

T.C. YEDİTEPE UNIVERSITY
INSTITUTE OF HEALTH SCIENCES
DEPARTMENT OF PUBLIC HEALTH

**EFFECTS OF THE USE OF TECHNOLOGICAL
DEVICES BY SECONDARY SCHOOL STUDENTS
DURING PANDEMIC PROCESS ON DIFFERENT
HEALTH VARIABLES**

MASTER THESIS

DUYGU ŞENGEZER

SUPERVISOR

Assoc. Prof. Dr. Hale ARIK TAŞYIKAN

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Owner of the Thesis : Duygu Şengezer

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This study have approved as a Master/Doctorate Thesis in regard to content and quality by the

Jury.

	Title, Name-Surname (Institution)
Chair of the Jury and Supervisor:	Assoc. Prof. Dr. Hale ARIK TAŞYIKAN Yeditepe University
Member/Examiner:	Prof. Dr. Recep Erol SEZER Yeditepe University
Member/Examiner:	Ass. Prof. Nevzat BİLGİN Istinye University

APPROVAL

This thesis has been deemed by the jury in accordance with the relevant articles of Yeditepe University Graduate Education and Examinations Regulation and has been approved by Administrative Board of Institute with decision dated and numbered

Prof. Dr. Bayram YILMAZ
Director of Institute of Health Science

DECLARATION

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree except where due acknowledgment has been made in the text.

25.01.2022

Duygu ŞENGZER



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LIST OF SYMBOLS and ABBREVIATIONS

BMI	Body Mass Index
COV	Coronavirus
EBA	Education Information Network
FATİH	The Movement to Increase Opportunities and Improve Technology
MEB	Ministry of Education
MERS	Middle East Respiratory Syndrome
RNA	Ribonükleik asid
SARS	Severe Acute Respiratory Syndrome
TDK	Turkish Language Society
TÜİK	Turkish Statistical Institute
WHO	World Health Organization

ABSTRACT

Şengezer, D. (2022) The Effects of the Use of Technological Devices By Secondary School Students During Pandemic Process on Different Health Variables. Yeditepe University, Institute of Health Sciences, Department of Public Health Master Thesis, Istanbul.

This study was conducted to examine the Effects of Technological Device (Mobile Phone, Computer, Tablet, Television, Game Console) Use of Secondary School Students in the during Pandemic Process on Different Health Variables. The population of the research consists of 320 secondary school students. In addition, the sample of the study consists of 208 secondary school students who voluntarily agreed to answer this questionnaire during the 2020-2021 academic year. The students consist of students studying at a private school located in Beşiktaş district of Istanbul. The questionnaire includes socio-demographic variables as well as musculoskeletal pain scale (back, waist, neck, hand, wrist and shoulder), Eye health status, and technological average such as mobile phone, computer, tablet, television and game console regarding daily average sleep time. includes health problems in device use. This research is a quantitative research and a descriptive, cross-sectional study. Chi-square and t-test analyzes were used for the existence of the relationship between the dependent and independent variables used in the study. According to the findings obtained; Findings about the usage period, purpose and device ownership of technological devices have been determined. During the pandemic process, a significant finding was obtained on the variables of neck pain, hand pain, wrist pain and average sleep duration of mobile phone use. It was found that computer use has a significant relationship on hand pain, neck pain, back pain, waist pain, BMI and eye health problem variables. In addition, a significant difference was observed on the variables of back pain, neck pain, wrist pain, average sleep duration and BMI of television use. It was observed that there was a significant relationship with the variables of neck pain, waist pain and hand pain variables in tablet use. Finally, there were significant results on the finding of significance of game console use on back pain, waist pain, neck pain, shoulder pain and BMI variables.

Keywords: Use of Technological Devices, Health Problems, Secondary School Students

ÖZET

Şengezer, D. (2022) Pandemi Sürecindeki Ortaokul Öğrencilerinin Teknolojik Cihaz Kullanımının Farklı Sağlık Değişkenleri Üzerinden Etkileri. Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü Halk Sağlığı ABD., Yüksek Lisans Tezi, İstanbul.

Bu çalışma, Pandemi Sürecindeki eğitim gören Ortaokul Öğrencilerinin Teknolojik Cihaz (Cep Telefonu, Bilgisayar, Tablet, Televizyon, Oyun Konsolu) Kullanımının Farklı Sağlık Değişkenleri Üzerinden Etkilerini incelemek amacıyla yapılmıştır. Araştırmanın evreni 320 olup, örnekleme 2020-2021 eğitim öğretim yılı boyunca bu ankete cevap vermeyi gönüllü olarak kabul eden 208 ortaokul öğrencisinden oluşmaktadır. Bu öğrenciler, İstanbul ilinin Beşiktaş ilçesinde özel bir okulda eğitim gören öğrencilerden oluşmaktadır. Anket, sosyo demografik değişkenleri içerdiği gibi Kas-İskelet Sistemi Ağrıları (sırt, bel, boyun, el, bilek ve omuz), Göz Sağlığı Sorunu, Günlük ortalama uyku süresi ile ilgili olarak cep telefonu, bilgisayar, tablet, televizyon ve oyun konsolu gibi teknolojik cihaz kullanımlarındaki sağlık sorunlarını içermektedir. Bu araştırma nicel bir araştırma olup, gözlemsel tanımlayıcı, kesitsel bir çalışmadır. Çalışmada kullanılan bağımlı ve bağımsız değişkenler arasındaki ilişkinin varlığı için ise ki-kare ve t-test analizleri kullanılmıştır. Elde edilen bulgulara göre; teknolojik cihazların kullanım süresi, amacı ve cihaz sahipliği ile ilgili bulgular tespit edilmiştir. Pandemi sürecinde, cep telefonu kullanımının boyun ağrısı, el ağrısı, bilek ağrısı ve ortalama uyku süreleri değişkenleri üzerinde anlamlılık bulgusu elde edilmiştir. Bilgisayar kullanımının el ağrısı, boyun ağrısı, sırt ağrısı, bel ağrısı, göz sağlığı sorunu ve VKİ değişkenleri üzerinde anlamlı bir ilişkinin olduğu bulunmuştur. Ayrıca, televizyon kullanımının sırt ağrısı, boyun ağrısı, bilek ağrısı, ortalama uyku süreleri, VKİ değişkenleri üzerinde anlamlı bir farklılık görülmüştür. Tablet kullanımda ise boyun ağrısı, bel ağrısı ve el ağrısı değişkenleri ile anlamlı bir ilişkinin olduğu görülmüştür. Son olarak, Oyun konsolu kullanımının sırt ağrısı, bel ağrısı, boyun ağrısı, omuz ağrısı, VKİ değişkenleri üzerinde anlamlılık bulgusu üzerinde anlamlı sonuçlar ortaya çıkmıştır.

Anahtar Kelimeler: Teknolojik Cihaz Kullanımı, Sağlık Sorunları, Ortaokul Öğrencileri

1. INTRODUCTION AND PURPOSE

1.1 Introduction

SARS COV-2 (Covid-19) started in Wuhan, China in December 2019, and was declared a pandemic by the World Health Organization in March 2020 due to the rate of spread and the increase in the countries (1). Due to the Covid-19 epidemic, people have spent more time at home, and the length of stay at home has increased. This has had a huge impact on people's habits. During the epidemic, people spent more time on electronic devices such as television, computers, mobile phones and tablets (2). In a study conducted during the epidemic, it was reported that internet addiction increased by 46.8% (3). In addition, it was stated that the time spent using electronic devices was 4 hours per day including television, radio, web sites and social media(4). It was emphasized that especially in this period, children's development of excessive playing behavior in order to stay away from stress, disruptions in the sleep process and increase in sedentary behaviors may be a repetitive lifestyle, albeit unnoticed (5).

The epidemic, which spread all over the world, caused different measures to be taken in countries. As a result, some measures have been taken to reduce and prevent the epidemic, and various restrictions have been introduced. Within the scope of these measures, it has been announced that face-to-face education has been temporarily suspended at all grade levels in Turkey. In addition, it has been stated that the education to be held at the primary and secondary education levels will be carried out with a platform called “Eğitimde Bilişim Ağı (EBA)”, which is prepared in a way that allows students and teachers to communicate with each other. This education system has been decided by the Ministry of National Education (MEB) and is carried out in the form of distance education through television (6).

It was observed that there was a decrease in the socialization levels of the students due to the fact that the education of the students who were educated at secondary school levels during the epidemic was not conducted in a face-to-face manner. As a result, students have become able to use more technological devices. Excessive use of technological devices adversely affects the physical and mental health of children and paves the way for health problems (7).

Factors that negatively affect health such as concentration disorders, aggressive behaviors, lack of physical activity, obesity and sleep problems have been observed in children studying at school due to the use of digital technology (8). The increasing use of technological devices limits children's need to eat, sleep and socialize with activities such as playing games and cause children to waste their time (9). Social media tools, especially used in the internet environment, are used by students a lot. While the use of social media on the internet was close to 3 hours before the pandemic emerged, it was observed that this use increased and exceeded the average for 5 hours after the epidemic. On the other hand, while the duration of watching television was approximately 1 hour before the epidemic, it was observed that it approximately doubled after the epidemic (10).

In recent years, technological devices have become widely used in home and school environments. It has been explained that this situation causes serious problems in the musculoskeletal systems (11).

In studies involving children and adolescents, there are studies showing a relationship between the use of portable technological devices (laptop, tablet, etc.) and musculoskeletal system problems (12). In another study investigating the relationship between computer use and musculoskeletal disorders, half of the 6th grade students reported that they experienced discomfort in at least one part of their body and that they experienced it most commonly in the neck, back and shoulder regions (13). In another study on the subject, it was reported that 60% of primary, secondary and high school students encountered somatic complaints in some parts of their bodies when they spent time with the computer (14).

It has been suggested that there is a relationship between physical activity status and obesity due to the excessive use of technological devices. It has been explained that the students studying at primary and secondary education levels do not exercise enough due to the excessive use of technological devices and the increase in the time they watch television. In a study on students studying in secondary education, it was observed that the risk of obesity is twice as high in children who do not exercise adequately and spend more time in front of technological devices than those who do not. (15). However, Baranowski et al. (16) stated

that the prevalence of obesity is increasing, especially in young people, and that unhealthy diet and lack of physical activity are among the factors causing this problem.

In addition to the health variables mentioned, decrease in school success, increase in stress level, depression, sleep disorders, learning difficulties, out-of-community behaviors, aggressive behaviors and depersonalization against violence are among the most important psychosocial problems as a result of excessive use of technological devices (17). Children who spend time with technological devices at a young age may also experience difficulties in attention when they start school (18). In the researches, there are effects such as decrease in sleep quality, especially in individuals who use technological devices such as computers, phones and tablets. It has been observed that there are common connections between sleep disorders in secondary school and adolescent individuals, and how many technological devices they have in their own rooms and how long they use them (19).

This study which was planned to examine the effects of technological device use on different health variables in secondary school students in a located Beşiktaş district in Istanbul. The hypothesis of this study is that there will be a relationship between the use of technological devices and different health variables evaluated. The aim of this study is to examine the possible relationships between different health variables of the use of technological devices in the pandemic process of secondary school students.

1.2 Importance of Research

After the first epidemic symptoms were seen in people in our country, various measures were taken in our country. In this direction, the Ministry of National Education has made some changes in the education system for students who will study outside of universities. This system, which they call EBA, is known as the Information Network in Education, which allows students and instructors to communicate. For primary, secondary and high school levels, the education through is done remotely, not face to face, although this was not expected to be permanent (20).

The measures taken to stay away from people due to the pandemic mostly affected adolescents (3). During this period spent at home, it has been reported that children and young people studying at school spend almost twice as much time watching television in the virtual environment (10). Various physical and mental problems occur in children who use technological devices a lot. These problems have a situation that threatens human health (21).

In this study, it was aimed to determine the possible relationships between different health variables of the use of technological devices in the pandemic process of secondary school students. This research is of great importance in terms of both determining the students' views on the use of technological devices and examining the possible relationships between the use of technological devices and different health variables. In addition, another important aspect of this research is that questions such as what technology is used for and for how long, and which health variables affect students, are answered by the students themselves. It is significant to determine how students are positively or negatively affected by technology in terms of giving important clues to teachers and parents. For this reason, the results of the research also come with recommendations; it is important for teaching staff, educational institutions, researchers, parents to benefit.

1.3 Aim of The Study

The aim of this study is to examine the effects of the use of technological devices on different health conditions of secondary school students studying in located Beşiktaş district in Istanbul during the pandemic process.

1.4 Specific Objectives

- Age, Gender, Height, Weight, Grade Level, Availability of Technological Devices and Health Variable Levels of Secondary School Students
- To determine the effect of technological device usage time of secondary school students in the pandemic process on different health variables.

- To examine the effects of the usage purpose of the students studying at the secondary school level in the pandemic process on different health variables according to the types of technological devices.
- To examine the relationship between the Availability/Ownership of a Technological Device in the Home of secondary school students in the pandemic process and different health variables.
- To examine the relationship of Gender, BMI and Class Levels of students studying at secondary school level during the pandemic process on different health variables.

1.5 Definitions

- BMI (Body Mass Index); Body Mass Index (BMI) is a person's weight in kilograms divided by the square of height in meters.
- Influenza; It commonly known as "the flu", is an infectious disease caused by influenza viruses.
- Covid-19; Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus.
- Incidence; It refers to the number of individuals who develop a specific disease or experience a specific health-related event during a particular time period.
- Pandemic; An epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people.
- Epidemic; An epidemic is the rapid spread of disease to a large number of people in a given population within a short period of time.
- Social Media; It is an online network where the user publishes and shares her own produced content.

2. LITERATUR REVIEW

2.1 Literatur Review

The spread of an epidemic to more than one country or continents is called a pandemic. As a matter of fact, the World Health Organization (WHO) defines a pandemic as "the name given to infectious diseases that threaten a large number of people simultaneously in the world" and states that three criteria must be present for a disease to be called a pandemic. These include a new virus that can pass to humans in a communicative way, secondly it needs to spread easily and finally transmitted from person to person continuously (22).

There is no doubt that there have been countless endemics and pandemics in the history of humanity, which have spread over wider geographies and created mass deaths and health problems (23). Infectious diseases, which have been an important public health problem throughout the history of humanity, will continue to exist generations after generations. When the history of the world is examined, in every period of history there are a wide variety of pandemic cases that produce results that will affect the social, cultural, political, scientific, economic and military structures of societies. Parildar and Dikici (24) explained some of them as follows:

- 541 plague pandemics,
- 1817 cholera pandemic,
- 1918 Spanish flu pandemic,
- 1957 Asian pandemic,
- 1968 Hong Kong flu pandemic,
- 2003 SARS pandemic,
- 2009 swine flu pandemic,
- 2012 MERS pandemic and
- 2019 Coronavirus (Covid-19) pandemic. Among them, COVID-19 has a special place (25).

2.2 The Covid-19 Pandemic

Coronaviruses (CoV) are a family of viruses that can cause self-limiting mild infections, such as the common cold, to more serious infections such as MERS and SARS. Coronaviruses are single-stranded, positive-sense, enveloped RNA viruses. Due to their positive polarity characteristics, they do not contain RNA-dependent RNA polymerase enzyme, but they can encode this enzyme in their genomes (6). They have rod-like extensions on their surface. The name Coronavirus (crowned virus) was given because the rod-like extensions evoke the Latin meaning of “corona”, that is, “crown” (26).

The Coronavirus (Covid-19) pandemic (27), which emerged in the city of Wuhan, the capital of the Hubei region of China in December 2019, has caused very important changes and effects on the economy, social life and education practices, especially on health at the global level. However, it was declared a global pandemic by WHO on March 11, 2020 (28).

The disease is mainly transmitted through close contact and droplets (29). In addition, droplets dispersed by sick individuals through coughing and sneezing can remain on inanimate surfaces for hours, causing contamination. Contamination occurs when people come into contact with these contaminated surfaces and take their hands to the mucous membranes of the mouth, nose and eyes (30). The disease caused by coronavirus in humans causes a wide spectrum ranging from the common cold to severe acute respiratory syndrome (6). Although covid-19 notifications were made in patients from all age groups, the most affected age group was mostly observed between the ages of 30 and 79. While asymptomatic disease is more common in young people, the incidence of severe disease increases with increasing age (29).

