

# Anxiety, Motivation, Stress Levels and Associated Factors Among University Students in the COVID-19 Pandemic

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## Abstract

**BACKGROUND/AIMS:** The global coronavirus disease (COVID-19) pandemic affects society seriously in terms of psychosocial aspects, but this effect is more intense on some specific population groups. University students are among the most affected population groups by the pandemic. This study was conducted to determine the anxiety, motivation, stress levels, and associated factors among health science students during the COVID-19 pandemic.

**MATERIALS AND METHODS:** The population of this descriptive and cross-sectional study consisted of students studying at health-related departments in three universities in Turkey. The data were collected from 855 students determined by the stratified sampling method using the online survey method. A questionnaire developed by the researchers and the Beck Anxiety Inventory (BAI) were used to collect the data. Percentage, mean, standard deviation, t-test, One-Way ANOVA test, Pearson correlation, and linear regression analysis were performed to evaluate the data.

**RESULTS:** The results revealed that the mean age of the students was  $20.85 \pm 2.37$  years (min: 18; max: 41), 80.5% were women, 38.0% were nursing students, 13.7% had a family member with the diagnosis of COVID-19. The BAI mean score was found to be  $29.00 \pm 7.8$ . According to the multiple linear regression analysis, the factors affecting students' anxiety scores significantly were being female, impaired sleep and nutrition patterns, decreased motivation, increased stress level and having a family member with the diagnosis of COVID-19.

**CONCLUSION:** Health science students experience severe anxiety due to COVID-19 pandemic and have moderate motivation and stress scores. Being a woman, having impaired sleep and nutrition patterns, reduced motivation, increased stress level and a family member diagnosed with COVID-19 are factors influencing the level of anxiety.

**Keywords:** COVID-19, psychological effect, health science student

## INTRODUCTION

Coronaviruses (CoV) are a large family of viruses that can lead to various diseases, from the common cold to more serious diseases such as the Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV).<sup>1</sup> COVID-19 causes

coronavirus disease. The novel COVID-19 was first identified on January 13, 2020 because of examinations in a group of patients who developed respiratory tract symptoms (fever, cough, shortness of breath) in Wuhan Province in late December.<sup>2</sup> The epidemic was initially detected in those in the seafood and

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animal market in this region.<sup>3</sup> Then, it spread from one person to another, other cities in Hubei province, other provinces of the People's Republic of China and finally almost all the countries in the world.<sup>4,5</sup> The World Health Organization (WHO) declared the Coronavirus as an International Health Emergency and announced on February 11, that the disease caused by the novel coronavirus would be called as "COVID-19".<sup>6</sup>

With the diagnosis of the first positive case on March 11, 2020, the pandemic began in Turkey.<sup>7</sup> As in the world, health authorities in Turkey have taken several measures to struggle against the pandemic such as social distancing, travel restrictions on visitors arriving from high-risk counties, quarantine for nationals returning from high-risk locations, and suspending education-related activities and closure of certain types of workplaces. On March 12, the government declared that all schools including universities were to be closed starting from March 16.<sup>7,8</sup> The rapid spread of the disease, tight isolation measures, interrupting face-to-face education in schools, and transition to distance education may negatively influence the mental health of students, causing psychological symptoms to occur.<sup>9</sup>

Because of the worldwide pandemic due to COVID-19 infection, people have experienced significant changes in many areas such as health, education, and social life. It is an inevitable fact that rapid and sudden lifestyle changes impact human psychology.<sup>10</sup> Reports on the psychological effects of the epidemic on society, patients, healthcare professionals, children, and the elderly have been prepared.<sup>11-13</sup> Due to the worldwide pandemic, the fear of getting ill, lockdown, delays in education and graduation may negatively affect the mental health of university students.<sup>9</sup>

