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We are happy to be together with interesting and covid-19 articles during the normalization process.

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Our magazine will grow even more with your efforts.

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PhD, Assoc. Prof. Ülkü KARAMAN

Editor

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RESEARCH ARTICLE

Traces and Effects of Biological Disasters in the World and in Turkey up to Covid-19

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Abstract

Objective: The purpose of this research is to evaluate the traces and effects of biological disasters in the world and in Turkey until the Covid-19 pandemic.

Methods: This study is a descriptive study aiming to reveal the history of biological disasters and contribute to the history of medicine. The data of the study were obtained from the literature review, the data of the World Health Organization and the statistical annuals of the Ministry of Health of the Republic of Turkey. Statistical evaluations were made in the computer environment. The number of infectious disease cases and deaths were obtained by scanning all sources in the literature and were corrected by confirming from official records. Obtained infectious disease data are presented by tabulating in groups.

Results: Biological disasters have deeply affected societies in terms of health, economic, environmental and psycho-social aspects since the earliest times of history. Epidemics have emerged as a result of unhealthy environments caused by people's lifestyles, deterioration of ecological balance, famines, natural disasters or many other reasons and have left important traces in the history of humanity by causing mass deaths. Major pandemics such as Severe Acute Respiratory Syndrome (SARS), bird flu, swine flu and Covid-19 have caused loss of lives and enormous economic damage. Epidemics are one of the types of disasters that affect the world and cause great destruction, mass deaths and population movements. It is possible to examine the epidemics in history under four headings. These are: Smallpox, Plague, Influenza and Cholera epidemics. Smallpox, which caused the most deaths throughout history, thankfully, has been eradicated from the world. Plague, which is the second biggest cause of death, has also been eliminated with treatment opportunities and preventive health services. However, influenza epidemics, which cause the third highest number of deaths, continue to have an intense effect today and seem to continue to cause the greatest biological disasters in the future. When the data of the Ministry of Health was analyzed, 3 epidemics that caused the most cases between 1956-2019 and still continue were tuberculosis, malaria and measles. However, the number of deaths from these ongoing epidemics is unknown.

Conclusion: It is an undeniable fact that epidemics in history can be experienced again in the globalizing world. For this reason, it is a very important fact for disaster management to know the history and details of epidemics, to learn the necessary lessons, and to prepare pandemic plans and solutions accordingly.

Key Words: Biological Disasters, Epidemic, Pandemic, Covid-19, History of Medicine

Covid-19'a Kadar Dünyada ve Türkiye'de Biyolojik Afetlerin İzleri ve Etkileri

Özet

Amaç: Bu araştırmanın amacı, Covid-19 pandemisine kadar olan biyolojik afetlerin dünyadaki ve Türkiye'deki izleri ve etkilerini değerlendirmektir.

Yöntemler: Bu çalışma biyolojik afetlerin tarihini ortaya koymayı ve tıp tarihine katkı sağlamayı amaçlayan betimsel bir çalışmadır. Çalışmanın verileri literatür taramasından, Dünya Sağlık Örgütü verilerinden ve Türkiye Cumhuriyeti Sağlık Bakanlığı istatistik yıllıklarından elde edilmiştir. İstatistiksel değerlendirmeler bilgisayar ortamında yapılmıştır. Bulaşıcı hastalık vaka ve ölüm sayıları literatürdeki tüm kaynaklar taranarak elde edilmiş ve resmi kayıtlardan teyit edilerek düzeltilmiştir. Elde edilen bulaşıcı hastalık verileri gruplar halinde tablolaştırılarak sunulmuştur.

Bulgular: Biyolojik afetler, tarihin en eski devirlerinden itibaren toplumları sağlık, ekonomik, çevresel ve psiko-sosyal yönden derinden etkilemiştir. İnsanların hayat tarzlarının sebep olduğu sağlıksız ortamlar, ekolojik dengenin bozulması, kıtlıklar, doğal afetler veya daha birçok sebep sonucunda salgınlar ortaya çıkmış ve kitlesel ölümlere yol açarak insanlık tarihinde önemli izler bırakmıştır. Şiddetli Akut Solunum Yolu Sendromu (SARS), kuş gribi, domuz gribi ve Covid-19 gibi önemli pandemiler, can kayıplarına ve devasa ekonomik hasara yol açmıştır. Dünyayı etkisi altına alan, büyük yıkımlara, toplu ölümlere ve nüfus hareketlerine neden olan afet türlerinden birisi de salgınlardır. Tarihteki salgınları dört başlıkta incelemek mümkündür. Bunlar; Çiçek, Veba, Grip ve Kolera salgınlarıdır. Tarih boyunca en fazla ölüme yol açan Çiçek hastalığı çok şükür ki; dünya üzerinden eradike edilmiştir. İkinci en büyük ölüm nedeni olan Veba da tedavi imkânları ve koruyucu sağlık hizmetleriyle ortadan kaldırılmıştır. Ancak üçüncü en fazla ölüme neden olan grip salgınları ise günümüzde etkisini yoğun bir şekilde sürdürmekte olup gelecekte de en büyük biyolojik afetlere neden olmaya devam edecek gibi gözükmektedir. Sağlık Bakanlığı verileri analiz edildiğinde 1956-2019 yılları arasında en çok vakaya neden olan ve halen devam eden 3 salgın hastalığın; tüberküloz, sıtma ve kızamık olduğu görülmektedir. Ancak halen devam eden bu salgınlara ait ölüm sayıları bilinmemektedir.

Sonuç: Tarihteki salgınların, küreselleşen dünyada tekrardan yaşanabileceği yadsınamaz bir gerçektir. Bu nedenle, salgınların tarihçesinin ve ayrıntılarının bilinmesi ve gerekli derslerin çıkarılması ve pandemi planlarının ve çözümlerin buna göre hazırlanması afet yönetimi açısından oldukça önemlidir.

Anahtar Kelimeler: Biyolojik Afetler, Salgın, Pandemi, Covid-19, Tıp Tarihi

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Introduction

When the course of epidemic diseases in the history of the world is followed; the negative effects of epidemics such as plague, cholera, typhus, smallpox, SARS, MERS, bird flu, swine flu, Ebola, Zika and Covid-19 on society will be seen (1).

During the First World War; especially the Spanish flu; many epidemics such as typhus, which started in Russia and spread to Western Europe, cholera, smallpox, dysentery and typhoid, which started in the Ottoman Empire, were seen (1).

Cholera, yellow fever and epidemic meningococcal diseases returned in the last quarter of the 20th century. Major international epidemics such as Severe Acute Respiratory Syndrome (SARS), bird flu, swine flu and Covid-19 have caused loss of lives and enormous economic damage. Viral epidemics such as MERS, Ebola, Marburg hemorrhagic fever and Nipah virus have also threatened global public health security (2, 3).

Due to the disruption of efforts to combat vector-borne diseases, many infectious diseases such as malaria, dengue and dengue hemorrhagic fever have started to make epidemics since the 1960s. This situation caused an unprecedented pandemic in 1998. In epidemics caused by malaria, dengue and dengue hemorrhagic fever, 1.2 million cases were reported to WHO from 56 countries, and this biological disaster adversely affected millions of people (1).

It is known that the Ebola epidemic is still a public health emergency of international importance (4). Ebola, which emerged in Guinea in December 2013 and caused an epidemic in West Africa between 2013 and 2016, caused 28,616 cases and more than 11,300 deaths. The Ebola epidemic ended in June 2016. This outbreak has been recorded as the deadliest Ebola outbreak in history (5).

The international spread of the influenza pandemic, which alarmed the world immediately after the SARS epidemic, could not be prevented (1).

Neglected tropical diseases have infected more than one billion people, mostly in developing countries. Due to urbanization, air travel, population growth and climate change, epidemics are also seen in developed countries from time to time (6).

Some infectious diseases that have prevailed for thousands of years and new and re-emerging infectious diseases still continue to pose a great threat at the global level. It is an undeniable fact that epidemics in history can be experienced again in the globalizing world.

This study was carried out in order to know the history and details of the epidemics, to learn the necessary lessons, and to contribute to the pandemic plans and pandemic management scientifically.

Methods

This study is a descriptive study aiming to reveal the history of biological disasters and contribute to the history of medicine. The data of the study were obtained from the literature review, the data of the World Health Organization and the statistical annuals of the Ministry of Health of the Republic of Turkey.

Statistical evaluations were made in the computer environment. The number of infectious disease cases

and deaths were obtained by scanning all sources in the literature and were corrected by confirming from official records. Obtained infectious disease data are presented by tabulating in groups.

Results

In this study, it has been tried to draw a vision about biological disasters by evaluating the infectious diseases that have caused or may cause disasters around the world.

As can be seen in Table 2, the epidemic disease that caused the most deaths and caused a major biological disaster throughout history is Smallpox. Thankfully; it has been eradicated from the world. Plague, which is the second biggest cause of death, has also been eliminated with treatment opportunities and preventive health services. However, influenza epidemics, which cause the third most deaths, continue today and seem to continue to be the biggest biological disaster in the future.

Table 2. Ranking of Some Historical Major Pandemics Caused by Biological Disasters by Estimated Number of Deaths

Pandemic	Estimated Number of Deaths (Million)
Smallpox Epidemics	300-500
Plague Epidemics	230
Influenza Epidemics	60
HIV/AIDS Epidemic	39
Cholera Epidemics	6
Typhus Epidemics	6
Yellow Fever	0.10-0.15

Table 3. Annual Cases and Deaths of Ongoing Pandemics as Today's Biological Disasters (2019)

Pandemic	Number of Cases	Annual Number of Deaths
Tuberculosis	10 million	1 4 000 000
Hepatitis B	2 billion	1 000 000
HIV/AIDS	37.7 million	680 000
Typhoid	16 million	600 000
Dysentery	?	600 000
Malaria	229 million	409 000
Whooping Cough	50 million	300 000
Cholera	3-5 million	100 000
Hepatitis C	180 million	?

Table 1. Major Pandemics in History (sorted by number of deaths)

Date	Epidemic Name	Estimated Number of Deaths (Million)
1519-1980	Smallpox Epidemics	300-500
1346-1353	Black Plague	75-125
541-542	Plague of Justinian	25-100
1981-	HIV/AIDS Epidemic	39
1918-1919	Spanish Flu	17-50
1894-1903	Hong Kong Plague	13.5
1855-1959	Chinese Plague	12
1817-2020	Cholera Epidemics 1-7	6
1489-1922	Typhus Epidemics	6
165-180	Antonine Plague	5
2019-	Covid-19	6
1957-1968	Asian Flu	4
1772-1773	Plague of Iraq	2
250-270	Plague of Cyprus	1
735-737	Japanese Smallpox	1
1889-1890	Russian Flu	1
1968-1979	Hong Kong Flu	1
1629-1631	Italian Plague	0.48
2009-2010	Swine Flu	0.29
1770-1772	Russian Plague	0.20
1890-1899	Yellow Fever	0.10-0.15
430 BC	Plague of Athens	0.10
627	Iranian Plague	0.10
1665-1666	Plague of London	0.10
1720-1723	Plague of Marseille	0.10
Date	**Epidemic Name**	**Number of Deaths**
2014-2016	Ebola Epidemic	11 325
2012-2014	MERS	858
2002-2003	SARS	916

Table 4. Total Number of Cases of Ongoing Biological Disasters in Turkey (T.R. Ministry of Health; 1956-2019)

Disease Name	Number of Cases
Tuberculosis	1 642 602
Malaria	1 206 233
Measles	1 100 950
Brucellosis	281 530
Hepatitis B	99 647
Anthrax	31 382
AIDS	1 819

When the statistical annuals of the Ministry of Health were examined; tuberculosis, malaria and measles were the most common infectious diseases between 1956 and 2019. However, there is no data on the number of deaths from these diseases.

Discussion

It is possible to examine the biological epidemics in history under four headings; Plague epidemics, Cholera epidemics, Smallpox epidemics and Flu epidemics.

a) Plague Epidemics

Plague, known as the "Black Death", is one of the greatest biological disasters that has killed millions of people over the centuries. However, it should not be forgotten that all epidemic diseases were called “Plague” until the 17th century (1). Plague epidemics can be listed in chronological order as follows:

Hittite Plague (14th century BC): The first plague epidemic in history, was an epidemic that was reported, have lasted for 20 years during the Hittite Civilization in the 14th century BC. It is understood from the tablets of the period that this epidemic deeply affected the society. The Hittite King (1st Suppililuma) fell ill with the plague upon his return from the Babylonian expedition and died. The epidemic spread all over the country and the Hittite Kingdom was severely decimated due to the plague epidemic. However, there is no definite information about the number of cases and deaths (7).

Plague of Athens (430 BC): During the Peloponnesian War, this epidemic, which started in a narrow area between Athens and Sparta in its second year and continued for five years, caused approximately 100 000 deaths (World population estimated 150 million) (1).

Antonine Plague (165-180): This plague epidemic took place within the borders of the Roman Empire. It got this name because it caused the death of Roman Emperor Antoninus. The disease agent was brought by the soldiers returning from the East expeditions. During the epidemic, approximately 2 thousand people died per day, and as a result of the epidemic, 30% of the empire population (approximately 5 million people), including the two Roman Emperors (L. Verus and MA Antoninus), died in this epidemic (1).

Plague of Cyprus (250-270): This epidemic, named after Bishop Cyprian, lasted 20 years. It caused the death of about 5,000 people a day and a million people in total. Rome, Greece and Syria were also affected by this epidemic, which started in Ethiopia (Abyssinia). As a result of the epidemic, the Roman Empire weakened and became open to attacks. The fact that the rural population took shelter in cities for security reasons and many farmers lost their lives due to the epidemic caused the collapse of agricultural production. In addition, the drought, floods and famines accompanying the epidemic brought the population of the country to the point of extinction. The world population is estimated to be around 200 million in these years (1).

Plague of Justinian (541-542): This epidemic occurred within the borders of the Byzantine Empire and especially the capital Constantinople (today's Istanbul borders) was affected. The name of the epidemic comes from Emperor Justinian I, who was sick and recovered. The entrances to the city were closed in order to protect from the epidemic, but the rats coming through the military supplies carried the plague agent to the city. The epidemic spread to the whole city within a week and deaths began. Due to thousands of deaths in a short time, the burial places were filled up and many corpses were thrown into the sea. About 40% of the people in the city died as a result of the epidemic. The Byzantine Empire was almost destroyed due to the loss of labor and soldiers in the epidemic. The strength of the Byzantine army was reduced, and its defense capacity decreased. Cities and the country have become

vulnerable. This situation has been instrumental in the developments that changed history. This epidemic also affected the Sassanid Empire and Mediterranean port cities. It is thought that the epidemic started from China and moved to Istanbul and other port cities due to rats and fleas coming by ships (8).

This epidemic, which also included the birth years of Islam, continued for about two centuries. It is thought that the epidemic spread to various regions during this time and caused a total of 25-100 million deaths. Due to the fact that the records were not kept regularly in those years and the epidemic spread over a wide area for two centuries, the death records could not be reached fully (9).

Persian Plague (627): The Battle of Nineveh (627 year) resulted by the victory of Byzantium and a great plague epidemic broke out while the defeated Sassanids were dealing with internal conflicts. Due to this epidemic, more than a hundred thousand deaths occurred in the capital of the Sassanids (Ctesiphon), and the ruler (Kawad II) also lost his life due to the plague (10).

Black Plague (1346-1353): This Plague Epidemic, which is considered to be the biggest epidemic in Europe, is thought to have originated from China and moved to Europe via the Silk Road or by ships. This epidemic is the largest biological disaster in history, killing 75-125 million people (world population was estimated as 350 million). This epidemic was one of the main reasons that started the Renaissance movement, destroying 30-60% of the European population (5).