2.2.1 Pandemic in the World

Cases of pneumonia of unknown etiology were reported on 31 December 2019 in Wuhan City, Hubei Province, China. When the reported cases are examined; clustering was noted in the employees of the Wuhan South China Seafood City Market (a wholesale fish and livestock market selling different animal species) in the south of Wuhan. On the 7th January

2020, it was found out that a novel coronavirus that has not been detected in humans before. While the pace of the epidemic slowed down in China, the starting point of the epidemic, as of March 2020, COVID-19 cases and related deaths increased rapidly in Iran, the Republic of Korea (South Korea) and Italy. The disease has spread rapidly due to its human-to-human transmission feature. As of the beginning of March 2020, cases have been reported in more than 100 countries worldwide (6).

It is stated that with the spread of a new type of corona virus, Covid-19, people had to self-isolate and began to spend more time at home, as a result of which they spent more time on the Internet. On the other hand, with the closure of schools, restaurants, workplaces and many places, people started to meet their social and intellectual needs by interacting with television and electronic devices for a long time (31). According to Dilci (32), she stated that the obligation to stay at home, brought about by social restrictions, pushes individuals to spend more time with technological and digital devices.

The 2019-2020 Coronavirus (Covid-19) pandemic has affected education systems worldwide, causing widespread closure of schools and universities (33). According to the United Nations Educational, Scientific and Cultural Organization (UNESCO) data, as of 07 April 2020, schools were closed in 188 countries due to the Coronavirus (Covid-19) pandemic (34). Due to the Coronavirus (Covid-19) pandemic, many countries, especially China, USA, Italy, Spain, France, Korea, Turkey and Germany, had to suspend face-to-face education practices. One of the most important priority targets for all countries with the Coronavirus (Covid-19) pandemic has been to ensure the continuation of education without interruption. In this process, it is seen that countries generally try to use the existing distance education opportunities supported by different technological infrastructures (31).

2.2.2 Pandemic in Turkey

As stated in the data sheet published by the Ministry of Health of the Republic of Turkey and updated daily; The first Covid-19 case in Turkey was detected on March 11, 2020 (35).

The state has taken some measures in the field of public and individual health in order to protect the right to life and health, which is a supranational and Constitutional right, against epidemic diseases that shook the world and caused put a halt in our country, and in particular the COVID-19 pandemic. Some of those; prohibition of the population under the age of 20 and over the age of 65 to go out on the street; prohibition of travel abroad; restriction of flight and public bus services; the imposition of curfew on weekends in many cities; the closure of some workplaces or their limited activities; the obligation to wear masks and the interruption of education in schools and the transition to online education (22).

This epidemic, which is defined as a public health problem, can be said to have an impact in the field of education in Turkey as in other countries of the world (36). The prominent effect in the field of education has been that students stay away from the learning environments in the schools where they study and participate in distance education from their homes, and where they have passed the isolation process (37). However, educational activities and local and central exams have been postponed at all education levels, and online exams have been introduced in measuring and evaluating student achievement (38). In order for students not to stay away from education during this period, the Ministry of National Education has decided to continue education through certain television channels and Education Information Network – Eğitim ve Bilişim Ağı (EBA) within the scope of open and distance education practices at primary, secondary and high school levels (39).

2.2.3 Use of Technology in The Pandemic Process

With the rapid spread of coronavirus among people during the epidemic process, the number of people suffering from this disease has increased all over the world. This epidemic, which affected the whole world, necessitated very serious changes in human life. Students and teachers could not go to school and people began to spend more time at home. This situation has made it compulsory to provide education with technology-based distance education tools. A process has emerged where individuals who stay away from social environments and cannot meet their social needs spend more time on social media platforms by using technological devices. Due to such reasons, technological tools have become an

indispensable element in the life of the individual during the epidemic period. Technological devices, whose frequency and number of use are increasing day by day and which have become indispensable elements of our lives, have both advantages and disadvantages (31).

According to the results of an international study, when the consumption of media at home during the worldwide COVID-19 pandemic is examined, 67% of individuals watch more news broadcasts, 45% spend longer on messaging services, 44% spend longer on social media. reported that they spend more time on computer/video games (40). Curfews and social isolation recommendations have increased the consumption of digital entertainment, especially online gaming. Studies have reported a 70% increase in online gaming activity and gaming-related internet traffic (41,42).

It can be said that the obligation of people to stay at home due to the epidemic has also increased the use of online video games. They stated that stay-at-home obligations and quarantine due to the coronavirus (COVID-19) epidemic greatly increased their participation in online games. (43). In addition, the use of television, radio, newspaper, online websites and social media during the COVID-19 process has been reported as 4 (Quarterly value, 2-6) hours per day (44).

Kemp (45) stated that there are nearly 5 billion internet users in the world. The number of social media users has reached nearly 4 billion people. At the beginning of April 2020, the number of individuals with a personal mobile phone reached 5 and a half billion people. It has been stated that 76% of individuals between the ages of 16 and 64 who have a smartphone in the days of quarantine and curfews spend more time with their phones. It was stated that one out of every 5 people using the internet watched more movies and videos during this period, and one out of every 7 users spent more time on social media applications. It can be said that this is not a surprising result, and individuals who cannot socialize due to social isolation measures or quarantine try to meet this need with social media platforms.

According to a study conducted by Dhawan (46) in India, 75% of the participants stated that they used more social media during the epidemic. It can be said that such an intensive use will cause multiple mental and physical health problems such as spine disorders, vision

disorders, sleep disorders, obesity, aggression, cognitive decline, depression, anxiety and stress. The EBA platform, which is carried out by distance education in Turkey, is also on the list of the most clicked on the world during the epidemic period. This means that students and teachers from primary school to high school spend a lot of time with technological devices in this period.

2.3 Technology

The term "technology" is a very broad concept that everyone can interpret in their own way. Each person understands and expects different things from technology. When we look at the definition of technology in the literature research, different branches of science have defined technology within the framework of their own field. TDK (47) is related to an industry branch in its online dictionary. James Finn (48), a famous education technologist, says the following when describing technology: It is also a point of view in order to be able to produce solutions to the problems arising from the goods, the degree of difficulty of these problems, the technical solution possibilities and their economic values.

Towards the end of the 17th century, a process of change began in the world. At the beginning of this process, the results of developments in science and technology began to shape social life. It also caused an interaction between science, technology and society triangle. As a result of the effects of technology on human life, a new field of study has emerged between technology and society and attitudes towards technology have begun to emerge (49).

It is an undeniable fact that there are positive statements such as technology making human life easier and sometimes showing educational features for individuals as the most important reason for the prevalence of technology use, as well as some criticisms made in the opposite direction. In this context, the first criticism to the society is the question of whether information technology is a good denominator trying to gather the society on a common point. Apart from this problem, it is also discussed to what extent information technologies really affect and facilitate social life (50). In the context of these questions, it is thought that information and communication technologies negatively affect people and social life and

create a technological addiction on people. It is considered that it may cause people to use technology more by negatively affecting people and social life (51).

2.4 Technological Devices

As a result of technologies entering our lives so fast; It is a visible fact that people have started to spend most of their days with technological devices in order to obtain information and to spend their free time, and technological devices are an important part of our daily lives. (52)

Studies examining technology use by children and families were focused on television until the 2000s (53,54, 55), after which the focus shifted from television to computers (56, 57), and today technology use is in many areas such as computers, tablets, smart phones, game consoles. It is seen that it is aimed at digital devices and emphasizes the interaction of these devices and mobile devices over the internet (58,59). Factors such as the increase in the variety of digital devices offered to children, advances in mobile technologies and easy and accessible internet access have led to an increase in the time children spend with these devices from a young age. (60)

When the purposes of children's use of technological devices such as computers, tablets and smart phones are examined, it is seen that consumption-oriented use such as games, entertainment and social media is a priority (61). When Kaspersky Lab's study covering the period of May 2016 – April 2017 is examined, the majority of children (89%) in the Middle East use the Internet for communication (social media, messaging, e-mail) and children in North America have the lowest use for this purpose. rate (28%). According to the report, the rate of communication among Turkish children is 70%, which is above the average (62).

According to 2021 data, 5.22 billion people around the world use mobile phones. The number of internet users has reached 4.66 billion people. The number of social network users reached 4.20 billion (63). In a study conducted by TUIK on the rate of having technological devices in households in our country, it was found that in 2021, the rate of having mobile phones in households was 99.3%, the rate of having a tablet computer was 26.3%, and the rate of having

a portable computer (laptop, netbook) was 38% (64). In a study on the purpose of using technological devices, it is seen that boys spend more time in front of the internet, television and computer compared to girls, and girls spend more time on mobile phones, extracurricular publications and books (65).

According to the results of the Household Information Technologies Usage Survey conducted by the Turkish Statistical Institute (TUIK) for 2021, the rate of Internet use among individuals in the 16-74 age group is 82.6%. TUIK Institutional (tuik.gov.tr). When the internet usage rate is analyzed by gender; this rate was found to be 87.7% for men and 77.5% for women. In the period covering July, August and September of 2021, the communication-based messaging rate of individuals using the internet was 93.0%, and the use of social media for entertainment purposes was 73.8% (64).

Studies on the positive and negative effects of the virtual world, which develops and changes with digital technologies such as television, computer, internet and telephone, on children are increasing day by day in our country (66). Young people today spend more time playing computer, mobile phone or electronic games than playing outside compared to previous generations (67). Despite the opinions pointing out the benefits of introducing technology to children at a young age, there are findings that this technology can be harmful to the development and health of children if it is not used correctly (68). In particular, it has been explained that using computers and mobile phones causes constant dragging and repetitive movements with fingers (69). In addition, it was stated that various electronic devices used by students for educational or entertainment purposes during the day may cause musculoskeletal diseases. (70).

2.5 The Place of Technological Devices in Education

Basically, education is defined as “the process of bringing about desired changes in an individual's behavior through his own life and purposefully” (71). Developments in science and technology have also brought about changes in the field of education. The use of technology in the learning process is becoming more and more widespread. Educational technology assists the achievement of predetermined goals through the teaching process (72).

Education and technology have become an integral part of our lives. Both concepts are tools that people use in the process of dominating their environment (31). While education enables people to use their innate abilities and to make the individual more creative, mature and powerful, technology enables people to benefit from the knowledge and skills gained through education more systematically and to use this benefit consciously (73).

Developing technology has an important contribution to fields such as health, education and industry. Especially when we look at the relationship between technology and education, it is seen that it is a result of the necessity of our age. The use of devices such as smart boards, computers and projectors used in classrooms is increasing day by day. Studies have shown that the use of technology has positive effects on education (74). However, many new applications are being designed in the field of education, facilitating the work of students and teachers alike and giving them the opportunity to create new products. Thus, teachers can offer rich content to their students and provide better education (75).

The increasing need for education has increased the interest in distance education. The fact that the individual has access to information through technological tools has revealed e-learning, that is, learning through electronic media (76). In order to improve the education system in Turkey, the Movement to Increase Opportunities and Improve Technology (FATİH) project was carried out through the Ministry of National Education. This project aims to provide interactive boards and internet network infrastructure to schools for the effective use of Information Technologies tools in the learning-teacher process, in a way that appeals to more sense organs in the learning-teacher process, in order to ensure equality of opportunity and improve technology in schools (77).

2.6 The Place of Technology in Distance Education

In the 21st century, which is called the information age, information technologies are developing rapidly. These developments in information technologies have made important contributions to the development of the global communication network with distance education applications (78). The foundations of educational practices were laid in 1856, and distance education institutions such as “Tele Colleg”, “Schulfernsehen”, “Fern Universitat”

and “Deutsch Institut Fur Fernstudien” have survived to the present day (79). In Turkey, the first steps towards distance education were taken in 1927(80). Distance education is a system in which students and teachers are provided with educational materials online or by means of technological tools, and the lessons can be taught live, without the obligation of students and teachers to come to the school and campus regardless of time and place. In this system, students can find various educational and training activities that they can watch again whenever they want. Students can participate in this education system at any time with technological devices such as mobile phones, computers, tablets and television (81).

Distance education and information technologies have been used actively especially for the last twenty years, and they affect and change all cultural values of humanity thanks to the fastest-growing online and offline technologies accepted by the society (82). These technologies have helped to transport and transfer educational content digitally by making information access and distribution available to a large part of the world's population, especially during the pandemic period (83).

Globally, the COVID-19 pandemic has affected the education system in many countries, causing some mandatory changes in the way education is implemented, and in this context, countries have switched to distance education instead of traditional face-to-face education (84). Education Information Network (EBA), the address of distance education, which was launched on March 23 due to the epidemic in Turkey, has been declared the most visited education website in the world with approximately 15 billion clicks (85). EBA mobile applications were downloaded 31 million times for Android devices and 3.1 million times for iOS devices. Between 21 September 2020 - 18 June 2021, close to 13 million students and more than 1 million teachers actively used EBA (86). This situation shows that students and educators use technological devices very intensively (31).

2.7 The Effect of Technological Device Use on Health

Thanks to technological devices such as computers, smartphones and tablets, children provide easy access to a range of products such as video games that are of interest. The fact that many families now have more than one computer, tablet or television, and that at least

one of them has now entered the children's rooms, has made children an independent audience from the family (87). Thanks to the Internet connection, children can access online games, videos or social media, and as a result, children spend a lot of time in front of the screen in daily life. As a result, some changes occur in the lifestyles of children. At the beginning of these changes, the child's adoption of a sedentary lifestyle, the development of swelling associated with the shift of the diet to fast-food-style foods over time, the deterioration of sleep patterns and the effect of school success can be counted (88).

However, the extensive use of technology also creates various physical problems. These physical effects, which are potential even for adults, involve a much greater risk for developing children. For developing children, it causes risks such as vision problems, posture and skeletal problems, and physical problems caused by lack of movement (75). In a study investigating the negative effects of technology use on children's development and health, it was concluded that children's use of digital technological devices for inappropriate time, frequency and different postures poses health risks such as developmental problems, musculoskeletal system problems, physical inactivity, obesity and poor sleep quality (89).

It has been reported that the increase in the use of digital technology in the home and school environment is associated with the increase in musculoskeletal system problems in children (90,91). There are limited studies in the literature investigating the relationship between the use of technological devices and musculoskeletal problems in children. It has been reported that children are at higher risk than adults in terms of musculoskeletal system problems, since children are acquainted with technological devices from an early age and technological products are designed for adults (66,92). Physically developing and growing children use technological devices for education and entertainment in different positions such as sitting, squatting and lying down (90). It has been reported that musculoskeletal disorders associated with exposure to technological devices increase depending on physical factors such as gender, age, body mass index (BMI) and sedentary activities, and psychological factors such as monitoring anxiety and somatic complaints (headache and abdominal pain) (93).

When technological device use is evaluated in terms of sleep problems, it has been determined that children who use social media excessively or sleep with technological devices in the bedroom are at higher risk for sleep disorders (94). It has been reported that poor sleep quality is related to the number of technological devices in the bedroom and the frequency of use of these devices in adolescents, and to excessive internet use and technology use before sleep in the pre-adolescent period (95). The use of technological devices during the daytime can also affect sleep quality. The use of technological devices during the day causes a short sleep time and a delay in falling asleep (96). It is generally the use of screen-based activities that delay sleep time or shorten total sleep time (66). Nearly all US adolescents (97%) have at least one electronic item (eg, television, computer, cell phone, video game console) in their bedroom (97). The ubiquity of media items in an adolescent's bedroom has been hypothesized to be a cause of insufficient and poor quality sleep on screen time(98).

The increase in the use of technological devices in relation to technological developments also causes changes in physical activities. Rowland and Freedson (99) defined physical activity as the energy expenditure of the body by using muscle strength as a result of the movements performed by people during the day. According to Kayıhan and Ersöz (100), with the development of technology, people have begun to lead a sedentary life, stay inactive for long periods in front of television and computer, and get overweight. It is thought that the lack of information about physical activity and the lack of understanding of the importance of physical activity on health are effective in the formation of a sedentary lifestyle and the increase in chronic diseases (101). In a study conducted on children aged 6-17 years, it was found that those who have low physical activity levels and who use technological devices (television or video watching and playing computer games) for a long time are twice more likely to be obese than those who do not (102). On the other hand, Ögel (103) mentions that as a result of the time spent in front of a technological device for a long time, the possibility of physical problems such as fatigue, obesity, neck and low back pain, headaches, eye diseases may increase due to the inactivity of individuals.

