health in 2020. It is recommended that the National Action Plan on Rare Diseases and Orphan Drugs should be implemented to develop policies, in particular access to healthcare services and provide economic and psychosocial support.

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INTRODUCTION

The term 'rare disease' (RD) is used to describe diseases that occur in a small number of people in the general population of a society. These diseases are also referred to as orphan diseases. To define them in different parts of the world, different prevalence is accepted. For example, diseases are seen in 1/200.000 people in Europe, 1/2.500 people in Asia are classified as rare. On the other hand, the World Health Organization (WHO) considers RD to have a prevalence of between 6.5/100.000 and 1/100.000 (as cited in Numanoğlu, 2019). Rare Diseases Report published by Turkish Health Institutes *(Türkiye Sağlık Enstitüleri Başkanlığı) (TÜSEB)* in 2019, the prevalence of RD in Turkey is 38/100.000. (Satman et al., 2019). Despite the low incidence of RD, there are currently more than 10.000 different types of RD (Haendel et al., 2019) and about 400 million people worldwide are living with a rare disease (GARD, 2017). Approximately seven million people in Turkey have a rare disease (Satman et al., 2019).

The fact that most of them are of genetic origin, that they are chronic, degenerative, and progressive, and that they can be seen both in childhood and adulthood, are among the fundamental characteristics of RD (Shire, 2013; Pogue et al., 2017). Some serious problems are experienced by individuals with RD. The first of these relates to RD diagnosis. It is difficult to diagnose RD, and the diagnosis time is long, and these diseases can be misdiagnosed (EURORDIS, 2009). The absence of sufficient laboratory tests or imaging methods to diagnose RD is one of the reasons for this. The second problem relates to treatment (Ayme et al., 2008). In the treatment of RD, high-cost medical products called 'orphan drugs' are used. The production, procurement and health insurance coverage of orphan drugs is time-consuming and expensive (Linertová et al., 2017). The third problem is that the number of healthcare institutions and professionals working in the field of RD is limited (Dharassi et al., 2017). As a result, these diseases also affect the healthcare system and healthcare providers. The lack of RD knowledge, guidance, and training makes it more difficult to diagnose and treat these diseases. Another critical issue is the psychosocial difficulties arising from RD (Aujoulat et al., 2012). In patients with RD and caregivers, the quality of life decreases, economic problems are encountered, levels of stress, anxiety and depression, and the burden of caregivers increases (Anderson et al., 2013; Bogart & Irvin, 2017; Allotey et al., 2018).When all these factors are taken into account as a whole, RD is accepted globally as an important public health problem. In the field of RD, this situation requires the development of customized health policies.The aim of this study is to explore the historical perspective of health policies in Turkey with regard to RD. First of all, this study will highlight the basic principles of health policy, present health policy approaches related to RD, and provide information on the political actors in the field of RD.

The Background of Health Policy of Rare Diseases

When certain stages come together, policy formation occurs. This process is expressed by Tengilimoğlu and Güzel (2020) as The Stages Model in Health Policy Making.' These stages consist of four stages: Agenda Setting, Policy Formulation, Policy Implementation, and Policy Evaluation (Figure 1).

Figure 1. The Stages Model in Health Policy Making (Tengilimoğlu and Güzel, 2020)

Setting the agenda is the first step in policymaking. Considering a small number of issues out of many societal issues and potentially worthy of policymakers' consideration, the agenda setting (Buse et al., 2012; Princen, 2007). An important part of policymaking is the setting of agendas for politicians, authorities and interest groups. This stage is also important for the strategies that political actors pursue (Princen, 2007). Legislative and other decision-making bodies ensure the design of policies in the policy-making phase and manage the process of putting policies into practice (Walt et al., 2008).

Actors have an important role to play in the formulation of health policies. Actors who are often part of a network and influence the process of policy making can sometimes be part of a network and have the role of decision-maker or consultant at times. Legislative and executive bodies, the Ministry of Health, the judiciary, the political parties, the bureaucrats, the media, interest groups, non-governmental organizations and international organizations are key players in Turkey's health policy (Tengilimoglu and Güzel, 2020).

This will lead to the creation of a dynamic environment for the provision of healthcare services, in particular in the diagnosis and treatment processes, and to the definition of the health policy framework in RD (Pejcic et al., 2017). Forman et al. (2012) demonstrate that some key points are needed to adapt RD to health policies:

- Although its prevalence in the general population is low, RD, which affects about 8% of the

population, should be considered as a public health problem by health policy authorities.