The plague epidemic, which started in China in 1331 and killed 90% of the population of Hebei province and more than 5 million people throughout China, infected the Genoese city of Kefe through trade routes and Mongol armies (1346). The Mongolian armies, besieging the city of Kefe, threw the plague-infected corpses into the city with catapults to break the resistance. The Genoese, who wanted to get rid of the plague epidemic that started in the city, fled to Europe and carried the epidemic there. The epidemic later reached Moscow in December 1350 (11).

It is estimated that there was a plague epidemic in Istanbul between 1468-1475 and in 1501, and ¼ of the population (25 thousand people) died (12).

b) Cholera Epidemics

Cholera has always remained an important biological disaster risk for the entire world. The mixing of human feces and wastes into drinking and utility waters causes a great disaster in terms of biological disasters. Cholera epidemics usually originate in India and spread to other countries from there (13).

There have been seven major cholera epidemics throughout history. However, the deadliest of these is the third, which occurred between 1852 and 1860.

First Cholera Epidemic (1817-1824): Thailand, Indonesia, Japan, China, Afghanistan, Nepal, the Middle East, Arabia, Mediterranean coasts and Africa were affected by this epidemic, which started in India (Calcutta city). The epidemic was later transported to Europe and America via ships (13).

Second Cholera Epidemic (1829-1837): China, Russia, Finland, Poland, Hungary, England and Germany were affected by the second Cholera epidemic, which also started in India. The epidemic then spread to Mexico and Cuba and spread to the Americas. Hungary and Germany gave 100 thousand victims, France 100 thousand, Egypt 130 thousand and England 55 thousand victims to this epidemic. There were also many Native American deaths in the Americas. During

the pilgrimage season of 1831, the epidemic spread to the Hejaz through pilgrims from India, and then to Istanbul, again through pilgrims. About half of those who went on pilgrimage that year, and 5-6 thousand people in Istanbul lost their lives due to the epidemic (13).

Third Cholera Epidemic (1852-1860): This epidemic, which is the most deadly among the cholera epidemics, came out of India as usual and spread to Asia, Europe, America and Africa continents, respectively. The epidemic caused severe damage especially in Russia (13).

It was only in this epidemic that it was understood that the main cause of the cholera epidemic was the microbiological contamination of drinking and utility water. During this epidemic (in 1854), a researcher named J. Snow mapped the homes of the sick and the deceased in London and determined that the cases were gathered around a water pump. It is also recorded that the water of the well smells badly and the sewage system passes near the well. Thinking that the epidemic might be related to this water source, Snow had the handle of the water pump removed in order to prevent the use of water. Following the disposal of the water source, there was a rapid decline in the number of cases and deaths. Snow 's work has been a historical turning point in terms of showing that the cholera epidemic is related to polluted waters. With the discovery of the cause of the cholera epidemic, the knowledge that drinking water should be purified and boiled became widespread all over the world. Sanitation still remains a problem for developing countries today (1).

There were five major cholera epidemics in the 19th century, and approximately one million people in Russia, 236 000 in Spain, 200 000 in Japan, 150 000 in North America, and more than 100 000 in Mexico died from cholera (13).

Fourth Cholera Epidemic (1863-1875): The epidemic originating from India (Ganges Delta) was carried to Mecca by the Muslims who went on pilgrimage, and 30 thousand of the 90 thousand people who went on the pilgrimage that year lost their lives due to Cholera. The epidemic later spread to all over the world, again through pilgrims (13).

Fifth Cholera Epidemic (1881-1896): Asia, Africa, South America, France and Germany were affected by this epidemic originating from India (Bengali region) and 981,899 people died. Robert Koch revealed for the first time (1883) that the causative agent of cholera was Vibrio cholerae in this epidemic (13).

Sixth Cholera Epidemic (1899-1923): Again, this epidemic originating from India affected the Middle East, North Africa, Eastern Europe and Russia and killed approximately 1.5 million people. This epidemic emerged in the Ottoman Empire during the Balkan War (1912-1913) and caused quite a lot of deaths (approximately 48 thousand cases and 22 thousand deaths) (14).

Seventh Cholera Outbreak (1961-): It started in South Asia (Indonesia) in 1961, spread to Africa in 1971 and the Americas in 1991. This Cholera epidemic, which is thought to be caused by aquatic products contaminated by the bilge waters of ships off the coast of Peru, caused approximately 400,000 cases and more than 4000 deaths in a year in 16 countries in Africa, Asia and Europe (13).

c) Smallpox Epidemics

The Smallpox epidemic first began in Japan in 735 and killed a third of the Japanese. The epidemic spread to neighboring countries within two years, causing the

death of approximately one million people, mostly children. Smallpox is thought to have spread from Asia to Europe, Africa, and finally the Americas (during the 16th century Spanish invasion) (15).

Europeans who immigrated from their countries between 1520 and 1902, knowingly or unknowingly transmitted this disease to the local people who were not immune to these diseases, causing the death of 90-95% of the 60 million indigenous population (15).

4. Influenza Epidemics

Influenza is a contagious disease that affects 20-50% of the population each year. The best way to prevent the flu is to get vaccinated with the flu vaccine. However, it is useful to remember that no vaccine can provide full protection. Influenza viruses are constantly changing. This change is the main cause of flu epidemics that occur every year. Therefore, every year, it is necessary to develop a new vaccine against changing viruses.

Russian Flu Pandemic (1889-1890): It started in Russia and spread all over the world in a few months; caused the death of more than one million people. The people who died in this epidemic were usually the elderly and sick people (16).

Spanish Flu Pandemic (1918-1920): This epidemic, caused by the H1N1 influenza virus, broke out in 1918 in Kansas City, USA, during the First World War. About one third of the world population (approximately 500 million cases) caught this disease. The epidemic caused more deaths (17-50 million) than the war (8 million) (5% of the world's population). The risk of illness and death was highest in the 20-40 age group. The Spanish flu also infected the top executives of the countries. The American President (W. Wilson), the British Prime Minister (L. George), the French Prime Minister (G. Clemenceau) and the German Chancellor (M. Von Baden) were among those caught this flu (17). The epidemic caused the death of approximately 675 thousand (43,000 soldiers) in the USA and at least 50 million people worldwide (1).

It is estimated that the epidemic caused 90 thousand deaths in the territory of the Ottoman Empire. It is known that the capital Istanbul was affected more by the epidemic and 6403 people died due to this epidemic (18).

The Spanish Flu epidemic was recorded as one of the greatest biological disasters in history. The virus that caused the Spanish Flu, like the Covid-19 virus, caused respiratory tract infections, and patients were dying of pneumonia. The disease was transmitted from animals (geese, pigs) to humans. The epidemiology of these two epidemics is extremely similar. The measures that could be taken in the Spanish Flu epidemic were the same as today's (mask, distance, hygiene) and it was recommended that patients stay at home (isolation) (1).

As an interesting information, the Spanish Flu didn't actually start in Spain. It originated in the USA, but Spain was the first to announce it and make it public. This epidemic, which broke out in the USA, spread to Europe and the whole world in a short time through the soldiers. Due to the war, many countries concealed that the society and soldiers died from the disease and denied the existence of the epidemic. However, since Spain, which did not participate in the First World War, was the only country that published the flu news first and uncensored and announced the epidemic to the world, the name of this pandemic is known as the Spanish Flu (18).

Another interesting feature of the Spanish Flu is that it was more likely to infect and kill healthy people rather than the elderly and sick (19). This pandemic still

remains a mystery due to its characteristics such as the fact that it started in summer, the spread is very rapid, and the lethality rate is different according to societies.

Asian Flu Pandemic (1957-1968): This epidemic, which started in Singapore in February 1957 and was caused by the Influenza-A H2N2 virus, affected China, Hong Kong, England and the USA. It caused 1 million deaths in China, 116,000 in the USA and 70,000 in the UK. The Asian flu lasted ten years and caused close to 4 million deaths. The epidemic was prevented with a vaccine. 40 million people were vaccinated in one year. Asian Flu has been one of the most important examples showing the importance and impact of mass vaccination (1).

Hong Kong Flu (1968-1969): The causative agent is the H3N2 strain of the Influenza A virus, which has killed more than one million people. It was more fatal in infants and the elderly. The epidemic originated in Hong Kong and quickly spread to Vietnam and Singapore. American soldiers returning from the Vietnam War brought the virus to the United States (fall of 1968). Epidemic spread all over the World and it caused approximately 33 800 deaths in the USA and approximately 1 million deaths worldwide (1).

Severe Acute Respiratory Syndrome (SARS) Outbreak (2002-2003)

It is a severe acute respiratory syndrome that took effect in Asia and Canada between 2002-2003. Severe acute respiratory syndrome is a respiratory disease caused by the Corona virus (SARS- CoV). It has been determined that SARSCoV was transmitted from civet cats to humans. The SARS epidemic, the first case of which was seen in Hong Kong, caused 8 422 cases and 916 deaths worldwide. The World Health Organization declared the death rate to be 10.9%. The SARS epidemic has spread to 37 countries (20).

Avian Influenza Outbreak (1997-2007): Human cases and deaths from H5N1 avian influenza were first reported in 1997 in the Hong Kong Special Administrative Region. By 6 June 2007, 310 cases and 189 deaths were reported to WHO. Although very few in number, this situation has become a symbol of an epidemic disease that poses a great threat to life, economies and security. These bird flu cases in humans have been accompanied by cases in poultry. In many countries, tens of millions of birds have been destroyed as part of a control strategy. In much of Asia, this virus has been tightly controlled. This pandemic has given a signal of what is to follow, giving the world the advantage of unprecedented early warning that a pandemic may be imminent. Although the H5N1 virus was first isolated in humans in 1997, it was first identified in children who had definitively died of severe respiratory disease caused by H5N1 infection in a pediatric hospital in Vietnam between 2003 and 2004 (21).

The virus has spread far from its original point of origin in Southeast Asia and has reached as far as Africa, Central Asia, Europe and the Eastern Mediterranean Region. Rapid containment of the virus has become more desperate as wild birds join the transmission cycle. The epidemic, which became a pandemic, in 2007 spread to 12 countries in Asia, Europe, the Middle East and Africa, reporting human cases and deaths (14) from H5N1 infections. Most cases were in Egypt (20 cases, 4 deaths) and Indonesia (6 cases, 5 deaths). Poultry epidemics and sporadic cases in humans continued (22).

While the death rate in the Spanish flu pandemic (1918-1919 influenza pandemic) was around 2.5%, in the avian flu epidemic (H5N1 infections), the death rate was more than 58%. Most cases are in healthy children and teenagers who have had contact with sick or dead chickens. The most severe cases died after suffering primary viral pneumonia (22).

Countries with limited resources are exhausted by the constant demands of fighting a virus so stubborn in birds and so treacherous and dangerous in humans.

H1N1 Swine Flu Epidemic (2009-2010): The epidemic caused by the H1N1 virus, a seasonal flu agent, started in Mexico in April 2009. The epidemic spread rapidly because it was transmitted through the respiratory tract. The virus was carried to the USA by university students and spread to other continents and 212 countries in a very short time, causing a pandemic. WHO declared a pandemic on 11 June 2009. There were approximately 284 500 deaths in this epidemic, mostly in Africa and Southeast Asia. WHO declared the end of the pandemic on 10 August 2010 (22).

MERS Epidemic (2012-2014): In April 2012, it was determined that this epidemic originating from Jordan was transmitted from dromedary camels to humans. In total, it has been seen in 27 countries (most seen in Saudi Arabia, the United Arab Emirates and the Republic of Korea) and has led to 858 deaths since 2012 (23).

Middle East Respiratory Syndrome Coronavirus (MERS- CoV) is a zoonotic virus transmitted from infected dromedary camels to humans. It can be transmitted through direct or indirect contact with infected animals. MERS- CoV has been detected in dromedary camels in many countries in the Middle East, Africa and South Asia. The origins of the virus are not fully understood, but according to analysis of different virus genomes, it is believed that it may have originated in bats and then transmitted to camels at some point in the distant past (23).

Typical MERS symptoms are fever, cough, and shortness of breath. Pneumonia is common, but not always present. Approximately 35% of MERS-CoV reported patients with infection died (22).

Most cases of MERS-CoV infection in humans have been in the form of human-to-human transmission in healthcare settings. The precise role of dromedaries in transmission and the precise route of transmission are unknown (WHO, 2021e). The virus is not easily transmitted from person to person unless there is close contact with a patient (as when providing unprotected service) (23).

New Type Corona Virus Outbreak (COVID 19): The epidemic, which started in Wuhan, China in December 2019, spread very quickly all over the world. The disease agent was announced by the World Health Organization as a new virus from the corona family, and the first death occurred on January 10, 2020. The first case in Europe was seen in France on January 27, 2020. In Turkey, the first case was announced on March 10, 2020, one day before WHO declared a pandemic (March 11, 2020). The first death in Turkey occurred on 17 March 2020 (24).

WHO described the COVID-19 outbreak as an “international public health emergency” on January 30, 2020, and declared it as a global epidemic (pandemic) as of March 11, 2020, due to the presence of cases in 113 countries outside of China. The name of the disease was COVID-19, and the virus was named SARS- CoV -2 due to its similarity to SARS CoV (25).

Covid-19 has caused an unprecedented crisis in history. Despite all the measures taken, COVID-19,

which has become a pandemic due to the lack of information and the lack of a ready vaccine at the beginning, is the biggest health problem experienced by humanity in the last century. The COVID-19 pandemic has caused both a public health crisis and a humanitarian crisis, affecting the lives, health and livelihoods of many people around the world.

More than 400 million confirmed cases of COVID-19 and nearly 6 to WHO million deaths have been reported. Approximately 10 billion doses of vaccine have been administered worldwide, mostly in developed countries (as of 11.02.2021). More than three-quarters of reported cases and one-third (34%) of deaths occurred in the Americas and European Region. Almost half (48%) of all reported cases of COVID-19 occurred in the Americas (WHO, 2021f). However, China has gone down in history as a true success story in the fight against the pandemic. Despite being the starting point of the pandemic, China managed to keep the number of cases at 106 thousand and the number of deaths at 4 636 (as of 05.02.2021). More than 86% of the 23.1 million cases reported in the Southeast Asian Region originated in India. COVID-19 cases are predominantly concentrated in high-income countries. The 20 most affected developed countries (only one-eighth of the world's population, 12.4%) account for almost half (45%) of the world's total COVID-19 cases (26).

Conclusion

When the statistical annuals of the Ministry of Health were examined, the 3 most reported diseases between 1956 and 2019 were tuberculosis, malaria and measles.

The epidemic that caused the most deaths and a major biological disaster throughout history is Smallpox. With the studies carried out, this disease has been eradicated from the world. Plague, which is the second biggest cause of death, has also been eliminated with treatment opportunities and preventive health services. However, influenza epidemics, which cause the third most deaths, continue today and seem to continue to be the biggest biological disasters in the future.

In line with these results, the following recommendations can be made:

1. An effective and comprehensive surveillance, early response and response infrastructure should be established, and these infrastructure systems should be based on global cooperation between governments, United Nations agencies, private sector organizations and organizations, professional associations, universities, media organs and civil society.
2. All infectious disease data should be included in the health statistical annuals, and other necessary information should be shared.
3. It is very necessary for surveillance to publish the number of infectious disease cases in that province on the web page of the Health Directorate of each province. WHO's recommendation is in this direction.
4. Infectious diseases should also be included in the health disaster and emergency plans implemented in our country.
5. It should not be forgotten that the risk of using infectious disease agents as biological weapons is high and may cause disasters.
6. Precautions against possible epidemics of infectious diseases (biological disasters) should be taken. When a biological disaster occurs, continuous plans should be made, and the plans should be updated according to the current conditions in order to survive with the least damage.