2.7.1 Effects of Computer Use on Health

While previous studies mainly focus on the time spent in front of the television, in recent years, computer and internet use have also been among the primary activities that immobilize the body (104-105). Long-term use of computers and the Internet can cause some physiological problems. In children and adolescents who have not completed their developmental cycle, these physiological problems can be experienced in much more serious dimensions. It is common to observe musculoskeletal disorders, tension and stiffness in the body, especially due to long-term computer use or sitting disorders. In addition, eye diseases, eye fatigue, eye pain or soreness, dryness and similar disorders can be seen (106). It has been observed that secondary school students have eye health problems such as eye fatigue and redness due to the prolonged period of looking at the monitor. It can also cause sleep problems. In case of fatigue due to insomnia, students may experience difficulties in their schools and employees may experience difficulties in their workplaces (12). Fatigue negatively affects concentration skills in individuals (107).

In other studies on computer use (90), who conducted a study with 314 students aged 10-17 years, the most common disorders were found in the neck, back, wrists, and knees, as well as pain or pain in the eyes due to intense visual focus. indicates that there is burning. Working with a large sample in Turkey, Kuzu et al. (108) reported that the most common physiological problems experienced in a family due to the use of information and communication technologies are eye fatigue/eye redness, respectively; back/neck pain, headache, joint/muscle pain, fatigue and insomnia. In the same study, it was revealed that as the duration and frequency of Internet use of individuals increased, physiological problems also increased (106).

Numerous epidemiological studies have shown that musculoskeletal disorders are experienced by computer use, not only among adults, but also in colleges (109) and middle and primary schools (110, 111). It is concluded that a risk factor for developing skeletal system disorders (112,113).

Numerous studies in the international literature emphasize the physical consequences of computer and Internet use; Excessive computer and Internet use are shown among the predictors of low physical activity, abnormalities in physical development, and weight gain in children and adolescents (114,115). It is age and gender specific for children and teens and is often referred to as BMI for age. It has been determined that BMI increases as the age and the average daily time spent in front of the computer increase in children in Turkey. As the time spent in front of the screen increases, the consumption of large amounts of snacks, deterioration of nutritional balance, decrease in physical activity, decrease in metabolic rate and increase in exposure to food advertisements increase the risk of obesity (116).

2.7.2 Effects of Television Use on Health

Today, television is in almost every home. The increasing number of television channels for children and the widespread use of children's programs and the fact that the contents of the programs become colorful, animated and attractive increase the amount of time spent in front of the screen by children. Spending time in front of a screen is an easy activity for children. Therefore, watching television in childhood has become a habit-forming activity (88). Children's lives are spent in front of the screen from birth, and the time allocated for watching television continues increasingly from early childhood to adolescence (117). Television plays an active role in the world of children, as it is attractive and entertaining for children and contains visual and auditory stimuli together. In addition to the entertaining and educational features of television, it is seen that the negative effects of television more predominantly affect children when the watching time increases (66).

Considering the studies, it is thought that there is a relationship between watching television and obesity. It has been reported that watching television causes the satiety mechanism in the brain to deteriorate with the effect of various distracting mechanisms, and as a result, the individual's food consumption increases (118,119). According to the study of Goodman et al., it was shown that 65% of children aged 8-13 and 65% of children aged 14-18 have a television in their bedroom (120). In a study involving children aged 10-12 years in seven

European countries, it was found that BMI level increased in children with television in the bedroom and who had more daily television watching (121).

In a study examining the relationship between the increase in time spent in front of television and obesity, it was found that obesity was not only related to the time spent watching TV, but also that low physical activity resulting from watching TV increased the risk of obesity (122). This situation is directly explained by the decrease in energy expenditure and the increase in snacking habits while watching television(120, 123). In particular, it has been reported that increased television viewing time is inversely related to fruit and vegetable consumption and is directly proportional to the consumption of high-calorie snacks and beverages (124).

Another factor that negatively affects health caused by watching television is the changes in sleeping patterns. As a result of watching television for a long time, problems such as difficulty in falling asleep, decreased sleep duration, resistance to bedtime, sleep anxiety, waking up at night, fear and nightmares decrease sleep quality. In a study conducted with individuals aged 12-18 in our country, it was reported that the rate of watching television for at least 4 hours a day was approximately 30% (125).

2.7.3 Effects of Tablet Use on Health

Access to the internet in any environment, portability, ergonomic use, and applications that arouse special interest for children are among the reasons for the widespread use of tablet computers, which are one of the most frequently used technological devices today (126). In recent years, the use of tablet devices in the field of education has been increasing in our country as well as the whole world (127). In a study, the rate of tablet possession of adolescents in our country was reported as 45.2% (128).

According to a study conducted in school children in a study conducted in France, children spend 900 hours at school and 1200 hours in front of a screen throughout the year. According to this research, it was noted that the total time spent by children in front of the screen during the year was more than the time they spent at school. (129,130). On the other hand, in another

similar study, the effect of different usage situations of tablet computers on spinal health was investigated (131). In the study, 15 experienced tablet users used tablets with different postures and the coordinates of the head and neck movements were determined by infrared rays. According to the findings, it was emphasized that the spine curvature was higher in the use of tablet computers in different situations than in desktop and laptop computers and that the tablets should be used on a support. It has been stated that the easy portability of tablets provides great convenience, but it can cause more head and neck bending compared to desktop computers, and this lack of movement causes spinal pain. In addition, when available studies are examined, it is seen that there is a relationship between tablet use and sleep deprivation (132).

Considering the negative effects of tablet use on health, according to the data obtained from some studies, a significant relationship was found between long-term tablet use and physical discomfort, especially in the neck and shoulders. As the time spent by children with mobile phones and tablets increased with long-term tablet use, the frequency of treatment for headache, neck and shoulder pain also increased. In another study, the effect of different usage situations of tablet computers on spine health was investigated (133).

2.7.4 Effects of Mobile Phone Use on Health

Today, the use of smart phones has an important place in the daily work and social life of individuals. Smartphones, the new type of mobile phones; It has many features that make life easier such as video calling, computer, internet, camera, navigation, music player, calculator, camera, video-sound recorder. Smartphones with these features and applications have become an indispensable element of life and their use has increased rapidly. Smartphones have a high number of users among the young population, regarding many features they have and especially internet access. (134)

Despite the innovations and conveniences that smartphones bring to daily life, they also cause some problems. Smart phones, which provide benefits and convenience in many areas when used correctly, have started to cause serious harm (physical and psychological health problems) when used unconsciously (it can cause many negative results by affecting social

life, psychological and physical health, general functionality). As an example of these; Health problems such as headaches and eye disorders, sleep problems as a result of constantly looking at the screen (135, 136), decrease in face-to-face communication and social isolation due to social media monitoring and messaging (137,135) neglect of daily work, sedentary life, deterioration in the immune system It has been observed that it can cause problems such as back pain, wrist syndrome, fatigue in the neck muscles, stiffness and school failure, and addiction (138).

As technology develops, the use of mobile phones and the use of the Internet via mobile phones have also increased. In Digital's 2021 report; While the world population is 7.83 billion, the number of people using the internet is 4.66 billion, the number of mobile device users is 5.22 billion, the number of world mobile Internet users is 4.32 billion, the average daily mobile usage time is stated as 3.5 hours (139). According to the usage data in the world, problematic mobile phone use (unconscious and unlimited mobile phone use) is increasing and becoming an important problem (171). When the mobile phone usage situation is evaluated in terms of our country; According to TUIK 2021 data, 99.3% of households in Turkey have a mobile phone or smart phone. In a study, 90% of young people aged 11-15 have a mobile phone (64).

Internet and mobile phone use is increasing in all age groups. It is possible to find studies on the unconscious and unrestricted use of mobile phones, which have become a part of their lives, especially among the young population, that may lead to the emergence of a new type of addiction (140). In a study conducted with individuals aged 6-18 in Turkey, it was reported that the duration of electronic media use is approximately 7 hours per day (141). In another study, the rate of mobile phone ownership was found to be 70% in secondary school students and 97% in high school students (142).

In their research, Cha and Seo (143) revealed that secondary school students generally use their mobile phones to communicate and surf the Internet, and a substantial portion of the students use their mobile phones to play games.

In addition to its positive aspects, it is possible to come across studies on the negative effects of using mobile phones on children and young people, both physically and mentally. There are studies that show an increase in the frequency of treatment for headache, neck and shoulder pain as the time spent by children with mobile phones and tablets increases with long-term tablet use (144). In addition, Augner and Hacker (145) stated in their study that the use of smartphones for messaging purposes, especially until late at night, causes sleep problems.

In another study, when the relationship between smartphone use and musculoskeletal system in students was examined, about half of the participants experienced neck and shoulder pain, the affected body parts increased as the time of smartphone use increased, it was pointed out that the back pain of students who spoke on the phone more than 3 hours a day increased (141). All people in the society should design their own healthy lifestyles by adopting positive health behaviors in order to protect and improve their own health (145).

2.7.5 Effects of Game Consoles Use on Health

The rapid progress of technology has led to the movement of game activities carried out for entertainment and spending time from the streets to electronic environments developed with computer technologies. There are different technologies (computers, mobile technologies, tablets, game consoles, etc.) where electronic games can be played. Among the new media entertainment devices from these technologies, video game consoles can also be shown. Consoles offer users a more advanced, graphically rich interactive gaming environment and experience where they can play computer games (146).

With the developing technology day by day, the concepts of games and toys appear as computer games (atari, commodore64, etc.), video games (Playstation, Xbox, Wii, etc.) and mobile games played on portable devices (mobile phone, portable playstation, gameboy, etc.) (147). It is thought that the increase in the use of digital games and especially the fact that they have become an indispensable part of children's daily lives, and that outdoor playgrounds become increasingly limited, have not only positive effects but also negative effects on children (148). In some studies, it has been reported that children who play digital

games excessively develop a decrease in academic achievement, inadequacy in physical activity, musculoskeletal complaints, inadequate and irregular sleep, and obesity (149). However, other studies have shown that children who spend excessive time with digital games (150), insufficient and irregular sleep habits (151), insufficient physical activity (152), obesity (153) and musculoskeletal system problems (154).

In the researches, there are studies about the individuals who experience the most hand and wrist pain while playing games. Apart from hand and wrist pain, it has been observed in individuals who experience dizziness, low back pain, nausea and neck pain (146). In addition, there are studies that suggest that the use of hand-held gaming devices for more than 2 hours a day in young children will significantly increase the risk of developing musculoskeletal disorders in different body parts (155).

3. MATERIALS AND METHODS

3.1 Type of Research

This study was planned as an observational descriptive and cross-sectional epidemiological study.

3.2 Place and Time of Research

This research was carried out with the participation of secondary school level students studying in a private school in the Beşiktaş District of Istanbul in the 2020-2021 academic year. The research was started in September 2020 by reviewing the literature. Preparation of the subject proposal, approval of the department, preparation of the questionnaire and other official approval processes started in February 2021 and were completed by April of that year. The time of data collection was also April 2021. Data entry and analysis were carried out between April 2021 and June 2021. The work was completed in November 2021.

3.3 The Subjects and Sample of the Research

The subjects of the research consists of secondary school students studying in a private school located in Beşiktaş district of Istanbul province. The students participating in the research constitute my population of approximately 320 students studying in the 5th, 6th, 7th and 8th grades. The number of students in the sample of the study is 208. The students who voluntarily agreed to answer the questionnaire during the 2020-2021 academic year.

3.3.1 Inclusion criteria in the study

- Participants between the ages of 10-12
- Students studying at secondary school level in the 2020-2021 academic year
- Participants who approved/signed the informed consent form by their family

3.3.2 Exclusion criteria from the study

- Participants outside the age range of 10-12
- Students who are not studying at the secondary school level
- Participants who did not approve/sign the informed consent form by their family
- Participants who cannot be communicated with verbally / in writing

3.4 Research Variables

The variables in this study can be examined in two groups as dependent and independent variables.

3.4.1 Dependent Variables

Dependent variables are the status of different health variables of the students within the scope of the research. These include pain scale variables (back, waist, neck, hand, wrist, shoulder), eye health problem status, sleep duration and BMI.

3.4.2 Independent Variables

The independent variables within the scope of the research are as follows; Age, Gender, Height, Weight, School Year, Periods of Use of Technological Devices, Purpose of Use of Technological Devices, Availability of Technological Devices at Home.

3.5 Data Collection Tools

In the development of the data collection tool, the literature on the subject was examined in order to base the research and achieve the targeted objectives. The questionnaire form prepared in this direction consists of three parts. In the first part of the questionnaire, the personal information form of the students is included; school year, gender, age, height, weight, eye health, chronic illness, availability of technological devices at home and in the room, the purpose of use of these devices, sleep duration, time to fall asleep, etc. In the second

part, investigating health-related symptoms the Pain Rating Scale is included; Musculoskeletal pains such as back, waist, neck, hand, wrist and shoulder were questioned. In the third part, there is the Technological Device Usage and Duration Scale.

3.5.1 Personal Information Form

The personal information form recorded information on students' grade level, gender, age, height, weight, eye health, chronic illness, sleep duration, etc.

3.5.2 Pain Rating Scale

The aim of this method, which is used to determine the degree of pain intensity, is to express the pain numerically. Pain severity assessment on this scale starts with 0 (no pain) and ends with 10 (unbearable pain). In this scale; Musculoskeletal pains such as back, waist, neck, hand, wrist and shoulder were questioned.

3.5.3 Technological Device Usage and Duration Scale

In the scale related to Technological Device Usage and Duration, a 5-point Likert questionnaire was conducted to the students included in the research, which included questions about the use of technological devices, their purpose and duration. In this survey, the number of technological devices in the students' home, the technological devices in the room and the daily usage times of these devices, etc. has been questioned.

3.6 Analysis Data

The collected data were analyzed using SPSS version 26.0 program for statistical analysis. In the statistical analysis given, the demographic characteristics of the participants were interpreted by calculating the frequency and percentage values, which are descriptive statistics. Chi-square was used to evaluate the relationships between dependent and independent variables. Statistical significance level was accepted as $p \leq 0.05$.

3.7 Ethical Decisions

This study was approved by the Yeditepe University Clinical Research Ethics Committee with the approval of the Ethics Committee dated 18/02/2021 and numbered 37068608-6100-15-2095 and the approval numbered 1383. At the last stage, a permission letter was obtained from the school administration. Within the scope of the study, an e-mail was sent to the parents of the students by the institution to fill in the questionnaire forms and the purpose of the research was shared by the researcher by writing an explanation text to the parents. Afterwards, there is an informed consent form on the first page of the forms in the questionnaire in the e-mail sent, and if the form is read and participation in the research is accepted, it is requested to tick the I agree box at the bottom of the form. However, it was reminded again that participation in the survey is on a voluntary basis. Afterwards, parents who gave their consent to fill out the questionnaire were asked to fill in the questionnaire with their children. The data has not been used other than for research purposes and is not given to third parties.

4. RESULTS

4. Results

In this section, the findings obtained by statistical analysis of the data collected regarding the problems examined in the research are given. The findings and results obtained as a result of the analyzes are given in the section below.

The effect of the use of technological devices on different health conditions of secondary school students studying in a located Beşiktaş district Istanbul during the pandemic process was examined. Analyzes were needed to determine whether there was a significant difference in terms of the technological devices that students used and the variables of different health conditions. The general descriptive statistics of the secondary school students belonging to the study group regarding age, gender, height, weight, grade level, availability of technological devices and health variable levels (i.e. Back, Waist, Neck, Hand, Wrist and Shoulder Pain Conditions, Eye Health Status, Average Daily Sleep Duration and Percentile BMI) are given in the tables below.

IBM SPSS Statistics 26.0 statistical program was used for data analysis. The level of significance considered in the analyzes was accepted as ($p \leq 0.05$). In cases where the significance level is p value ($p > 0.05$), it is concluded that there is no significant difference in the study examined, and in cases where it is ($p \leq 0.05$), there is a statistically significant difference in the study examined (Can, 2019).

In the data analysis where the data obtained as a result of the research showed normal distribution, the Chi-Square Test within the scope of the parametric test and Logic Regression models were used for the effect and difference significance of the scales. Findings indicating that there is no significant difference between the scores of the scales used in the analysis of the research questions are also included.

