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The Correlation between Nursing Students' Anxiety Level and E-Learning during the COVID-19 Pandemic**

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ABSTRACT:
Purpose: The aim of this study is to investigate the correlation between anxiety levels of nursing students and e-learning during COVID-19 pandemic.
Material and Methods: The population of this descriptive study consisted of all the students studying at nursing school during spring term of 2019-2020 academic year. No sampling selection was employed and the study was completed with 284 students. The "the Socio-demographic Form", "State-Trait Anxiety Inventory" and "General Attitude Scale Towards E-Learning" were employed to collect the data. Percentage distributions, means, t test, One-Way ANOVA and correlation analysis were used in the data analysis
Results: It was determined that the participants' mean age was 20.83±1.71 years, 73.9% of them were female, 29.2% of them were second-year students and 82.7% of them had a moderate income level. While age and grade had an effect on anxiety, considering oneself sufficient in using electronic tools had an effect on e-learning. The students' state and anxiety mean score was 45.01±5.63, their trait anxiety mean score was 49.77±7.17, their e-learning susceptibility mean score was 35.38±10.15 and their e-learning avoidance mean score was 21.14±7.71. There was no significant correlation between the students' mean scores of State-trait anxiety inventory and General Attitude Scale Towards E-Learning.
Conclusion: It was concluded that e-learning received by the students during distance education and their anxieties were independent from each other.
Keywords: *Anxiety, E-Learning, Student, Nursing*

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INTRODUCTION

The severe acute respiratory coronavirus 2 (SARS-CoV-2) has caused Coronavirus Disease (COVID-19) , a highly infectious disease that has spread rapidly all around the world. This pandemic has usually had negative effects on individuals' psychology, behaviors, and activities of daily life (Jakovljevic et al., 2020). It had dominated their emotional and physical lives until an efficient treatment or a safe and effective vaccine was found (Hallas, 2020).

Both the World Health Organization (WHO) and national health institutions called for social isolation and staying at home for reducing the infection rate of the COVID-19. Moreover, many countries imposed lockdown to prevent the spread of the pandemic although duration of this measure except for obligatory cases varied from country to country, which was estimated to have inevitably affected the routine daily practices of millions of people (Öztürk and Bayraktar, 2020). COVID-19 pandemic has had effects on both physical and psychological health and has increased anxiety of people particularly about the coronavirus (Altun, 2020) because psychological health is associated with physical health in numerous

dimensions (Hallas, 2020). People have inevitably suffered from high levels of anxiety during the pandemic.

Rapid developments in information technologies recently have paved the way for the development of new modules and systems in many fields including organizations. The organizations that keep pace with these developments and provide their workers with these opportunities could maintain their presence extensionally; otherwise they will downsize. E-learning requires the integration of learner organizations and workers should benefit from e-learning opportunities to share their experiences and follow innovations. E-learning and its environments enable all individuals and organizations to access information under equal conditions and convenience (Çakır and Yükseltürk, 2010) Learning analytics have become one of the trend topics in higher education as a result of the opportunities provided by the online learning environments and have increased interest in the e-learning model. E-learning has emerged in parallel to the technological developments (Bozkurt, 2016). COVID-19 pandemic, as a super effective catalyst, has made e-learning globally popular within a short period of time (Wang et al., 2020). Since e-learning is a type of information technology that can be accessed anywhere and anytime in the form of a website in the teaching and learning process (Rismayani and Soetikno, 2020), all education institutions have started to use the e-learning system actively during this period.

An experimental study on the COVID-19 pandemic reported that university students experienced psychological problems and fear of losing an academic year due to the inefficient e-learning systems (Hasan and Bao, 2020). The literature on e-learning (Carpenter et al., 2020; Ren et al., 2017) reports that students need to worry about losing an academic year due to e-learning. It is essential to make an in-depth analysis on mental health development of university students during the COVID-19 pandemic (Hasan and Bao, 2020). Students' increased anxiety during the pandemic is somewhat expected to be caused by the reasons such as starting e-learning without any background, not being able to access instructors at any time, and having lack of access. High levels of anxiety could cause students to experience learning problems. The aim of this study is to determine the correlation between nursing students' anxiety level and e-learning during the COVID-19 pandemic.

