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**THE EFFECTS OF THE COVID-19 PANDEMIC ON THE MENTAL HEALTH OF
UNIVERSITY STUDENTS IN THE FIELD OF HEALTH AND RELATED
FACTORS: A WEB-BASED CROSS-SECTIONAL STUDY HEALTH STUDENT IN
THE PANDEMIC**

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ABSTRACT

Aim: The aim of the study is to evaluate the knowledge, attitudes, behaviors and anxiety of university students about the Covid-19 epidemic at the beginning of the Covid-19 pandemic.

Material and Methods: The study is a cross-sectional study. The sample consists of 1243 health students. The data were collected through an online questionnaire consisting of three parts. The questionnaire included questions to assess the socio-demographic characteristics of students, their level of knowledge, awareness and behavior about the Covid-19 pandemic, and the impact of the epidemic on their psychological health. The GAD-7 scale was used to assess students' anxiety levels.

Results: In this study; 79.60% of the Health Care Students (HCSs) did not attend any training on COVID-19. Their sources of information were internet/social media (97.18%) and TV (97.18%). In the COVID-19 knowledge assessment test, it was found that 65.7% of them had a high level of knowledge. Most of HCSs thought that their knowledge about COVID-19 was very good (55%). The correct answer means of the 31 questions on the COVID-19 knowledge questionnaire were 22.07 ± 1.70 . In this questionnaire, it stated that the most effective methods of protection were the use of a mask in crowded environments (99.1%). Most of the HCSs stated that outbreak was affected their mental health negatively (73.1%) and some of them named this state as "Coronaphobia" (33.2%). In this study was found that some HCSs have a generalized anxiety disorder (22.6%) and anxiety experienced due to COVID "completely affected" their lives (19.5%). The average knowledge score of the students who received applied training in the hospital at the beginning of the pandemic (22.29 ± 1.58) and anxiety level of students (6.77 ± 5.85) was higher than those who did not receive applied training in the hospital (5.84 ± 5.47 , $p < 0.05$). The GAD-7 scores for those with a previous diagnosis of psychological disease were 2 times higher than those without a previous diagnosis ($p < 0.05$)

Conclusion: At the beginning of the pandemic, students who received hands-on training at the hospital had higher knowledge and awareness levels. Generalized Anxiety Disorder was observed more frequently in those with a previous psychological disorder than in other students.

Keywords: Anxiety; coronavirus disease 2019 (covid-19); knowledge; health students; pandemic and mental health

INTRODUCTION

In the literature, it has been reported that sufficient information and awareness about infectious diseases are important in taking preventive measures in pandemic. Also identifying and informing at an early stage, developing a positive attitude towards the COVID-19 pandemic, and implementing protective health behaviors are important steps in preventing other epidemic attacks that will continue during the pandemic.(Gajdács, Paulik, & Szabó, 2020) Pandemics are not only a medical phenomenon, but also a social phenomenon that affects physical and mental health.(*World Health Organization Coronavirus disease (COVID-19) Situation Report-149*, 2020) The uncertainty about when the pandemic will be controlled, the unpredictability of what it brings, causes an increase in the stress level in the society. Incomplete and inaccurate knowledge causes the anxiety among the masses to increase. This may also trigger common mental disorders such as anxiety and depression in individuals.(Dar, Iqbal, & Mushtaq, 2017) Recent evidence asserts that individuals in isolation and quarantine experience significant distress in the form of anxiety, and post-traumatic stress symptoms.(Brooks et al., 2020) The mental health issues are other major health apprehensions that are expected to increase day by day during the epidemic (Roy et al., 2020).