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References

1. World Health Organization. The World Health Report 2007: A Safer Future: Global Public Health Security in the 21st century: overview. 2007.Available from: URL: https://apps.who.int/iris/handle/10665/69698; Access: 28.06.2021
2. World Health Organization. Ebola Virus Disease. Available from: URL: https://www.who.int/health-topics/ebola#tab=tab_1; Access: 28.06.2021
3. World Health Organization. Marburg Haemorrhagic Fever. Available from: URL: https://www.who.int/health-topics/marburg-virus-disease#tab=tab_1; Access: 12.09.2021.
4. World Health Organization. Kızamık Bilgi Notu. Available from: URL: https://www.who.int/en/news-room/fact-sheets/detail/measles; Access: 28.06.2021.
5. World Health Organization. World Health Statistics Monitoring Health for The Sdgs, Sustainable Development Goals. 2021; ISBN 978-92-4-002705-3 (electronic version)
6. Murray NEA, Quam MB, Wider-Smith A. Epidemiology of dengue: past, present and future prospects. Clin Epidemiol. 2013;20(5): 299-309.
7. Youngerman B. Pandemic and Global Health, New York: Infobase Publishing, 2008.
8. Yuksel E. Conquest of Constantinapole and black death. International Journal of Social Sciences Academy. 2020; 2(3):441-459.
9. Kilic O. Global Epidemics in History and Their Effects on Community Life. Seker M, Ozer A, & Korkut C. Editors. Anatomy of the Global Pandemic: The Future of Man and Society, Turkish Academy of Sciences. TDV Printing Facilities, Ankara. 2020. ISBN: 978-605-2249-46-8.
10. Nikiforuk A. The Fourth Horseman of the Apocalypse, the History of Epidemics and Infectious Diseases. Erkanli S, Translated Editor. Communication Publications. History Series 12. ISBN-13: 978-975-4 70-853-0 Istanbul. 2018;7. Baskı (7. printing).
11. Atac A, Ucar M. Important Infectious Diseases and Effects on Life Process. Bilim Tarihi Arastırmaları 2006;(2):33-42.
12. Bulmus B. Plague, Quarantines and Geopolitics in the Ottoman Empire. Edinburgh University Press. 2005. Available from: URL: http://library.oapen.org/handle/20.500.12657/31780; Access: 28.06.2021.
13. Ali M, Lopez AL, You Y, Kim YE, Sah B, Maskery B, & Clemens J. The Global Burden of Cholera. Bulletin of the World Health Organization 2012; 90: 209-218.
14. Bakar C. Kırk Reexamination of an outbreak after fortyseven years: Key lessons from the Sagmalcılar outbreak, 1970. Turkish Journal of Public Health 2017;15(3):245.
15. Fenner F, Henderson DA, Arita I., Ježek Z, Ladnyi ID. Smallpox and its Eradication. World Health Organization Geneva,1988.

16. Erdem H, Besirbellioglu BA, Oz B., Tetik A, Batur S, Erdem A, Savascı U & Ozbay G. The 1923 Article of Bacteriologist Osman Serafeddin Related to Spanish Flu. Mediterr J Infect Microb Antimicrob 2012; (1): 1-9.
17. Crosby AW. "The Pandemic of 1918", Influenza in America 1918:1976: History, Science and Politics, June E. Osborn (Ed.), New York: Prodist; 1977.
18. Yolun M. Ispanyol the Effects of the Spanish Flu on the World and the Ottoman State, Master Thesis, Adıyaman University Institute of Social Sciences 2012.
19. Aslan R, Epidemics, Pandemics and Covid-19 from History to the Present. Monthly Economy and Culture Journal of the Lake District Detail 2020;8 (85):35-41.
20. WHO. Summary table of SARS cases by country. Available from: URL: https://www.who.int/health-topics/severe-acute-respiratory-syndrome; Access: 28.06.2021.
21. Mabuza MP. Epidemiology and Statistics for Public Health Research: Concepts, Practices and Critical perspectives. Beau Bassin: Lambert Academic Publishing 2018.
22. World Health Organization. Influenza (Avian and other zoonotic). 2018. Available from: URL: https://www.who.int/news-room/fact-sheets/detail/influenza-(avian-and-other-zoonotic); Access: 25.09.2021.
23. World Health Organization. Middle East Respiratory Syndrome Coronavirus (MERS-CoV). Available from: URL: https://www.who.int/health-topics/middle-east-respiratory-syndrome-coronavirus-mers#tab=tab_1; Access: 28.06.2021.
24. T.R. Ministry of Health COVID-19 Outbreak Management and Working Guide. 2021. Available from: URL: https://covid19.saglik.gov.tr Access: 19.08. 2021.
25. T.R. Ministry of Health. 2022. Available from: URL: https://www.saglik.gov.tr/TR,80604/bakan-koca-turkiyenin-kovid-19la-1-yillik-mucadele-surecini-degerlendirdi.html- Access: 02.02.2022
26. World Health Organization Coronavirus Disease (COVID-19) Pandemic. 2021. Available from: URL: https://www.who.int/emergencies/diseases/novel-coronavirus-2019 Access: 22.09.2021

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RESEARCH ARTICLE

Evaluation of Vocational School of Health Services Students' Opinions on Vaccine and The Importance of Vaccine

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Abstract
Objective: Vaccination is one the most effective, reliable and very low-cost method of protection in protecting human health and preventing epidemics. Strengthening the immune system against infectious diseases is the right of every human being. Vaccination is one of the most important preventive practices from past to present in terms of protecting public health. In this study, it was aimed to determine the opinions of Van Yuzuncu Yıl University (YYU) Vocational School of Health Services students about the importance of vaccine and vaccine in vaccine preventable diseases, their attitudes towards vaccination and their vaccination status.
Method: This descriptive study is a questionnaire consisting of 20 questions prepared to evaluate the opinions of the students studying at Van YYU Health Services Vocational School in the 2021-2022 academic year about the vaccine and its importance. Descriptive statistics: It was expressed as numbers and percentages for categorical variables, and as mean and standard deviation for continuous variables.
Results: 54.5% of the participants think that their knowledge about the vaccine is not sufficient, 40.4% think that the vaccine is not effective enough to protect against diseases, and 70.4% think that the vaccine is not effective in eliminating epidemics completely. 69.4% of the participants stated that they were hesitant about getting vaccinated, and 85.2% stated that vaccines had side effects.
Key Words: Vaccine, Importance of vaccine, Questionnaire, Student opinions.

Sağlık Hizmetleri Meslek Yüksekokulu Öğrencilerinin Aşı ve Aşının Önemi ile İlgili Görüşlerinin Değerlendirilmesi

Özet
Amaç: Aşı, insan sağlığını koruma ve salgın hastalıkları önlemede en etkili, güvenilir ve oldukça düşük maliyetli korunma yöntemlerinden biridir. Bulaşıcı hastalıklara karşı bağışıklık sisteminin güçlendirilmesi her insanın hakkıdır. Aşılama, toplum sağlığının korunması açısından geçmişten günümüze en önemli koruyucu uygulamalardan biridir. Bu çalışmada Van YYU Sağlık Hizmetleri Meslek Yüksekokulu öğrencilerinin aşıyla önlenebilen hastalıklarda aşı ve aşının önemi ile ilgili görüşlerinin, aşılanmaya olan tutumlarının ve aşı durumlarının belirlenmesi amaçlanmıştır.
Yöntem: Tanımlayıcı tipteki bu çalışma, Van YYU Sağlık Hizmetleri Meslek Yüksek Okulunda 2021-2022 eğitim öğretim yılında öğrenim gören öğrencilerin, aşı ve aşının önemi hakkındaki görüşlerinin değerlendirilmesine yönelik hazırlanan, 20 sorudan oluşan anket çalışmasıdır. Tanımlayıcı istatistikler; Kategorik değişkenler için sayı ve yüzde olarak, sürekli değişkenler için ise ortalama ve standart sapma olarak ifade edilmiştir.
Bulgu: Katılımcıların %54,5'inin aşı hakkında bilgilerinin yeterli olmadığını, %40,4'ünün hastalıklara karşı korunmada aşının yeterince etkili olmadığını, %70,4'ü salgın hastalıkları tamamen ortadan kaldırmada aşının etkili olmadığını düşünmektedir. Katılımcıların %69,4'ü aşı yaptırma konusunda tereddüt yaşadığını, %85,2'si aşıların yan etkisi olduğunu belirtmiştir.
Sonuç: Katılımcılarda aşıların önemi ve güvenirliliğine ilişkin tereddütlerin beklenenin aksine yüksek düzeyde olduğu belirlenmiştir. Öğrencilerin çoğunun aşı ve aşının önemi ile ilgili bilgilerinin yetersiz olduğu görülmüştür.
Anahtar Kelimeler: Aşı, Aşının önemi, Anket, Öğrenci görüşleri.

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Introduction

Vaccination is the most effective, safe and cost-effective method for protecting human health and preventing epidemics. Strengthening the immune system against infectious diseases is the right of every human being (1). The first target in vaccination services; It is to prevent the existence of vaccine-preventable diseases in the society, especially in infants and children, and thus to prevent deaths and disabilities that may occur as a result of these diseases. Immunization studies carried out for this purpose should reach the entire society and should also be at the highest level in terms of quality. Immunity can be acquired in two ways, active and passive. Active immunity is a specific immunity that occurs with a certain disease or vaccines. The antigen or mixture of antigens used to achieve active adaptive immunity is called a vaccine. A certain amount of time is needed for the development of active immunity induced by the vaccine. Thus, the acquired immunity usually lasts for a long time. Passive immunity is obtained by taking antibodies (immunoglobulins) from humans or animals. The duration of immunity provided by this method is short, and may vary from a few weeks to a few months, depending on the level of immunoglobulin taken (2). An effective immunization, together with the prevention of infectious diseases in childhood, ensures the controllability of the same diseases in later life. The inclusion of new vaccines in the national program in line with new developments and information makes significant contributions to public health (3).

Getting the desired response after vaccination depends on more than one factor. In addition, the content of the vaccine, the age of the person receiving the vaccine and the immune status are known as the most important factors (4).

In this study, it was aimed to determine the opinions, attitudes, and vaccination status of Van YYU Vocational School of Health Services students about the vaccine and the importance of the vaccine in vaccine preventable diseases.

Materials and Methods

Type of research

The research is a descriptive study.

Place and time of research

The questionnaire form prepared in line with the purpose of the study, between February-March 2022 in the 2021-2022 academic year, Van YYU Vocational School of Health Services; It was conducted by using face-to-face interview technique on 2nd year students studying in Anesthesia, Child Development, Dialysis, Disabled Care and Rehabilitation, First and Emergency Aid, Radiotherapy, Medical Laboratory, Medical Imaging, Elderly Care programs.

Population and Sample of the Research

A total of 297 volunteer students who were at the school on the day of the study and agreed to participate in the study were included in the study.

Data Collection Tools

The questionnaire form prepared by the researchers was applied to the students who accepted the study after the permission of the relevant lecturer was taken at the end of the course and after it was explained that they did not name names under observation. 4 of the questions include the socio -demographic characteristics of the participants, and 20 of them include the opinions of the participants about the vaccine and its importance. In the prepared question form; age, gender, the program he attended, the college he graduated from, general

information about vaccines, whether the vaccines are effective enough to protect against diseases, information about the current vaccine calendar, the side effects of vaccines, the effects of vaccines in preventing infectious diseases from turning into epidemics, Opinions on the control of Covid-19 disease with vaccines and there are questions about the content and safety of the vaccines.

Statistical analysis

Descriptive statistics; It was expressed as numbers and percentages for categorical variables, and as mean and standard deviation for continuous variables. Chi-square test was used to determine the relationship between categorical variables. Statistical significance level was taken as $p<0.05$ in calculations and SPSS (ver:13) statistical software was used for calculations

Results

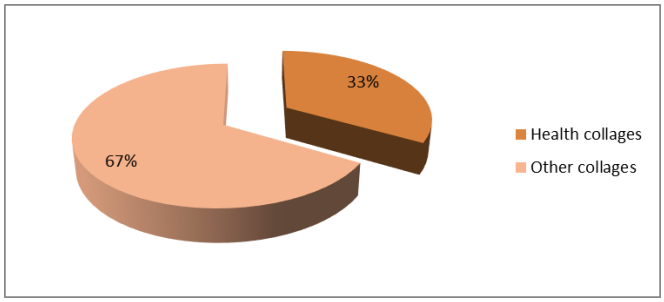
Socio -demographic characteristics of the participants were examined.

When Table 1 is examined; 68% of the participants were female, 32% were male, and 84.5% were between the ages of 18-22. 33.3% of them graduated from health collage and 66.7% of them graduated from other colleges (Graph 1). 5.4% Elderly Care Services, 5.4% Child Development, 2.4% Medical Laboratory Techniques, 13.5% Medical Imaging Techniques, 7.1% Radiotherapy, 15.8% Anesthesia, 13.1% Dialysis, 3.4% of them are studying in the Disability Care and Rehabilitation and 34% of them are studying in the First and Emergency Aid program (Graph 2).

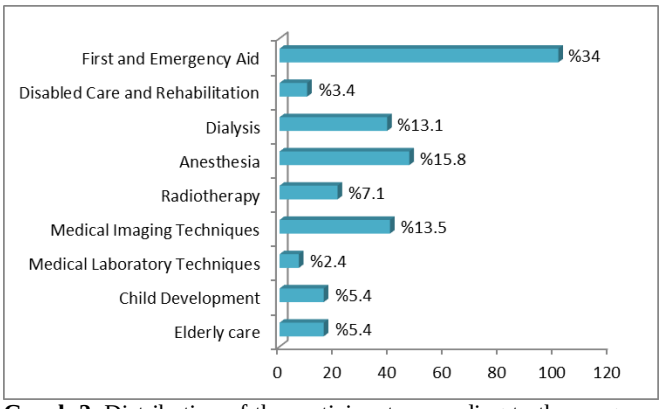
The distribution of responses regarding the vaccine and its importance is given in Table 2. When Table 2 is examined; To the question "Do you believe that your knowledge about vaccines is sufficient?", 54.5% of the participants answered "No", 25.6% "Yes" and 19.9% "I am undecided". "Are vaccines effective enough to protect against diseases?" 40.4% of the participants answered "No", 33.7% as "I am undecided" and 25.9% as "Yes" to the question. "Do you have information about the current vaccination schedule of the Ministry of Health?" To the question, 63% of the participants answered "No", 32.3% "Yes" and 4.7% "I am undecided". "Do you think vaccines have side effects?" To the question, 85.2% of the participants answered "Yes", 7.7% with "I am undecided" and 7.1% with "No". "Are vaccines effective in preventing infectious diseases from turning into epidemics?" 55.9% of the participants answered "Yes", 27.9% as "I am undecided" and 16.2% as "No" to the question. "Do you think it is necessary to vaccinate adults with chronic diseases (who are at risk)?" To the question, 71.4% of the participants answered "Yes", 16.8% "I am undecided" and 11.8% "No".