MATERIAL AND METHODS

Study design

This study was conducted with descriptive and correlational design and on nursing students during the spring semester of 2019-2020 academic year. The population consisted of all students studying in the Nursing Department of the Faculty of Health Sciences at a University in Turkey. No sampling was performed; all the students accessed were included in the study. The data collection forms prepared using Google forms were shared with students via links over social media and 284 students who responded to the forms were included in the study. Data were collected through the Socio-demographic Form, the State-Trait Anxiety Inventory, and General Attitude Scale towards E-learning.

Data collection tools

The Socio-demographic Form: This form consists of 8 questions questioning the descriptive characteristics of the students (age, gender, income, class, etc.) and was prepared by the researchers.

The State-Trait Anxiety Inventory: The scale was developed by Spielberger et al. (1970). The validity and reliability study was conducted by Öner et al. he did (Öner and Le Compte, 1983). The State-Trait Anxiety Inventory is a self-evaluation scale that consists of short statements. The scale aims to measure the trait and state anxiety variables and has a total of 40 items including 20 items in each subscale. The scale was developed to determine how an individual feels at a certain moment and under certain conditions. It is designed to determine how the individual feels in general, regardless of the current situation and circumstances. As your score increases, the level of anxiety increases. Scores obtained from both subscales theoretically range between 20 and 80. The literature reports that anxiety scores range between 36 and 42 (Üngüren, 2007). Cronbach's alpha values were found to be

0.92 for the State Anxiety Subscale and 0.87 for the Trait Anxiety Subscale in the study.

General Attitude Scale Towards E-learning: Haznedar and Baran (2012) developed the scale.It has a total of 20 items (10 positive and 10 negative) and it can be used as a one-factor or two-factor structure. When the two-factor structure is used, the scale items are analyzed as "tendency towards e-learning" and "avoidance from e-learning". The items are rated on a 5-point Likert scale with the options of "I totally disagree", "I disagree", "I am not sure", "I agree" and "I totally agree". Total score ranges between 20 and 100. The scale internal consistency coefficient was found to be .93 (Haznedar and Baran, 2014). While the internal consistency coefficient of e-learning tendency of the scale used in the research is 0.94, the internal consistency coefficient of avoiding e-learning is 0.84.

Data Analysis

The data of the research were evaluated in the SPSS 23 package program. The data show a homogeneous distribution. Numbers, percentages, mean and standard deviation, t test, Analysis of Variance and Pearson correlation analysis were used in the analysis of the data.

Ethical Considerations

Before the study was conducted, ethics approval was obtained from Ethics Committee (dated 30/04/2020-04/21 Protocol No), and written permission was obtained from the related units. Before the data were collected, the participants were informed about the study and that participation was based on voluntariness. In addition, before the data collection forms were responded, the participants were asked "Do you agree to participate in this study?" to obtain each participant's written consent.

RESULTS

State-Trait Anxiety Inventory mean score of 284 students was 45.01±5.63, while the mean trait anxiety score was 49.77±7.17. While the mean scores of students' Susceptibility to E-Learning were 35.38±10.15, the mean of Avoidance of E-Learning was 21.14±7.7 (Table 1). In the study, the average age of the students was 20.83±1.715, 73.9% were female, 29.2% were in the second grade and 82.7% had a medium economic level. Of the students, 81.3% maintained their education activities through their smartphones. 45.8% thought that they felt moderately sufficient in using electronic devices, and 39.1% reported that they used internet for averagely 11-12 hours per week.

Table 1. Students' State-Trait Anxiety Inventory and General Attitude Scale towards E-learning Mean Scores (N=284)

Scales		Min	Max	Mean±SD
State-Trait Anxiety Inventory	State Anxiety	31.00	63.00	45.01±5.63
	Trait Anxiety	32.00	67.00	49.77±7.17
General Attitude Scale towards e-learning	Tendency towards e-learning	10.00	50.00	35.38±10.15
	Avoidance from e-learning	10.00	48.00	21.14±7.71