Social isolation and quarantine measures in workplaces, employment, and education have caused increases many mental health problems such as anxiety, depression, stress, especially among university students who make up a large part of the society (Alahmadi, 2019). In the literature, it has been proven that infectious diseases such as Severe Acute Respiratory Syndrome and Middle East Respiratory Syndrome, which erupted in recent years, create anxiety, and especially in students who are educated in the field of health and go to hospital for practice (Khalid, Khalid, Qabajah, Barnard, & Qushmaq, 2016). In the study by Wang et al. (2019), it was found that the psychological effect of the epidemic and the levels of anxiety, and depression were high in students (Wang et al., 2020). Experience from previous outbreaks has revealed that individuals' knowledge, attitudes, and behaviors are important to control the spread of the virus. It is important to determine the impact of the epidemic on the health care

students (HCS) who are being educated on this field, go to hospital and attend field practices, and come into contact with patients, and their knowledge, awareness, and protective behaviors. This study was aimed to examine the knowledge, awareness, psychological health, anxiety levels of HCSs who participated in field and hospital practices during the pandemic period, and the variables associated with them. Accordingly, the answers to the following questions were sought: (1)What is the level of knowledge of the HCSs who are in the hospital practice in the pandemic about coronavirus and the pandemic? (2)What are the impact and anxiety level of the pandemic on the mental health of HCSs? (3) What are the factors associated with the level of knowledge about the coronavirus, and the anxiety experienced?

MATERIAL AND METHODS

Study design/setting

A cross-sectional and relational questionnaire design was used in the study. It was carried out in the first weeks (30 March-10 April) of the COVID-19 pandemic in Turkey and the university education and training were suspended after this period. HCSs from 6 departments of Health Services Vocational School (Elderly Care/In-home Patient Care/First and Emergency Aid/Medical Promotion and Marketing/Medical Documentation and Secretariat/Physiotherapy) were included in the study. There were 1400 HCSs actively studying at the college. Prior to the current study, a questionnaire was developed using Google Forms. The questionnaire was shared in the WhatsApp groups of the departments that are involved in active training and participating hospital applications. 1243 HCSs participating in the study constitute 88.78% of the whole population.

Study Instruments

Questionnaire Form: The survey consisted of three parts and prepared by the researchers through scanning the literature. In the first part, socio-demographic characteristics and effects of COVID-19 infection (14 questions) were questioned. In the second part, the level of knowledge about COVID-19 was evaluated using 31 questions in the form of "True/False/I don't know" on the following topics: COVID-19 symptoms, incubation period, ways of transmission, effective methods of prevention, risky groups, treatment, and social awareness. 2 of the information questions in the survey were wrong. Therefore, the total maximum score was 31 and the minimum score was 2 for the survey. 2-11 refers to a low level of knowledge, 12-21 to a medium level of knowledge, and 22-31 to a high level of knowledge. There are a total of 10 questions to determine awareness. The behaviors developed for the protection against the

COVID-19 pandemic were evaluated using 10 items. In the third part, questions were used to evaluate the impact of the COVID-19 outbreak on psychological health.

The Generalized Anxiety Disorder-7 (GAD-7) Scale: It was used to evaluate the anxiety that the HCSs experienced due to coronaviruses and pandemic. GAD-7 is a 7-item 4-point Likert scale (0=never/1=many days/2=more than half of the days/3=almost every day) that evaluates the experiences in the last 2 weeks. The cut-off points for the total scale score are 5 (mild anxiety), 10 (moderate anxiety), and 15 (severe anxiety). Patients with a total score of 10 or more should be investigated and confirmed by other methods of GAD diagnosis. The score classification of the scale is as follows: 0-4=minimal anxiety, 5-9=mild anxiety, 10-14=moderate anxiety, and >15=severe anxiety.(Konkan et al., 2013) A score of 10 and above on the scale was accepted as "have anxiety".

Ethics Committee Approval

Permissions were obtained from Ethics Committee of University (Decision Number:2020-SBB-0040) for the implementation of the study. The informed consent of the participants was obtained with brief information at the beginning of the online survey.

Informed Consent: Informed consent was obtained from the study participants.