- Attention should be paid to fairness and justice in accessing healthcare services for individuals with RD. It should be acknowledged that it is a human right to receive good healthcare for these patients and that special health policies should be developed to accommodate their requirements.
- Research and development activities in the diagnostic and treatment processes of RD should be effective. Countries should implement programs to support and encourage research and development (R&D) in the field of RD.
- Individuals with RD are struggling not only with medical problems but also with psychosocial and economic problems. There is therefore and the need for a comprehensive approach to service provision.
- Information is very important for healthcare professionals and patients/caregivers alike. It is therefore necessary to ensure a sustainable flow of information in the RD.
- Patient organizations are important to individuals with RD. Patient groups should be included at all stages of policy and service development.

A standard public health approach for other diseases that are common or tend to cluster may not apply to RD. Due to the limited number of diagnostic, treatment and rehabilitation services in the field of RD and the problems associated with how to reach a geographically dispersed patient population, it is necessary to develop service delivery systems that meet different needs. The development of health policies to support public health approaches aimed at reducing the burden of RD is at a crucial point.

The beginning of the RD International Health Policy Regulations is based on the Orphan Drug Act, published by the United States in 1983. The European Union (EU) countries, on the other hand, have been developing health policies for RD since 1990. Examples of such policies are the Community action program in the field of public health (2003-2008), the Community action program in the field of public health (2008-2013), the Rare Diseases Task Force, the European Union Committee of Experts on Rare Diseases (EUCERD), the Research Framework Programmes, ERN and EUROPEAN (Orphanet, 2013). There are also health policies in Turkey in the field of RD. The aim of this study is to reveal the historical perspective of the relevant health policies with RD in Turkey. In this study, RD health policies in Turkey will be outlined to cover the 1930-2000, 2000-2015, and post-2015 periods.

Historical Development of the Health Policies of Rare Diseases in Turkey

Health policies for RD developed in Turkey have evolved since the 1930s. In this part of the study, health policies in the field of RD are reviewed to cover the period 1930-2000, 2000-2015 and post-2015.

1. Health Policy of Rare Diseases between 1930-2000

The origin of RD health policy in Turkey is based on the early years of the Republic. Public Health Law *(Umumi Hıfzıssıhha Kanunu)* No. 1593, first published in 1930, provides a framework for the delivery of healthcare services. The legal regulation has established the infrastructure of the services to be provided for the diagnosis, treatment and rehabilitation of diseases. It is emphasized that various screening programs should be prepared in particular for the early diagnosis of diseases in children.Among all the motivations behind the implementation of these screening programs are to understand what is causing RD, to identify people suspected of RD, and to provide early diagnosis. Screening programs have begun to be developed to diagnose RD seen in childhood and to extend over the years to include larger parts of the community.

The Ministry of Health is continuing studies under the 'Neonatal Metabolic and Endocrine Disease Screening Program.' The first of the studies carried out under the newborn screening programs is the Phenylketonuria Screening Program, which was launched in 1987. In 1993, the program was spread across the country. A blood sample is taken from the heel stick test for newborns in the screening program and the level of phenylalanine in the blood is checked. If the level of phenylalanine is high, a special feeding program is applied to infants (General Directorate of Public Health, 2018).

Another important area in the diagnosis of RD is related to hereditary blood diseases. These practices are based on Combating Hereditary Diseases (*Kalıtsal Hastalıklarla Mücadele Kanunu)* Law No 3960, which has been introduced in 1993. Within the context of this legal regulation, it has been stated that 'the state shall fight against all hereditary blood diseases, including thalassemia and sickle cell anemia and other hereditary diseases that cause disability, within the scope of preventive healthcare services.' Thalassemia centers have been established in Antalya, Antakya, Mersin and Muğla in 1994 (General Directorate of Public Health, 2018).

2. Health Policy of Rare Diseases between 2000-2015

Screening programs for hereditary blood disorders continued in the early 2000s. The Hemoglobinopathy Control Program and the Diagnosis and Treatment Centers Regulation have been published in 2002 and

the Hemoglobinopathy Prevention Program (2003) was implemented. In 2004, the Newborn Hearing Screening Program has been carried out as part of a pilot study in Ankara and began offering services in a national screening program across Turkey in 2008 (General Directorate of Public Health, 2018).