COVID-19-related studies show that students' feelings of anxiety, stress, and depression increase,<sup>9,14-16</sup> their concentration and academic performance decrease,<sup>17</sup> and their sleep patterns are disrupted.<sup>16</sup> Outbreaks have negative effects on medical education and students just like healthcare workers.<sup>9</sup> A study by Loh et al.<sup>18</sup> showed that lower-class students' anxiety rates were higher than senior students during SARS epidemic. Yakar et al.<sup>19</sup> examined the knowledge, attitude, and concerns of medical students about the current COVID-19 outbreak in Turkey and found that they had sufficient knowledge and positive attitudes about the outbreak, and the state and trait anxiety scores of female students were higher. The number of studies conducted on university students who have been heavily influenced by the COVID-19 pandemic in terms of both education and socialization is limited. As highlighted in multiple recent correspondences, there is an urgent need to assess the effects of the current pandemic on the mental health and well-being of college students.<sup>20-22</sup> For this reason, this study determines the anxiety, motivation, stress levels and associated factors among students studying at three different universities in Turkey and seeks the answers to the following questions:

- What are the anxiety, motivation, and stress mean scores of the students during the COVID-19 pandemic?
- Do students' socio-demographic characteristics impact their anxiety, motivation, and stress levels during the COVID-19 pandemic?
- What is/are the most significant determinant variable/s on students' anxiety levels during the COVID-19 pandemic?

## MATERIAL AND METHODS

### Study Design

This study is a descriptive and cross-sectional study.

### Setting

The research data were collected from three different universities in the Eastern Black Sea region of Turkey.

### Sample

The data were collected between May 10, 2020 and May 17, 2020. The population of the study consisted of 2,440 students studying at health-related departments of three universities located in the eastern Black Sea region in Turkey. Determined by using a stratified random sampling method (the departments were used as the stratum criterion), the sample of the study included 989 students from nursing department (278), faculty of medicine (123), pharmacy faculty (175), health management department (196) and the other vocational schools of health services (217). Eight hundred and fifty-five students who volunteered to participate in the study and completed the forms were included in the study with a response rate of 86.4%.

### Measurements

The data of the study were collected using the Beck Anxiety Inventory and a questionnaire form developed by the researchers. After obtaining the necessary permissions, the online questionnaire form was prepared using the Google Forms web application and sent to the students' smartphones through WhatsApp messaging program.

### Questionnaire Form

The questionnaire form consists of three sections and 17 questions. In the first part, there are nine questions to determine the socio-demographic characteristics of students, the second part includes six questions regarding students' experiences in the COVID-19 pandemic, and the third part has two questions created using the numerical scale '0-10' to define the motivation and stress levels of the students. In this numerical scale created by researchers, '0' refers to the low level of motivation/stress and '10' refers to the highest level of motivation/stress. Students were asked to evaluate their motivation and stress levels in response

to the question “How many points do you give to your current level of motivation/stress?”

You can access the survey form from the link below.

<https://docs.google.com/forms/d/15A4KwHbJTRunFvmH6Zz6VuSwwwDcgBeRQZBfTTDvPXA/edit>

### The Beck Anxiety Inventory (BAI)

The Beck Anxiety Inventory (BAI) that includes 21 items ranked on a 0–3 scale with total raw scores ranging from 0–63 was used to assess students' anxiety levels. High scores indicate high anxiety levels. The BAI scores are classified into four categories, including normal ( $\leq 7$ ), mild (8–15), moderate (16–25), and severe ( $\geq 26$ ) anxiety levels. The Turkish validity and reliability study of the scale was done by Ulusoy et al.<sup>23</sup> Cronbach's alpha internal consistency coefficient of the scale was found to be 0.93 by Ulusoy et al.<sup>23</sup> and 0.89 in this study.

### Ethical Considerations

Ethical approval was obtained from the Human Research Ethics Committee of the Gümüşhane University (2020/5) and approval numbered 2020-05-05T12\_24\_34 was obtained from the Turkish Republic Ministry of Health. All the participants gave their electronic informed consent before their inclusion in the study, and they were informed that they could withdraw from the survey at any moment without providing any justification.

### Statistical Analysis

All analyses were conducted using SPSS statistical software, version 22 (SPSS Inc., Chicago, USA). Cronbach's alfa was used to assess the internal consistency of the scale, and descriptive statistics, t-test, One-Way ANOVA test, Pearson correlation, and linear regression analysis were used to evaluate the data. In the study, all findings were tested at a significance level of  $p=0.05$ .