Table 1. Socio -demographic characteristics of the participants

	n	%
Gender		
Male	95	32
Female	202	68
Age range		
18-22	251	84.5
23-26	42	14.1
>27	4	1.3
Health college graduated from		
Health college	99	33,3
Other college	198	66.7
Program studied		
Elderly care	16	5.4
Child Development	16	5.4
Medical Laboratory Techniques	7	2.4
Medical Imaging Techniques	40	13.5
Radiotherapy	21	7.1
Anesthesia	47	15.8
Dialysis	39	13.1
Disabled Care and Rehabilitation	10	3.4
First and Emergency Aid	101	34



Graph 1. Distribution of participants by health college and other colleges



Graph 2. Distribution of the participants according to the program they studied

Table 2. Distribution of responses about the vaccine and its importance

		Yes	No	undecided
1	Do you believe that your knowledge about vaccines is sufficient?	76 (%25.6)	162 (%54.5)	59(%19.9)
2	Are vaccines effective enough to protect against diseases?	77(%25.9)	120(%40.4)	100(33.7)
3	Do you have information about the current vaccination schedule of the Ministry of Health?	96(%32.3)	187 (%63)	14(%4.7)
4	Do you think vaccines have side effects?	253(%85.2)	21(%7.1)	23(%7.7)
5	Are vaccines effective in preventing infectious diseases from turning into epidemics?	166((%55.9)	48(%16.2)	83(%27.9)
6	Do you think it is necessary to vaccinate adults with chronic diseases (who are in the risk group)?	212(%71.4)	35(%11.8)	50(%16.8)
7	Do you think that vaccination with alternative methods (by keeping the immunity strong) may not be necessary?	118(%39.7)	115(%38.7)	64(%21.5)
8	Have you ever been vaccinated as an adult?	275(%92.6)	18(%6.1)	4(%1.3)
9	Do you think the vaccine is necessary for children?	196(%66)	66(%22.2)	35(%11.8)
10	Do you think childhood infectious diseases can cause death or disability?	230(%77.4)	26(%8.8)	41(%13.8)
11	Have epidemic diseases been completely eradicated thanks to vaccines?	22(%7.4)	230(%77.4)	45(%15.2)
12	Do you believe that the Covid-19 disease, which has taken the world under its influence, is under control with a vaccine?	58(%19.5)	171(%57.6)	68(%22.9)
13	Would you recommend to your friends to get the Covid-19 vaccine?	172(%57.9)	70(%23.6)	55(%18.5)
14	Have you ever had any hesitation about getting vaccinated?	206(%69.4)	77(%25.9)	14(%4.7)
15	Do you think it is necessary to get vaccinated before traveling abroad?	190(%64)	69(%23.2)	38(%12.8)
16	Do you think that vaccines contain harmful substances?	131(%44.1)	62(%20.9)	104(%35)
17	Have you been vaccinated to protect yourself from Covid-19?	285(%96)	8(%2.7)	4(%1.3)
18	Do you believe vaccines are safe?	115(%38.7)	68(%22.9)	114(%38.4)

"Do you think there may be no need to vaccinate with alternative methods (keeping immunity strong)?" To the question, 39.7% of the participants answered "Yes", 38.7% "No" and 21.5% "I am undecided". "Have you ever been vaccinated as an adult?" 96.2% of the participants answered "Yes", 6.1% as "No" and 1.3% as "I am undecided". "Do you think the vaccine is necessary for children?" To the question, 66% of the participants answered "Yes", 22.2% "No" and 11.8% "I am undecided". "Do you think childhood infectious diseases can cause death or disability?" 77.4% of the participants answered "Yes", 13.8% "I am undecided" and 8.8% "No" to the question. "Has the epidemics been completely eradicated thanks to the vaccine?" To the question, 77.4% of the participants answered "No", 15.2% as "I am undecided" and 7.4% as "Yes". "Do you

believe that the Covid-19 disease, which has taken the world under its influence, is under control with a vaccine?" 57.6% of the participants answered "No", 22.9% "I am undecided" and 19.5% "Yes" to the question. "Would you recommend your friends to get the Covid-19 vaccine?" 57.9% of the participants answered "Yes", 23.6% "No" and 18.5% "I am undecided". "Have you ever had any hesitation about getting vaccinated?" 69.4% of the participants answered "Yes", 25.9% as "No" and 4.7% as "I am undecided". "Do you think it is necessary to get vaccinated before traveling abroad?" To the question, 64% of the participants answered "Yes", 23.2% "No" and 12.8% "I am undecided". "Do you think that vaccines contain harmful substances?" 44.1% of the participants answered "Yes", 35% "I am undecided" and 20.9% "No" to the question. "Have you been vaccinated to protect yourself from Covid-19?" To the question, 96% of the participants answered "Yes", 2.7% as "No" and 1.3% as "I am undecided". Of those who answered negatively to this question, 1.3% stated that they did not trust the Covid-19 vaccine, 1.2% stated that the lack of information, the ineffectiveness of the vaccine, its content and side effects were not known enough. "Do you believe the vaccines are safe?" 38.7% of the participants answered "Yes", 38.4% "I am undecided" and 22.9% "No" to the question. 24.2% of the participants stated that they do not believe that vaccines are safe in general. 10.4% of these are due to insecurity, 5.4% to lack of information, 4.4% to not knowing clearly the content of the vaccine, 0.7% to fear of death, 0.3% to mandatory vaccination, 0.3% thought it was the manipulation of the USA, 0.3% stated that they did not trust vaccines due to the increase in cases.

There was no statistically significant correlation in the comparisons made according to the vaccination and the importance of the vaccine and the collage, gender and departments of the participants.

Discussion

Vaccination is one of the most important medical practices in terms of protecting public health from the past to the present. It is one of the most effective methods of preventing the prevention and spread of infectious diseases. Adult immunization is a current problem in all countries of the world as well as in our country. This problem arises from deficiencies in the lack of childhood vaccinations, the lack of long-term efficacy of some vaccines, and the insensitivity of adults to vaccination. Some professions (such as health workers), trips to home and abroad, advanced age, low immunity, such as the risks posed by conditions, make it mandatory for certain vaccinations to be made available to adults. In addition, by preventing diseases with serious complications with vaccination, it can reduce the financial burden that these diseases may cause (5).

The main way to protect against all infectious diseases is to educate individuals. In terms of infectious diseases, health personnel are 10 times more at risk than other. Therefore, protection-related training must first be given to medical personnel (6). Artan and Güleser researched that 81.9% of the students had sufficient knowledge levels related to infectious diseases and this source of information was the school (7). In the study conducted by Kılıç et al., 78.4% of the students, and in the study by Gündüz et al. 62% stated the school as the first source of information (6,8). Considering that students receive their knowledge about infectious diseases from the school, it is very important to

eliminate deficiencies in transmission methods, prevention methods and risk groups. Cetin and his colleagues found that students experienced serious doubts about the reliability of vaccines, graduating with a distinct confusion about ways to prevent infectious diseases and traditional treatment methods (9).

A study of 735 university students on a possible Covid-19 vaccine during the Covid-19 pandemic in Italy reported that 633 (86.1%) students would agree to be vaccinated, while 102 (13.9%) were undecided about the vaccine and would not get vaccinated. It has been observed that there are more students who want to get vaccinated than those who study in different departments. It is thought that this may be due to the fact that their knowledge of the vaccine is adequate and public health protection awareness has developed (10).

In a study aiming to determine anti-vaccination in Antalya, 6.2% of the participants defined themselves as being anti-vaccine, and their reasons for this were respectively; side effects of vaccines (65%), harmful substances in vaccines (25.8%), thought that vaccines are not useful (19.4%), distrust of vaccine companies (6.4%), and vaccines causing sterility (3.2%) has been thought. (11). In another study, a high rate of fear of side effects and distrust of the ingredients were found to be the reason for not getting the vaccine. The reason for the mistrust of the vaccine may be that the vaccine, which has gained popularity recently, contains substances such as thiomersal (compound containing mercury), aluminum, and it is rumored that these cause autisms. Tiomersalin, which is found in vaccines with multiple doses, was removed from the vaccine content in 2001 in order to increase vaccine compliance and confidence, although it does not accumulate in the body and has proven to be reliable. In addition, aluminum contained in the vaccine content is considered to be very low risk for infants and the benefits of its addition to the vaccine are much greater than its known harms (12,13).

Conclusion

Although the value of vaccines has been demonstrated in the fight against pandemics that threaten the health of the society, vaccination rates may decrease due to the fact that some people experience vaccine hesitation (14, 15). This situation is seen as a serious public health problem and policies are tried to be developed and solutions are offered (16). It is stated that the reasons for refusing the vaccine, experiencing vaccine hesitancy, and delaying the vaccine are various (17). Although vaccine-preventable diseases in particular threaten public health, it is stated that the issue should be addressed in different dimensions in order to avoid vaccine hesitation (18,19).

In this study, it was determined that doubts about the importance and reliability of vaccines were higher than expected. It has been observed that most of the students have insufficient knowledge of the importance of vaccines and vaccines. This result shows that students should be informed about the vaccine and its importance. In order for students to enlighten the individuals who will apply to them in their professional lives, the courses related to vaccination must be added to the curriculum. The relevant higher education curriculums should be reviewed in a way that not only provides information on vaccine issues, but also the right attitude and awareness. Students should at least go to the "health worker vaccination unit" of the institution where they are interning during their education and participate in the applications and learn about their vaccinations will also be effective in reducing vaccine hesitation. Necessary trainings should be given for

students who are studying outside of health. The inclusion of safety data related to these vaccines applied in Turkey for many years in the educational contents prepared by the Ministry of Health will contribute to the elimination of vaccine instability and opposition based on side effects in health students, health workers and society as a whole. Health workers play an important role in solving the growing anti-vaccination problem in society. Indecision by health workers in person prevents them from this role. Given that this indecision occurs largely during university years, extensive investigations into the causes of vaccine instability in health students are needed. Seminars and conferences can be created and education can be provided for these students. In addition, brochures, catalogs or educational materials can be prepared and distributed to students and students may be interested in this subject. Although it is seen that the students' confidence in the vaccination policies of the Ministry of Health and the testing period of vaccines in Turkey has increased during the study period, we believe that this increase is not enough.

Ethics Committee Approval: Ethics committee approval was received for this study from Van Yüzüncü Yıl University Non-Interventional Clinical Research Ethics Committee (Decision no: 2022/02-07, Date: 11.02.2022).

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References

1. Arisoy ES, Ceyhan M, Ciftci E, Hacımustafaoglu M, Kara A, Kuyucu N, et al. The national vaccination Schedule in previously healthy children: the practical recommendations about additional vaccines. J Pediatric Inf, 2014; 8(1): 1-6.

2. Tezcan S, Yigit EK. Vaccination and Child Health, Hacettepe University Institute of Population Studies Turkish Demographic and Health Survey. 2003; 131-141.

3. Vitrinel A, Erdag GC. Vaccine application principles. Turkish Journal of Family Medicine 2007;11(4):149-153.

4. Yalcin SS. Does analgesic prophylaxis affect post-vaccine fever reaction frequency and vaccine antibody response? Journal of Child Health and Diseases. 2010; 53: 1-3.

5. Guner E. Determination of Vaccination Preventable Diseases and Vaccination-Related Awareness and Vaccination Status of Healthcare Professionals. İzmir Southern Region Public Hospitals Union Health Sciences University Bozyaka Training and Research Hospital Family Medicine Department, 2016; Izmir.

6. Gunduz T, Altiparmak S, Karadeniz G. Knowledge levels of college students about sexually transmitted diseases. Journal of Viral Hepatitis, 2004;2:93-98.

7. Artan M, Güleser G. Evaluation of Health School Students ' Knowledge Levels on HIV / AIDS, Hepatitis B Virus and Hepatitis C Virus. Erciyes Medical Journal, 2006;28 (3):125-133.

8. Kilic S, Acikel C, Kir T, Ogur R, Ucar M. Knowledge levels and attitudes of health non-commissioned officer vocational school students about HIV/AIDS. TAF Preventive Medicine Bulletin, 2004; 6:111-118.

9. Cetin AO, Sasmaz A, Kurtuluş D, Badur I, Balkan II, Owiwi M. Vaccination Hesitancy in Health Students Anadolu Clinic Journal of Medical Sciences, September 2021; 26(3).

10. Barello S, Nania T, Dellafiore F, Graffigna G, Caruso R. ' Vaccine hesitancy ' among university students in Italy during the COVID-19 pandemic. Eur J Epidemiol, 2020; 35(8):781-3. doi:10.1007/s10654-020-00670-z.

11. Türkay M, Ay EG and Aktekin MR. Anti - Vaccine Status in a Selected Groups in Antalya. Akdeniz Medical Journal, 2017;2:107–112. doi:10.17954/amj.2017.78.

12. Mitkus RJ, King DB, Hess MA, Forshee RA and Walderhaug MO. Updated aluminum pharmacokinetics following infant exposures through diet and vaccination. Vaccine, 2011; 29(51): 9538–9543. doi: 10.1016/j.vaccine.09.124.

13. CDC. Thimerosal in Vaccines Thimerosal Concerns Vaccine safety (Online). Available: https://www.cdc.gov/vaccinesafety/concerns/thimerosal/index.html. Accessed: 04-Jan-2020.

14. Black S, Rappuoli P. A. Crisis of Public Confidence in Vaccines. Science translational Medicine, 2010;2(61):61. doi: 10.1126/Scitranslmed.3001738.

15. Leask J, Kinnersley P, Jackson C, Cheater F, Bedford H, Rowles G. Communicating with parents about vaccination: a framework for health professionals. BMC Pediatr. 2012; 12:154.

16. Larson HJ, Jarrett C, Eckersberger E, Smith DM, Paterson P. Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: A systematic review of published literature. Vaccine, 2014; 32(19): 2150–2159. doi: 10.1016/j.vaccine.2014.01.081.

17. Cooper LZ, Larson HJ & Katz SL. Protection Public Trust in Immunization. Pediatrics, 2008; 122(1): 149–153. doi:10.1542/peds.2008-0987.

18. Dube E, Laberge C, Guay M, Bramadat P, Roy R, Bettinger JA. Vaccine hesitancy: an overview. Human Vaccines & Immunotherapeutics, 2013;9(8),1763–1773. doi:10.4161/hv.24657.

19. Larson HJ, Cooper LZ, Eskola J, Katz SL & Ratzan S. Addressing the vaccine confidence gap. The Lancet, 2011;378(9790):526–535. doi:10.1016/s0140-6736(11)60678-8.

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RESEARCH ARTICLE

Vocational School of Health Services Students' Knowledge Levels on Hand Hygiene

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Abstract

Objective: Hand washing is an effective, easy and low cost application in the protection and development of general public health that can be applied in the prevention of the formation and spread of infections that individuals. The aim of this study is to evaluate the knowledge levels of students in hand hygiene in terms of compliance with hand hygiene both in school and practice areas and to determine the extent to which this information affects hand washing habits in daily life.

Methods: The research was carried out in the fall semester of the 2019-2020 academic year. A total of 384 volunteer students who were present at the school on the day of the study and agreed to participate in the study were included in the study. The data of the research was collected through a questionnaire consisting of a total of 36 questions that will determine the level of knowledge about the socio-demographic characteristics of the students and hand hygiene. Descriptive statistics for continuous variables while expressed as mean and standard deviation, it is expressed as number and percentage for categorical variables. Chi-square test was used to determine the relationship between categorical variables.

Results: 71.1% of the participants in the study were female and 28.9% were male students, and the average age of the students was 20.80 ± 2.165. 49.7% of them received hand hygiene training. 4.9% of the participants stated that they washed their hands 2-3 times a day, 32% 4-5 times, 41.7% 10 and above, 20.1% as needed. For hand hygiene, 73.7% stated that they used water-soap and 2.6% used hand sanitizer. 94% of the participants stated that hand hygiene reduced the rate of infection. 86.2% of the students stated that the number of washbasins in school is insufficient and 78.9% stated that there is no soap in the washbasins. In the application areas, 75% stated that there were no paper towels, 49.2% hand sanitizer, and 47.4% no gloves.

Conclusion: In the field of hand hygiene, standard rules prepared by national and international infection prevention and control organizations confirm that hand hygiene alone is the most important procedure in preventing infections. In study, it was determined that the students who are candidates to become health personnel in the future have sufficient information about hand hygiene, but the necessary material to provide hand hygiene in school and application areas is insufficient.