The 'Neonatal Screening Program Circular' has been enacted by the Ministry of Health (coordinating the Directorate-General for Maternal and Child Health and Family Planning and chairing the Refik Saydam Hıfzıssıhha Center *(Refik Saydam Hıfzıssıhha Merkezi Başkanlığı*) in 2006. A congenital hypothyroidism screening program has also been added to the Phenylketonuria screening program within the scope of this circular. Congenital hypothyroidism includes an important period of development in the prevention of mental retardation in childhood. The spread of the screening program is therefore important in terms of early diagnosis (Erçin & Ovalı, 2019). The second biotinidase deficiency screening program was launched in 2008 (Özaltun et al., 2015). Cystic fibrosis screening, a genetic disease that affects the glands, has the potential to disrupt the functioning of multiple organs in the body, particularly the lungs, has been added to screening programs in 2015 (General Directorate of Public Health, 2018).

The Health Transformation Program is a milestone in the provision of healthcare services in Turkey that took place in 2003. Staged healthcare services have therefore been introduced; the principles and procedures for the reimbursement of health expenditure have been laid down within the scope of health insurance. Healthcare services for RD are now being offered as part of this transformation.

The acceleration of the international dimension of RD-related health policy studies in 2005 corresponds to the start of full accession negotiations in Turkey's European Union (EU). During this period, studies on the prevalence of RD, diagnostic and treatment methods in EU countries are continuing rapidly. An international coding system has been put in place to track these diseases, encourage information sharing and set up a database for the follow-up of these diseases. In this context, many patients in the world, including Turkey, have switched to the ICD-10 code tracking system (Soyer, 2019). In 2007, Turkey was a member of Orphanet. This is a significant development in the international arena (Orphanet, 2020). The Technical Assistance Information Exchange Instrument of the European Commission (TAIEX) has been organized by the Ministry of Health in 2009. A structure was established in this workshop to encourage the use of Orphanet in the field of RD.

Studies on the problems experienced by rare disease patients and families were conducted in 2014. For example, a meeting was organized between the Ministry of Health and the Department of Patient Rights and Medical Social Services to improve the quality of life of individuals with RD. It has been concluded at the meeting that diagnosis and treatment services should be enhanced. The same year, at the 1st Turkish Medical World Congress, RD has been put on the agenda. In this scientific meeting, working groups were formed on the basis of an examination of different countries' examples of policies and services for RD.

3. Health Policy of Rare Diseases between 2015-2020

Since 2015, the training of decision makers, public authorities, universities and non-governmental organizations in health policy on RD has been accelerated. TÜSEB established the Turkish Institute for Public Health and Chronic Diseases *(Türkiye Halk Sağlığı ve Kronik Hastalıklar Enstitüsü) (TÜHKE)* in 2015. TÜHKE aims to develop policies for health in RD. In the same year, at the 2nd Turkish Medical World Congress, the "Rare Diseases Study Group" was established. The most significant results of this study relate to the limited epidemiological data relating to RD in Turkey. The report proposes to increase epidemiological studies, raise awareness and increase the level of knowledge in society and healthcare personnel, train professionals, develop screening programmes, promote research and development, set up multidisciplinary reference centers and lay down legislation on orphan drugs. It is essential to set up a national RD action plan, to open reference centers, to set up an information network and to set up incentives to develop health policies related to RD.

Awareness has begun to increase in the field of RD since 2016. The events organized on Rare Diseases Awareness Day since 2016 have been hosted by public authorities, universities, and non-governmental organizations. Furthermore, in the activities carried out by both the Directorate-General of Health Services and the Health Command of the Turkish Armed Forces *(Türk Silahlı Kuvvetleri Sağlık Komutanlığı)*, the concerns and needs of people with RD have been identified. Istanbul University, Istanbul Faculty of Medicine, Experimental Medicine Research Institute, and Orphanet-Turkey organized the Rare Diseases Symposium that same year.