When the participants' anxiety mean scores were analyzed according to the gender variable, it was determined that the trait anxiety mean score of female students was 50.52±7.26 and the trait anxiety mean score of male students was 47.63±6.50. The mean scores of women's E-Learning Susceptibility to E-Learning is 36.17±9.93, while the mean of men's E-Learning Susceptibility to E-Learning scores is 33.12±10.52. There was a similarity between men and women, and it was determined that women scored higher than men (t=-3.020; p<0.05) (Table 2). The state anxiety point average of the 1st grade students was 44.89±5.37, the 2nd grade students 45.63±6.48, the 3rd grade students 46.10±4.25, and the 4th grade students 42.63±5 ,63 was found as. In the mean scores of state anxiety, the 3rd year students scored higher than the other students, and it was found to be significant (F=4,081; p<0.05) (Table 2).

Students' e-learning mean scores exhibited no

significant differences in terms of the grade level variable.

The anxiety scale mean scores of the students did not demonstrate differences in terms of the most frequently used electronic device for educational activities, and the difference between the groups was not statistically significant (p>0.05, Table 2).

When the students' e-learning mean scores were examined in terms of the most frequently used electronic device for educational activities, avoidance from e-learning mean scores of the students who used a computer was found to be 23.11±9.52.

Table 2. The Students' Descriptive Characteristics and the State-Trait Anxiety Inventory and General Attitude Scale Towards e-Learning Mean Scores (N=284)

			State-Trait Anxiety Inventory		General attitude scale towards e-learning	
Descriptive Characteristics			**State Anxiety**	**Trait Anxiety**	**Tendency towards e-learning**	**Avoidance from e-learning**
Socio-demographic Characteristics	**N**	**%**	**X± SD**	**X± SD**	**X± SD**	**X± SD**
Gender						
Female	210	73.9	45.11±5.79	50.52±7.26	36.17±9.93	20.83±7.25
Male	74	26.1	44.74±5.19	47.63±6.50	33.12±10.52	22.02±8.89
Test - p			t=-.486 p=.627	t=-3.020 **p=0.003**	t=-2.240 **p=.026**	t=1.140 p=.255
Grade						
1st year	89	31.3	44.89±5.37	48.75±7.32	35.25±9.91	21.20±6.95
2nd year	83	29.2	45.63±6.48	50.34±7.41	33.55±10.86	21.66±8.45
3rd year	65	22.9	46.10±4.25	50.86±6.76	36.73±9.44	20.81±7.33
4th year	47	16.5	42.63±5.63	49.17±6.91	36.95±10.05	20.59±8.40
Test - p			F=4.081 **p=.007**	F=1.392 p=.245	**F=**1.675 p=.173	**F=**.243 p=.866
Income level						
Low	49	17.3	44.42±6.05	49.53±6.90	33.79±11.78	21.95±9.40
Middle	235	82.7	45.14±5.55	49.82±7.24	35.71±9.78	20.97±7.33
Test - p			t=-.804 p=.422	t=-.257 p=.797	t=-1.201 p=.231	t=.808 p=.420
Most frequently used device in educational activities						
Computer	53	18.7	44.69±5.61	49.64±7.61	33.01±11.38	23.11±9.52
Smart Phone	231	81.3	45.09±5.65	49.80±7.08	35.92±9.80	20.69±7.18
Test - p			t=.457 p=.648	t=.146 p=.884	t=1.885 p=.061	t=-2.067 p=.040
Self-Sufficiency about using these devices						
Very Insufficient	14	4.9	46.00±4.93	47.64±7.67	33.92±11.05	19.07±9.30
Insufficient	44	15.5	46.54±5.79	53.61±7.23	36.20±11.39	19.13±7.46
Moderately sufficient	130	45.8	44.40±5.43	49.30±6.98	35.80±9.41	21.16±7.57
Sufficient	76	26.8	44.92±5.99	49.02±6.91	35.86±9.45	20.89±5.81
Highly sufficient	20	7.0	45.35±5.41	48.70±6.78	30.00±13.01	27.90±10.86
Test - p			F=1.334 p=.257	F=4.088 **p=.003**	**F=**1.661 p=.159	**F=**5.132 **p=.001**
Average weekly internet usage (Including Computer, tablet, mobile phone)						
11-12 hours	111	39.1	45.44±5.16	50.65±6.66	36.37±9.98	20.79±8.07
13-24 hours	83	29.2	44.81±5.88	49.57±7.42	35.53±9.70	20.27±6.99
25-34 hours	46	16.2	44.47±6.49	47.86±7.07	35.69±9.29	21.13±6.10
35 hours and over	44	15.5	44.88±5.43	49.88±7.87	32.25±11.90	23.70±9.19
Test - p			F=.389 p=.761	F=1.677 p=.172	F=1.785 p=.150	F=2.063 p=.105
Age (Mean=20.83±1.715)						
Test			r=-.056	r=.039	r=.055	r=-.004
p			p=0.344	p=0.512	p=0.357	p=0.943