Key Words: Knowledge level; Hand hygien; Student

Sağlık Hizmetleri Meslek Yüksekokulu Öğrencilerinin El Hijyeni Bilgi Düzeyleri

Özet

Amaç: El yıkama, bireylerde enfeksiyon oluşumunun ve yayılmasının önlenmesinde uygulanabilecek genel halk sağlığının korunması ve geliştirilmesinde etkili, kolay ve düşük maliyetli bir uygulamadır. Bu çalışmanın amacı, öğrencilerin el hijyeni bilgi düzeylerini hem okul hem de uygulama alanlarında el hijyenine uygunluk açısından değerlendirmek ve bu bilgilerin günlük yaşamlarında el yıkama alışkanlıklarını ne ölçüde etkilediğini belirlemektir.

Yöntemler: Araştırma 2019-2020 akademik yılı güz döneminde yapılmıştır. Çalışma günü okulda bulunan ve çalışmaya katılmayı kabul eden toplam 384 gönüllü öğrenci çalışmaya dahil edilmiştir. Araştırmanın verileri, öğrencilerin sosyo-demografik özellikleri ve el hijyeni ile ilgili bilgi düzeylerini belirleyecek toplam 36 sorudan oluşan bir anket aracılığıyla toplanmıştır. Sürekli değişkenler için tanımlayıcı istatistikler ortalama ve standart sapma olarak ifade edilirken, kategorik değişkenler için sayı ve yüzde olarak ifade edilmiştir. Kategorik değişkenler arasındaki ilişkiyi belirlemek için ki-kare testi kullanıldı.

Bulgular: Araştırmaya katılanların %71.1'i kız, %28.9'u erkek öğrenci olup, öğrencilerin yaş ortalaması 20.80±2.165 olarak bulunmuştur. Katılımcıların %49.7'si el hijyeni eğitimi almıştır. Katılımcıların %4.9'u ellerini günde 2-3 kez, %32'si 4-5 kez, %41.7'si 10 ve üzeri, %20.1'i gerektiği kadar yıkadığını belirtmiştir. El hijyeni için %73.7'si su sabun ve %2.6'sı el dezenfektanı kullandığını belirtmiştir. Katılımcıların %94'ü el hijyeninin enfeksiyon oranını azalttığını ifade etmiştir. Öğrencilerin %86.2'si okuldaki lavabo sayısının yetersiz olduğunu ve %78.9'u lavabolarda sabun bulunmadığını belirtmiştir. Uygulama alanlarında %75'i kağıt havlu, %49.2'si el dezenfektanı ve %47.4'ü eldiven olmadığını belirtmiştir.

Sonuç: El hijyeni konusunda, ulusal ve uluslararası enfeksiyon önleme ve kontrol organizasyonları tarafından hazırlanan standart kurallar, enfeksiyonların önlenmesinde el hijyeninin tek başına en önemli prosedür olduğunu onaylamaktadır. Çalışmada, sağlık personeli olmaya aday öğrencilerin el hijyeni konusunda yeterli bilgiye sahip oldukları ancak okul ve uygulama alanlarında el hijyenini sağlamak için gerekli materyallerin yetersiz olduğu tespit edilmiştir.

Anahtar Kelimeler: Bilgi düzeyi; El hijyeni; Öğrenci

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Introduction

Hand washing is an effective, easy and low cost application in the protection and development of general public health that can be applied in the prevention of the formation and spread of infections that individuals may experience in environments such as hospitals, workplaces, shopping malls and schools (1,2). The individuals, especially personal characteristics of healthcare workers, the level of knowledge about hand hygiene and knowledge sharing, professional experiences, gender, work intensity, lack of role models, emotional motivation and habits are the factors that affect compliance with hand hygiene as they can change hand washing behaviors (1,3).

Materials such as water, soap, hand disinfectants and wet wipes are used to ensure hand hygiene. Failure to apply hand hygiene correctly may cause infections (4). However, it is estimated that inadequate hand hygiene practices negatively affect 80% of the world population (1). Although it is known that hand washing is of great importance in the prevention of infections, the inability to access the utensils required for hand hygiene such as sinks, soap, water, paper towels, and trash can reduce compliance with hand washing. Therefore, it is important to increase the compliance of hand hygiene for all healthcare workers, and this can be achieved through quality education (5).

While many studies focus on accurate and effective hand hygiene practices in healthcare professionals, studies for students receiving healthcare training are less common. For this reason, it is very important to evaluate the knowledge level, attitude and practices of students studying in health-related departments on hand hygiene (6).

The aim of this study is to evaluate the knowledge levels of students with or without hand hygiene education about compliance with hand hygiene both in school and practice areas and to determine the extent to which this information affects hand washing habits in daily life.

Methods

Type of Research

A descriptive research design was used in this study.

Place and Time of Research

The research was carried out in Van Yuzuncu Yil University Vocational School of Health Services, 2019-2020 academic year fall semester. Second-years students studying in the Child Development, Dialysis, Disabled Care and Rehabilitation, Elderly Care Services, Pharmacy Services, First and Emergency Aid (Day Education), First and Emergency Aid (Night Education), Perfusion, Radiotherapy, Medical Documentation and Secretarial, Medical Laboratory, Medical Imaging and Anesthesia programs were included in the study.

Population and Sample of the Research

Sampling method was not preferred. 384 volunteer students who were present at the school on the day of the study and who agreed to participate in the study were included in the study.

Data collections

The data of the research was collected through a questionnaire consisting of a total of 36 questions that will determine the level of knowledge about the socio-demographic characteristics of the students and hand hygiene. In the questionnaire form prepared by the researchers; the socio-demographic characteristics of the students are age, class, department, gender, marital status, educational status of the mother and father, residence, high school etc. while addressing the questions, questions such as the importance of hand hygiene, the frequency of hand washing, what it uses in hand hygiene, the conditions required by hand hygiene, whether it has received hand hygiene training or not, have been included.

Statistical Analysis

Descriptive statistics for continuous variables from the features mentioned; while expressed as mean and standard deviation, it is expressed as number and percentage for categorical variables. Chi-square test was used to determine the relationship between categorical variables. Statistical significance level was taken as $p < 0.05$ in calculations and SPSS statistical software was used for calculations.

Result

71.1% (n = 273) of the participants in the study are female students, 28.9% (n = 111) are male students and the average age of the students is 20.80 ± 2.165 and 96.4% of the students are single. 52.6% (n=202) of the students stay in the dormitory, 39.6% (n=152) with their family, 3.4% (n=13) stay with their friends. While the mother of 43.8% (n=168) and the father of 10.4% (n=40) participants are illiterate, the mother of 6% (n=23) and the father of 17.7% (n=68) are high school graduate. (Table 1). 9.6% (n=37) of the students are normal high school, 40.6% (n=156) Anatolian high school, 12.2% (n=47) technical high school, 31% (n=119) health vocational high school, 1.3% (n=5) science high school and 5.2% (n=20) are other high school graduates (Figure 1). While 47.7% of the participants lived in the village and district center before coming to the university, 52.3% stated that they lived in the city center (Figure 2). 49.7% of students have received training in hand hygiene and 97.9% believe in the importance of hand hygiene. 95.6% of the participants defined hand hygiene as cleansing hands and removing germs from hands. 4.9% of the students stated that they wash their hands 2-3 times a day, 32% 4-5 times, 41.7% 10 and above, and 20.1% as needed (Figure 3). For hand hygiene, 73.7% stated that they used water-soap, 2.6% hand sanitizer, 0.3% wet wipes and 0.3% paper towels (Figure 4). In the application areas, 16.4% of the participants are before the patient contact, 9.1% after the patient contact, 0.8% before the aseptic procedure, 1.3% after the aseptic procedure, 1% contact the patient's environment stated that they washed their hands before, 2.6% after contact with patient environment, 0.5% before contact with body fluids, 0.8% after contact with body fluids and 75.5% in all of these applications. 94% of the participants stated that hand hygiene reduced the rate of infection. 86.2% of the students stated that the number of washbasins in school is insufficient and 78.9% stated that there is no soap in the washbasins. In the application areas, 75% stated that there were no paper towels, 49.2% hand sanitizer, and 47.4% no gloves. 8.6% of the participants stated that they did not wash their hands after removing the gloves and 18.8% of them used disinfectants on gloves.

For questions asked to be marked as correct or incorrect in the questionnaire, 98.4% of the participants stated that they should change the glove and ensure hand hygiene in each patient, 95.3% stated that they should change the glove when moving from the dirty area to the clean area, 97.1% stated that the gloves wearing is not fully protected, hand hygiene is required after removing the glove, 88.8% stated that hand hygiene cannot be provided with antiseptic, 87.8% stated that hand hygiene is the most effective way to prevent hospital infections, and 57.8% stated that hand washing and use of alcohol based hand antiseptic is superior (Table 2).

No statistically significant correlation was found between the importance given to hand hygiene, daily hand washing frequency, and the material used or preferred for hand hygiene. No statistically significant correlation was found between the importance given to hand hygiene and gender, high school graduated and departments ($p < 0.05$).

Table 2. Distribution of questions and answers to determine the level of knowledge

	True n (%)	False n (%)	Other n (%)
Each patient should be replaced with gloves and hand hygiene provided	378(98.4)	6(1.6)	
Gloves should be changed when moving from a dirty to a clean area	366(95.3)	18(4.7)	
It is fully protected by wearing gloves, there is no need for hand hygiene after removing the gloves	19(4.9)	360 (93.8)	5(1.3)
Hand hygiene should be provided after removing the glove	373(97.1)	10(2.6)	1(0.3)
Hand hygiene is provided by antiseptic application, there is no need for hand washing	41(10.7)	341(88.8)	2(0.5)
Providing hand hygiene is the most effective way to prevent hospital infections	337(87.8)	45(11.7)	2(0.5)
Hand washing is superior to alcohol-based hand antiseptic	212(57.8)	155(40.4)	7(1.8)

Table 1: Distribution of socio-demographic characteristics of students.

(n=384)	n	%
Gender		
Male	111	28.9
Female	273	71.1
Marital status		
Single	370	96.4
The married	14	3.6
Place of residence		
Dorm	202	52.6
At home with friends	13	3.4
At home with family	152	39.6
At home with relatives	7	1.8
Alone at home	5	1.3
Other	5	1.3
Mother Education		
Not literate	168	43.8
Literate	60	15.6
Primary school graduate	92	24
Secondary school graduate	32	8.3
High school	23	6
University	9	2.3
Father education status		
Not literate	40	10.4
Literate	45	11.7
Primary school graduate	124	32.3
Secondary school graduate	68	17.7
High school	68	17.7
University	39	10.2
Department		
Anesthesia	28	7.3
Child Development	25	6.5
Dialysis	15	3.9
Disabled Care and Rehabilitation	21	5.5
Pharmacy Services	18	4.7
First and Emergency Aid (Normal)	37	9.6
First and Emergency Aid (Night)	39	10.2
Perfusion	8	2.1
Radiotherapy	16	4.2
Medical Documentation and Secretariat	40	10.4
Medical Laboratory	48	12.5
Medical Imaging	42	10.9
Elderly care	47	12.2

Discussion

In this study, it has been tried to determine the knowledge levels of the students who have received or have not received hand hygiene training. 52.6% of

students stay in dormitories. The low compliance with hand hygiene in public places can cause the transmission and spread of diseases. Therefore, it is very important for students to have the necessary knowledge about hand hygiene in terms of preventing the spread of diseases. Health technicians are both among the important risk groups since they will work in different areas of health institutions and they have a critical role in controlling the spread of the disease. Lack of information in them will cause them not to notice the possible disease risks, as well as negatively affect people at risk, the sick person, their family and even the whole society in reaching support and treatment (7).

Hand hygiene, which is an effective method of preventing the spread of microorganisms, also plays an important role in reducing the incidence of infections (6,8). According to the researches, it has been determined that hand hygiene practices are effective in reducing the infections related to health care and at the same time, the transmission of organisms showing multiple drug resistance (1).

In a study conducted by Türkmen et al., it was reported that hand washing protects from microbes (1). Similarly, in the study by Tüzün et al., the participants (98.5%) reported that hand washing is very important in preventing diseases (9). In our study, 95.6% of the participants stated that hand hygiene is an effective way to cleanse hands from germs and protect them from diseases.

In the study conducted by Demirdal et al., it was stated that 72% of nurses and 58.7% of assistant doctors received training on hand washing (10). In the studies in which Demir et al. investigated the level of knowledge of hand hygiene among students, research assistants and faculty members, the level of knowledge was higher in education areas in the last year (5). In one study, the rate of compliance of health personnel to hand hygiene was 58%, and in another study, this rate was found to be 30-50% (6,11). Periodic hand hygiene trainings given by infection control committee, bedside practical trainings and 5 indication rules written in the units are thought to increase compliance with hand hygiene. In our study, 49.7% of the participants reported that they received hand hygiene training. 98.2% of them stated that they believed in the importance of hand hygiene and 94% of them stated that it reduces the infection rate.

In his study, Boyce revealed that the hand washing technique, such as washing all surfaces of the hands and fingers with soap and water, is generally not applied correctly (12). In the study conducted by Tem et al., it was reported that the awareness, knowledge levels and practices of healthcare professionals about hand hygiene were not good (13). In the study conducted by Demir et al., most of the participants stated that the number of sinks in the hospital was insufficient and their location was inappropriate (8). In contrast, in a study by Togan et al, it was reported that the sink, soap, paper towel, hand antiseptic and glove were sufficient in the units (14). In our study, 86.2% of the participants stated that the number of washbasins in school was insufficient and 78.9% of them stated that there was no soap in the washbasins. In the application areas, 75% stated that there were no paper towels, 49.2% hand sanitizer, and 47.4% no gloves. Excuses such as hand washing time taking too long, excessive workload, the view that hands are not dirty, contact time with patient or dirty material, shortness of sink and drying materials are among the reasons that decrease compliance with hand hygiene (14). In his study, Tem and his colleagues stated that if hygiene sources such as accessible sinks and sufficient

antibacterial soap, gel and paper towels are reached, compliance with hand hygiene will increase (13). These results are in line with the report of the world health organization (2009), which argues that potential barriers to hand hygiene in developing countries are the result of insufficient infrastructure problems and lack of necessary materials.

In the study conducted by Türkmen et al., 100% of the students stated that they used water-soap for hand hygiene (1). In our study, the rate of those using water-soap was found to be 73.7%.

Poor hand hygiene, which adversely affects patient treatment and increases the risk of hospital infections, can increase the length of hospital stay, as it can cause health complications. In the study of Şen et al., it was shown that healthcare personnel tend to provide hand hygiene most frequently after contact with the patient (15). In our study, 75.5% of the participants stated that they wash their hands in all applications.

In this study we carried out within the body Vocational School of Health Services, no meaningful results between departments were found. Similar results were observed in the study of Tem et al. among nursing and midwifery students (13).

In the study conducted by Artan et al., it was stated that hospital infections could decrease with the full compliance of health personnel with hand hygiene (16). Similarly, 87.8% of the participants in our study stated that providing hand hygiene is an effective way to prevent hospital infections.

Demirdal et al. reported the hand washing rate as 93.3% after using gloves in a study conducted in a university hospital (10). In our study, it was found that wearing gloves did not fully protect and the need for hand hygiene was 97.1% after removing the gloves. It is difficult to comply with hand hygiene because there are many situations where hand washing is necessary, and it is an application that should be done in a short time. Therefore, wearing gloves during healthcare practices is a supported situation. Hands must be washed after every glove change to meet the criteria of the World Health Organization (17).