### Limitations of the Study

The study was conducted with the students studying at health-related departments at three universities located in the eastern Black Sea region in Turkey, however not all students could be reached. The research is based on students' self-report. It is possible that some students avoided or exaggerated their real situation during the application. These reasons limit the generalizability of the results.

## RESULTS

The study results revealed that the mean age of the students was  $20.85 \pm 2.37$  years (min: 18; max: 41), and 80.5% of them were female. 38.0%, 26.0%, 14.7%, 9.0%, 7.0%, and 5.3% of the students studied at nursing, medical services and techniques, faculty of medicine, pharmacy, health management, and physiotherapy departments, respectively. During the lockdown, 64.3% followed

the coronavirus news, 55.4% had increased sleep time, 52.5% had increased appetite, 78.6% had decreased motivation, 0.5% were treated with COVID-19 diagnosis, and 13.7% had a family member with the diagnosis of COVID-19.

The comparison between the students' mean scores and their gender showed that female students' BAI mean scores were significantly higher than the male students ( $p < 0.001$ ). No significant relationship was found between students' gender and motivation scores ( $p > 0.05$ ) and between students' genders and stress scores ( $p > 0.05$ ). The motivation levels of the students with high family income were found to be significantly higher ( $p < 0.001$ ), but there was no significant difference between the BAI and stress scores. The BAI scores of those who started smoking after the pandemic ( $p = 0.005$ ), the motivation scores of nonsmokers ( $p < 0.001$ ), and the stress scores of those who started smoking after the pandemic ( $p = 0.002$ ) were found to be significantly higher. Despite not statistically significant, the BAI scores of the students living in the metropolis during the COVID-19 were higher. Besides, the BAI and stress scores ( $p < 0.50$ ) of students with chronic and psychological diseases are significantly higher than those without any psychological diseases ( $p < 0.001$ ) (Table 1).

The mean BAI scores of the students having a family member with the diagnoses of COVID-19 were significantly higher ( $p < 0.001$ ). Not statistically significant, but they also had higher stress and lower motivation scores. The mean BAI scores of students who had decreased sleep time and appetite during the lockdown due to COVID-19, and the motivation scores of those whose sleep time and nutrition did not change were found to be significantly higher ( $p < 0.001$ ) (Table 2).

Table 3 shows how the mental health of healthcare worker candidate students was affected by the COVID-19 pandemic. It was seen that the students did not have a normal and mild level of anxiety symptoms, 28.1% had moderate anxiety, and 71.9% had a severe anxiety level. The students' mean BAI score was  $29.00 \pm 7.8$ , the motivation score was  $5.00 \pm 2.00$ , and the stress score was  $5.00 \pm 2.37$ . According to the mean BAI score, all students experienced moderate ( $23.14 \pm 1.43$ ) and severe ( $34.02 \pm 7.2$ ) anxiety. The relationship between the variables demonstrated a statistically significant relationship between the BAI, motivation, and stress scores. A negative relationship was observed between students' motivation score and the BAI ( $r = -0.35$ ,  $p < 0.001$ ) and stress scores ( $r = 0.27$ ,  $p < 0.001$ ), and a moderately significant positive relationship was found between the BAI and stress scores ( $r = 0.39$ ,  $p < 0.001$ ) (Table 3).

According to the multiple linear regression analysis, factors affecting students' anxiety scores significantly were being female, impaired sleep and nutrition patterns, decreased motivation, increased stress level and having a family member diagnosed with COVID-19. These variables explain 30.0% of the total variance (Table 4).

**Table 1. Distribution of the BAI, motivation and stress scores according to some socio-demographic characteristics of students (n=855)**