In 2017, scientific meetings continued the development of RD-related health policies. RD has been discussed at a panel held in cooperation with the Directorate General of Health Services of the Ministry of Health and TÜSEB. Also within scope of the panel, RD national plans have been indicated by speakers from different countries. Challenges in clinical and laboratory applications, orphan drugs, and R&D activities have been expressed by the participating researchers from Turkey. The studies on the National Action Plan for Rare Diseases have been discussed in the 'Rare Diseases Workshop' with a small group of

institutions and organizations and an inadequate group to solve the problems (Ministry of Health - General Directorate of Healthcare Services, 2017). The main topics on RD as medical issues such as registry studies, epidemiological field studies, chronic rheumatic diseases, diagnosis and treatment guidelines, cohort studies and also big data, cost-effective applications, and quality in R&D topics have been discussed at the Turkish Medical World Congress in the same year. The workshop report focused on possible developments in RD with cohort studies and discussed the potential benefits that can be achieved through the combination of certain cohort studies with the Genome Project. It has been stated that new studies should be carried out with regard to cost-effective services (TÜHKE, 2017).

It has been continued to develop screening programs for RD in 2017. In this frame of reference, within the scope of newborn screening programs, a pilot study for Adrenal Hyperplasia has been initiated. Pilot implementation was carried out in 14 provinces in 2018. Moreover in 2019, pilot implementation was carried out in 22 provinces. The purpose of the screening programs is to prevent mental retardation, brain injury and irreversible medical damage, while at the same time reducing the socio-economic aspects of these diseases. Approximately 4.500 children can be preserved annually thanks to this screening program (Ministry of Health - General Directorate of Healthcare Services, 2020).

Health policy actors are not only limited to a group of public institutions and organizations and politicians, but also include a number of stakeholders (Aba, 2018). In health policy, for instance, studies conducted by universities are also effective. The Rare Diseases and Orphan Drugs Application and Research Center *(Nadir Hastalıklar ve Yetim İlaçlar Uygulama ve Araştırma Merkezi) (ACURARE)*, which has been operating under the University of Acıbadem since 2017, is among the actors affecting RD policy. ACURARE is continuing its research into the treatment and diagnosis of orphan drugs and diseases (ACURARE, 2018). Scientific meetings on RD are also on the rising trend in 2018. For instance, within the scope of the Common Solution in Health Meetings, the Private Hospitals and Health Institutions Association *(Özel Hastaneler ve Sağlık Kuruluşları Derneği) (OHSAD)* addressed the issue of diseases. It has been emphasized that more attention should be paid to RD in the workshop where the 2023 Health Policies Vision has been discussed with the relevant stakeholders. The other RD-related subjects discussed in the workshop have been RD hospitals, treatment protocols and cost issues (OHSAD, 2018). In 2018, TÜHKE's First Scientific Board Meeting provided the necessary information for establishing health policies in the field of RD. In terms of its establishment mission, the role of TÜHKE in RD policy is crucial. It contributes to the formation of health policies through its activities, activities and opinions. The importance of R&D studies for RD, problems in reimbursement systems, problems in the follow-up of adults with RD, problems arising from consanguineous marriages, the importance of screening programmes, centers of excellence in RD, the creation of a primary care follow-up model in RD and the integration of health services have been discussed (TÜHKE, 2018). On RD Day in 2018, activities have been carried out by the Turkish Institute of Mother, Child and Adolescent Health *(Türkiye Anne, Çocuk ve Ergen Sağlığı Enstitüsü) (TAÇESE)*. The Ankara Institutions' Rare Diseases Recording Systems Meeting and Rare Disease Capacities Workshop have been organized within the scope of this activity (TAÇESE, 2018).

Patient advocacy organizations are another important factor in health policy. These organizations have a key role to play in R&D activities, particularly in the fields of biomedical science and pharmaceuticals (Koay & Sharp, 2013). Patient associations have recently raised awareness of RD and influenced policy makers to address the problems experienced by people with RD. In 2019, some of the associations operating in the field of RD united under the Rare Diseases Network *(Nadir Hastalıklar Ağı)*. Rare Diseases Network was formed by Albinism Association *(Albinizim Derneği)*, Cystic Fibrosis Family Solidarity Association *(Kistik Fibrozis Aile Yardımlaşma ve Dayanışma Derneği) (KİFDER)*, Mucopolysaccharidosis Lysosomal Storage Diseases Association *(Mukopolisakkaridoz Lizozomal Depo Hastalıkları Derneği)(MPS - LH)*, the Combating NCL Disease and Solidarity Association *(NCL Hastalığı ile Mücadele ve Dayanışma Derneği)*, PKU Family Association *(PKU Aile Derneği)*, Pulmonary Hypertension and Scleroderma Association *(Pulmoner Hipertansiyon ve Skleroderma Hasta Derneği) (PAHSSc)*, the Cystinosis Patients Association *(Sistinozis Hastaları Derneği)*, the Association for Combating SMA Disease *(SMA Hastalığı ile Mücadele Derneği)* and I'm Happy with My Face Association *(Yüzümle Mutluyum Derneği)*. The aim of the Rare Diseases Network is to provide decision makers with solutions, to raise awareness in legislative studies, to carry out activities for the benefit of patients in diagnostic and treatment studies, and to improve the quality of life of patients (Nadir Hastalıklar Ağı, 2019).

