ORIGINAL ARTICLE

The effect of COVID-19 on fear, anxiety, and sleep in nursing students

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Abstract

Purpose This research was conducted to determine the effect of COVID-19 on fear, anxiety, and sleep in nursing students.
Methods The sample of the study consisted of 1222 students in the 2019–2020 academic year who were members of the student nurses association. The data were collected online via Google Form between June and August 2020 using the student information form containing socio-demographic characteristics, the Generalized Anxiety Disorder 7-Item (GAD-7) Scale, the fear of COVID-19 scale, and the Bergen Insomnia Scale.
Results In our study, the mean score of the fear of COVID-19 scale of nursing students was 18.23 ± 6.31, and it was determined that 51.8% had sleep problems and 70.9% had anxiety (39.9% mild, 20.8% moderate, and 10.2% severe). In simple linear regression analysis, the fear of COVID-19 was found to be statistically significant and positively correlated with anxiety (β: 0.383, $p = 0.001$), and the fear of COVID-19 (β: 0.120, $p = 0.001$) and anxiety (β: 0.346, $p = 0.001$) was found to be statistically significant and positively correlated with sleep.
Conclusion In our study, there is a relationship between nursing students' fear of COVID-19 and anxiety and sleep quality. Accordingly, it is recommended to train students in effective methods for coping with the fear of COVID-19, and to take initiatives to reduce related anxiety and sleep problems.

Keywords Anxiety · COVID-19 · Fear · Nursing students · Sleep

Introduction

The coronavirus disease-19 (COVID-19), which affects the whole world today, has spread rapidly and caused many deaths. High death rates, increasing data on the epidemic, ignorance, and unpredictability of the course of the epidemic have caused severe psychological problems such as fear, helplessness, anxiety, stigma, stress, and depression [1–4]. Considering the high incidence of emotional diseases in university-aged students, it has been predicted that the

psychological effects of COVID-19 will significantly affect the young population [5].

As a result of the quarantine enforced during the epidemic, distance education, uncertainty about the epidemic, and decrease in social interaction have negatively affected the mental health of the students [2, 6, 7]. In the literature, studies show that students in the field of health have a high level of anxiety due to the epidemic [4, 6, 8]. It has been stated that students in the field of health are more likely to encounter patients diagnosed with COVID-19 in hospitals, causing high levels of anxiety [9, 10]. A positive relationship has also been reported between increased knowledge about the virus and high anxiety levels [11].

In the study conducted by Casagrande et al. examining anxiety, depression, and sleep disorders caused by COVID-19, it was reported that these psychological problems are more common in the young population, especially in graduates in the field of health [12].

The videos and articles shared about COVID-19 create high levels of stress, fear, and anxiety, and can also cause sleep problems [12, 13]. The prevalence of sleep disorders in the general population is quite high and is associated

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with significant morbidity and mortality. It is reported that more than half of university students have poor sleep quality, which has worsened during the quarantine period [14]. Changes in sleep patterns negatively affect an individual's activities of daily living, cognitive functions, and quality of life. Providing adequate and balanced sleep is as indispensable as breathing, eating, and excretion in human life, and is extremely important for the protection of health [15].

Methods

Aim

In the literature, there are separate studies on COVID-19 fear, anxiety, and sleep, but there is no study examining these three variables together. Therefore, this research was conducted to determine the effect of COVID-19 on fear, anxiety, and sleep in nursing students.

The research has sought answers to the following questions:

1. What is the COVID-19 fear level in nursing students during the pandemic?
2. Is there a difference between the sociocultural characteristics of nursing students and the fear of COVID-19 during the pandemic?
3. What is the anxiety level of nursing students during the pandemic?
4. Is there a relationship between the sociocultural characteristics of nursing students and anxiety during the pandemic?
5. Is there a relationship between fear of COVID-19 and anxiety in nursing students during the pandemic?
6. What is the sleep quality level of nursing students during the pandemic?
7. Is there a relationship between the sociocultural characteristics of nursing students and sleep during the pandemic?
8. Is there a relationship between the fear of COVID-19 and anxiety levels and sleep in nursing students during the pandemic?