Characteristics	n	(%)	BAI (mean ± SD)	Motivation score (mean ± SD)	Stress score (mean ± SD)
<b>Gender</b>					
Female	688	(80.5)	31.78±7.98	4.80±1.94	4.94±2.36
Male	167	(19.5)	27.61±6.50	5.06±2.23	4.66±2.42
p-value	-	-	p<0.001*	p=0.139	p=0.178
<b>Family income</b>					
High	158	(18.5)	30.96±8.69	5.34±2.22	4.72±2.31
Moderate	657	(76.8)	30.81±7.43	4.76±1.94	4.88±2.38
Low	40	(4.7)	33.42±11.05	4.47±1.96	5.55±2.28
p-value	-	-	p=0.128	p=0.002**	p=0.147
<b>Cigarette smoking</b>					
Yes	51	(6.0)	30.76±8.71	4.31±2.15	4.84±2.62
Yes; decreased after COVID-19	96	(11.2)	31.76±9.87	4.40±2.24	4.96±2.53
Yes; increased after COVID-19	15	(1.8)	36.40±10.21	3.00±1.88	7.26±2.28
Yes; started after COVID-19	8	(0.9)	37.62±14.32	2.37±1.50	5.87±3.27
No	685	(80.1)	30.67±7.28	5.03±1.91	4.81±2.29
p-value	-	-	p=0.005*	p<0.001*	p=0.002*
<b>Place of residence</b>					
Metropolis	378	(44.2)	31.62±7.89	4.67±2.01	4.81±2.34
Countryside	308	(36.0)	30.20±7.49	5.1±1.91	4.87±2.32
City	169	(19.8)	30.89±8.48	4.74±2.12	5.07±2.53
p-value	-	-	p=0.063	p=0.007**	p=0.481
<b>Chronic disease<sup>a</sup></b>					
Yes	49	(5.7)	34.46±8.17	4.42±1.96	5.61±2.53
No	806	(94.3)	30.75±7.80	4.88±2.01	4.84±2.35
p-value	-	-	p=0.001*	p=0.122	p=0.027*
<b>Psychological disease<sup>b</sup></b>					
Yes	92	(10.8)	37.28±10.70	4.00±2.09	5.80±2.63
No	763	(89.2)	30.20±7.11	4.96±1.97	4.77±2.31
p-value	-	-	p<0.001*	p<0.001*	p<0.001*

Significant p-values are shown in bold.

<sup>a</sup>Chronic disease: diabetes mellitus, hypertension, cardiac diseases, respiratory tract diseases, <sup>b</sup>psychological disease: depression, anxiety disorder, obsessive-compulsive disorder, \*t-test, \*\*One-Way ANOVA, BAI: Beck Anxiety Inventory, COVID-19: coronavirus disease-2019, SD: standard deviation, n: number.

## DISCUSSION

This study was conducted to determine the anxiety, motivation, stress levels of university students and associated factors during the COVID-19 pandemic. This section includes the discussion of the results with the literature.

The COVID-19 outbreak, which emerged in China and spread worldwide, not only caused the risk of death from infection, but also a severe psychological impact on individuals.<sup>9</sup> It has been reported that epidemics lead to many psychological effects such as anxiety, stress, and depression on the public, healthcare workers,

children, elderly individuals, and students.<sup>11-13</sup> As in the world, the sudden closure of the universities in Turkey, the discharge of student dormitories, the transition to online education, and not knowing how long this epidemic will continue has caused some uncertainties. All these uncertainties can negatively influence the mental health of students, causing them to experience anxiety and stress, and may affect students' motivation.<sup>16,24-26</sup> Our study demonstrated that during the COVID-19 pandemic, students' anxiety mean scores were high and their motivation and stress mean scores were moderate. In a relevant study, students' anxiety, stress, and depressive thinking levels increased due to the COVID-19 outbreak.<sup>15</sup> In another study,

**Table 2. Distribution of students’ experiences regarding COVID-19 process according to BAI, motivation and stress scores (n=855)**