Although hand disinfection of health personnel with antiseptics is considered to be theoretically appropriate, it is reported that washing with water and soap will be sufficient to remove temporary bacteria (15). The availability of hand antiseptics everywhere, less time spent in use and no need for other tools have increased compliance with hand hygiene (18). In the study conducted by Togan et al. in health vocational high school students, hand antiseptic use was found to be 44.5% in hand hygiene and 38.3% was determined in hand antiseptic preference (14). Sonmezer et al. determined that the rate of using alcohol-based hand disinfectant in the hand cleaning of healthcare professionals working in a pediatric intensive care unit was 11% (19). In a study, it was reported that facilitating access to alcohol-based hand antiseptics increased hand hygiene compliance rate from 38.4% to 54.5% (20). In our study, only 2.6% of the participants stated that they used hand antiseptics.

Limitations of the study

Participation in the study is on a voluntary basis. The study could be carried out with all students of the Vocational School of Health Services, which is a pioneer in the field of health**.**

Suggestions

In the field of hand hygiene, standard rules prepared by national and international infection prevention and control organizations confirm that hand hygiene alone

is the most important procedure in preventing infections.

The corona virus (Covid-19), which emerged in December 2019 and has shown its effect in many countries in a short time and even causes the death of many people, is an important infectious disease. In order to protect from the Covid-19, world health organization emphasized that, paying attention to hand hygiene, washing hands frequently with soap and water for at least 20 seconds; it is important to use alcohol-based hand antiseptics in the absence of soap and water (WHO, Accessed March 31, 2020).

Research shows that the basic hygiene compliance required for clinical practice in primary health education does not always reach the desired level. In order to increase hand hygiene practices, hand washing materials such as water-soap, disposable towels and hand disinfectants should be made easily accessible. Hand hygiene trainings should be repeated continuously and regularly both at school and in practice areas. In addition, awareness for hand hygiene should be raised with the distribution of promotional materials (bags, pens, mouse pads, etc.), slogans, banners and posters. Electronic and mass media, such as television, radio and social media broadcasts, should also be used.

Conclusion

As a result, in our study, it was determined that the students who are candidates to become health personnel in the future have sufficient information about hand hygiene, but the necessary material to provide hand hygiene in school and application areas is insufficient.

Ethics Committee Approval: Required permissions from Van Yüzüncü Yıl University Non-Interventional Clinical Research Ethics Committee (Decision no: 2019/16-08, Date: 08.11.2019) and the School Directorate to conduct research taken.

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References

1. Turkmen L, Bakir B. Evaluation of Knowledge, Attitude and Practices of Hand Hygiene (Routine / Hand Washing) of Health Technician Candidates. Gumuşhane University Journal of Health Sciences 2017; 6(3): 122-127.

2. Bulut A, Bulut A, Yigitbas Ç, Tuncay S. Hand hygiene attitudes of healthcare staff working in intensive care unit of a state hospital. Hand Hygiene in Health Behavior Staff 2017; 74(7): 139-146.

3. Karadag M, Yildirim N, İseri OP. The validity and reliability study of Hand Hygiene Belief Scale and Hand Hygiene Practices Inventory. Cukurova Med J 2016; 41(2): 271-284.

4. McCalla S, Reilly M, Thomas R, McSpedon-Rai D. An automated hand hygiene compliance system is associated with improved monitoring of hand hygien. Am J Infect Control 2017; 45(5): 492-497.

5. Aktug Demir N, Sumer Ş, Saltuk Demir L, Ural O. Knowledge levels of students, Trainees and Faculty Members About Hand Hygiene at a University Hospital.

Klimik Journal 2018; 31(2): 106-109.

6. Novák M, Breznický J, Kompaníková J, Malinovská N, Hudečková H. Impact of hand hygiene knowledge on the hand hygiene compliance. Medicinski Glasnik 2020; 17(1):194-199. doi: 10.17392/1051-20.

7. Kaya M, Aylaz R, Yagmur Y, Gunes G. Knowledge and Attitudes of School of Health Students Concerning HIV/AIDS. TAF Preventive Medicine Bulletin 2007; 6(3):175-180.

8. Aktug Demir N, Kolgelier S, Kucuk A, et al. Level of Knowledge and Compliance to Hand Hygiene Among Health Care Workers. Nobel Medicus 2013;9(3):104-109.

9. Tuzun H, Karakaya K, Baran Deniz EB. Turkey handwashing survey: suggestion for taking the ecological model into better consideration. Environ Health Prev Med 2015;20(5):325–331.

10. Demirdal T, Uyar S, Demirturk N. Evaluation of Practices and Knowledge Level About Hand Hygiene Among Health Care Workers in A University Hospital. Kocatepe Medical Journal 2007;8(3):39-43.

11. Kosucu SN, Goktas SB, Yildiz T. Hand hygiene compliance rate of health professionals. Clinical and Experimental Health Sciences 2015;5(2):105-108.

12. Boyce JM. New Insights for Improving Hand Hygiene Practices. Infection Control and Hospital Epidemiology 2004;25(3):187-188.

13. Tem C, Kong C, Him N, Sann N, Chang SB, Choi J. Hand hygiene of nursing and midwifery students in Cambodia. International Nursing Review 2019; 00:1-7.

14. Togan T, Isik B, Turan H, Ciftci Ö. Knowledge, attitude and behavior of health vocational high school students about hand hygiene and work accidents in Aksaray city center. Journal of Health Academicians 2015;2 (1): 8-15.

15. Sen S, Sonmezoglu M, Akbal E, Ugur E, Afacan S. Five Indications for Hand Hygiene Compliance among Healthcare Providers in a University Hospital. Klimik Journal 2013;26(1):17-20.

16. Artan Oguzkaya M, Artan C, Baykan Z. The Level of Knowledge among Vocational Health College Students on Nosocomial Infections. Düzce University Journal of Health Sciences Institute 2014;1(1):17-21.

17. Fehling P, Hasenkamp J, Unkel S, et al. Effect of gloved hand disinfection on hand hygiene before infection-prone procedures on a stem cell ward. Journal of Hospital Infection 2019;321-327.

18. Widmer AF, Dangel M. Alcohol-based handrub: evaluation of technique and microbiological efficacy with international infection control professionals. Infection Control & Hospital Epidemiology 2004;25(3), 207-209.

19. Sonmezer MÇ, Gulhan B, Otuzoglu M, Yakut Hİ, Tezer H. Evaluation of Hand Hygiene Compliance of Health Personnel in the Pediatric Intensive Care Unit. Turkish J Pediatr Di 2014;2:75-78.

20. Hugonnet S, Perneger TV, Pittet D. Alcohol-based handrub improves compliance with hand hygiene in intensive care units. Arch Intern Med 2002;162:1037-43.

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RESEARCH ARTICLE

Concept of Leadership in Disaster Management and Leadership Orientations of Emergency and Disaster Management Students

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Abstract
Objective: One of the main functions of education and training is to train leaders who will take part in various fields of social life and in the administration of the country. It is expected that those who train today's Emergency Aid and Disaster Management students will contribute to the development of this profession, train good leaders to move the profession forward, and support the students to learn and develop their leadership behaviors. This study aims to determine the leadership orientations of Emergency Aid and Disaster Management students, to evaluate the deficiencies, and to reveal the relationships between the concepts of Disaster Management and Leadership.
Methods: The research population consisted of 1st, 2nd, 3rd and 4th grade students of Gumushane University, Faculty of Health Sciences, Department of Emergency Aid and Disaster Management. The research universe includes 176 students in total. The data were obtained using the survey technique. Statistical analysis of the data was carried out using the SPSS package program.
Results: Considering the average scores they got from the Leadership Orientation Scale in the study, it was determined that the students got the highest score from the Human-Oriented Leadership sub-dimension and the lowest score from the Transformational Leadership style. As expected in this study, a statistically significant difference was found between the students' Leadership Orientation Scale's human-oriented leadership, structure-oriented leadership, Transformational leadership and Charismatic leadership scores and grade levels. When we consider the perception of class levels of Emergency Aid and Disaster Management students, some important differences have been obtained.
Conclusion: It has been determined that those in the upper class have more leadership characteristics than those in the lower class. It is thought that students have leadership characteristics such as being able to influence people, having a purpose, a goal, a vision.
Key Words: Disaster Management, Leadership, Emergency and Disaster Management, Leadership Orientations

Afet Yönetiminde Liderlik Kavramı ve Acil Yardım ve Afet Yönetimi Öğrencilerinin Liderlik Yönelimleri

Özet
Amaç: Eğitim ve öğretimin temel işlevlerinden biri toplum yaşantısının çeşitli alanlarında ve ülke yönetiminde rol alacak lider kişiler yetiştirmektir. Günümüz Acil Yardım ve Afet Yönetimi öğrencilerine eğitim veren kişilerin, bu mesleğin gelişimine katkıda bulunmaları ve mesleği ileriye taşımak için iyi liderler yetiştirmeleri, öğrencilerin liderlik davranışlarını öğrenmeleri ve geliştirmeleri için destek olmaları beklenmektedir. Bu çalışma, Acil Yardım ve Afet Yönetimi öğrencilerinin liderlik yönelimlerini belirlemek, eksikliklere ilişkin değerlendirmelerde bulunmak, Afet Yönetimi ve Liderlik kavramları arasındaki ilişkileri ortaya çıkarmak amacı taşımaktadır.
Yöntem: Araştırma evrenini Gumushane Üniversitesi Sağlık Bilimleri Fakültesi Acil Yardım ve Afet Yönetimi Bölümü 1, 2, 3 ve 4. sınıf öğrencileri oluşturmuştur. Araştırma evreni toplamda 176 öğrenciyi içermektedir. Veriler, anket tekniği kullanılarak elde edilmiştir. Verilerin istatistiksel analizi SPSS paket programı kullanılarak gerçekleştirilmiştir.
Bulgular: Çalışmada Liderlik Yönelimleri Ölçeğinden aldıkları puan ortalamaları ele alındığında, öğrencilerin en yüksek puanı İnsana Yönelik Liderlik alt boyutundan, en düşük puanı ise Dönüşümsel Liderlik tarzından aldıkları belirlenmiştir. Bu çalışmada beklenildiği üzere öğrencilerin Liderlik Yönelimleri Ölçeği insana yönelik liderlik, Yapıya yönelik liderlik, Dönüşümsel liderlik ve Karizmatik liderlik puanları ile sınıf düzeyleri arasında istatistiksel olarak anlamlı fark tespit edilmiştir. Acil Yardım ve Afet Yönetimi öğrencilerinin sınıf düzeyleri algısını göz önüne aldığımızda bazı önemli farklar elde edilmiştir.
Sonuç: Üst sınıfta bulunanların alt sınıfta bulunanlara göre daha çok liderlik özelliği taşıdıkları belirlenmiştir. Öğrencilerin insanları etkileyebilme, bir amacı, hedefi, vizyonu olma gibi liderlik özelliklerine sahip oldukları düşünülmektedir.
Anahtar Kelimeler: Afet Yönetimi, Liderlik, Acil Yardım ve Afet Yönetimi, Liderlik Yönelimleri

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Introduction

When viewed from different perspectives and viewed, leadership is seen as an expression that can be studied and examined in various types. Just as we are able to discover different qualities of an object from different perspectives, when we approach the expression of leadership from different perspectives, we have seen the factor in which it can be handled in various types. As we can see from this point of view, the fact of leadership can be seen as a situation related to management or it can be seen in different (social, psychological, environmental, cultural, political, military) issues.

One of the views accepted in today's conditions is that 'the leaders can be raised and developed'. These two approaches have created a different and new situation. There is now a need for "leading managers" in the organizational environment at every level of management, who have "developed leadership competencies" (1). The need for individuals with new ideas at each level of management shows that there is a need for institutions, schools and departments within the school to train these leaders.

The issue of management has been a source of interest for humanity for centuries, both in terms of ideas and has been a subject that has been widely debated and discussed. The concept of management has been tried to be expressed in a variety of ways with the different viewpoints and interpretations of some management communities (2).

The concept of management brings the concept of manager with it. Manager;

- Profit and risk belong to someone else,
- Those who purchase to produce goods and / or services,
- Directing them to meet certain requirements,
- The person who has the responsibility to run the business on behalf of the entrepreneur.
- To organize the group to perform the intended work,
- Controlling, coordinating and coordinating employees for the same objective,
- Briefly, the person who takes responsibility.

The manager who has administrative capacity must be effective in leadership and managing people, but also must be effective in the planning phase, control and coordination (3).

The concept of leadership, considering the success and effectiveness of the business, attracting attention on the subject, is a subject of debate, from the past to the present is a widely spoken phenomenon. As it is understood from the so-called term, this concept is one that exists throughout history. However, it is known that after 1980 more development is achieved. There have been many questions in the minds of people from the past to the present, in managerial issues, and are still being discussed (4).

The qualities required for the motivation and influencing power of the leader are:

1. Persuasiveness, effective speaking, effective communication,
2. Gathering groups,

3. Good listening and to be able to make sense,
4. Ability to produce solutions,
5. Power to persuade.

Leading people are separated from others in order to express their opinions comfortably and to impose their ideas.

To be an effective leader; to bring suggestions, to open new horizons, to present new ideas, to speak openly and effectively, to influence people, to reveal problems, to discuss with sincere feelings and to find solutions that reveal results are important factors.

The leaders' qualifications in this regard are such as;

- Precision, determination and ability to manage people,
- Interpersonal relations and communication ability,
- Creativity,
- Systematic thinking,
- Understanding others' feelings (empathy).

Physical Properties; although health and physical fitness are appropriate, it has been observed that leaders have achieved success by maintaining adequate attitude and physical fitness.

If we will write the mental qualities of a leader;

- Being disciplined,
- To be able to use initiative
- Creating solutions,
- Being fast, practical,
- Self-confidence,
- Being cultural.

The emotional characteristics of a leader can be listed as follows;

The relationships the leader has with others may depend on him feeling good or bad, and his emotional qualities reveal how he can relate to other people. Emotional qualities also affect decision-making and consistency (5).

- Personal control
- Balance
- Consistency

The leader is the one who collects individuals under the name of common goals, adopts goals, forms the inter-individual bridge, and collects dispersed power and knowledge together. The administrator is the person who follows monitors and controls the work done for the common purposes in the most effective manner by others. These concepts, which seem to be structurally similar to each other, have taken their place in the literature as fundamentally different concepts.

Leadership is a subject matter, which is widely emphasized in the field of education as well as in the literature about management science. The importance of education in human and community life is an indisputable fact. In addition to the individual gains, the benefits offered by the society are very valuable.

Educational leadership has moved the information society to a different level. Creating a shared vision, developing a strong school culture, institutionalizing ethical values and becoming a learning leader are of great importance in terms of the roles expected of future managers (6). It is important to discover the students' leadership orientations, to engage in activities that encourage them in this direction, to help the leadership characteristics to be expressed and to provide all kinds of help and opportunities. On the other hand, one of the important functions of education and training in educational practices is to educate the student group that will participate in the management of the country in various areas (workplace, organization, school, etc.) in the status of leader (1).

Education and training have a great influence on how to maximize the leadership orientation of students and create opportunities for the student group.

This study aims to link the concepts of disaster management and leadership and to examine the leadership orientations of emergency aid and disaster management students. The aim of this research is to investigate the leadership behaviors of students, to determine the related factors, to determine the problems in line with the data obtained, and to make suggestions.

Methods

Research Model

This study which aims to determine the leadership characteristics of Emergency and Disaster Management students is a cross sectional study.

The questionnaire is presented to the students in two different sections. In the first part, there are 21 questions to measure the demographic and personal information of the students prepared by the researcher, while; in the second part the Leadership Orientations Scale having a total of 32 questions, developed by Lee Bolman and Terrence Dealx (7) and the translation and validity and reliability tests performed by Dereli (8) was used (7).

Leadership attitudes were calculated by taking the arithmetic average of the answers given. The value of the answers to the questions was between 1 and 5.