4.1 Descriptive Levels of Age, Gender, Height, Weight, School Years, Availability of Technological Devices and Health Variables of Secondary School Students

In the research examined, a three-part questionnaire was created to examine the effects of the use of technological devices on different health conditions of the students who participated in the study during the pandemic process. In the first part of the questionnaire, the personal information of the students was included; age, gender, height, weight, school years, eye health, chronic discomfort status, presence of technological devices at home, purposes of use of these devices, sleep duration, time to fall asleep, etc.

In the second part, the Pain Rating Scale is included; musculoskeletal pains such as back, waist, neck, hand, wrist and shoulder were questioned. In the third part, there was the technological device usage and technological device usage period Scale. The findings of age, gender, height, weight, school years, availability of technological devices and health variable data are given in Table 1.

Table 1: Descriptive Statistics of Students by Age

Age	N	%	Mean	Std. Dev.
10	20	9,6	12,21	1,20
11	38	18,3		
12	62	29,8		
13	55	26,4		
14	32	15,4		
15	1	0,5		
Total	208	100		

Of the 208 students questioned, it is seen that 20 students (9,6%) were 10 years old, 38 students (18,3%) 11 years old, 62 students (29,8%) 12 years old, 55 students (26,4%) 13 years old, 32 students (15,4%) are 14 years old and just 1 student (0,5%) is 15 years old. In

line with this information, it is observed that the statistical average of the students according to their age is 12,21 and the standard deviation statistically is 1,20 in Table 1.

Table 2: Descriptive Statistics of Students by Gender

Gender	N	%
Girls	110	52,9
Boys	98	47,1
Total	208	100

According to Table 2, there are descriptive statistics according to the gender of the students at the secondary school level studying during the pandemic process. According to these statistics, there are 110 female students and 98 male students. The female students constitute 52.9% of the total students and 47.1% are male students. In line with this information, it is seen that female students are more than male students according to the gender of the students.

Table 3: Descriptive Statistics of Students by Height

Height (cm)	N	%	Mean	Std. Dev.
135 – 144	13	6,25		
145 - 154	44	21,15		
155 - 164	88	42,30		
165 - 174	50	24,03	159,72	9,75
175 - 184	12	5,76		
185 - 194	1	0,48		
Total	208	100		

Looking at Table 3, there are descriptive statistics of the use of technological devices of secondary school students studying during the pandemic process, according to the height of the students. According to these statistics; there are 13 students (6,25%) between 135-144 cm, 44 students (21,15%) between 145-154 cm, 88 student s(42,30%) between 155-164 cm,

50 students (24,03%) between 165-174 cm, 12 students (5,76%) between 175-184 cm and only 1 student (0,48%) between 185-194 cm. In line with this information, it was seen that the most crowded height ranges was between 155-164 cm and 165-174 cm. However, it is found that the average height of the students is 159.72 and their standard deviation is 9,75.

Table 4: Descriptive Statistics of Students by Weight

Weight (kg)	N	%	Mean	Std. Dev.
25 -34	5	2,40	50,27	10,68
35 - 44	64	30,76		
45 -54	69	33,17		
55 - 64	47	22,59		
65 – 74	18	8,65		
75 - 84	4	1,92		
85 - 94	1	0,48		
Total	208	100		

Looking at Table 4, there are descriptive statistics according to the weight of the students at the secondary school level. According to these statistics, there are 5 students (2,40%) between 25-34 kg, 64 students (30,76%) between 35-44 kg, 69 students (33,17%) between 45-54 kg, 47 students (22,59%) between 55-64 kg, 18 students (8,65%) between 65-74 kg, 4 students (1,92%) between 75-84 kg. and only 1 student (0,48%) over 85kg. In addition, it is seen that the majority of the students weigh between 35 and 64 kg and their total as a percentage is 86,52. In line with this information, the average weight of the students is 50.27 and their standard deviation is 10,68.

Table 5: Descriptive Statistics of Students by Grade Levels

Grades	N	%
5th Grade	28	13,5
6th Grade	38	18,3
7th Grade	70	33,7
8th Grade	72	34,6
Total	208	100

According to these statistics, it is seen that there are 28 students (13,5%) in the 5th grade, 38 students (18,3%) in the 6th grade, 70 students(33,7%) in the 7th grade and 72 students(34,6%) in the 8th grade In line with this information, it is seen that the students are mostly 7th and 8th grade levels in Table 5.

Table 6: Descriptive Statistics of Students by the Number of Technological Devices at Home

	Mobile Phone		TV		PC		Tablet		Game Console	
	N	%	N	%	N	%	N	%	N	%
1 Device or Less	6	2,9	108	51,9	41	19,7	45	21,6	185	88,9
2 Devices or More	202	97,1	100	48,1	167	80,3	163	78,4	23	11,1
Total	208	100	208	100	208	100	208	100	208	100

Looking at Table 6,

- The number of students who have the mobile phone at home, that 6 students (2,9%) out of 208 students have 1 or less, and 202 students (97,1%) have 2 or more mobile phones.

- The number of students who have the television (TV) at home, it is seen that out of a total of 208 students, 108 students (51,9%) have 1 or less, and 100 students (48,1%) have 2 or more television.
- In addition, the number of students who have the computer (PC) at home, it is seen that 41 students (19,7%) have 1 or less, and 167 students (80,3%) have 2 or more computer.
- Looking at the number of students who have tablets at home, it is seen that 45 students (21,6%) out of 208 students have 1 or less, while 163 students (78,4%) have 2 or more tablets.
- Finally, the number of students who have the game console at home, it is seen that 185 students(88,9%) out of a total of 208 students have 1 or less, and 23 students (11,1%) have 2 or more game consoles.

Table 7: Descriptive Statistics of Students' Health Variable Levels After Using Technological Devices According to the Severity of Back, Waist, Neck, Hand, Wrist and Shoulder Pain

	Back		Waist		Neck		Hand		Wrist		Shoulder	
	N	%	N	%	N	%	N	%	N	%	N	%
Less/No Pain	109	52,4	133	63,9	90	43,3	178	85,6	165	79,3	135	64,9
Painful	99	47,6	75	36,1	118	56,7	30	14,4	43	20,7	73	35,1
Total	208	100	208	100	208	100	208	100	208	100	208	100

According to Table 7, there are descriptive statistics according to the levels of back, waist, neck, hand, wrist and shoulder pain on different health variables of technological device use of secondary school students studying during the pandemic process.

- When the back pain of the students is examined, it is seen that 109 students (52,4%) experienced little or no pain after the use of technological devices. However, it is seen that 99 students (47,6%) have back pain after using technological devices.
- When the waist pain of the students is examined, it is seen that 133 students (63,9%) experienced little or no pain after the use of technological devices. However, it is seen that 75 students (36,1%) have waist pain after the use of technological devices.
- Considering the neck pain of the students, it is seen that 90 students(43,3%) experienced little or no pain after the use of technological devices. However, it is seen that 118 students (56,7%) have neck pain after using technological devices.
- When the students' hand pain is examined, it is seen that 178 students (85,6%) experienced little or no pain after the use of technological devices. However, it is seen that 30 students (14,4%) have hand pain after using technological devices.
- When the students' wrist pain is examined,, it is seen that 165 students (79,3%) experienced little or no pain after the use of technological devices. However, it is seen that 43 students (20,7%) have wrist pain after using technological devices.
- Finally when the students' shoulder pain, it is seen that 135 students (64,9%) experienced little or no pain after using technological devices. However, it is seen that 73 students (35,1%) have wrist pain after using technological devices.

Table 8: Descriptive Statistics of Students' Health Variable Levels After Using Technological Devices by Eye Health Status

Eye Health Problem	N	%
Unhealthy	106	51,0
Healthy	102	49,0
Total	208	100

According to Table 8, there are descriptive statistics of the use of technological devices of secondary school students studying during the pandemic process, according to their eye health problems. According to these statistics, it is seen that 106 students (51,0%) have a problem with their eyes and 102 students (49,0%) have healthy eyes. In addition, it is seen that most of the students in the research had problems with their eyes.

Table 9: Descriptive Statistics of Students' Health Variable Levels After Using Technological Devices by Sleep Duration Status

Sleep Time	N	%
Less 8 Hours Less	35	16,8
8 – 9 Hours	155	79,8
More 9 Hours	7	3,4
Total	208	100

According to Table 9, there are descriptive statistics of the use of technological devices by secondary school students studying during the pandemic process, according to the sleep duration of different health variables. In the these statistics, it is seen that 35 students (16,8%) sleep less than 8 hours, 155 students (79,8%) sleep between 8 hours and 9 hours, and 7 students (3,4%) sleep more than 9 hours.

Table 10: Descriptive Statistics of Students' Health Variable Levels After Using Technological Devices by BMI Duration

BMI	N	%
Underweight	36	17,3
Normal weight	141	67,8
Overweight	31	14,9
Total	208	100

According to Table 10, there are descriptive statistics of technological device use of secondary school students studying during the pandemic process, according to percentile BMI of different health variables. These statistics show that 36 students(17,3%) are in the underweight category, 141 students(67,8%) are in the normal category, and 31 students(14,9%) are in the overweight category. None of the students participating in the study was included in the obesity weight category according to the students respective percentile BMI duration. In addition, it is seen that most of the students in the research with BMI category had normal weight.

4.2 To Determine The Effect Of Technological Device Usage Time Of Secondary School Students During Pandemic On Different Health Variables

Within the scope of the study, statistical analyses of technological device usage time of secondary school students studying during the pandemic process according to different health variables are included. In this analysis, mobile phones, computers, televisions, tablets and game consoles were included as technological devices. In addition, back, waist, neck, hand, wrist and shoulder pain conditions, eye health conditions, sleep durations and BMI were included as different health variables, and it was examined whether there was a statistically significant difference on the duration of technological device use and different health variables.

4.2.1 The Effect of Cell Phone Usage Time on Different Health Variables

The statistical results of the variables of back, waist, neck, hand, wrist and shoulder pain levels of the secondary school students studying during the pandemic process, according to their different health variable of cell phone usage time, are given in Table 11.

The results show that there is a statistically significant difference between the duration of mobile phone use and pain in the neck and hand regions, but there is no significant difference in the back, waist, wrist, and shoulder regions. Moreover, when the statistical results were examined on the variables of eye health status, sleep duration and BMI, it was seen that there was no statistical difference ($p>0,05$).

Table 11: Statistical Results of Students' Cell Phone Usage Period on Different Health Variables

1 – Less/No Pain, 2 – Painful, % – Row Percentage

Cell Phone Usage Rate	Back		Waist		Neck		Hand		Wrist		Shoulder	
	1	2	1	2	1	2	1	2	1	2	1	2
Less Use	43 (48%)	47 (52%)	60 (66%)	30 (37%)	29 (32%)	61 (68%)	71 (79%)	19 (21%)	70 (78%)	20 (22%)	53 (59%)	37 (41%)
Overuse	66 (55%)	52 (45%)	73 (62%)	45 (38%)	61 (52%)	57 (48%)	107 (91%)	11 (9%)	95 (80%)	23 (20%)	82 (70%)	36 (30%)
Total	208		208		208		208		208		208	
p	0,243		0,475		0,005**		0,016**		0,630		0,112	

Cell Phone Usage Rate	Eye Health Problem		Sleep Time			BMI		
	Healthy	Unhealthy	Less 8	8 – 9	More 10	UnderW.	Normal	OverW.
Less Use	48 (53%)	42 (46%)	13 (15%)	75 (83%)	2 (2%)	16 (18%)	56 (62%)	18 (20%)
Overuse	54 (46%)	64 (54%)	22 (19%)	91 (77%)	5 (4%)	20 (17%)	85 (68%)	13 (15%)
Total	208		208			208		
p	0,279		0,497			0,173		

4.2.2 The Effect of Computer Usage Time on Different Health Variables

Table 12 shows the statistical results of secondary school students studying during the pandemic period, regarding the levels of back, waist, neck, hand, wrist and shoulder pain, according to different health variables of computer usage time.

According to the results in Table 12, there is a statistically significant difference between the duration of computer use only with pain in the hand region, but there is no significant difference in the back, waist, neck, wrist, and shoulder regions. In addition, when the statistical results were examined on the variables of eye health status, sleep duration and BMI, it was seen that only BMI variables showed a statistically significant difference, but there was no statistical difference with the other variable, eye health status and sleep duration ($p>0,05$).

Table 12: Statistical Results of Students' Computer Use Duration on Different Health Variables

1 – Less/No Pain, 2 – Painful, % – Row Percentage

Computer Usage Rate	Back		Waist		Neck		Hand		Wrist		Shoulder	
	1	2	1	2	1	2	1	2	1	2	1	2
Less Use	56 (55%)	45 (45%)	67 (66%)	34 (34%)	43 (43%)	58 (57%)	92 (91%)	9 (9%)	83 (82%)	18 (18%)	70 (69%)	31 (31%)
Overuse	53 (50%)	54 (50%)	66 (62%)	41 (38%)	47 (44%)	60 (56%)	86 (80%)	21 (20%)	82 (77%)	25 (23%)	65 (61%)	42 (39%)
Total	208		208		208		208		208		208	
P	0,393		0,485		0,844		0,028**		0,324		0,196	

Computer Usage Rate	Eye Health Problem		Sleep Time			BMI		
	Healthy	Unhealthy	Less 8	8 – 9	More 10	UnderW .	Normal	OverW.
Less Use	55 (54%)	46 (46%)	12 (12%)	86 (85%)	3 (3%)	18 (18%)	75 (74%)	8 (8%)
Overuse	47 (44%)	60 (56%)	23 (21%)	80 (75%)	4 (4%)	18 (17%)	66 (62%)	23 (21%)
Total	208		208			208		
P	0,129		0,161			0,022**		

4.2.3 The Effect of Television Usage Time on Different Health Variables

The statistical results of the variables of back, waist, neck, hand, wrist and shoulder pain levels of the secondary school students studying during the pandemic process, according to their different health variable of television usage time, are given in Table 13.

Table 13 shows that there is a statistically significant difference between the duration of computer use and pain in the back and wrist regions, but there is no significant difference in the waist, neck, hand and shoulder regions. On the other hand, when the statistical results are examined on the variables of eye health status, sleep duration and BMI, it is found that only the sleep duration variables are statistically significant, but there is no statistical difference with the other variables, eye health status and BMI ($p>0,05$).

Table 13: Statistical Results of Students' Television Usage Time on Different Health Variables

1 – Less/No Pain, 2 – Painful, % – Row Percentage

Television Usage	Back		Waist		Neck		Hand		Wrist		Shoulder	
Rate	1	2	1	2	1	2	1	2	1	2	1	2
Less Use	35 (40%)	52 (60%)	51 (59%)	36 (41%)	43 (49%)	44 (51%)	71 (82%)	16 (18%)	61 (70%)	26 (30%)	51 (59%)	36 (41%)
Overuse	74 (61%)	47 (39%)	82 (68%)	39 (32%)	47 (39%)	74 (61%)	107 (88%)	14 (12%)	104 (86%)	17 (14%)	84 (69%)	37 (31%)
Total	208		208		208		208		208		208	
P	0,003**		0,175		0,129		0,167		0,005**		0,107	

Television Usage Rate	Eye Health Problem		Sleep Time			BMI		
	Healthy	Unhealthy	Less 8	8 – 9	More 10	UnderW.	Normal	OverW.
Less Use	41 (47%)	46 (53%)	23 (26%)	61 (70%)	3 (3%)	11 (13%)	65 (75%)	11 (13%)
Overuse	61 (50%)	60 (50%)	12 (10%)	105 (87%)	4 (3%)	25 (21%)	76 (63%)	20 (17%)
Total	208		208			208		
P	0,640		0,007**			0,178		

4.2.4 The Effect of Tablet Usage Time on Different Health Variables

Table 14 shows the statistical results of the variables of back, waist, neck, hand, wrist and shoulder pain levels of the secondary school students studying during the pandemic process, according to the different health variables of the tablet use duration.

Table 14 shows that there is no statistically significant difference between the duration of tablet use and pains in the back, waist, wrist and shoulder regions. However, there is statistically significant difference between the duration of tablet use and pains in the neck and hand regions. In addition, when the statistical results are examined on the variables of eye health status, sleep duration and BMI, there is no statistical difference ($p>0,05$).