Another significant development in the field of RD in 2019 has been the establishement of the council committee of the Turkish Grand National Assembly (TBMM) entitled "Treatment and Care Methods for ALS, SMA, DMD, MS and Other Diseases with Unknown Cure and Identifying the Problems and Solutions of People with These Diseases and Their Relatives". RD has been taken into consideration by political parties with this research commission, and the current problems have been systematically expressed in the parliament through a commission for

the first time (TBMM 27th Term Commission Reports, 2019). Studies on the Special Needs Report for Children *(Çocuklar İçin Özel Gereksinim Raporu) (ÇÖZGER)* have also been conducted in 2019, which is a significant development that has been implemented to benefit services for children with RD.

There have been developments in 2019 which will ensure that studies in the field of RD are supported by both national and international public institutions and organizations. For example, the STisNA - Istanbul Solution Platform for Undiagnosed and Rare Diseases *(İstanbul Tanısız ve Nadir Hastalıklara Çözüm Platformu)* has been established in the national field The project, supported by ISTKA (Istanbul Development Agency- *İstanbul Kalkınma Ajansı*), intends to generate an ecosystem that brings together all relevant RD actors (Acıbadem University, 2019). The 1st European Joint Program International Rare Diseases Research (EJP-RD) Joint Call has been published in the international arena.

Scientific meetings held by various disciplines in the field of RD have continued in 2019. For example, at the 5th Rare Diseases Symposium and Neurogenetics Course, organized by the Turkish Neurology Association *(Türk Nöroloji Derneği)*, RD has been discussed in detail. In addition, in the program, the idea of a national Neurogenetic Network has also been discussed (https://norogenetik.org/).

In 2020, the Ministry of Health established the 'Autism, Special Needs in Mental Problems and Rare Diseases Department.' This unit can be expressed as an example of the fact that the issue is taken into account by public institutions and organizations and reciprocated by awareness activities.

Health Policy of Orphan Drugs in Turkey

Drugs used in the treatment of rare diseases are called orphan drugs. However, not all orphan drugs should be perceived as drugs used in the treatment of rare diseases. The issue of orphan drugs is a very broad subject and in this study, orphan drugs are discussed and summarized in the context of rare diseases. Global studies on orphan drugs have started to be seen since 1980. The advocacy activities initiated by the patient organization National Organization for Rare Disorders (NORD) on these dates refer to activities aimed at implementing the orphan drug law. As a matter of fact, after these studies, one of the first studies on orphan drugs was the Orphan Drug Act (ODA) enacted by the USA in 1983 (Tambuyzer, 2010). After the orphan drug law was enacted in the USA, orphan drug laws were enacted in Japan in 1985, in Australia in 1997, and in the EU in 2000 (Aronson, 2006).

In Turkey, studies on orphan drugs started with the inclusion of orphan drugs in the Regulation on Clinical Trials issued in 2008. With the definition of orphan drug in this regulation, it is aimed to eliminate the problems related to the definition of the orphan drug (Köken et al., 2018). Studies on orphan drugs have been accelerated since 2009. During the same year, studies on the Draft Guide to Orphan Drugs were initiated by the Ministry of Health. Studies have been conducted on how to purchase orphan drugs, how to fund these drugs, how to provide incentives for the production of these drugs, and finally how to bring together and sustain rare disease patients and their drugs. Studies on orphan drugs continued rapidly throughout 2014. Rare Diseases and Orphan Drugs Symposium was organized by the Drug Awareness Development and Rational Medicine Association. Studies on orphan drugs have been continuing since 2014.

DISCUSSION

The aim of this study has been to present the historical perspective of the relevant health policies in Turkey with regard to RD. This study highlights basic principles of health policy, presents health policy approaches related to RD, provides information on political actors in the field of RD, and presents developments in health policy in the field of RD over historical periods.