Characteristics	n	%	BAI (mean ± SD)	Motivation score (mean ± SD)	Stress score (mean ± SD)
<b>Having a family member with a diagnosis of COVID-19</b>					
Yes	117	(13.7)	33.58±9.66	4.55±2.23	5.26±2.45
No	738	(86.3)	30.55±7.79	4.09±1.96	4.82±2.35
p-value	-	-	<b>p&lt;0.001</b>	p=0.078	p=0.063
<b>Sleep pattern during COVID-19 process</b>					
Decreased sleep time	137	(16.0)	34.36±8.57	4.34±1.98	5.55±2.49
Increased sleep time	474	(55.4)	31.93±8.05	4.55±1.93	5.03±2.27
No change	244	(28.5)	27.19±5.35	5.73±1.90	4.22±2.34
p-value	-	-	<b>p&lt;0.001</b>	<b>p&lt;0.001</b>	<b>p&lt;0.001</b>
<b>Nutrition pattern in the COVID-19 process</b>					
Decreased appetite	101	(11.8)	33.20±8.30	4.50±2.23	4.48±2.53
Increased appetite	449	(52.5)	32.54±8.19	4.42±1.88	5.18±2.34
No change	305	(35.7)	27.90±6.19	5.61±1.88	4.46±2.3
p-value	-	-	<b>p&lt;0.001</b>	<b>p&lt;0.001</b>	<b>p&lt;0.001</b>

Significant p-values are shown in bold.  
 COVID-19: coronavirus disease-2019, BAI: Beck Anxiety Inventory, SD: standard deviation, n: number.

the anxiety, stress, and depression levels of university students were moderate and severe due to the COVID-19 pandemic.<sup>27</sup> The results of our study are consistent with the literature.

The rapid increase in the number of countries affected by the COVID-19 pandemic, the number of cases and deaths has caused great concern in the public.<sup>25</sup> Our study showed that the anxiety levels of university students associated with the pandemic were related to their socio-demographic characteristics such as gender, family income level, place of residence, the presence of chronic and psychological disease, and the presence a family member diagnosed with COVID-19 in the immediate environment. Besides, it was found that the anxiety mean score of female students was much higher than that of men. Studies have reported that women are more exposed to stress, anxiety, and depression, which are the psychological effects of the epidemic.<sup>5,28</sup> Additionally, individuals develop

psychological, somatic, and behavioral conditions and their sleep quality deteriorates during the epidemic process.<sup>29</sup> In our study, the anxiety and stress mean scores of the students who started smoking after the COVID-19 epidemic, whose sleep time decreased and whose appetite increased was found to be higher. The anxiety mean score of the students living in big cities was high, while the average motivation scores of the students living in rural areas were high. This situation can be explained by the fact that these people have houses in the countryside and with gardens, they are in touch with nature, and they engage in relaxing physical activities. Contrary to our study, another study found that students living in urban areas had lower anxiety levels than those living in rural areas. This situation is explained by the differences in access to economic, cultural, and educational resources. People living in urban areas can easily access health services, masks, disinfectants, and all kinds of information about transmission, protection, and treatment.<sup>9,26,30</sup> In our study, the

**Table 3. Students’ BAI, motivation and stress mean scores (n=855)**

Scale	n	(%)	Mean ± SD	Median (min-max)
<b>BAI</b>	-	-	29.00±7.8	30.96 (21–63)
Normal anxiety level	-	-	-	-
Mild anxiety level	-	-	-	-
Moderate anxiety level	240	(28.1)	23.14±1.43	23.14 (21–25)
Severe anxiety level	615	(71.9)	34.02±7.2	32.00 (26–63)
<b>Motivation score</b>	-	-	5.00±2.00	4.85 (1–10)
<b>Stress score</b>	-	-	5.00±2.37	4.88 (1–10)

BAI: Beck Anxiety Inventory, SD: standard deviation, min: minimum, max: maximum, n: number.

**Table 4. The results regarding multiple regression analysis between students' BAI and independent variables**

Model	B	SE	$\beta$	t	p-value
Constant	24.109	2.263		11.979	<0.001
Gender	3.350	0.572	0.168	5.853	<0.001
Sleep pattern	-2.367	0.559	-0.136	-4.232	<0.001
Nutrition pattern	1.991	0.528	0.121	3.773	<0.001
Motivation score	-0.735	0.123	-0.187	-5.998	<0.001
Stress score	0.972	0.100	0.293	9.748	<0.001
Having a family member with the diagnosis of COVID-19	-1.929	0.661	-0.084	-2.919	<0.001

Model R=0.552; R<sup>2</sup>=0.304; adjusted R<sup>2</sup>=0.300; F=61.87; p<0.01. Dependent Variable: Beck Anxiety Inventory. Gender (0. Male, 1. Female), Sleep pattern (0. Affected 1. Not affected), Nutrition pattern (0: Not affected, 1: Affected), Having a family member with the diagnosis of COVID-19 (0: Yes, 1: No).