Table 14: Statistical Results of Tablet Use Periods of Students on Different Health Variables*1 – Less/No Pain, 2 – Painful, % – Row Percentage*

Tablet Usage Rate	Back		Waist		Neck		Hand		Wrist		Shoulder	
	1	2	1	2	1	2	1	2	1	2	1	2
Less Use	43 (48%)	47 (52%)	60 (67%)	30 (33%)	29 (32%)	61 (68%)	71 (79%)	19 (21%)	70 (78%)	20 (22%)	53 (59%)	37 (41%)
Overuse	66 (56%)	52 (44%)	73 (62%)	45 (38%)	61 (52%)	57 (48%)	107 (91%)	11 (9%)	95 (81%)	23 (19%)	82 (69%)	36 (31%)
Total	208		208		208		208		208		208	
P	0,243		0,475		0,005**		0,016**		0,630		0,112	

Tablet Usage Rate	Eye Health Problem		Sleep Time			BMI		
	Healthy	Unhealthy	Less 8	8 – 9	More 10	UnderW.	Normal	OverW.
Less Use	53 (52%)	48 (48%)	15 (15%)	80 (79%)	6 (6%)	16 (16%)	66 (65%)	19 (19%)
Overuse	49 (46%)	58 (54%)	20 (19%)	86 (80%)	1 (1%)	20 (19%)	75 (70%)	12 (11%)
Total	208		208			208		
p	0,335		0,115			0,297		

4.2.5 The Effect of Game Console Usage Time on Different Health Variables

Table 15 shows the statistical results of the variables of back, waist, neck, hand, wrist and shoulder pain levels of the secondary school students studying during the pandemic process, according to the different health variables of the game console usage time.

Looking at Table 15, it is seen that there is a statistically significant difference between the duration of game console usage and pain in the back, waist, neck and shoulder regions, but there is no significant difference in the other regions in the hand and wrist regions. Looking at the statistical results over BMI variables, it is found that there is no statistical difference ($p>0,05$).

Table 15: Statistical Results of Game Console Usage Duration of Students on Different Health Variables

1 – Less/No Pain, 2 - Painful, % – Row Percentage

Game Console Usage	Back		Waist		Neck		Hand		Wrist		Shoulder	
Rate	1	2	1	2	1	2	1	2	1	2	1	2
Less Use	71 (44%)	89 (56%)	94 (59%)	66 (41%)	59 (37%)	101 (63%)	134 (84%)	26 (16%)	123 (77%)	37 (23%)	96 (60%)	64 (40%)
Overuse	38 (79%)	10 (21%)	39 (81%)	9 (19%)	31 (65%)	17 (35%)	44 (92%)	4 (8%)	42 (82%)	6 (13%)	39 (81%)	9 (19%)
Total	208		208		208		208		208		208	
P	0,001**		0,004**		0,001**		0,171		0,111		0,007**	

Game Console Usage Rate	Eye Health Problem		Sleep Time			BMI		
	Healthy	Unhealthy	Less 8	8 – 9	More 10	UnderW.	Normal	OverW.
Less Use	81 (51%)	79 (49%)	26 (16%)	130 (81%)	4 (3%)	31 (19%)	107 (67%)	22 (14%)
Overuse	21 (44%)	27 (56%)	9 (19%)	36 (75%)	3 (6%)	5 (10%)	34 (71%)	9 (19%)
Total	208		208			208		
P	0,403		0,394			0,299		

4.3 To Examine The Effects of The Usage Purpose of The Students Studying at The Secondary School Level During Pandemic on Different Health Variables According To The Types of Technological Devices.

Within the scope of the study, statistical analyzes are included according to different health variables of the usage purpose of technological devices of secondary school students studying during the pandemic process. In this analysis, mobile phone, computer, television, tablet and game console are included as technological devices. As for technological device usage purposes; the two usage options offered in the questionnaire were entertainment and others including reading, communication and virtual classroom/school.

The data has been examined to discover whether there is a statistically significant difference between the related variables and the purpose of using technological devices and different health variables.

4.3.1 The Effect of Mobile Phone Usage Purpose on Different Health Variables

Table 16 shows the statistical results of secondary school students studying during the pandemic process, which are mobile phone usage purposes such as entertainment, others variables and back, waist, neck, hand, wrist and shoulder pain conditions.

When Table 16 is examined, it is seen that there is a statistically significant difference between the purpose of mobile phone use and pain in the hand and wrist regions. Also, there is no statistical significance in the areas of back, waist, neck and shoulder pain regions of the purpose of mobile phone use. On the other hand, when the statistical results on the variables of eye health status, sleep duration and BMI were examined, it was seen that only sleep duration variable was a statistically significant difference, but there was no statistical difference with the other variables, eye health status and BMI ($p>0,05$).

Table 16: Statistical Results of Students' Mobile Phone Usage Purpose on Different Health Variables

1 – Less/No Pain, 2 - Painful, % – Row Percentage

Mobile Phone Usage Purpose	Back		Waist		Neck		Hand		Wrist		Shoulder	
	1	2	1	2	1	2	1	2	1	2	1	2
Entertainment	23 (62%)	14 (38%)	28 (76%)	9 (24%)	16 (43%)	21 (57%)	37 (100%)	0 (0%)	35 (95%)	2 (5%)	29 (78%)	8 (22%)
Others	86 (50%)	85 (50%)	105 (61%)	66 (39%)	74 (43%)	97 (57%)	141 (82%)	30 (18%)	130 (76%)	41 (24%)	106 (62%)	65 (38%)
Total	208		208		208		208		208		208	
p	0,190		0,101		0,997		0,006**		0,011**		0,058	

Mobile Phone Usage Purpose	Eye Health Problem		Sleep Time			BMI		
	Healthy	Unhealthy	Less 8	8 – 9	More 10	UnderW.	Normal	OverW.
Entertainment	20 (54%)	17 (46%)	1 (3%)	34 (92%)	2 (5%)	4 (11%)	28 (76%)	5 (14%)
Others	82 (48%)	89 (52%)	34 (20%)	132 (77%)	5 (3%)	32 (17%)	131 (69%)	26 (14%)
Total	208		208			208		
p	0,501		0,035**			0,465		

4.3.2 The Effect of Computer Use Purpose on Different Health Variables

The statistical results of back, waist, neck, hand, wrist and shoulder pain conditions, which are different health variables of the purpose of computer use, of secondary school students studying during the pandemic process are given in Table 17.

Looking at Table 17, it is seen that there is a statistically significant difference between the purpose of computer use and pain in the back, waist, neck regions, but there is no significant difference in the hand, wrist and shoulder regions. Moreover, when the statistical results were examined on the variables of eye health status, sleep duration and BMI, it was seen that there was no statistical significance. ($p>0,05$).

Table 17: Statistical Results of Students' Computer Use Purpose on Different Health Variables*1 – Less/No Pain, 2 – Painful, % – Row Percentage*

Computer Usage Purpose	Back		Waist		Neck		Hand		Wrist		Shoulder	
	1	2	1	2	1	2	1	2	1	2	1	2
Entertainment	43 (63%)	25 (37%)	51 (75%)	17 (25%)	41 (60%)	27 (40%)	62 (91%)	6 (9%)	55 (81%)	13 (19%)	50 (74%)	18 (26%)
Others	66 (47%)	74 (53%)	82 (59%)	58 (41%)	49 (55%)	91 (65%)	116 (83%)	24 (17%)	110 (79%)	30 (21%)	85 (61%)	55 (39%)
Total	208		208		208		208		208		208	
p	0,029**		0,021**		0,001**		0,109		0,699		0,069	

Computer Usage Purpose	Eye Health Problem		Sleep Time			BMI		
	Healthy	Unhealthy	Less 8	8 – 9	More 10	UnderW.	Normal	OverW.
Entertainment	30 (44%)	38 (56%)	15 (22%)	50 (74%)	3 (4%)	12 (18%)	45 (66%)	11 (16%)
Others	72 (51%)	68 (49%)	20 (14%)	116 (83%)	4 (3%)	24 (32%)	96 (56%)	20 (12%)
Total	208		208			208		
p	0,322		0,291			0,925		

4.3.3 The Effect of Television Usage Purpose on Different Health Variables

Table 18 shows the statistical results of secondary school students studying during the pandemic process, which are television usage purposes, entertainment, others that are reading, communication, virtual classroom/school variables, and back, waist, neck, hand, wrist and shoulder pain conditions, which are different health variables.

Table 18 shows that there is a statistically significant difference between the purpose of television use and pain only in the back regions, but there is no significant difference in the hand, waist, neck, wrist and shoulder regions. On the other hand, when the statistical results on the variables of eye health status, sleep duration and BMI were examined, there was no statistical difference with the all variables, eye health status, sleep duration and BMI ($p>0,05$).

Table 18: Statistical Results of Students' Purpose of Television Use on Different Health Variables

1 – Less/No Pain, 2 – Painful, % – Row Percentage

Television Usage Purpose	Back		Waist		Neck		Hand		Wrist		Shoulder	
	1	2	1	2	1	2	1	2	1	2	1	2
Entertainment	104 (56%)	83 (44%)	123 (66%)	64 (34%)	83 (44%)	104 (56%)	159 (85%)	28 (15%)	148 (79%)	39 (21%)	119 (64%)	68 (36%)
Others	5 (24%)	16 (76%)	10 (48%)	11 (52%)	7 (33%)	14 (67%)	19 (90%)	2 (10%)	17 (81%)	4 (19%)	16 (76%)	5 (24%)
Total	208		208		208		208		208		208	
p	0,006**		0,100		0,332		0,500		0,846		0,253	

Television Usage Purpose	Eye Health Problem		Sleep Time			BMI		
	Health y	Unhealt hy	Less 8	8 – 9	More 10	Under W.	Normal	Over W.
Entertainment	95 (51%)	92 (49%)	34 (18%)	146 (78%)	7 (4%)	32 (17%)	127 (68%)	28 (15%)
Others	7 (33%)	14 (67%)	1 (5%)	20 (95%)	0 (0%)	4 (19%)	14 (67%)	3 (14%)
Total	208		208			208		
p	0,129		0,173			0,975		

4.3.4 The Effect of Tablet Usage Purpose on Different Health Variables

Table 19 shows the statistical results of the secondary school students studying during the pandemic process, with the purposes of tablet use, entertainment, others that are reading, communication, virtual classroom/school variables, and back, waist, neck, hand, wrist and shoulder pain, which are different health variables.

Looking at Table 19, it is seen that there is no significant difference in the all other regions such as the back, waist, neck, hand, wrist and shoulder regions. Moreover, when the statistical results on the variables of eye health status, sleep duration and BMI were examined, there was no statistical difference with the all other variables like eye health status, sleep duration and BMI ($p>0,05$).

Table 19: Statistical Results of Students' Tablet Use Purpose on Different Health Variables

1 – Less/No Pain, 2 - Painful, % – Row Percentage

Tablet	Back		Waist		Neck		Hand		Wrist		Shoulder	
Usage Purpose	1	2	1	2	1	2	1	2	1	2	1	2
Entertainment	20 (50%)	20 (50%)	21 (53%)	19 (48%)	17 (43%)	23 (58%)	34 (85%)	6 (15%)	35 (88%)	5 (13%)	29 (73%)	11 (28%)
Others	89 (53%)	79 (47%)	112 (65%)	59 (35%)	73 (44%)	94 (56%)	114 (83%)	24 (17%)	130 (77%)	38 (23%)	106 (63%)	62 (37%)
Total	208		208		208		208		208		208	
p	0,735		0,094		0,913		0,908		0,156		0,263	

Tablet	Eye Health Problem		Sleep Time			BMI		
Usage Purpose	Healthy	Unhealthy	Less 8	8 – 9	More 10	UnderW.	Normal	OverW.
Entertainment	23 (58%)	17 (42%)	5 (13%)	33 (83%)	2 (5%)	6 (15%)	29 (73%)	5 (13%)
Others	79 (47%)	89 (53%)	30 (18%)	133 (79%)	5 (3%)	30 (18%)	112 (67%)	26 (15%)
Total	208		208			208		
p	0,234		0,001**			0,776		

4.3.5 The Effect of Game Console Usage Purpose on Different Health Variables

There are statistical variables of the secondary school students studying during the pandemic process, which are the game console usage purposes, like entertainment, others variables, and different health variables. The statistical results of these variables for back, waist, neck, hand, wrist, shoulder pain and others are given in Table 20.

Looking at Table 20, it is seen that there is a statistically significant difference between the purpose of using the game console with pain in the back, waist, neck regions, but there is no significant difference in the other regions such as the hand, wrist and shoulder regions. On the other hand, when the statistical results were examined on the variables of eye health status, sleep duration and BMI, it was seen that there was a statistically significant difference only BMI. However, there was no statistical difference with the other variable like eye health status and sleep duration ($p>0,05$).

Table 20: Statistical Results of Students' Game Console Usage Purpose on Different Health Variables

1 – Less/No Pain, 2 – Painful, % – Row Percentage

Game Console	Back		Waist		Neck		Hand		Wrist		Shoulder	
Intended Use	1	2	1	2	1	2	1	2	1	2	1	2
Entertainment	109 (54%)	92 (46%)	132 (66%)	69 (34%)	90 (45%)	111 (55%)	172 (86%)	29 (14%)	160 (80%)	41 (20%)	130 (65%)	71 (35%)
Others	0 (0%)	7 (100%)	1 (14%)	6 (86%)	0 (0%)	7 (100%)	6 (86%)	1 (14%)	5 (71%)	2 (29%)	5 (71%)	2 (29%)
Total	208		208		208		208		208		208	
P	0,005**		0,005**		0,019**		0,0992		0,600		0,713	

Game Console Intended Use	Eye Health Problem		Sleep Time			BMI		
	Health y	Unhealt hy	Less 8	8 – 9	More 10	Under W.	Normal	Over W.
Entertainment	97 (48%)	104 (52%)	35 (17%)	159 (79%)	7 (3%)	36 (%18)	138 (69%)	27 (13%)
Others	5 (71%)	2 (29%)	0 (0%)	7 (100%)	0 (0%)	0 (0%)	3 (43%)	4 (57%)
Total	208		208			208		
p	0,228		0,400			0,005**		

4.4 To Examine the Relationship Between the Ownership of Technological Devices in The Homes Of Secondary School Students During Pandemic and Different Health Variables

Within the scope of the study, there are statistical analyzes according to the ownership of technological devices in their homes and different health variables of secondary school students studying during the pandemic process. In order to make this analysis, manageable within the scope of this study, the number of technological devices is defined as "1 or less" or "2 or more". Back, waist, neck, hand, wrist and shoulder pain conditions, eye health conditions, sleep durations and BMI were included as different health variables. In addition, it was examined whether there is a statistically significant difference between these variables and technological device ownership and different health variables.

4.4.1 The Effects of Number of Mobile Phones on Different Health Variables

The statistical results of the number of mobile phones at home and the different health variables of back, waist, neck, hand, wrist and shoulder pain status of secondary school students studying during the pandemic process are given in Table 21.

Looking at Table 21, it is seen that there is a statistically significant difference between the number of students having the mobile phone at home and pain only in the neck region, but there is no significant difference in the back, waist, hand, wrist and shoulder regions. Moreover, when the statistical results were examined on the variables of eye health status, sleep duration and BMI, it was seen that there was no statistical difference ($p>0.05$).

Table 21: Statistical Results of the Number of Students Having Cell Phones at Home on Different Health Variables

1 – Less/No Pain, 2 - Painful, % – Row Percentage

Having Number of Cell Phone	Back		Waist		Neck		Hand		Wrist		Shoulder	
	1	2	1	2	1	2	1	2	1	2	1	2
1 or Less	5 (83%)	1 (17%)	5 (83%)	1 (17%)	6 (100%)	0 (0%)	6 (100%)	0 (0%)	6 (100%)	0 (0%)	5 (83%)	1 (17%)
2 or More	104 (51%)	98 (49%)	128 (63%)	74 (37%)	84 (42%)	118 (58%)	172 (85%)	30 (15%)	159 (79%)	43 (21%)	130 (64%)	73 (36%)
Total	208		208		208		208		208		208	
p	0,124		0,315		0,004**		0,308		0,204		0,337	

Having Number of Cell Phone	Eye Health Problem		Sleep Time			BMI		
	Health y	Unhealt hy	Less 8	8 – 9	More 10	Under W.	Normal	Over W.
1 or Less	1 (17%)	5 (83%)	0 (0%)	6 (100%)	0 (0%)	1 (17%)	4 (67%)	1 (17%)
2 or More	101 (50%)	101 (50%)	35 (17%)	160 (79%)	7 (3%)	35 (17%)	137 (68%)	30 (15%)
Total	208		208			208		
p	0,107		0,458			0,992		

4.4.2 The Effects of Number of Computers on Different Health Variables

The statistical results of the number of computers at home and the different health variables of back, waist, neck, hand, wrist and shoulder pain status of secondary school students studying during the pandemic process are given in Table 22.