Turkey's National Action Plan/RD Strategy is rather limited. Nevertheless, in the workshop held by the TÜHKE and at the Turkish Medical World Congress, the RD national action plan had been discussed but has not yet been implemented. Other studies in the literature, however; Gammie et al. (2015) and Khosla & Valdez (2018) summarize in their study the situation in countries on the RD national plan. Nearly all EU Member States and many other countries (Australia, Ireland, Japan, Singapore, Taiwan, etc.) have national RD plans included in the study. Dharssi et al. (2017) stated that although some progress has been observed, there is no national plan for RD in Turkey. Orphanet (2009) recommended that states develop national plans and strategies to structure their responses to the challenges of rare diseases. Although Turkey has started to prepare its national plan for rare diseases, it should accelerate these studies and meet the needs of patients and their families (Yücel, 2019).

Turkey has orphan drugs-related legal regulation deficiencies. It is known to have been formed in 2016 as a draft text of orphan drug laws in Turkey. Czech et al. (2020) pointed out that Turkey's legislation lacks a strategy for orphan drugs. It was, however, emphasized that in accessing unapproved drugs, there

is a well-structured three-step process. 43 are covered in Turkey by drug reimbursement. These drugs are not, however, marketed, 22 of which are in Turkey and are supplied by the Social Security Institution *(Sosyal Güvenlik Kurumu) (SGK)*. Although reimbursement systems have problems, it is an indication that the supply of drugs has alternatives. The study stated that by stating that it allowed access to and use of unlicensed orphan drugs, legal flexibility was provided. Despite all these developments, the problems experienced about orphan drugs carry the agenda of being a public health problem in Turkey. Dharssi et al. (2017) noted that the study of orphan drug-related processes in Turkey was indeed advancing faster than in the past. Given the legislative studies on orphan medicinal products, it can be seen that the Orphan Medicinal Products Law was enacted in the US in 1983 and that the Orphan Drug Products Regulation was published in the EU in 1999. (Rodwell and Ayme, 2015). In countries such as The Netherlands, Germany, and France, more than 100 orphan drugs are covered by reimbursement (Czech et al., 2020).

RD studies in Turkey focus on genetic screening programs. However, these screening programs do not include the diagnosis of many RDs. Dharssi et al. (2017) argued that R&D activities for the diagnosis of RD are limited in terms of national initiatives in Turkey. Czech et al. (2020) indicated that six various types of RD in Turkey are included in the screening program. Taking into account health policy in different countries; Poland 28, Netherlands 20, Germany 15 and France 5 different types of programs to screen for rare diseases (Czech et al., 2020). Genetic screening programs are also important for frequent consanguineous marriages in Turkey (Dündar & Karabulut, 2010). Dissemination of screening programs, development of diagnostic methods, increased awareness of healthcare professionals and improvement of treatment methods will also increase the chance of diagnosis and survival of rare diseases (Bülbül, 2019). However, it can be argued that the policies for genetic counseling services have not been well developed or that the agenda is not sufficiently set in this regard.

RD epidemiological studies in Turkey are limited. Dharssi et al. (2017) indicated that there are many problems with the RD registration system in Turkey. However, it has been stated that some registration projects (as TREAT-NMD and EUROCARE) are supported. Yavuz Çolak (2019) also states that the number of rare diseases in Turkey is not sufficiently known and that there are not enough epidemiological studies in rare diseases. As a consequence, epidemiological studies for RD in Turkey are incomplete and are very much needed.

In both medical and psychosocial fields in RD, research and development studies have an important place. The universities and public authorities in Turkey offer a wide variety of opportunities to researchers in the field of RD. Besides that, in the international projects for RD, Turkey is defined as 'underrepresented.' EJP-RD 2021 calls for review when applying for projects in countries where each country has a number of partners applying to Turkey are less likely to have initiatives in the field of rare diseases, as this limitation is further extended (EJP - RD, 2020). However, it is challenging to create research groups or networks (Castillo-Esparcia and López-Villafranca, 2016). Dharssi et al. (2017) asserts that in some countries, research and development activities are officially supported but not officially supported in Turkey. Ceylaner and Ceylaner (2019) state that due to the low number of employees in the field of rare diseases, the investments of pharmaceutical and large device companies in Turkey in R&D studies are low in this field.