Statistical Analysis

The analysis of the data was carried out using IBM-SPSS 25.00 statistics program. The dependent variables in the study were the knowledge about COVID-19 infection and the level of anxiety experienced. The independent variables were age, gender, duration of study, level of knowledge about COVID-19 and how they assess their anxiety, their status in clinical practice at the onset of COVID-19, and participation in training on COVID-19. Normality of the data was tested using visual (histogram and probability graphs) and analytical methods (Kolmogorov-Smirnov test/Shapiro-Wilk test). The descriptive statistics were expressed in number, percentage, mean and standard deviation. In order to compare the mean scores for the scale, t-test and One-Way ANOVA were used in the independent groups. The statistical significance was set at $p < 0.05$.

RESULTS

Sociodemographic Profile

According to Table-1; 74.1% (n:921) of the participants were male, 97.5% (n:1095) were under the age of 22, and 50.8% (n:631) attended the hospital practices until the pandemic. 20.4% (n:254) of them had a healthcare worker in their family and 5.6% (n:69) had acquaintances diagnosed with COVID-19.

Knowledge, and Awareness Behaviors About COVID-19

In this study; 79.60% of the HCSs did not attend any training on COVID-19. Their sources of information were internet/social media (97.18%) and TV (97.18%). In the COVID-19 knowledge assessment test, it was found that 65.7% of them had a high level of knowledge (Figure-1). Most of HCSs thought that their knowledge about COVID-19 was very good (55%). The correct answer means of the 31 questions on the COVID-19 knowledge questionnaire were 22.07 ± 1.70 . In this questionnaire, it stated that the most effective methods of protection were the use of a mask in crowded environments (99.1%). Other effective methods are given in Table-2.

COVID-19 Outbreak and Psychological Health

As depicted in Figure-2 and Table-2, we presented the mental health status of HCSs. Students experienced a high level of anxiety (24.8%, Figure-2). Most of the HCSs stated that outbreak was affected their mental health negatively (73.1%) and some of them named this state as "Coronaphobia" (33.2%). In this study was found that some HCSs have a generalized anxiety disorder (22.6%) and anxiety experienced due to COVID "completely affected" their lives (19.5%, Table-2).

The Relationship Between Knowledge, Awareness Behaviors GAD-7 Scores, and Associated Variables

The average knowledge score of the students who received applied training in the hospital at the beginning of the pandemic (22.29 ± 1.58) and anxiety level of students (6.77 ± 5.85) was higher than those who did not receive applied training in the hospital (5.84 ± 5.47 , $p < 0.05$). Those who thought that they had insufficient knowledge (no or a little) about COVID-19 had a lower mean knowledge score ($F = 5.659$, $p < 0.05$). Also, the students who thought they had no anxiety at all had lower mean scores for GAD-7 (2.50 ± 4.43) than those who thought they had anxiety (at different degrees) ($F = 291.033$, $p < 0.05$). The mean score for GAD-7 was higher in the students who defined the influence of pandemic on their daily life as "coronaphobia" (9.78 ± 0.89) than in the other group (4.58 ± 4.71 , $p < 0.05$). The GAD-7 scores for those with a previous diagnosis of psychological disease were 2 times higher than those without a previous diagnosis ($p < 0.05$) (Table-4).

DISCUSSION

It is necessary to determine the level of awareness, knowledge, and anxiety of individuals in order to prevent the pandemic by taking the necessary precautions. It is important to determine

about coronavirus infection knowledge level of HCSs practicing during the pandemic, their behaviors, and anxiety that may affect their behavior.

In this context, we aimed to investigate the knowledge, and behaviors of HCSs against the new coronavirus pandemic and to investigate the effect of the epidemic on HCSs' anxiety levels. According to the findings of this study, although the HCSs' level of knowledge about coronaviruses and pandemic are sufficient, it is seen that their anxiety levels are high. A study conducted in Saudi Arabia showed that approximately 35% of students experience moderate to extreme anxiety (Khoshaim et al., 2020). The HCSs increased preventive measures such as washing hands and wearing masks at a rate varying between 72% and 96.8% compared to the pre-pandemic period in social life. Additionally, one study revealed that obsessive-compulsive hand washing symptoms increased during COVID-19 (Knowles & Olatunji, 2021).