Purpose and Type of Research

This study aims to determine the leadership orientations of the Emergency and Disaster Management students, to evaluate the deficiencies, and to reveal the relationships between the concepts of Disaster Management and Leadership.

Universe and Sample of the Research

The research universe was composed of 1.st, 2.nd, 3.rd and 4.th grade students in the Department of Emergency and Disaster Management of the Faculty of Health Sciences of Gumushane University. The research population includes 176 students in total. The criteria for inclusion in sampling are as follows; 1) volunteering factor and 2) to be 1.st, 2. nd, 3. rd and 4.th grade students who are currently studying in this department. All students who complied with these situations were included in the study. During the data collection period, a questionnaire was applied to 150 students who agreed to participate in the study.

Data Collection Tools

The “Student Information Form” questioned the personal characteristics of the Emergency and Disaster Management students, and the “Leadership Orientations Scale” questioned the leadership orientations. 1. Student Information Form: This form includes questions about students 'personal characteristics (age, gender, residential area of childhood, income level perception), characteristics of family structure (family type, mothers and fathers’ educational level, family and friends' relations), questions related with their school (their class, high school type graduated). 2. The Leadership Orientations Scale: In order to evaluate the leadership characteristics of the students, Leadership Orientation Scale developed by Lee. Bolman and Terrence. Deal (7) and validity and reliability studies realized in our country by Dereli (8) was used. A total of 32 statements are included in the scale, and the scale analyzes four main leadership traits: Human Intended leadership,

Structural leadership, Transformational leadership and Charismatic leadership. The frequency of exhibiting the behavior of the participants in the scale was evaluated in 5-Likert type. Evaluations were performed by giving always option 5 point and no option 1 point. Accordingly, the high score taken from the dimensions of the scale shows that the person always exhibits the relevant leadership characteristics; low score indicates that it never exhibited the relevant leadership characteristics.

Statistical analysis

The data obtained because of the research were analyzed by using SPSS statistical package program. After determining the leadership style scores, averages were obtained according to various classification variables and calculations were made to make sense of the relationships between these points and some characteristics of the individuals.

Results

The data of the study were obtained by applying a questionnaire to 150 students who accepted to participate in the study. The demographic characteristics of the students in the research group are shown in Table 1.

According to table 1 of the 150 Emergency and Disaster Management students, 38.7% were male and 61.3% were female. The age of the students was between19-25. 33.3% of the participants continue their education in the first class, 29.3% in the second class, 12% in the third class and 25.3% in the 4th class.

For each of the expressions mentioned in each question of the scale, 1 starts from no time, 5 from always according to the responses given between 1 and 5. “22. I am a good listener, and I am often open to other people's ideas and contributions.” question received the highest score (4.21 ± 0.82), “12. I am an inspiration for other people.” question received the lowest (3.40 ± 0.91) score.

Table 1. Demographic Characteristics of the Students in the Research Group

Demographic Characteristics		N	%
Gender	Male	58	38.7
	Female	92	61.3
	Total	**150**	**100.0**
Age	19	5	3.3
	20	25	16.7
	21	38	25.3
	22	35	16.3
	23	36	24.0
	24	8	5.3
	25	3	2.0
	Total	**150**	**100.0**
Class	1.Class	50	33.3
	2.Class	44	29.3
	3.Class	18	12.0
	4.Class	38	25.3
	Total	**150**	**100.0**

Table 2. Comparison of Leadership Orientations Scale Scores by Gender

	Gender	Mean	SD	t	p
Human Intended Leadership	Male	4.04	0.56	-.351	0.72
	Female	4.07	0.58	-.354	0.72
Structural Leadership	Male	4.01	0.55	.900	0.37
	Female	3.92	0.51	.886	0.37
Transformational Leadership	Male	3.84	0.58	1.950	0.05
	Female	3.63	0.63	1.984	0.04
Charismatic Leadership	Male	3.86	0.61	2.368	0.01
	Female	3.62	0.56	2.323	0.02

As can be seen from table 2 there was no statistically significant difference among Emergency and Disaster Management students', Human Intended Leadership, Structural Leadership, Transformational Leadership and Charismatic Leadership scores according to gender. On the other hand, mean scores of Charismatic Leadership subscale scores were found to be 3.86 ± 0.61 for male students and 3.62 ± 0.56 for female

students. According to the gender differences of the students, the difference between the charismatic leadership scores was statistically significant ($p < 0.05$).

Table 3. Comparison of Leadership Orientation Scale by Class Level

	Class	N	Mean	SD	p.
Human Intended Leadership	1	50	3.96	0.55	0.0001
	2	42	3.82	0.44	
	3	18	4.20	0.74	
	4	38	4.39	0.46	
Structural Leadership	1	50	3.79	0.49	0.0001
	2	42	3.81	0.47	
	3	18	4.12	0.68	
	4	38	4.27	0.40	
Transformational Leadership	1	50	3.49	0.51	0.0001
	2	43	3.49	0.53	
	3	17	3.93	0.69	
	4	38	4.16	0.53	
Charismatic Leadership	1	48	3.47	0.50	0.0001
	2	44	3.48	0.48	
	3	16	3.92	0.73	
	4	38	4.20	0.42	

As expected in this study, the Leadership Orientation Scale of the students was determined to be statistically significant between class and Human intended leadership, Structural leadership, Transformational leadership and Charismatic leadership scores. Bakan (9), in his study of the relationship between the employees 'perceptions of demographic characteristics and their perception of leadership types stated that as the employees' levels of education, working time, work experience and management experience increases; they started to advocate more participatory, supportive and leading leadership in terms of leadership styles.

Considering the perception of class levels of the Emergency and Disaster Management students, it is thought that those in the upper class have more leadership characteristics than those in the lower class; they have leadership characteristics such as being able to influence people (charisma), aim, target and vision. Keklik's (10) research conducted in order to determine whether the perception of leadership according to the education of the participants have made analyzes and found a statistical significance in the perception of transformational leadership.

It was determined that there was a relationship of students who were continuing their education between Human Intended leadership score and Structural leadership score, between Human Intended leadership score and transformational leadership score, between Human Intended leadership score and charismatic leadership score, between transformational leadership score and charismatic leadership score, with Structural leadership score and transformational leadership score, between Structural leadership score and Charismatic leadership score. In this study, the relationship between the scale sub-dimension averages shows that there was a close relationship between leadership concepts and leadership behaviors. In this respect, Celik's leadership perceptions of research can be given as an example (6).

Table 4. The Relationship between Structural Leadership Orientation Scale and Human Intended Leadership Orientation Scale

	N	Mean	SD	r	p
Human Intended Leadership	148	4.06	0.57	0.74	0.0001
Structural Leadership	148	3.96	0.53	0.74	0.0001

A positive directional and high degree relationship was found between Structural leadership score and human intended leadership score (r: 0.74, $p < 0.0001$).

Table 5. Relationship between Leadership Orientation Scale Human Intended Leadership and Transformational Leadership

	N	Mean	SD	r	p
Human Intended Leadership	148	4.06	0.57	0.65	0.0001
Transformational Leadership	148	3.71	0.61	0.65	0.0001

A positive and strong relationship was found between Leadership Orientation Scale Human intended leadership score and Transformational leadership score (r: 0.65, p <0.0001). In his study of the relationship between leadership and teamwork, Chen (11) found a positive relationship between transformational leadership and teamwork, and a negative relationship between structural leadership and teamwork.

Table 6. Leadership Orientation Scale the Relationship between Human Intended and Charismatic Leadership

	N	Mean	SD	r	p
Human Intended Leadership	148	4.06	0.57	0.62	0.0001
Charismatic Leadership	146	3.72	0.59	0.62	0.0001

A positive and moderate correlation was found between human intended leadership score and charismatic leadership score (r: 0.62, p <0.0001).

Table 7. Leadership Trends Scale Relationship between transformational and charismatic leadership

	N	Mean	SD	r	p
Transformational Leadership	148	3.71	0.61	0.81	0.0001
Charismatic Leadership	146	3.72	0.59	0.81	0.0001

A positive and high correlation was found between transformational leadership score and charismatic leadership score (r: 0.81, p <0.0001). Shamir et al. (12) investigated the relationship between charismatic leadership and organizational success, and found that, when the charismatic leadership type was adopted, the subordinates were more engaged to the organization and therefore success rates increased.

A positive and high degree correlation was found between transformational leadership score and Structural leadership score (r: 0.73, p <0.0001). Hamidifar, in his study on the relationship between "job satisfaction and accepted leadership" in 2009, revealed that transformational and structural leadership styles were more satisfied with the employees (13).

Table 8. Leadership Orientation Scale the Relationship between Transformational and Structural Leadership

	N	Mean	SD	r	p
Transformational Leadership	148	3.71	0.61	0.73	0.0001
Structural Leadership	148	3.96	0.53	0.73	0.0001

Table 9. Leadership Orientations Scale the Relationship between Structural and Charismatic Leadership

	N	Mean	SD	r	p
Structural Leadership	148	3.96	0.53	0.70	0.0001
Charismatic Leadership	146	3.72	0.59	0.70	0.0001

A positive and high degree correlation was found between Structural leadership score and charismatic leadership score (r: 0.70, p <0.0001).

Discussion

The concept of leadership has existed throughout history and will continue to exist. Because today, it is an inevitable fact that groups or organizations will need a leader at their point (14).

In our study, when the averages of the Leadership Orientation Scale were taken into consideration, it was determined that the students got the highest score from the Human Intended Leadership sub-dimension and the lowest score from the Transformational Leadership styles. The findings of this study points out that the

leadership behaviors of the students towards people are the most exhibited leadership characteristics, and that students are mostly interested in the opinions and thoughts of others and they are the ones who are interested with their problems. In the study, it has been observed that Structural Leadership follow the Human Intended Leadership; in addition, it has been observed that students have leadership styles and qualities that attach importance to planning and achieving goals, which set business goals and hold people responsible for reaching them. Bakan, (9) conducted a field study, the participants of the survey; stated that they generally give positive answers to the suggestions about the types of directing, supporting and participatory leadership and have made positive progress in this field. In addition, Taskiran (15) in his study, has revealed that the duty orientation of the managers of the hotel businesses was higher than their orientation in the human intended orientation.

Studies on leadership orientations show that structural leadership and human-oriented leadership scores are mostly high. In a 2014 study, some of the key findings were that the structural frame appeared to be strongest frame used by the participants when evaluated by her direct reports. The participants rated herself highly in both the structural and human resource frames (16). Beltran reached the following findings in his study at Isabela State University in 2019 'They show high importance on people in their leadership orientation and very high relationship with people in their leadership skill. Thus, they put primacy on human relations expressed in collaborating and empowering people rather than being rational and goal oriented (17). In a 2018 study, majority of the student leaders rated themselves higher in the structural and human resource frames (18).

In the study named “Determination of Leadership Types Adopted in Health Services” conducted by Keklik (10), it was observed that there was no difference between the perception of leadership of the men and women in the analysis conducted in order to test whether the perception of leadership by gender has changed in the participants.

Celik's research on leadership perceptions can also be discussed. In a study, which was conducted for university students studying in Mersin province, there was no significant difference between the male and female students in the university in terms of leadership perception. However, it was emphasized that university students' perceptions of leadership could be said to be more developed compared to high school students (6). Ozsoy's thesis titled “Gender Relations with Leadership Behaviors”can be discussed in this topic. In this study, it is concluded that there is a significant difference between the leadership styles of the women and men managers working for Turkish non-governmental organizations. The main factor of these differences is that gender differences, physiological and biological structure differences, and behavioral differences due to creation are important (19). Devecioglu (20). Conducted a study for sports students. When the means of the sub-scales of leadership orientation survey obtained by students receiving sports education are compared, a significant relation has been found in terms of the direction and strength of the relations between sex, class department and school in the research. The strongest sub-scale among the mentioned ones is “people-oriented leadership”. There is a positive relation, which is also

the strongest one between the sub-scale of people-oriented leadership and departments.

Conclusions

Leadership concept is a state that there are people who follow the leaders, and their behaviors and movements carefully and trust them. Those who display active leadership are those who manifest themselves in physical, spiritual and intellectual aspects. Unlike others, they have qualities that make them different from their followers that make them leaders. On the other hand, the phenomenon of Disaster Management is a dynamic process and during this process, there is a need for leaders who direct Disaster Management. Targeting the person, targeting the job, structural leadership, human intended leadership, and transformational and charismatic leadership have a great importance.

A creative, innovative, development-oriented, having goals, certain goals and insisting on reaching them, persuative, visionary, away from easy attitudes, not just working to save the day, to have his thoughts and ideas accepted, who can drag masses of people, trustted concept of leader/manager is important for the effective implementation of Disaster Management. Active leaders are important for today's developing, changing and globalizing world and our future to carry the societies forward. Leadership typologies of these leaders can include significant differences from country to country, culture to culture and more diverse leadership styles may occur. Therefore, this issue is open to continuous investigations and researches that will continue in the future without slowing down.

When the average scores of the Leadership Orientations Scale were taken into account in our study, it was determined, that the students got the highest score from the Human Intended Leadership sub-dimension and the lowest score from the Transformational Leadership styles. In our study, it has been demonstrated that human intended leadership behavior was followed by structural leadership behavior and that it is followed by charismatic leadership behavior and transformational leadership behavior.

Because of the findings obtained in our study, some studies are recommended to develop the leadership orientation of Emergency Aid and Disaster Management students during their four-year undergraduate education. These; organizing educational activities such as training and in-group discussions, adopting strategies for raising students 'self-confidence, providing training to develop students' leadership behaviors, and using social support resources effectively. A good sense of leadership in today's conditions; will be possible with the presence and behaviors of creative leader people whose vision will lead to innovations. Providing a leadership understanding in disaster management will help to reduce the impossibilities and disadvantages existing in disaster concept to acceptable levels. The absence of leaders in the event of a disaster can lead to an increase in negativity, and it may be difficult to prosper.

Another issue is the presence of the leader managers who will provide the necessary arrangements, plans, coordination and cooperation in order to pull people out of this chaos in the event of a chaotic event of a disaster.

What is important is that prior to the occurrence of disasters, there are people who will provide the necessary planning, preparatory activities, risk management and cooperation, or they are brought into the society through the necessary trainings.

The concept of leadership is in an important position as a fundamental element of coping with uncertainty in today's world, which shows rapid development and change.

Since there is uncertainty about when the issue of disasters will occur or our vulnerability is unpredictable, it does not seem possible to overcome this without leadership.

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References

1. Sisman M. Instructional Leadership. Ankara: Pegem A Publishing; 2002.

2. Tutar B. The Effect of Leadership Style on Employee Performance and an Application. Afyonkarahisar: Afyon Kocatepe University Social Sciences Institute.2008.

3. Dogan S. Vision-Based Leadership. Istanbul: Philips & Richard's Human and Business Resources Consulting Publications; 2001. p. 9-15.

4. Sabuncuoglu Z., Tuz M. Organizational Psychology. Third Edition. Bursa: Ezgi Bookstore; 2001.

5. Alkin M. C. Determination of Leadership Traits, Behaviors, and a Research Related to the Subject. Edirne: University of Trakya Social Sciences Institute. 2006.

6. Celik V. Educational Leadership. Ankara: Pegem Publishing; 2003.

7. Bolman L. G., Deal T. E. (1990). Leadership Orientations (self). Brookline, MA: Leadership Frameworks.

8. Dereli M. A Survey Research of Leadership Styles of Elementary School Principals. Ankara: Middle East Technical University Social Sciences Institute. 2003.

9. Bakan I. The Relationship between Perceptions of "Organizational Culture" and "Leadership" Types and Demographic Characteristics of Managers: A Field Study, Karamanoglu Mehmetbey University J Soc Econ Res 2008;(1):13-40.