The economic problems in RD are also crucial. Families are suffered with both indirect and direct economic costs (Köken, Hayırlıdağ, & Büken, 2018). Nevertheless, it is noted that the regulations providing economic support to individuals with RD and their families are limited in health policy regulations. The financing of these diseases in Turkey, in particular drugs, therapies, nutrition and physical therapy costs, is seen as an improvement that needs to be covered by payment systems. In order to solve the economic problems experienced by people with rare diseases and their families, the scope of reimbursement systems in health policies should be expanded and all patients should be included in this scope (Güngör, Tunca, & Öcan, 2019).

The intersection of RD-related health policies and social policies are insufficient. Health policies must be developed in conjunction with social policies in the face of RD problems. Limited information, challenges in accessing healthcare services, limited diagnostic and treatment processes, and severe psychosocial and economic problems are increasing the importance of this integration. Aksu (2019) suggested that daycare services, socialization and rehabilitation centers, summer camps and training activities for individuals with RD be part of social policy as well as health policy in Turkey.

In setting the agenda among health policy actors, the roles of rare disease patient groups may be determinant. In recent years, studies in this field have gained momentum and patient organizations have been organized to affect health policies and increase awareness. Different achievements, such as the commission formed by the Turkish Grand National Assembly, have been achieved as a result of studies by patient organizations, the Rare Diseases Network, and other NGOs. In addition, by using the written and visual media efficiently, patient organizations have affected decision makers and bureaucracy in diseases such as SMA (Yıldız & Yalçın, 2020). When the literature is reviewed, however, patient organizations

date back to ancient times in the field of RD. It is stated that in the 1980s, patient organisations historically emerged in the USA and then spread to countries in Europe and the Far East (Huang et al., 2019). In countries like Japan (1993), Australia (1998), and EU member states, the legislation enacted through this movement has set an example and inspired legal regulations (2000). The studies attracted decision-makers' attention and raised awareness among other stakeholders (medical and scientific communities, industry, etc) (Choudhury & Saberwal, 2019). It is critical for the development of RD NGOs in Turkey. Within the scope of collective action awareness, it is necessary to have information about non-governmental organizations in line with the illness, to encourage patients and their families to actively participate in these organizations, and even to support them to establish non-governmental organizations (Özden, Tekindal, & Çoban, 2019).

In the public sector in the development of health policy about RD in Turkey in the area began to increase. Awareness is also positive for activities such as panels and symposiums organized in universities, patient organization activities, and studies of other actors. However, considering the existence of activities launched at the end of the 20th century in 1980 in the US and the EU, Turkey has many steps to take in the development of health policy in the field of RD.

CONCLUSION

This study has demonstrated that RD-related health policies with a historical perspective in Turkey include activities carried out by health policy actors associated with RD. It includes the formulation of RD health policy in Turkey with contributions from public institutions and organizations, universities, research centers and NGOs. These studies focus primarily on genetic screening for early diagnosis, healthcare services processes and principles to be offered in the diagnosis and treatment of RD, orphan drugs, solving the problems of people with RD and their families, and activities to raise awareness.

As a consequence of efforts to influence the agenda and agenda-setting activities, health policies are emerging. The emphasis on health policy in the field of RD in Turkey is on important issues. To solve these issues, the following suggestions can be developed:

- Taking into consideration that the epidemiological studies on RD are limited, more data are needed in the planning of the services to be provided to these patients. Comprehensive epidemiological studies on RD should be included in the health policy agenda.
- It is recommended that a national RD action/strategy plan be developed.
- It is known that not all orphan drugs belong to rare diseases. However, developments in orphan drugs will reduce the problems. So, it is recommended that the legal provisions on orphan drugs be finalised.
- Early genetic screening programs for RD should be extended.
- Informing individuals and families about consanguineous marriages on RD and developing policies to expand genetic counseling services are recommended.
- Increased number of studies to support research and development activities in RD are recommended.
- It is necessary to integrate health policies and social policies with one another and to act with a holistic approach to health.
- It is recommended that policies to eliminate funding problems should be broadened (especially orphan drugs, treatment expenses, medical equipment, nutrition, and physical therapy costs).
- It is recommended that health policies that support patient organizations be developed.

Conflict of Interest:

The authors declare that they have no conflict of interest.

Ethical Approval:

All procedures have performed in accordance with the ethical standards and with the Helsinki Declaration and its later amendments or comparable ethical standards.

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