In addition, the anxiety levels of those who were affected by coronaphobia in their daily lives and those diagnosed with a psychological disease were found to be 2 times higher than the other students. Coronaphobia, a relatively new construct related to the pandemic, has been shown to be strongly associated with functional impairment and psychological distress (Lee, Jobe, Mathis, & Gibbons, 2020). At the beginning of the Covid-19 pandemic, widespread anxiety and stress disorders were observed in HCSs who attended clinical applied courses at the hospital. HCS' knowledge of Covid-19 positively affects both their health behaviors and their anxiety levels. In the study conducted with Filipino nurses, it was concluded that coronaphobia is especially common among public health nurses (Labrague & De Los Santos, 2021). Similarly, a study among hospital staff found that depression and anxiety associated with COVID-19 are common (Hassamal et al., 2021). For this reason, it is important to examine the psychosocial problems experienced by students who receive applied education in the field of health, in order to protect public health.

HCSs' knowledge, and awareness about COVID-19 infection and pandemic: In this study, it was found that 65.7% of HCSs have a high level of knowledge about COVID-19 infection and pandemic. Additionally, most students (55%) thought that their knowledge about coronavirus infection had very good. On the other hand, Taghrir et al. in their study among Iranian medical faculty students reported that average of correct answers of the participants was 86.9% and their knowledge level is sufficient (Taghrir, Borazjani, & Shiraly, 2020). In the study of healthcare professionals and students from the Mumbai Metropolitan Area, participants demonstrated adequate awareness of COVID-19 in the healthcare setting, with an overall correct response percentage of 71.2% (Modi et al., 2020). The correct answer score means of the 31 questions on the COVID-19 knowledge questionnaire were sufficient (22.07 ± 1.70).

According to the literature data, it was thought that our participants' level of knowledge about the COVID-19 infections and pandemic was sufficient. There is a need for regular educational interventions and training programs on infection control practices for COVID-19 in all healthcare professions. Occupational health and safety is of great importance in order to minimize the risk of contamination to health students and professionals and to provide the most appropriate care to patients.

In the study, it was found that 9 out of 10 students used the social media as a source of information. The Turkish Ministry of Health has created a web-based "COVID-19 Information Sheet" during the pandemic period. In addition, public service announcements related to COVID-19 social measures were broadcast on all social media channels and the Ministry of Health informed the public of the number of cases every day. Managing information and maintaining public trust is important during a pandemic. Health authorities should place great emphasis on the use of appropriate media channels and resources to enable more effective dissemination of critical information to the public (Mohamad et al., 2020). Two out of 10 students received training on the subject in addition to these sources of information. Distance lectures about COVID-19 and informative TV programs are effective in raising awareness (Ataş & Talo Yıldırım, 2020). All this up-to-date information is thought to have a positive effect on improving the knowledge level of COVID-19 infection and pandemic of the students in the field of health. In this period, it has been important to receive accurate and reliable information from official sources in increasing the students' knowledge and perceptions.

Having correct information about the ways of transmission is an important point in protecting oneself and the whole society. It is very important that students know the ways of transmission and take appropriate protective measures in preventing the transmission of COVID-19 infection in society. In our study, almost all of the HCSs had informed that taking protective measures such as wearing masks, washing hands, and social isolation plays a key role in protecting public health. Likewise, the finding in our study, in the study conducted by Atas et al. with the participation of dentistry students, it was found that all the students knew the precautions (Ataş & Talo Yıldırım, 2020). In the study among medical students, Health literacy played an important role in increasing the effectiveness of protection against COVID-19 and reducing anxiety related to the pandemic (Koh et al., 2021). Clinical training aimed at managing epidemics should be given to students in the field of health. In these trainings, it should not be forgotten that students are a large part of society, and it is necessary to better prepare students for pandemics by emphasizing public health policy. Although the students had a good

knowledge of correct protective measures, it is worrisome that 6 out of 10 students stated that washing the nose and throat with vinegar water was among the protective measures.