10. Keklik B. Determining the Leadership Types Adopted in Health Services: A Private Hospital Example. Afyon Kocatepe University J Fac of Eco Adm Sci 2012;14(1):73-93.

11. Chen C. C. Leadership and Teamwork Paradigms: Two models for baseball coaches. J Soc Behav Pers 2010;38(10):1367-1376.

12. Shamir B., House, R. J., & Arthur, M. B. The Motivational Effects of Charismatic Leadership: A self-concept based theory. Organ Sci 1993; 4(4):577-594.

13. Hamidifar F. A Study of the Relationship between Leadership Styles and Employee Job Satisfaction at IAU in Tehran, Iran. Au-GSB e-Journal 2010;3(1):45-58 .

14. Tuncer P. Organizational change and leadership. TCA Journal 2011;80:57-83.

15. Taskiran E. Leadership Orientations of Managers Working in Hotel Businesses: A Study in Five Star Hotel Businesses in Istanbul. Anatol: J Tourism Stud

2006;17(2):169-183.

16. Joo M. T. H., Hee T. F., Piaw C. Y. Leadership orientations of an educational leader in a private university in Malaysia. Procedia Soc Behav Sci 2014;114:681-686.

17. Beltran R. M. Leadership orientation of the student-organization presidents of Isabela State University: An assessment. Int J. Adv. Res. Mgmt Soc Sci 2019;8(10):254-322.

18. Tan M. H., Adams D. Malaysian student leaders' perception of their leadership styles. Int J Innov Learn 2018;23(3):368-382.

19. Ozsoy E. The Relationship between Leadership Behaviors and Gender: A Study in Non-Governmental Organizations in Turkey. Sakarya: Sakarya University Social Sciences Institute. 2010.

20. Devecioglu S. The Leadership Orientations of the Students Receiving Sports Education in Turkey. Int Educ Stud 2018;11(8):58-68.

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CASE REPORT

Methanol Intoxication and High D-Dimer Levels

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Abstract

Methanol is very similar to ethyl alcohol in terms of color, odor and consistency. Methanol intoxication is generally caused by oral intake of illegally produced fake drinks prepared by replacing ethanol with methanol. Abdominal pain, nausea, and vomiting,visual disturbances, headache, severe metabolic acidosis, vision loss, cardiovascular instability and death may develop in methanol intoxication. Severe metabolic acidosis is the most important cause of mortality. But a D-dimer elevation is not reported primarily due to methanol intoxication in the literatüre. In this case, the severe metabolic acidosis that develops will be pointed out by reminding the findings of methanol intoxication and the unexpected and persistent D-dimer elevation despite the normal clinical and laboratory status will be shared.

Key Words: Methanol intoxication, metabolic acidosis, D-dimer levels

Metanol Zehirlenmesi ve Yüksek D-Dimer Seviyeleri

Özet

Metanol, renk, koku ve kıvam açısından etil alkole çok benzer. Metanol intoksikasyonu genellikle etanolün metanol ile değiştirilmesiyle hazırlanan yasa dışı olarak üretilmiş sahte içeceklerin ağızdan alınmasından kaynaklanır. Karın ağrısı, bulantı ve kusma, baş ağrısı, görme bozuklukları, şiddetli metabolik asidoz, görme kaybı, kardiyovasküler instabilite ve ölüm metanol intoksikasyonunda gelişebilir. Şiddetli metabolik asidoz en önemli mortalite nedenidir. Ancak literatürde metanol intoksikasyonu sonucu olan bir D-dimer yüksekliği bildirilmemiştir. Metanol intoksikasyonuyla gelen bu vakada hem bulguları hatırlatılarak gelişen şiddetli metabolik asidoza dikkat çekilecek, hem de klinik ve laboratuar düzelmeye rağmen beklenmeyen D-dimer yüksekliği paylaşılacaktır.

Anahtar Kelimeler: Metanol intoksikasyonu, metabolic asidoz, D-dimer düzeyi

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Introduction

In December 2021, 84 people in Turkey died of poisoning due to fake alcohol (1). The substance that caused the poisoning of these people was methyl alcohol (methanol). It is very similar to ethyl alcohol in terms of color, odor and consistency. It is impossible to distinguish from ethyl alcohol with the naked eye or

smell. Methanol intoxication is generally caused by oral intake of illegally produced fake drinks prepared by replacing ethanol with methanol. Due to use in industry, methanol poisoning may also occur as a result of occupational accidents. Serum concentrations peak immediately after absorption and follow a zero-order elimination rate. Metabolism occurs mainly in the liver through serial oxidation via alcohol dehydrogenase and aldehyde dehydrogenase Alcohol dehydrogenase oxidizes methanol to formaldehyde, and aldehyde dehydrogenase subsequently oxidizes formaldehyde to formic acid. Methanol has a toxic effect through its metabolites (2). While visual disturbances, headache, abdominal pain, nausea, and vomiting may occur in the early period, severe metabolic acidosis, vision loss, cardiovascular instability and death may develop in the later process.

In this case, besides reminding the clinical and laboratory findings of methanol poisoning, unexpected and persistant D-dimer elevation despite clinical and laboratory improvement in a patient with methanol intoxication will be shared.

Case

On 19/01/2021, a 54 year old male patient was brought to Emergency Service of Medicine Faculty Education and Research Hospital of University Ordu with confusion, hypotension and respiratory failure. It was learned in the patient's history, that he did not have a systemic disease or drug use, that he drank alcohol 10 hours ago, he started to have a headache after a while, visual impairment and worsening in the later hours. His blood pressure was 70/40 mmHg, heart rate: 90/min, respiratory rate was 30/min, arterial oxygen saturation was 85%. On physical examination, his general condition was poor, and he was unconscious. The patient was monitored, and vascular access was established and hydration with 5% dextrose and physiological saline was started. Meanwhile, he was intubated due to superficial respiration. He was admitted to the intensive care unit (ICU).

In the emergency unit, pH: 6.97, HCO3: 9.4 mmol/L, PCO2: 36 mmHg, Base deficit: -29, Lactate: 7.2 mmol/L were found in the arterial blood gas(ABG). Glucose: 262 mg/dl, urea:10.3 mg/dl, creatinine:1.81 mg/dl, Na: 137 mmol/lt, K:5.8 mmol/lt, Ca: 8,4 mg/dl, Cl: 96,7 mmol/lt, ALT:88 U/L, AST:91 U/L, LDH: 376 U/L were found in biochemical analysis . Hemoglobin, hematocrit and thrombocyte counts were normal. Leukocytosis as 23500/mm3 was detected with 83.6% neutrophils, 11% lymphocytes, 4.8% monocytes, 0.2% eosinophils, 0.4% basophils. Peripheral smear was consistent with this count. In the urine analysis, pH was 6, density was 1015, ketone, protein, glucose, bilirubin, nitrite was negative, urobilinogen quantity was normal, and no leukocytes, crystals, or casts were detected. Serum osmolality was calculated as 292 mosmol/lt. Troponin and INR levels were normal. D-dimer was slightly elevated as 0.87 mg/dl. Since methanol measurement could not be performed in our hospital, the methanol level could not be detected. The ethanol level was found to be 163 mg/dl (range 0-10 mg/dl). In the emergency unit, 15 ampoules of bicarbonate infusion was given to the patient in the first hour. Due to the hypotensive course, norepinephrine was started at an infusion rate of 8 mcg/min. Meanwhile, cranial, thorax, abdominal tomography and pulmonary CT angiography were evaluated as normal. Bicarbonate infusion was continued in the intensive care unit, and blood pressure was stabilized, two hours hemodialysis was applied due to severe metabolic acidosis. A total of 30 ampoules of

bicarbonate were replaced in 24 hours by monitoring the bicarbonate level. Bicarbonate replacement and acute hemodialysis in the first 24 hours improved the fatal metabolic acidosis and he did not require repeat hemodialysis. In the follow-up of the patient, clinical and laboratory improvement was achieved within 48 hours. He regained consciousness, his spontaneous breathing improved, and he was extubated. The laboratory parameters of the patient in 48 hours are shown in the table (Table 1).

Table 1. Laboratory parameters in the first 48 hours in the Intensive Care Unit

	1. day				2. day
Parameters	firs 6 hours	second 6 hours	third 6 hours	fourth 6 hours	
PH	7,07	7,13	7,23	7,39	7,40
HCO_3 (mmHg)	11,9	13,1	16	19	24
PCO_2 (mmHg)	42	41	38	27	30
Laktat (mmol/L)	5,7	6,4	5,1	4,6	3,1
WBC (/$mm^{3)}$	23500			12600	8300
Glucose (mg/dl)	154	144	163	120	119
BUN (mg/dl)	10			19	18
Creatinine (mg/dl)	1,8			1,2	0,77
Na (mEq/l)	137			137	142
K^+ (mmol/lt)	5,8			3,5	3,4
ALT (IU/L)	88			38	42
Ethanol (mg/dl)	163		21		0
D-dimer (mg/dl)	0,87				0,60

The patient was transferred to inpatient service on the 3rd day of hospitalization. His general condition was good, he was cooperative and oriented, his vital signs were normal, and he had no complaints. Vital status was followed up and hydration was continued for 2 days. Discharge decision was made. While all tests were normal in the control blood tests taken before discharge, the D-dimer level was found to be high with 2.39 mg/dl. (Normal levels <0.5 mg/dl). The patient did not have any complaints. However, thorax CT angiography was performed, and it was found to be normal and pulmonary embolism was excluded. The patient's discharge was delayed, and anticoagulant treatment (oxapar 2x06 ml) was started. D-dimer level was followed up. On the 8th day of his hospitalization, his D-dimer level reached a peak value and then started to decrease. On the 10th day of hospitalization, the patient was discharged by giving 0.6 ml 1x1 of oxapar and outpatient follow-up was done. Fifteen days after discharge, D-dimer level was found to be 0.5 mg/dl and oxapar treatment was stopped. D-dimer values of the patient are shown in the table (Table 2).

Table 2. D-dimer levels

Date	D-dimer (mg/dl)
1. day (19/12/2021)	0,87
2. day	0,60
5. day	2,39
7. day	5,06
8. day	6,01
9. day	5,94
10. day	4,82
13/01/2022	2,69
25/01/2022	0,51

Discussion

Methanol is obtained by distillation from charcoal. It is a colorless, volatile and poisonous liquid. It is known that it was used for mummification for the first time in ancient Egypt (3). Due to its solvent effect, it is

industrially used especially in dry cleaning, automotive, fuel, etc., but the methanol level should not exceed 60 ppm in the air in the working environment. Since it is widely used in the sectors, it can be sold legally. Unfortunately, it is not possible to distinguish colorless and odorless methanol from ethyl alcohol when taken orally. For this reason, it can be used especially in the production of fake drink, since its cost is cheaper than ethyl alcohol. Even 8-10 ml of methanol taken from the body is toxic. Approximately 25-30 ml of methanol can lead to a poisoning picture that can cause permanent blindness, and ingestion of 1 ml/kg or 100 ml of methanol is fatal. When methanol is taken orally, it is absorbed very quickly from the gastric mucosa and reaches its peak plasma concentration in approximately 30-60 minutes (4). While clinical signs and symptoms related to methanol poisoning may begin during these periods, they may last up to 72 hours depending on the type of exposure, amount, and administration of antidote ethanol (5). Methanol itself is not toxic, but its metabolite, formic acid, has serious toxic effects on many tissues. Formic acid causes inhibition of cytochrome c oxidase in the electron transport chain, leading to cellular dysfunction and end-organ damage. Formic acid also inhibits oxidative phosphorylation, causing an increase in anaerobic metabolism. This causes an increase in lactate. This is another parameter that contributes to metabolic acidosis (6). Although the findings of poisoning are often specific ın the late phase of methanol poisoning, most of the early findings are unfortunately nonspecific. Gastrointestinal system findings such as nausea, vomiting and abdominal pain are prominent in the early period. After the latent period, blurred vision, double vision, photophobia, early or late blindness may occur accompanied by severe metabolic acidosis. The state of consciousness is variable according to the patient (7,8). D-dimer elevation is not mentioned in the theoretical information about methanol poisoning in the literature (9,10).

In this case, the anamnesis provides reliable evidence of methanol intoxication. All early and late toxic effects of methanol intoxication were observed in this patient. Patients who present within the first 12 to 24 hours following ingestion may appear normal, and this is described as the latent period. Symptoms associated with basal ganglia toxicity are not detectable early on due to mental status depression and the acuity of illness. Without treatment, patients may progress to coma, respiratory or circulatory failure, and death. In this case, the patient was quickly treated for metabolic acidosis and intubated before respiratory arrest. The most serious laboratory disorder known in methanol intoxication is metabolic acidosis, but a D-dimer elevation is not reported primarily due to methanol intoxication. It can be seen secondary to the hypotension, shock, multiple organ failure and disseminated intravascular coagulation. In such a situation, clinical and laboratory deterioration are observed together. However, in this case, it is noteworthy that the D-dimer level, which was slightly elevated at first, then decreased to normal levels, and increased again on the 5th day of hospitalization without any complaints. D-dimer levels returned to normal about 15 days after the discharge. This situation may have been caused by any chemical added to the fake drink other than methanol.

Conclusion

In most emergency departments, the plasma methanol level cannot be measured. The combination of the patient's suspected alcohol intake, clinical

presentation and severe metabolic acidosis is diagnostic. Suspicion in methanol intoxication is very important for diagnosis. Through this case, attention was drawn to methanol intoxication, and it was reminded that rapid intervention is life-saving. In addition, it was concluded that isolated D-dimer elevation could be observed despite clinical improvement in cases with methanol intoxication, therefore it should be the patient's follow-up after recovery in terms of D-dimer elevation.

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References

1. Anadolu Agency News. 29/12/2021.https://www.aa.com.tr/tr/ agenda /in Turkey
2. Koca T, Hilal A. Methyl Alcohol (Methanol) Intoxication. Bulletin of Legal Medicine,2020; 25(2): 128-138
3. Ott J, Gronemann V, Pontzen F, Fielder E, Grossman G, Burkhard Kersebohm D et al. Methanol. Ullmann's Encyclopedia of Industrial Chemistry doi:10.1002/14356007.a16_465.pub3
4. Pohanka M. Toxicology and the biological role of methanol and ethanol: Current view. Biomedical papers of the Medical Faculty of the University Palacky, Olomouc, Czechoslovakia. 2016;160(1):54-63. doi:10.5507/BP.2015.023
5. Kruse JA. Methanol and ethylene glycol intoxication. Critical care clinics. 2012;28(4):661-711. doi:10.1016/J.CCC.2012.07.002
6. Liesivuori J, Savolainen AH. Methanol and formic acid toxicity: biochemical mechanisms. Pharmacology & toxicology. 1991;69(3):157-163.doi:10.1111/J.1600-0773.1991.TB01290.X
7. Paasma R, Hovda KE, Hassanian-Moghaddam H, et al. Risk factors related to poor outcome after methanol poisoning and the relation between outcome and antidotes – a multicenter study.2012;50(9):823-831. doi:10.3109/15563650.2012.728224
8. McMahon DM, Winstead S, Weant KA. Toxic alcohol ingestions: Focus on ethylene glycol and methanol. Advanced Emergency Nursing Journal.2009;31(3):206-213. doi:10.1097/TME.0b013e3181ad8be8
9. Taskın O, Açıkalın A, Disel N.R. Methyl Alcohol Intoxications. Anatolian Journal of Emergency Medicine 2022;5(1):37-42
10. Chan-Seok Moon. Estimations of the lethal and exposure doses for representative methanol symptoms in humans. Moon Annals of Occupational and Environmental Medicine (2017) 29:44. doi: 10.1186/s40557-017-0197-5