These students had higher scores than the students who used a smartphone and the difference between the groups was statistically significant (t=-2.067; p<.05). When students' self-sufficiency about the devices used in the education process was analyzed in terms of the anxiety mean scores, the trait anxiety mean score of the students with low self-sufficiency was found to be 53.61±7.23. The analysis of the difference between the groups indicated that the students who perceived their skills insufficient had significantly higher anxiety levels (F=4.088; p<.005). İt was found that avoidance from e-learning mean score was 27.90±10.86 in students who perceived their skills highly sufficient. The analysis between the groups indicated that the students who perceived themselves highly sufficient had significantly higher e-learning scores (F=5.132; p=.001).

The variables of age, socioeconomic status, average weekly internet usage time of the students participating in the research do not affect anxiety and e-learning (p>0.05, Table2).

In Table 3, it was determined that there was no statistical relationship between the e-learning scale mean scores and the anxiety scale mean scores (p>0.05).

Table 3. Correlation Analysis Results between the State-Trait Anxiety Inventory and General Attitude Scale Towards e-Learning (N=284)

Scales		State-Trait Anxiety Inventory	
		State Anxiety	Trait Anxiety
General attitude scale towards e-learning	Tendency towards e-learning	r=.068 p=.252	r=.018 p=0.761
	Avoidance from e-learning	r=-.088 p=0.141	r=-.047 p=0.427

DISCUSSION

COVID-19 has continued to cause more anxiety in many communities as it has spread across the world (Faize and Husain, 2020). Students' higher anxiety levels are somewhat expected to be caused by this global crisis. This study discusses the effect of anxiety levels of students on e-learning with literature.

Students' anxiety levels and e-learning attitudes were found to be above average. E-learning is defined as a type of information technology that can be accessed anywhere and anytime in the form of a website in the teaching and learning process (Rismayani and Soetikno, 2020). Internet forms the infrastructure necessary for e-learning platforms. Before the pandemic, many educational activities such as student enrollment, classroom planning, management of course materials, and the exams and tests had been done online (Wang et al., 2020). A study conducted with university students also reported that students had psychological problems due to inefficient e-learning systems (Hasan and Bao, 2020). Likewise, another study also demonstrated that students had a moderate-level of e-learning attitudes during the COVID-19 pandemic. Moreover, they experienced anxiety and had the fear of disease, thus impairing their psychological condition (Bawaneh, 2021). In many studies conducted with students during the pandemic period, it has been determined that students feel anxiety in this process (Tonkuş ve Bakırhan 2022; Durgun et al. 2021; Cao et al. 2020; Wang et al. 2020). A study conducted during the pandemic reported that online learning and infectious diseases were the main causes of anxiety among university students (Wu et al., 2020). In today's technology age, students inevitably use online tools. Therefore, students' above-average level of e-learning attitudes was somewhat expected. The e-learning problems experienced by students during the pandemic period caused anxiety. On the other hand, students' anxiety levels were moderately affected by factors such as the fear of the disease and lockdowns.

Participating female students' trait anxiety mean scores and tendency towards e-learning levels were found to be higher than their male counterparts. In a study conducted during the pandemic period, unlike

the findings of this study, it was determined, that there was no significant difference between the gender status of the students and their trait anxiety levels (Durgun et al.,2021). A study conducted with midwifery students studying in undergraduate program via distance education reported high levels of readiness for e-learning (Çetintaş Öner et al., 2018). Likewise, another study reported that gender affected the presence of psychological problems in individuals during the pandemic (Losada-Baltar et al., 2021). Compared to male students, female students in Turkey have fewer rights to speak in the family, which might have caused them to experience more anxiety due to being at home with the family during the pandemic. Besides, female students had more willingness to learn than males to gain their insufficient autonomy, which could have increased their levels of tendency to e-learning.