BAI: Beck Anxiety Inventory, SE: standard error, COVID-19: coronavirus disease.

anxiety and stress mean scores of the students with chronic and psychological diseases and those who had a family member diagnosed with COVID-19 in their immediate environment were high, while the motivation mean scores the students without chronic diseases were high. The fear of the unknown, being in the risk group, the high risk of virus transmission cause anxiety, fear, and anxiety even in healthy individuals, so they further increase the anxiety level of students with chronic and psychological diseases and those having a family member diagnosed with COVID-19.

The variables that significantly affected the anxiety score of the students in our study were being a woman, impaired sleep and nutrition patterns, decreased motivation, increased stress level and having a family member with a diagnosis of COVID-19. Studies show that women are highly exposed to the psychological effects of the epidemic.<sup>5,28</sup> High levels of anxiety negatively affect sleep and diet patterns. Literature shows that the level of anxiety negatively affects sleep quality because it makes it difficult to fall asleep and interrupts sleep frequently. Anxiety, depression, and stress are closely related to sleep quality and eating habits.<sup>31-35</sup> A study reported that as the motivation of the students decreased, their anxiety levels increased, and individuals with high motivation and satisfaction had low stress and anxiety levels.<sup>5</sup> In another study, students fear and worry about their own health and of their loved ones, so they have difficulty in concentrating, disruptions to sleeping patterns, decreased social interactions due to physical distancing, and increased concerns about academic performance.<sup>15</sup> Another factor affecting the students' anxiety level in our study is the presence of a family member with a diagnosis of COVID-19. This is related to the high transmission rate of the virus, poor course of the disease, and high morbidity and mortality rates.<sup>6,9,36</sup>

## CONCLUSION

The study showed that students' anxiety scores were high, and their motivation and stress scores were moderate during the

COVID-19 pandemic. Their anxiety levels are affected by gender, family income level, place of residence, the presence of chronic and psychological illness, and presence of a family member diagnosed with COVID-19. Family income and place of residence do not affect students' anxiety levels. Students' motivation levels are influenced by family income, smoking status, place of residence, and the presence of psychological illness. Gender and presence of chronic disease do not affect motivation levels. The stress levels of students are affected by smoking, having chronic and psychological diseases, but gender, family income, and place of residence are not effective on stress levels. Being a woman, impaired sleep and nutrition patterns, reduced motivation, increased stress level and having a family member diagnosed with COVID-19 are factors affecting the level of anxiety. It is recommended that the mental health of students should be carefully monitored, intervention programs on psychological health should be created and psychosocial support to students through online training during and after the pandemic should be provided.

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## MAIN POINTS

- The mean score of the healthcare worker candidate university students on the BAI was 29.00±7.8, which means severe anxiety due to COVID-19.
- Being a woman, impaired sleep and nutrition patterns, reduced motivation, increased stress level, and having a family member diagnosed with COVID-19 are factors affecting the level of anxiety.
- There are no statistically significant differences between the students' mean scores on the BAI according to family income and place of residence.

## ETHICS

**Ethics Committee Approval:** Ethical approval was also granted by the Human Research Ethics Committee of a Gümüşhane University (2020/5). To conduct the study, approval numbered 2020-05-05T12\_24\_34 was obtained from the Turkish Republic Ministry of Health.

**Informed Consent:** All the participants gave their electronic informed consent before their inclusion in the study, and they were informed that they could withdraw from the survey at any moment without providing any justification.

**Peer-review:** Externally peer-reviewed.

## Author contributions

Conception: C.U.Ş., M.A., N.K., Design: C.U.Ş., M.A., N.K., Data Collection and/or Processing: C.U.Ş., M.A., N.K., Analysis and/or Interpretation: C.U.Ş., M.A., N.K., Literature Search: C.U.Ş., M.A., N.K., Writing: C.U.Ş., M.A., N.K., Critical Review: C.U.Ş., M.A., N.K.

## DISCLOSURES

**Conflict of Interest:** The authors declare no conflict of interest.

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