Looking at Table 22, it is seen that there is a statistically significant difference between the number of students having the computer at home and pain only in the neck regions, but there is no significant difference in the back, waist, hand, wrist and shoulder regions. In addition, when the statistical results were examined on the variables of eye health status, sleep duration and BMI, it was seen that only the variable of eye health status had a statistically significant difference, but there was no statistical difference with the other variables, the sleep duration variable and BMI ($p>0,05$).

Table 22: Statistical Results of the Number of Students Having Computer at Home on Different Health Variables

1 – Less/No Pain, 2 - Painful, % – Row Percentage

Having Number of Computer	Back		Waist		Neck		Hand		Wrist		Shoulder	
	1	2	1	2	1	2	1	2	1	2	1	2
1 or Less	21 (51%)	20 (49%)	26 (63%)	15 (37%)	24 (59%)	17 (41%)	39 (95%)	2 (5%)	35 (85%)	6 (15%)	30 (78%)	11 (22%)
2 or More	88 (53%)	79 (47%)	107 (64%)	60 (36%)	66 (40%)	101 (60%)	139 (83%)	28 (17%)	130 (78%)	37 (22%)	105 (63%)	62 (37%)
Total	208		208		208		208		208		208	
p	0,865		0,937		0,028**		0,052		0,287		0,216	

Having Number of Computer	Eye Health Problem		Sleep Time			BMI		
	Health	Unhealth	Less 8	8 – 9	More 10	Under W.	Normal	Over W.
	y	y						
1 or Less	13 (32%)	28 (68%)	5 (12%)	35 (85%)	1 (2%)	7 (17%)	27 (66%)	7 (17%)
2 or More	89 (53%)	78 (47%)	30 (18%)	131 (78%)	6 (4%)	29 (17%)	114 (68%)	24 (14%)
Total	208		208			208		
P	0,013**		0,613			0,909		

4.4.3 The Effects of Number of Televisions on Different Health Variables

Table 23 shows the statistical results of secondary school students studying during the pandemic, the number of televisions in their homes and the different health variables of back, waist, neck, hand, wrist and shoulder pain.

Looking at Table 23, it is seen that there is a statistically significant difference between the number of students having a television at home and the pain in the back, neck and wrist regions. However, there is no significant difference in the waist, hand and shoulder regions. On the other hand, when the statistical results were examined on the variables of eye health status, sleep duration and BMI, it was seen that there was a statistically significant difference with BMI, also there was no statistical difference with the other variables, eye health status and sleep duration ($p>0,05$).

Table 23: Statistical Results of the Number of Students Having Television at Home on Different Health Variables

1 – Less/No Pain, 2 - Painful, % – Row Percentage

Having Number of Television	Back		Waist		Neck		Hand		Wrist		Shoulder	
	1	2	1	2	1	2	1	2	1	2	1	2
1 or Less	45 (42%)	63 (58%)	64 (59%)	44 (41%)	38 (35%)	70 (65%)	89 (82%)	19 (18%)	79 (73%)	29 (27%)	64 (59%)	44 (41%)
2 or More	64 (64%)	36 (36%)	69 (69%)	31 (31%)	52 (52%)	48 (48%)	89 (89%)	11 (11%)	86 (86%)	14 (14%)	71 (71%)	29 (29%)
Total	208		208		208		208		208		208	
p	0,001**		0,144		0,004**		0,176		0,022**		0,337	

Having Number of Television	Eye Health Problem		Sleep Time			BMI		
	Health y	Unhealt hy	Less 8	8 – 9	More 10	Under W.	Normal	Over W.
1 or Less	53 (49%)	55 (51%)	15 (14%)	88 (81%)	5 (5%)	12 (11%)	77 (71%)	19 (18%)
2 or More	49 (49%)	51 (51%)	20 (20%)	78 (78%)	2 (2%)	24 (24%)	64 (64%)	12 (12%)
Total	208		208			208		
P	0,991		0,317			0,039**		

4.4.4 The Effects of Number of Tablets on Different Health Variables

Table 24 shows the statistical results of the number of tablets at home and the different health variables of back, waist, neck, hand, wrist and shoulder pain status of secondary school students studying during the pandemic process.

Looking at Table 24, it is seen that there is a statistically significant difference between the number of tablets found in the homes of the students and the pain in the waist and neck regions. However, when the statistical results were examined on the variables of eye health status, sleep duration and BMI, it was seen that there was no statistical difference ($p>0.05$).

Table 24: Statistical Results of the Number of Students Having Tablet at Home on Different Health Variables

1 – Less/No Pain, 2 – Painful, % – Row Percentage

Having Number of Tablet	Back		Waist		Neck		Hand		Wrist		Shoulder	
	1	2	1	2	1	2	1	2	1	2	1	2
1 or Less	18 (40%)	27 (60%)	18 (40%)	27 (60%)	13 (29%)	32 (71%)	42 (93%)	3 (7%)	31 (69%)	14 (31%)	27 (60%)	18 (40%)
2 or More	91 (56%)	72 (44%)	115 (71%)	48 (29%)	77 (47%)	86 (53%)	136 (83%)	27 (17%)	134 (82%)	29 (18%)	108 (66%)	55 (34%)
Total	208		208		208		208		208		208	
P	0,060		0,001**		0,028**		0,094		0,051		0,436	

Having Number of Tablet	Eye Health Problem		Sleep Time			BMI		
	Healthy	Unhealthy	Less 8	8 – 9	More 10	UnderW.	Normal	OverW.
1 or Less	18 (40%)	27 (60%)	4 (9%)	40 (89%)	1 (2%)	10 (22%)	29 (64%)	6 (4%)
2 or More	84 (52%)	79 (48%)	31 (19%)	126 (77%)	6 (4%)	26 (16%)	112 (69%)	25 (15%)
Total	208		208			208		
p	0,171		0,227			0,609		

4.4.5 The Effects of Number of Game Consoles on Different Health Variables

Table 25 shows the statistical results of secondary school students studying during the pandemic, the number of game consoles in their homes, and the different health variables of back, waist, neck, hand, wrist and shoulder pain.

Looking at Table 25, it is seen that there is a statistically significant difference in the number of students having a game console in their homes and pain in the back and waist regions. However, there is no significant difference in the neck, hand, wrist and shoulder regions. In addition, when the statistical results were examined on the variables of eye health status, sleep duration and BMI, it was seen that there was no statistical significance.

Table 25: Statistical Results of the Number of Students Having Game Console at Home on Different Health Variables

1 – Less/No Pain, 2 - Painful, % – Row Percentage

Having Number of Game Console	Back		Waist		Neck		Hand		Wrist		Shoulder	
	1	2	1	2	1	2	1	2	1	2	1	2
1 or Less	89 (48%)	96 (52%)	114 (62%)	71 (38%)	76 (41%)	109 (59%)	160 (86%)	25 (14%)	149 (81%)	36 (19%)	116 (63%)	69 (37%)
2 or More	20 (87%)	3 (13%)	19 (83%)	4 (17%)	14 (61%)	9 (39%)	18 (78%)	5 (22%)	16 (70%)	7 (30%)	19 (83%)	4 (17%)
Total	208		208		208		208		208		208	
p	0,001**		0,048**		0,071		0,290		0,220		0,059	

Having Number of Game Console	Eye Health Problem		Sleep Time			BMI		
	Health y	Unhea lthy	Less 8	8 – 9	More 10	Unde rW.	Normal	Over W.
1 or Less	88 (48%)	97 (52%)	29 (16%)	149 (81%)	7 (4%)	30 (18%)	127 (77%)	28 (4%)
2 or More	14 (61%)	9 (39%)	6 (26%)	17 (74%)	0 (0%)	6 (26%)	14 (61%)	3 (13%)
Total	208		208			208		
p	0,229		0,317			0,498		

4.5 To Examine The Relationship Between Different Health Variables of Gender and School Years of Secondary School Students During The Pandemic Process.

Within the scope of the study, statistical analyzes of the gender and school years of secondary school students studying during the pandemic process are included according to different health variables. In this analysis, back, waist, neck, hand, wrist and shoulder pain conditions, eye health conditions, sleep durations and BMI were included as different health variables along with gender and school years. With this review, it was examined whether there was a statistically significant difference between the variables of gender and grade levels on different health variables.

4.5.1 The Effects of Gender on Different Health Variables

The statistical results of the genders of the secondary school students studying during the pandemic process and the status of back, waist, neck, hand, wrist and shoulder pain, which are different health variables, are given in Table 26.

Looking at Table 26, it is seen that there is a statistically significant difference between the gender of the students and the pain in the back, waist, neck, hand, wrist and shoulder regions. When the statistical results were examined on the variables of eye health status, sleep duration and BMI, it was seen that these variables and the gender of the students were also statistically significant ($p>0.05$).

Table 26: Statistical Results on Different Health Variables of Students' Gender and Purpose of Use

1 – Less/No Pain, 2 – Painful, % – Row Percentage

Gender	Back		Waist		Neck		Hand		Wrist		Shoulder	
	1	2	1	2	1	2	1	2	1	2	1	2
Girl	72 (73%)	26 (27%)	76 (78%)	22 (22%)	52 (53%)	46 (47%)	90 (92%)	8 (8%)	89 (91%)	9 (9%)	83 (85%)	15 (15%)
Boy	37 (34%)	73 (66%)	57 (52%)	53 (48%)	38 (35%)	72 (65%)	88 (80%)	22 (20%)	76 (69%)	34 (31%)	52 (47%)	58 (53%)
Total	208		208		208		208		208		208	
p	0,001**		0,001**		0,007**		0,015**		0,001**		0,001**	

Gender	Eye Health Problem		Sleep Time			BMI		
	Healthy	Unhealthy	Less 8	8 – 9	More 10	UnderW.	Normal	OverW.
Girl	56 (57%)	42 (43%)	11 (11%)	81 (83%)	6 (6%)	11 (11%)	60 (61%)	27 (28%)
Boy	46 (42%)	64 (58%)	24 (22%)	85 (77%)	1 (1%)	25 (23%)	81 (74%)	4 (4%)
Total	208		208			208		
p	0,027**		0,020**			0,001**		

4.5.2 The Effect of Grade Levels on Different Health Variables

The statistical results of the grade levels and the different health variables of back, waist, neck, hand, wrist and shoulder pain status of secondary school students studying during the pandemic process are given in Table 27.

According to Table 27, it is seen that there is no statistically significant difference between the grade levels of the students and pain in any region. However, when the statistical results were examined on the variables of eye health status, sleep duration and BMI, it was seen that there was a statistically significant difference with the sleep duration variable and BMI, although there was no statistical significance eye health status.

Table 27: Statistical Results on Different Health Variables of Students' Grade Levels and Purpose of Use*1 – Less/No Pain, 2 – Painful, % – Row Percentage*

Grade Levels	Back		Waist		Neck		Hand		Wrist		Shoulder	
	1	2	1	2	1	2	1	2	1	2	1	2
5th Grade	15 (54%)	13 (46%)	17 (61%)	11 (39%)	14 (50%)	14 (50%)	23 (82%)	5 (18%)	22 (79%)	6 (21%)	20 (71%)	8 (29%)
6th Grade	16 (42%)	22 (58%)	25 (66%)	13 (34%)	11 (29%)	27 (71%)	36 (95%)	2 (5%)	32 (84%)	6 (16%)	25 (66%)	13 (34%)
7th Grade	39 (56%)	31 (44%)	45 (64%)	25 (36%)	30 (43%)	40 (57%)	57 (81%)	13 (19%)	53 (76%)	17 (24%)	45 (64%)	25 (36%)
8th Grade	39 (54%)	33 (46%)	46 (64%)	26 (36%)	35 (49%)	37 (51%)	62 (86%)	10 (14%)	58 (81%)	14 (19%)	45 (62%)	27 (38%)
Total	208		208		208		208		208		208	
p	0,567		0,980		0,209		0,279		0,756		0,866	

Grade Levels	Eye Health Problem		Sleep Time			BMI		
	Healthy	Unhealthy	Less 8	8 – 9	More 10	UnderW.	Normal	OverW.
5th Grade	15 (54%)	13 (46%)	2 (7%)	24 (86%)	2 (7%)	2 (7%)	16 (57%)	10 (36%)
6th Grade	23 (61%)	15 (39%)	1 (3%)	36 (94%)	1 (3%)	2 (5%)	29 (76%)	7 (18%)
7th Grade	31 (44%)	39 (54%)	10 (14%)	57 (81%)	3 (4%)	14 (20%)	49 (70%)	7 (10%)
8th Grade	33 (46%)	39 (54%)	22 (31%)	49 (68%)	1 (1%)	18 (25%)	47 (65%)	7 (10%)
Total	208		208			208		
P	0,367		0,004**			0,003**		

5. CONCLUSIONS, DISCUSSION, AND SUGGESTIONS

5. Conclusion, Discussion and Suggestions

In this thesis, the possible relationships between the use of technological devices in the pandemic process of secondary school students and different health variables were examined. For this purpose, it is aimed to compare the use of technological devices on different health variables and to examine the relationships between technology use variables and different health variables. Based on the results of these comparison, it is aimed to present data-based evidence about the ways that different technological devices and technology use should be followed according to different health variables.

In this section, in parallel with the order of the research questions, the results obtained from the findings for each research question are summarized under separate headings and discussed together with other studies in the literature. In the continuation, suggestions for future studies are listed from the conclusions drawn from the study. Thus, this section consists of three main parts: discussion, conclusion and recommendations.

The research was conducted to examine the possible relationships between the use of technological devices during the pandemic process of secondary school students and different health variables.

Quantitative method was preferred in the related research. At the beginning of the study, necessary permissions were obtained and the scale prepared to measure general demographic information, technological usage information, technological usage purposes, the number of technological devices in their homes, pain conditions, eye health problems and sleep duration were used.

In order to find an answer to the question of whether there is a possible relationship between the use of technological devices and different health variables, during the pandemic process, the student who participated in the research was given training on research applications.

The results for the findings are summarized, and the results for the findings related to each sub-problem are discussed in separate sections and as results related to the sub-problems one by one. National and international field papers addressing more relevant research questions are indicated. Finally, recommendations for practice and research are given.

5.1 Results and Discussion on Demographic Information

In the research, a three-part questionnaire was created to examine the effects of the use of technological devices on different health conditions of the students who participated in the study during the pandemic process. In the first part of the questionnaire, the personal information form of the students is included; such as their age, gender, height, weight, class level, eye health, chronic discomfort status, presence of technological devices at home and in the room, purposes of use of these devices, sleep duration, time to fall asleep, etc. health-related symptoms were questioned. In the second part, the Pain Rating Scale is included; musculoskeletal pains such as back, waist, neck, hand, wrist and shoulder were questioned. In the third part, there are the Technological Device Usage and Technological Device Usage Period Scale. In addition, findings regarding the availability of technological devices, health variables and other data are included.

When the ages of the students are considered, 9,6% of them are 10 years old, 18,3% are 11 years old, 29,8% are 12 years old, 26,4% are 13 years old, 15,6% are 14 years old and 0,5 of them are 15 years old. In addition, it is determined that the mean age of the related students is 12,21 and their standard deviation was 1,20.

Looking at the gender of the students, it is determined that 52,9% are female students and 47.1% are male students. According to these results, it is observed that most of the students participating students are female.

Considering the height of the students, 6,25% of the students are between 135-144 cm, 21,15% of them are between 145-154 cm, 42,30% of them are between 155-164 cm, 24,03% of them are 165-174 cm. Also, it is determined that 5,76% of them are between 175-184 cm

and 0.48% of them are between 185-194 cm. In addition, it is determined that the average height of the students is 159,72 and the standard deviation is 9,75.

When the weights of the students are examined, it is seen that 2,4% of them are between 25-34 kg, 30,76% of them are between 35-44 kg, 33,17% of them are between 45-54 kg, 22,59% of them are 55-64 kg. In addition, it is seen that 8,65% of them are between 65-74 kg, 1,92% are between 75-84 kg and 0,48% are over 85kg. In addition, the average weight of the students is 50,27 and their standard deviation is 10,68.