In his review, Auwaerter (2020) underlined that deaths due to COVID-19 infection occurred more often in individuals with co-morbid diseases and in the elderly population (Auwaerter, 2020). Most of the students stated that those with chronic diseases and the elderly people, respectively, are in the high-risk group. In the present study, only half (51.08%) of the students stated that healthcare personnel were among the individuals at risk for COVID-19 infection. Almost all of the students (98.2%) responded that the first-line treatment available was a "supportive treatment." However, there are also some studies proving the efficacy of plasma therapy and various drugs in treatment.(Chen, Xiong, Bao, & Shi, 2020)

After the pandemic started, almost all students have experienced increases in their behaviors such as using masks, paying attention to social distancing, washing hands, avoiding crowded places, and using disinfectants. Similarly, in a study conducted among university students on MERS-Cov, it was concluded that the habits of students such as hygiene and social distancing improved.(Khalid et al., 2016) In the fight against COVID-19 infection, it is very important for the students in the field of health to have sufficient knowledge, gain awareness, develop healthy behaviors to prevent transmission and protect public health.

COVID-19 outbreak and psychological health: Most students stated that COVID-19 outbreak negatively affected their daily lives to varying degrees. Additionally, 2 out of 10 students suffered from GAD. Most of the students did not have a previous diagnosis of psychiatric disease. However, approximately one-third of the group experienced anxiety of COVID-19 infection to the extent of naming it "Coronaphobia". In addition, in the study conducted in Bangladesh, one of the countries most affected by the COVID-19 pandemic, it is stated that "Coronaphobia" has spread from the health sector to the socio-economic sectors of this country (Rahman et al., 2021). In a study conducted with participation of medical students in China, it was seen that 21.3% of the students had mild anxiety and 0.9% of them had severe anxiety, which was less than our study group.(Cao et al., 2020)

The relationship between students' knowledge, GAD-7, and some variables: The students who practiced in the hospital during the pandemic period and who perceived their knowledge level as very good had higher knowledge scores. Additionally, students who continue their hospital practices experience more anxiety. The prevalence of GAD in students due to the COVID-19 outbreak is associated with the high level of anxiety perceived by students, naming this situation "coronaphobia," and practicing in the hospital during this period. It is necessary to focus on information, awareness, and development programs for preventive health behaviors

to reduce anxiety in the community. In addition, groups with a high risk should be identified and psychological support should be provided by health care workers to protect and improve the psychological health. Health literacy played an important role in increasing the effectiveness of protection against COVID-19 and reducing anxiety related to the pandemic. Clinical training aimed at managing epidemics should be given to students in the field of health.

CONCLUSION

HCSs had sufficient knowledge level and awareness about the COVID-19 outbreak. It was determined that anxiety levels of the clinical period students were high. Considering the possibility that prolonged pandemic duration may increase anxiety disorder; should do research, distance education programs, and strategies to protect HCSs' mental health.

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Conflict of Interest: The authors declare that there is no conflict of interests.