While the grade level was found to affect students' state anxiety levels, e-learning did not affect the grade level. In a study conducted during the pandemic period, it was determined that there was no significant difference between the class status of the students and their trait anxiety levels, unlike the findings of this study (Durgun et al. 2021). Likewise, various studies in the literature have reported no significant differences between students' e-learning and grade level (Bawaneh, 2021; Çetintaş Öner et al., 2018). Since people are living in a technological world, lack of difference between e-learning and grade levels is an expected result. A study conducted with university students during the pandemic reported that the fear of losing a year due to e-learning caused students to experience anxiety (Hasan and Bao, 2020). Since all students continued their educational activities through e-learning due to the pandemic, it did not affect the grade level. On the other hand, 3rd and 4th-year students, who had face-to-face education before the pandemic and started e-learning upon the pandemic, were considered to experience more anxiety due to the fear of losing one year with the changes in the usual learning conditions. Lack of effects of these factors on anxiety is an expected finding in first-year students.

It was found that students' anxiety levels did not change according to the most frequently used electronic device; the students who used a computer for their education had higher e-learning scores compared to those who used a smartphone. In addition, students who found themselves insufficient about the devices used in the education process had high state anxiety levels, and students who found themselves sufficient had higher e-learning levels. E-learning has emerged in line with the technological developments (Bozkurt, 2016). Users are able to access e-learning platforms through electronic devices such as smartphones, tablets, laptops, and desktop computers (Wang et al., 2020). Due to the opportunities offered by online learning environments, all higher education institutions in Turkey started using the e-learning model. Students' anxiety levels were considered not to be affected by the devices because in today's technology age, they are already familiar with using electronic devices. The students who used a computer had higher e-learning scores, which was thought to be associated with the larger screen size and easy use of computers in comparison to smartphones.

The students' socio-demographic characteristics such as age, socio-economic condition, and average weekly internet usage were found to have no effects on the anxiety and e-learning levels. The COVID-19 anxiety in Turkey as in the whole world seems to have more priority. A study conducted during the pandemic reported that various variables (gender, age, negative perceptions about aging, more exposure to the news about COVID-19, fewer positive emotions, poor sleep quality, higher loneliness) caused individuals to experience psychological problems (Losada-Baltar et al., 2021). Another study reported that individuals' psychological condition was affected by age (Krüger-Malpartida et al., 2020). Another study indicated a significant correlation between the period of study for e-learning and anxiety levels (Faize and Husain, 2020). Results of the studies conducted with students during the pandemic have revealed differences, which are associated with the economic conditions and cultural structures in different countries.

In this study, it was determined that the students' anxiety level had no effects on their e-learning levels.

Their anxiety and e-learning levels were affected independently of each other. A study conducted with students during the pandemic demonstrated that the students had lack of focus on e-learning due to factors such as distraction, lack of participation, and mental stress. In addition, increased technical problems such as poor internet connection and limited data plans were also among the challenging factors for this process (Azlan et al., 2020). Students were reported to experience anxiety concerning online learning, exams, and the pandemic (Wu et al., 2020). Studies conducted during the pandemic reported that students experienced technical problems during their education and they had high levels of anxiety (Keskin and Özer Kaya, 2020; Nikčević et al., 2021). In line with the results of this study, it was concluded that the effect of the pandemic on people and the problems caused by e-learning were independent of each other and they had no effects on one another. It is thus recommended that the anxiety caused by the pandemic and the problems experienced in e-learning should be dealt with, solved, and supported independently of each other. The results have also indicated that e-learning is mainly associated with a country's education system and internet infrastructure.

CONCLUSION

Consequently, It was concluded that the students had above-average anxiety levels and e-learning attitudes. Age and class year were concerns, and perceived proficiency in owning a computer and using electronic devices affected e-learning. Anxiety and e-learning levels during the distance education were independent of each other.

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