According to grade levels of the students, it is determined that 13,5% of them are in the 5th grade, 18,3% of them are in the 6th grade, 33,7% of them are in the 7th grade and 34,8% of them are in the 8th grade. With this information, it is examined that the majority of the students were at the 7th and 8th grade levels.

When the descriptive results of the students according to the presence of a technological device in their home are examined,

- Considering the number of students who have the television in their homes, it is found that 51,9% of the students had 1 or less, and 48,1% had 2 or more. As a result, it is concluded that most of the students had 1 TV or less at home.
- Considering the number of students who have the computer at home, it is found that 19,7% of the students had 1 or less, and 80,3% had 2 or more. As a result, it is concluded that most of the students have 2 or more computers at home.
- Also, when looking at the number of students who have tablets at home, it is found that 21,6% of the students had 1 or less, and 78,4% of them had 2 or more. It is concluded that most of his students had 2 or more tablets at home.
- On the other hand, when the number of students with a game console is examined, it is found that 88.9% of the students had 1 or less, and 11,1% had 2 or more. As a result, it is concluded that most of the students have no game console at home.

- Finally, when looking at the number of students with mobile phones, it is found that 2,9% of the students had 1 or less, and 97,1% had 2 or more. As a result, it is viewed that almost all of the students had 2 or more mobile phones at home.

When the descriptive results of the Health Variable Levels of the Students after Using Technological Devices According to the Severity of Back, Waist, Neck, Hand, Wrist and Shoulder Pains are examined,

- Firstly, When looking at back pain, it is seen that 52,4% of the students experienced little or no pain after the use of technological devices, and 47.6% of them had pain after the use of technological devices. As a result, it is concluded that most of the students have no or less severe pain problems in the back region after using technological devices.
- When looking at waist pain, it is seen that 63,9% of the students experienced little or no pain after the use of technological devices, and 36,1% of them had pain after the use of technological devices. Thus, it is concluded that the majority of the students experienced little or no pain in the waist region after using a technological device.
- On the other hand looking at neck pain, it is seen that 43,3% of the students experienced little or no pain after using a technological device, and 56,7% of them have pain after using a technological device. As a result, it is concluded that most of the students experienced pain in the neck region after using technological devices.
- According to hand pain, it is seen that 85,6% of the students experienced little or no pain after using a technological device, and 14,4% of them have pain after using a technological device. Thus, it is concluded that most of the students have no or less severe pain problems in the hand region after using a technological device.
- Moreover, looking at wrist pain, it is seen that 79,3% of the students experienced little or no pain after using a technological device, and 20,7% of them have pain after using

a technological device. As a result, it is concluded that the majority of the students experienced little or no pain in the wrist region after using a technological device.

- Finally, considering the shoulder pain, it is seen that 64,9% of the students experienced little or no pain after using a technological device, and 35,1% have pain after using a technological device. Therefore, it is concluded that the majority of the students have no or less severe pain problems in the shoulder region after using a technological device.

According to the eye health status of the students, it is determined that 51,0% have problem with their eyes and 49,0% have no problems with their eyes. It has been concluded that most of the students using technological devices have eye health problems. When the sleep duration results of the students are examined, it is determined that 16,8% slept less than 8 hours, 79,8% slept between 8-9 hours, and 3,4% slept more than 9 hours. According to this result, it is concluded that most of the students slept 8-9 hours.

Looking at the distribution of percentile BMI levels of the students, it is determined that 17,3% of them have underweight body mass index, 67,8% of them have normal body mass index and 14,9% of them have body mass index that was overweight. Considering these results, it is concluded that most of the students were of normal weight.

5.2 The results of the technological device usage time of secondary school students in the pandemic process on different health variables

The second objective of the study, the duration of technological device use of secondary school students in the pandemic process, was examined whether there was a significant difference on different health variables.

5.2.1 Results of Mobile Phone Usage Time on Different Health Variables and Discussion

In the study, it was examined whether there is a significant difference in the mobile phone usage time of secondary school students in the pandemic process according to different health variables. As a result of the data obtained according to this review, it was seen that no statistically significant difference was found in the variables of back pain, waist pain, wrist pain, shoulder pain, eye health, sleep time and BMI ($p > ,05$). On the other hand, a significant difference was found in the neck pain and hand pain variables of the related students ($p < ,05$). It is understood that there is a statistical relationship between the mobile phone usage time, neck pain and hand pain.

5.2.2 Results of Computer Usage Time on Different Health Variables and Discussion

In the study, it was researched whether there is a significant difference in the computer usage time of secondary school students in the pandemic process according to different health variables. As a result of the data obtained according to this review, no statistically significant difference was found in the variables of back pain, waist pain, neck pain, wrist pain, shoulder pain, eye health and sleep time ($p > ,05$). However, a significant difference was found in the hand pain and BMI variables of the related students ($p < ,05$). It is understood that there is a statistical relationship between the computer usage time, hand pain and BMI.

5.2.3 Results of Television Usage Time on Different Health Variables and Discussion

In the study, it was examined whether there is a significant difference in the television usage time of secondary school students in the pandemic process according to different health variables. As a result of the data obtained according to this review, it was observed that no statistically significant difference was found in the variables of waist pain, neck pain, hand pain, shoulder pain, eye health and BMI ($p > ,05$). However, a significant difference was found in the variables of back pain, wrist pain and sleep time of the related students ($p < ,05$). It is understood that there is a statistical relationship between the television usage time, back pain, wrist pain and sleep time.

5.2.4 Results of Tablet Usage Time on Different Health Variables and Discussion

In the study, it was examined whether there is a significant difference in the tablet usage time of students studying at the secondary school level during the pandemic process, according to different health variables. As a result of the data obtained according to this review, it was observed that no statistically significant difference was found in the variables of back pain, waist pain, wrist pain, shoulder pain, eye health, sleep time and BMI ($p > ,05$). However, a significant difference was found in the neck pain and hand pain variables of the related students ($p < ,05$). It is understood that there is a statistical relationship between tablet usage time, neck pain and hand pain.

5.2.5 Results of Game Console Usage Time on Different Health Variables and Discussion

In the study, it was examined whether there is a significant difference in the game console usage time of the students studying at the secondary school level during the pandemic process, according to different health variables. As a result of the data obtained according to this review, no statistically significant difference was found on wrist pain, eye health, sleep time and BMI variables ($p > ,05$). However, a significant difference was found in the variables of back pain, waist pain, neck pain, hand pain and shoulder pain of the related students ($p < ,05$). In this case, it is understood that there is a statistical relationship between the game console usage time, back pain, waist pain, neck pain, hand pain and shoulder pain.

5.3 The results of the usage purpose of the students studying at the secondary school level in the pandemic process according to the technological device types on different health variables

The third objective of the research, which is the usage purpose of the students studying at the secondary school level during the pandemic process, according to the types of technological devices was examined whether there is a significant difference on different health variables.

5.3.1 Results of Mobile Phone Usage Purpose on Different Health Variables and Discussion

In the study, it was examined whether there is a significant difference in the usage purpose mobile phones of secondary school students in the pandemic process according to different health variables. As a result of the data obtained according to this review, it was observed that no statistically significant difference was found in the variables of back pain, waist pain, neck pain, shoulder pain, eye health and BMI ($p > ,05$). However, a significant difference was found on hand pain, wrist pain and the sleep time variable of the related students ($p < ,05$). It is understood that there is a statistical relationship between the usage purpose of mobile phone and hand, wrist pains with sleep time.

5.3.2 Results of Computer Usage Purpose on Different Health Variables and Discussion

In the study, it was examined whether there is a significant difference in the usage purpose computer of secondary school students in the pandemic process according to different health variables. As a result of the data obtained according to this review, it was observed that no statistically significant difference was found in the variables of hand pain, wrist pain, shoulder pain, eye health, sleep time and BMI ($p > ,05$). However, a significant difference was found on the back pain, waist pain and neck pain variable of the related students ($p < ,05$). In this case, it is understood that there is a statistical relationship between the usage purpose of computer and neck, back, waist pain.

5.3.3 Results of Television Usage Purpose on Different Health Variables and Discussion

In the study, it was examined whether there is a significant difference in the usage purpose television of secondary school students in the pandemic process according to different health variables. As a result of the data obtained according to this review, it was observed that no statistically significant difference was found on waist pain, neck pain, hand pain, wrist pain, shoulder pain, eye health, sleep time and BMI variables ($p > ,05$). However, a significant

difference was only found on the variable back pain of the related students ($p < ,05$). In this case, it is understood that there is a statistical relationship between the usage purpose of back pain.

5.3.4 Results of Tablet Usage Purpose on Different Health Variables and Discussion

In the study, it was examined whether there is a significant difference in the usage purpose tablet of secondary school students in the pandemic process according to different health variables. As a result of the data obtained according to this review, it was observed that no statistically significant difference was found in the all variables of back pain, waist pain, neck pain, hand pain, wrist pain, shoulder pain, eye health, sleep duration and BMI ($p > ,05$). In this case, it is understood that there is no statistical relationship between the usage purpose of all variables like back pain, waist pain, neck pain, hand pain, wrist pain, shoulder pain, eye health, sleep duration and BMI.

5.3.5 Results of Game Console Usage Purpose on Different Health Variables and Discussion

In the study, it was examined whether there is a significant difference in the usage purpose game console of secondary school students in the pandemic process according to different health variables. As a result of the data obtained according to this review, no statistically significant difference was found in hand pain, wrist pain, shoulder pain, eye health and sleep time variables ($p > .05$). However, a significant difference was found in the variables of back pain, waist pain, neck pain and BMI of the related students ($p < ,05$). In this case, it is understood that there is a statistical relationship between the usage purpose of the game console and back pain, waist pain, neck pain and BMI.

5.4 Results of the relationship between the ownership of technological devices in the homes of secondary school students in the pandemic process on different health variables

The fourth objective of the research, the secondary school level students in the pandemic process, has been examined whether there is a significant difference between the ownership of technological devices in their homes and different health variables.

5.4.1 Results of Number of Mobile Phone on Different Health Variables and Discussion

In the study, it was examined whether there is a significant difference according to the ownership of the mobile phone technological device in the home of the students studying at the secondary school level during the pandemic process. As a result of the data obtained according to this review, it was seen that no statistically significant difference was found in the variables of back pain, waist pain, hand pain, wrist pain, shoulder pain, eye health, sleep time and BMI ($p > ,05$). However, a significant difference was found only on the neck pain variable of the related students ($p < ,05$). It is understood that there is a statistical relationship between the number of mobile phones in their homes and neck pain

5.4.2 Results of Number of Computer on Different Health Variables and Discussion

With this study, it was examined whether there is a significant difference according to the ownership of a computer technological device in the home of the students studying at the secondary school level during the pandemic process. As a result of the data obtained according to this review, it was seen that no statistically significant difference was detected on back pain, waist pain, hand pain, wrist pain, shoulder pain, sleep time and BMI variables ($p > .05$). However, a significant difference was found in the variables of eye health and neck pain of the students concerned ($p < ,05$). It is understood that there is a statistical relationship between the number of computers in their homes and neck pain and eye health problems.

5.4.3 Results of Number of Television on Different Health Variables and Discussion

In the study, it was examined whether there is a significant difference according to the ownership of the television technological device in the home of the students studying at the secondary school level during the pandemic process. As a result of the data obtained according to this review, it was seen that no statistically significant difference was found on the variables of waist pain, hand pain, shoulder pain, eye health and sleep time ($p > .05$). However, a significant difference was found on the back pain, neck pain, wrist pain and BMI variables of the students concerned ($p < .05$). It is understood that there is a statistical relationship between the number of televisions in their homes, neck pain and BMI.

5.4.4 Results of Number of Tablet on Different Health Variables and Discussion

In the study, it was examined whether there is a significant difference according to the ownership of a tablet technological device in the home of the students studying at the secondary school level during the pandemic process. As a result of the data obtained according to this review, it was seen that no statistically significant difference was detected on the variables of back pain, hand pain, wrist pain, shoulder pain, eye health, sleep time and BMI. ($p > .05$). However, a statistically significant difference was found on the waist pain and neck pain variables of the students concerned ($p < .05$). It is understood that there is a statistical relationship between the number of tablets in their homes and low back pain and neck pain.

5.4.5 Results of Number of Game Console on Different Health Variables and Discussion

In the research, it was examined whether there is a significant difference according to the ownership of the game console technological device in the home of the students studying at the secondary school level during the pandemic process. As a result of the data obtained according to this review, it was seen that no statistically significant difference was detected on neck pain, hand pain, wrist pain, shoulder pain, eye health, sleep time and BMI variables. ($p > .05$). However, a statistically significant difference was found in the variables of back pain and waist pain of the related students ($p < .05$). In this case, it is understood that there is

a statistical relationship between the number of having a game console in their home and back pain and waist pain.

5.5 The results of the gender and class levels of the students studying at the secondary school level during the pandemic process on different health variables

The fifth objective of the study, the gender and class levels of the students studying at the secondary school level during the pandemic process, was examined whether there was a significant difference on different health variables.

5.5.1 Results of Gender on Different Health Variables and Discussion

In this study, it was examined whether there was a significant difference according to the gender of the students studying at the secondary school level during the pandemic process. As a result of the data obtained, a significant difference was found on the variables of all pain area (back pain, waist pain, neck pain, hand pain, wrist pain, shoulder pain), eye health, sleep time and BMI ($p < ,05$). It is understood that there is a statistical relationship between the gender of the students and of all pain area (back pain, waist pain, neck pain, hand pain, wrist pain, shoulder pain), eye health problem, sleep time and BMI.

5.5.2 Results of Grade Levels on Different Health Variables and Discussion

In the results, it was examined whether there was a significant difference according to the grade levels of the students studying at the secondary school level during the pandemic process. As a result of the data obtained, no significant difference was found on the variables all pain area (back pain, waist pain, neck pain, hand pain, wrist pain, shoulder pain) and eye health. However, a significant difference was found on the sleep time and BMI variables of the related students ($p < ,05$). It is understood that there is a statistical relationship between students' grades, sleep time and BMI.

Considering the relationship and findings between the use of technological devices and other health variables, it can be interpreted that there are some findings that do not comply with

the literature in the results of the study, which were found to be statistically significant, but that it is varied depending on the types of technological devices.

The literature review was conducted for this research on the possible relationships between the use of technological devices in the pandemic process of secondary school students and different health variables. When the studies in the literature are examined, it is seen that there are many studies on the use of technological devices. however, during the pandemic period, it was seen that the number of literature on this subject was almost non-existent.

When the literature is searched, the results found support our studies on the use of technological devices. As a result of the studies, it has been observed that long-term use of the mobile phone causes problems such as insomnia, eye problems, back pain, pain in the hand, pain in the neck (156). In addition, in the study conducted by Günel and Pekçeti, studies were conducted that determined that there was pain in the hand and wrist regions due to the increase in the duration of mobile phone use (157). In addition, Yang et al. (158) examined the relationship between mobile phone use and musculoskeletal system problems of adolescents, and showed that the participants had neck and shoulder problems, and this situation was related to the length of time they used smartphones in the literature. The literature reviews support this research. As a result of this study, it was concluded that mobile phone use was associated with neck pain, hand pain and sleep duration.

In a review article published by Bilgin and Holly (159), it was reported that the risk of developing discomfort in the neck, shoulders, back and hands increases as the time spent in front of the computer increases, and it can increase musculoskeletal symptoms from moderate to severe. In addition, the main health problems associated with computer use; it has been observed that there are studies on eye health problems and problems related to the musculoskeletal system. It is also stated that the health problems seen in computer users are related to the duration of computer use. Finally, in a study investigating the relationship between computer use and musculoskeletal disorders, half of the 6th grade students reported that they experienced discomfort in at least one part of their body and that they experienced it most commonly in the neck, back and shoulder regions (160). As a result of this research,

it was found that computer use was associated with neck pain, hand pain, eye health status and BMI.

Regarding television use, there are many studies in the literature showing that as television viewing time increases, sleep duration decreases (161). In addition to this research, the increase in the time spent in front of the television in children disrupts their sleep patterns and changes their sleeping habits (23,24). Cespedes et al. (162) revealed that increasing television viewing time reduced sleep time. In addition to these studies, it has been determined that most of the children have health problems when they watch television for a long time and these health problems are seen in the eyes, sleep pattern, neck region, back region and waist region (163). Moreover, Proctor MH et al. (102) that included older children and young people, it was reported that there was a significant relationship between the increase in television viewing hours and the increased risk of obesity. As a result of this research, it was seen that television use was associated with back pain, neck pain, hand pain, wrist pain, sleep duration and BMI. As a result, the results of the literature review on television use and the results of this research support each other.