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731

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Tables and Figures

Table 1. Sociodemographic and Outcome Characteristics of Participants

	n	%
Sex		
Male	921	74.1
Female	322	25.9
Age		
< 22	1095	97.5
> 22	148	11.9
Academic year		
First year	667	53.7
Second year	576	46.3
Practical training at the hospital until the pandemic		
Yes	631	50.8
No	612	49.2
Having a healthcare worker in the family		
Yes	254	20.4
No	989	79.6
Having acquaintances diagnosed with COVID-19		
Yes	69	5.6
No	1174	94.4

734

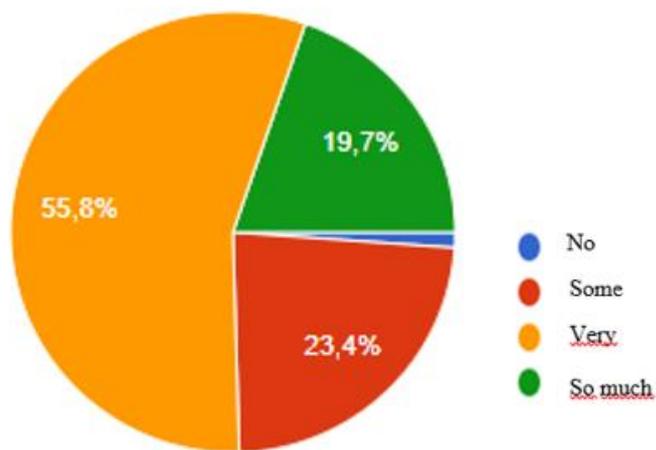


Figure 1. The Students' Perceived Level of Knowledge About COVID-19

Table 2. Knowledge, Attitude, and Awareness About Covid-19

	n	%	
Participating in training on COVID-19			
Yes	254	20.40	
No	989	79.60	
Information sources *			
Internet	1208	97.18	
Friends	767	61.70	
Teaching Staff	701	56.39	
TV	1134	97.18	
Poster and brochure	215	17.29	
Family members	762	61.30	
Institution	287	23.09	
COVID-19 Knowledge Level Average Score	22.07±1.70(Min:7.0-Max:22.07)		
COVID-19 Knowledge Level			
Medium level	426	34.3	
High level	817	65.7	
Knowledge, Attitude, Awareness			
Incubation Time (2-14 days)	1117	89.4	
Modes of Transmission*			
It is transmitted by the contact of eyes, nose or mouth with dirty hands.	1170	93.6	
It is transmitted from one person to another through droplets.	1082	86.6	
Effective Methods in Protection*			
Mask should be used in crowded environment.	1239	99.1	735
Hands should be washed for at least 20 seconds with soap.	1232	98.6	
Washing the nose and throat with vinegar water provides protection. (-)	702	56.2	
Living place should be ventilated frequently.	1233	98.6	
A balanced and healthy diet and vitamin C are important.	1237	99.0	
Maintaining proper sleep patterns is important.	1220	97.6	
Washing the nose and throat with salty water provides protection. (-)	609	48.7	
Crowded environments should be avoided.	1238	99.0	
It is important to avoid contact with infected people (shaking hands, kissing, etc.).	1232	98.6	
Disposable wipes should be used for coughing and sneezing, or coughing and sneezing into the elbow should be preferred.	1239	99.1	
Risky Groups*			
Health care staff	635	51.08	
Elderly individuals	847	68.14	
Young men	158	12.71	
Children	239	19.22	
Those having an immune system deficiency	354	28.47	
Those having a chronic disease	904	72.72	
Treatment*			
Molecular tests required for diagnosis are performed in Turkey.	1212	97.0	
Antibiotics are not used in treatment.	852	68.2	
There is no vaccine for the disease.	1126	90.1	

Supportive therapy is important.	1228	98.2
Social Awareness*		
It has been recognized as a pandemic by the World Health Organization.	1195	95.6
Travelers should follow the warnings of national and international authorities.	1236	98.9
People coming from abroad and those who contacted the infected people should be under quarantine at home or in relevant health institutions for 14 days and should not go out in public.	1241	99.3
Changes in behavior after the COVID-19 outbreak*		
Using mask	1139	91.63
Using gloves	1017	81.81
Paying attention to social distancing	1147	92.27
Decreasing social relations	1054	84.79
Washing hands more often and longer	1152	92.67
Following hygiene rules when sneezing and coughing	1095	88.09
Avoiding crowded places	1187	95.49
Having a healthy and balanced diet	900	72.40
Increased use of disinfectants	1203	96.78

* Multiple options were checked.

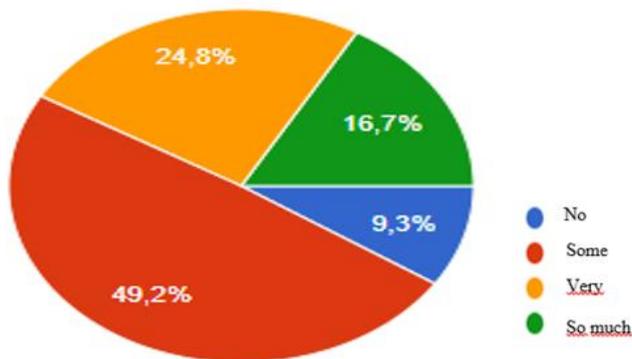


Figure 2. The Student Perceived Level of Anxiety due to Covid-19

Table 3. Covid-19 Outbreak and Psychological Health

	n	%
Negative effect of COVID-19 on mental health		
Yes	909	73.10
No	334	26.90
Whether the anxiety experienced due to COVID-19 affects daily life		
Does not affect at all	146	11.70
It affects a little	525	42.20
It affects a lot	330	26.50
It totally affects	242	19.50
Naming its effects on daily life "Coronaphobia"		
Yes	413	33.20

No	830	66.80
Having a previous diagnosis of psychological disease		
Yes	104	8.40
No	1139	91.60
Average Score for Generalized Anxiety Disorder	6.31±5.69 (Min:0.00; Max: 21.00)	
Generalized Anxiety Disorder		
Not having	962	77.40
Having	281	22.60

Table 4. The Relationship Between Students' Knowledge, GAD-7 Mean Scores and Some Variables

Factors	Mean Knowledge Score				GAD-7 Mean Score		
	n	Mean (Sd)	t value	P	Mean (Sd)	t value	P
Age							
20 years and under	615	22.00±1.69	-1.480	0.139	6.46±5.53	0.344	0.354
21 years and older	628	22.14±1.71			6.20±5.83		
Sex							
Male	921	22.11±1.58	1.417	0.157	6.38±5.56	0.774	0.439
Female	322	21.95±2.02			6.10±6.04		
Did You Receive Applied Training at the Beginning of COVID-19?							
Yes	631	22.29±1.58	4,702	0.000*	6.77±5.85	2.890	0.004*
No	612	21.84±1.80			5.84±5.47		737
Did You Participate in training on COVID-19?							
Yes	254	22.23±1.53	1.641	0.101	5.92±5.54	-1.220	0.223
No	989	22.03±1.74			6.41±5.72		
Perceived level of knowledge about COVID-19							
No	14	20.64±2.46	F:5.659	0.001**	8.64±7.77	F=1.57	0.195
Some	291	20.64±1.72			6.56±5.78		
Good	693	22.09±1.51			6.06±5.44		
Very good	245	22.30±1.62			6.57±6.10		
Perceived anxiety level due to Covid-19							
No	116	22.01±2.13	F=0.657	0.579	2.50±4.43	F=291.033	0.000**
Some	611	22.07±1.58			3.84±3.54		
Very	308	22.17±1.56			7.84±4.75		
Too much	208	21.96±1.97			13.41±5.70		
Do You Name the effect of Pandemic on daily life "Coronaphobia"?							
Yes	413	22.09±1.64	0.344	0.731	9.78±5.89	16.838	0.000*
No	830	22.06±1.73			4.58±4.71		
Having a previous psychological disorder							
Yes	104	22.20±1.59	0.788	0.431	10.44±6.21	7.140	0.000*
No	1139	22.06±1.71			5.93±5.48		

GAD: Generalized Anxiety Disorder *Independent Groups t test, **ANOVA Test