In addition, according to the data obtained from some studies, there are studies in which there is a significant relationship between long-term tablet use and physical discomfort, especially in the neck and shoulders. As the time spent by school-age children with mobile phones and tablets increases, there are studies that have determined the frequency of treatment for headache, neck pain and shoulder pain. (164). It has been concluded that playing digital games, mostly on tablets, may cause physical health problems such as musculoskeletal system problems, eye health problems and decrease in sleep quality in body parts such as the spine and wrist. In addition, the research has been found that the use of tablets causes muscle pain in the neck muscles of children. (165). In this study, it was seen that the use of tablets was associated with low back pain, neck pain, hand pain and sleep times and was in line with the literature studies mentioned above.

In the literature review on the game console, in a study conducted on children, it was concluded that the physical complaints associated with the game console increased. It was

observed that such complaints were hand pain, wrist pain, back pain and neck pain. As a result of this research, it was seen that game console use was associated with back pain, low back pain, neck pain, hand pain, shoulder pain, eye health status and BMI variables. It is clearly seen that the results of this study and the results of similar studies in the literature support each other.

In a newly published review investigating the negative effects of using digital technology on children's development and health, it was reported that children's use of digital technology devices for an inappropriate time and frequency may lead to health problems such as musculoskeletal system problems, lack of physical activity, inadequate sleep quality and obesity (166). In this study, it was found that there is a relationship with pain in at least two parts of the human body as a result of using technological devices. Looking at this relationship, it is thought that musculoskeletal problems may arise as a result of students' use of technological devices. In addition, when it is looked at the relationship between technological device use and eye health, it is considered that eye health problems may occur in students who use computers and game consoles. When the sleep duration, which is another health variable, is examined in the research, the results have emerged that the use of mobile phones, television and tablet devices affects sleep duration. Looking at the BMI variable, which is the last health variable of the research, it was concluded that technological devices such as computers, televisions and game consoles affect the weight status of the students.

Advances in the world of technology not only provide many benefits in the lives of societies, but also negatively affect society and human health. (167). It is noteworthy that young people who are addicted to technological devices in a short time can experience various health problems while making uncontrolled use of the opportunities provided by technology (168).

The ongoing epidemic process has necessitated very serious changes in human life. Students and teachers could not go to school and people began to spend more time at home. This situation has made it compulsory to provide education with technology-based distance education tools. This means that starting from primary school to high school, students and teachers spend a lot of time on technological devices in this period. Due to such reasons,

technological tools have become an indispensable element in the life of the society during the epidemic period (31). In a study, it was reported that the use of technological devices by children for inappropriate duration, frequency and different postures causes many different health problems such as sleep disturbances (169), increased risk of obesity, unhealthy eating behaviors, musculoskeletal system problems (170).

In line with the findings obtained in these studies, it is of great importance to raise awareness of the society and families in order to minimize the different health problems that may occur during the use of technological devices. In addition, families should be conscious and knowledgeable so that their children do not spend more time with technological devices and are not exposed to some physical and mental negative effects.

The research was conducted for secondary school students in the Beşiktaş district of province Istanbul. It can be done in secondary schools in and outside the in the Beşiktaş district of province Istanbul and by expanding the sample group. For future studies, studies investigating different variables of technological device use, internet and computer game addiction on both students and public health after the pandemic is over can be included.

5.6 Suggestion

In this section, taking into account the findings of the research, suggestions are given in order to guide the future researches:

Parents should be aware of their duties and responsibilities to ensure that their children use technology without excessive use within the specified time intervals and to provide a balance between other activities. Also, parents should not guide their children in the use of technological devices and should not allow them to use them unsupervised. Technological devices should not be kept in children's bedrooms for situations that parents cannot control.

In order to reduce the physical problems of students due to the use of technological devices, it is of great importance to teach ergonomic usage skills appropriate to their age and level. Moreover, the students at school should be given training on the correct use of technology. It is necessary to provide trainings to raise awareness for families to participate in social activities with their children and spend time with them.

It is important to raise awareness of working families about evening and weekend activities where they can spend time with their children. Also, families should minimize their children's bad habits and raise awareness of the problems related to the use of technological devices that may adversely affect their health, well-being and social development. To address all these, they need to cooperate with health professionals.

5.7 Limitations Of The Study

The study is limited to secondary school students studying in Beşiktaş district of Istanbul in the 2020-2021 academic year. It is limited to students studying in private schools only.

The validity of the data obtained is limited to the accuracy of the answers given to the survey questions by the families of the participants. The findings of the study are limited to the data in the questionnaire form. This situation cannot reveal the relationship between different health parameters evaluated and different causes.

In the research, all the courses of the students at the secondary school were taught through distance education.

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7. APPENDICES

7.1 Ethical Approval



Sayı : 37068608-6100-15- 2095
Konu: Klinik Araştırmalar
Etik Kurul Başvurusu hk.

18/02/2021

İlgili Makama (Duygu Şengezer)

Yeditepe Üniversitesi Tıp Fakültesi Halk Sağlığı AD. Dr. Öğr. Üyesi Hale Arık Taşyikan'ın sorumlu araştırmacı olduğu "**Pandemi Sürecindeki Ortaokul Öğrencilerinin Teknolojik Cihaz Kullanımının Farklı Sağlık Değişkenleri Üzerinden Etkisi**" isimli araştırma projesine ait Klinik Araştırmalar Etik Kurulu (KA EK) Başvuru Dosyası (2084) kayıtlı Numaralı KA EK Başvuru Dosyası, Yeditepe Üniversitesi Klinik Araştırmalar Etik Kurulu tarafından 17.02.2021 tarihli toplantıda incelenmiştir.

Kurul tarafından yapılan inceleme sonucu, yukarıdaki isim belirtilen çalışmanın yapılmasının etik ve bilimsel açıdan uygun olduğuna karar verilmiştir. (KA EK Karar No:1383)

Prof. Dr. Turgay Çelik

Yeditepe Üniversitesi
Klinik Araştırmalar Etik Kurul Başkanı

7.2 Curriculum Vitae

Özgeçmiş

Kişisel Bilgiler

Adı	DUYGU	Soyadı	ŞENGEZER
Doğum Yeri	-	Doğum Tarihi	-
Uyruğu	-	TC Kimlik No	-
E-mail	-	Tel	-

Öğrenim Durumu

Derece	Alan	Mezun Olduğu Kurumun Adı	Mezuniyet Yılı
Doktora	-	-	-
Yüksek Lisans	HALK SAĞLIĞI	YEDİTEPE ÜNİVERSİTESİ	-
Lisans	SAĞLIK YÖNETİMİ	ANADOLU ÜNİVERSİTESİ	-
Lisans	HEMŞİRELİK	YEDİTEPE ÜNİVERSİTESİ	-
Lise	-	-	-

Bildiği Yabancı Dilleri	Yabancı Dil Sınav Notu (#)
-	-

İş Deneyimi (Sondan geçmişe doğru sıralayın)

Görevi	Kurum	Süre (Yıl – Yıl)
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

Görev Aldığı Projeler/Sertifika/Ödülleri

Pedagojik Formasyon Sertifika Programı
Diğer Sağlık Personeli (İş Yeri Hemşireliği)
Aile Danışmanlığı Sertifika Programı
Çocuk ve Projectif Değerlendirme Eğitimi
Tek Boyutlu Ağrı Ölçeklerinin Duyarlılığı ve Etkileyen Faktörler Lisans Tezi

7.3 Survey Form Printed

Anket No: _____

Okul Adı: _____

Tarih: _____

Bu anket uygulaması bir tez çalışması için yapılmaktadır. Toplam dört sayfadan oluşan bu veri formunu doldurulma süresi ortalama 10 dakikadır. Ankette bulunan soruları okuyup düşündükten sonra size en uygun cevapları işaretleyiniz. Kişisel bilgileriniz hiçbir şekilde kullanılmayacak olup veriler sadece bilimsel çalışmada değerlendirilecektir. Araştırmaya katılımınız için teşekkür ederiz.

1. Sınıfınız:
2. Cinsiyetiniz A. Kız B. Erkek
3. Doğum tarihiniz: (Yıl)
4. Kilonuz (kg)
5. Boyunuz (cm)
6. Gözlük kullanıyor musunuz?
A. Evet B. Hayır
7. Herhangi bir kronik hastalığınız varsa yazınız?
A. Yok B. Var ise
8. Evinizde hangi teknolojik cihazlar bulunmaktadır? *(Birden çok seçenek işaretleyebilirsiniz)*
A. Televizyon adet
B. Bilgisayar (Dizüstü, Masaüstü) adet
C. Tablet adet
D. Oyun Konsolu adet
E. Cep Telefonu (Akıllı Telefon) adet
9. Evinizde kendinize ait odanız varsa, odanızda hangi teknolojik cihazlar bulunmaktadır? *(Birden çok seçenek işaretleyebilirsiniz)*
A. Kendime ait odam yok
B. Televizyon
C. Bilgisayar (Dizüstü, Masaüstü)
D. Tablet
E. Oyun Konsolu
F. Cep Telefonu (Akıllı Telefon)
10. Aşağıdaki soruları kullanım amacına en uygun olan cevabı daire içine alarak yanıtlayınız.

Teknolojik Cihaz Kullanım Amacı	Eğlence	Kitap Okuma	İletişim	Sanal Sınıf Derslerinde
Televizyon	1	2	3	4
Bilgisayar	1	2	3	4
Tablet	1	2	3	4
Oyun Konsolu	1	2	3	4
Cep Telefonu	1	2	3	4

11. Aşağıdaki soruları kullanım sürenize en uygun olan cevabı daire içine alarak yanıtlayınız.

Ders ile ilgili Teknolojik Cihaz Kullanımı	Kullanmıyorum	1 saatten az	1-2 saat	3-4 saat	4 saatten fazla
<i>Pandemi Öncesi Bölümü</i>					
a. Pandemi öncesi günde ortalama ne kadar süre ders amaçlı teknolojik cihaz kullanıyorsunuz?	1	2	3	4	5
b. Pandemi öncesi günde ortalama ne kadar süre ders dışı teknolojik cihaz kullanıyorsunuz?	1	2	3	4	5
<i>Pandemi Sonrası Bölümü</i>					
c. Pandemi sonrası günde ortalama ne kadar süre ders amaçlı teknolojik cihaz kullanıyorsunuz?	1	2	3	4	5
d. Pandemi sonrası günde ortalama ne kadar süre ders dışı teknolojik cihaz kullanıyorsunuz?	1	2	3	4	5

Pandemi Sonrası Günde Ortalama Teknolojik Cihaz Kullanım Süreleri	Kullanmıyorum	1 saatten az	1-2 saat	3-4 saat	4 saatten fazla
e. Günde ortalama ne kadar süre cep telefonu (akıllı telefon) kullanıyorsunuz?	1	2	3	4	5
f. Günde ortalama bilgisayar (dizüstü veya masaüstü) kullanma süreniz ne kadardır?	1	2	3	4	5
g. Günde ortalama televizyon izleme süreniz ne kadardır?	1	2	3	4	5
h. Günde ortalama ne kadar süre tablet kullanıyorsunuz?	1	2	3	4	5
i. Oyun konsolunuz varsa günde ortalama ne kadar süre oyun oynuyorsunuz?	1	2	3	4	5

12. Günde ortalama kaç saat uyuyorsunuz? (Son 15 gün içinde)

- A. 6 saatten az
- B. 6-7 saat
- C. 8-9 saat
- D. 10 saat ve üzeri

13. Yatağa yatmanız ile uykuya dalmanız arasında geçen süre ortalama ne kadardır? (Son 15 gün içinde)

- A. 5 dakikadan az
- B. 5-10 dakika
- C. 10-20 dakika
- D. 20 dakika ve üzeri

14. Son 15 gün içinde teknolojik cihaz kullandıktan sonra ağrı, sızı veya rahatsızlık hissettiniz mi?
Varsa ağrı şikayetinizin şiddeti hakkında ilgili alana 0 (*Hiç ağrı yok*) ile 10 (*dayanılmaz şiddette ağrı var*) arasında işaretleme yapınız?

A. Hayır B. Evet

A. Sırt	Ağrı Yok 0 1 2 3 4 5 6 7 8 9 10 Ağrı Var
B. Bel	Ağrı Yok 0 1 2 3 4 5 6 7 8 9 10 Ağrı Var
C. Boyun	Ağrı Yok 0 1 2 3 4 5 6 7 8 9 10 Ağrı Var
D. El	Ağrı Yok 0 1 2 3 4 5 6 7 8 9 10 Ağrı Var
E. Bilek	Ağrı Yok 0 1 2 3 4 5 6 7 8 9 10 Ağrı Var
F. Omuz	Ağrı Yok 0 1 2 3 4 5 6 7 8 9 10 Ağrı Var

15. Yaşadığınız ağrı, sızı veya rahatsızlıklar sizin davranışlarınızı nasıl etkiliyor ?

- A. Etkilemiyor
B. Günlük aktivitelere katılmamı sınırılıyor
C. İlaç kullanmama neden oluyor
D. Sağlık kuruluşuna başvurmama neden oluyor
E. Diğer (.....)

16. Göz sağlığı problemi (*uzak yada yakın görmeye sorun, bulanık görme, göz kuruluğu, gözlerde kızarma, kaşınma*) yaşıyor musunuz?
A. Evet B. Hayır C. Evet ise yukarıdakilerden hangileri
17. Okulda ve evde derslerle ilgili aktivitelerde dikkat dağınıklığı, hatırlamada güçlük, odaklanamama gibi sorunlar yaşıyor musunuz?
A. Evet B. Hayır C. Evet ise yukarıdakilerden hangileri
18. Teknolojik cihaz kullanırken ya da sonrasında aşağıdaki şikayetlerden hangisini yaşıyorsunuz? (*Birden çok seçeneğe işaretleyebilirsiniz*)
A. Baş dönmesi
B. Mide bulantısı
C. Baş ağrısı
D. Herhangi bir şikayet yok
E. Diğer (.....)
19. Düzenli spor-egzersiz yapıyorsanız, haftada kaç gün ve haftalık toplam ne kadar süre yapıyorsunuz? (*Son 15 gün içinde*)
A. Spor – egzersiz yapmıyorum
B. 1 gün toplam dakika
C. 2-3 gün toplam dakika
D. 4-5 gün toplam dakika
E. 6-7 gün toplam dakika
20. Aşağıdaki soruları kullanım sürenize en uygun olan cevabı daire içine alarak yanıtlayınız.
1. Hiçbir zaman 2. Nadiren 3. Ara sıra 4. Sıklıkla 5. Her zaman

	Hiçbir zaman	Nadiren	Ara sıra	Sıklıkla	Her zaman
a. Kendinizi ne sıklıkla yorgun hissediyorsunuz? (<i>son 15 gün içinde</i>)	1	2	3	4	5
b. Teknolojik cihaz kullanırken sosyal işlerinizi (<i>evdeki görevler, ders çalışmayı vb.</i>) aksatıyor musunuz?	1	2	3	4	5
c. Teknolojik cihazlardan uzaklaştığınızda endişe, stres, yalnızlık hissi gibi duygulara kapılıyor musunuz?	1	2	3	4	5
d. Beslenme alışkanlığıyla ilgili, öğün atlar mısınız?	1	2	3	4	5
e. Sağlığınızla ilgili bilgi edinmek, sağlık problemlerinizi çözmek için interneti kullanır mısınız?	1	2	3	4	5
f. Akıllı telefonunuzu sağlık – egzersiz amaçlı kullanır mısınız?	1	2	3	4	5

20. Annenizin eğitim durumu nedir?
A. Okuma-Yazma Bilmiyor C. Lise Mezunu
B. İlkokul Mezunu D. Üniversite Mezunu
21. Babanızın eğitim durumu nedir?
A. Okuma-Yazma Bilmiyor C. Lise Mezunu
B. İlkokul Mezunu D. Üniversite Mezunu
22. Anne ve babanızın çalışma durumu açısından size uygun olan seçeneği işaretleyiniz.
A. Anne ve baba çalışıyor B. Anne çalışıyor, baba çalışmıyor
C. Anne çalışmıyor, baba çalışıyor D. Her ikisi de çalışmıyor