Population and sample of the research

The research was carried out with all student nurses who are members of the student nurse association in Turkey and can be reached online. In the study, it was aimed to reach the whole population of student members of the Student Nurses Association rather than choosing a sample.

A cross-sectional study design was used in the study. Quarantine was in force due to the pandemic on the dates of the study; therefore, the study was conducted through an online survey platform ("Google Forms," Google Inc., CA). Respondents were selected by snowball sampling. The questionnaire link was sent to respondents through social media (Whatsapp, Instagram). The online survey was first disseminated to students in the university where the research was conducted who were then encouraged to forward the link to their contacts. The survey was conducted between June and August 2020.

Inclusion criteria

- Open to communication and cooperation
- No known history of psychiatric illness
- Those who accepted to participate in the study

Exclusion criteria

- Those who use medication that affects sleep quality: antidepressants, antihistamines, diuretics, hypnotics, benzodiazepines, antidepressants, anxiolytics, and narcotic analgesics.

Data collection

The Student Information Form, the fear of COVID-19 scale, the Generalized Anxiety Disorder 7-Item Test (GAD-7), and the Bergen Insomnia Scale (BIS) were used to collect data.

Student information form

The questionnaire, prepared by the researchers, consists of 18 questions focused on the fundamental characteristics of the students and their sleep-related characteristics.

The generalized anxiety disorder 7-item test (GAD-7)

The GAD-7 test was first developed by Spitzer et al. in [16], and its Turkish validity and reliability were performed by Konkan et al. in [17]. The Cronbach's alpha of the Turkish version of the scale was 0.88. The GAD-7 is a short, self-reported test that evaluates generalized anxiety disorder. It is a 7-item, 4-point Likert scale that evaluates the experiences in the last 2 weeks (0 = never, 1 = many days, 2 = more than half of the days, and 3 = almost every day). Total scores from the scale 5, 10, and 15 are cut-off points for mild, moderate, and severe anxiety, respectively. The diagnosis of GAD should be investigated and confirmed by other methods in patients with a total score of 10 or more [17]. In this study, the total Cronbach's alpha coefficient of the scale was 0.91.

The fear of COVID-19 scale

Developed by Ahorsu et al. in [18], the scale has 7 items and is graded as a 5-point Likert type (1: I strongly disagree, 2: I disagree, 3: I am undecided, 4: I agree, and 5: I strongly agree) [18]. The validity and reliability study of the Turkish version of the scale was conducted by Satici et al. in [19]. The Cronbach's alpha of the Turkish version of the scale was 0.82. The lowest possible score from the one-dimensional scale without reverse items is 7, and the highest is 35. As the score obtained from the scale increases, so does the level of fear [18]. In this study, the total Cronbach's alpha coefficient of the scale was 0.90.

Bergen insomnia scale (BIS)

The scale, consisting of 6 questions measuring different symptoms of insomnia, was developed by Pallesen in 2008. Participants indicate the number of days per week on which they have experienced some form of sleep problem during the past month on an 8-point scale ranging between 0 and 7. The lowest score that can be obtained from the scale is 0, and the highest is 42. According to the DSM-5 diagnostic criteria, a score of 3 or more from at least one of the first three questions and, in addition to this, a score of three or more from at least one of the last two questions is considered to indicate insomnia [20]. The validity and reliability of the Turkish form of the scale was tested by Bay and Ergün in [21]. The Cronbach's alpha of the Turkish version of the scale was 0.79. In this study, the total Cronbach's alpha coefficient of the scale was 0.86.

Evaluation of data

The data obtained from the research were evaluated using the IBM SPSS Statistics 22.0 package program (IBM Corp., Armonk, NY, USA).

Socio-demographic data is given as numbers, mean, percentage, and standard deviation. The normality analysis of the numerical data in the study was evaluated with the Kolmogorov–Smirnov test. In this respect, according to the results of the test (fear of COVID-19 scale: Kolmogorov–Smirnov = 0.059, $p < 0.05$; GAD-7: Kolmogorov–Smirnov = 0.118, $p < 0.05$), it is seen that the scales are not normally distributed. Therefore, the Mann–Whitney U test and Kruskal–Wallis test were used to compare the variables affecting the mean score of the fear of COVID-19 scale and the Generalized Anxiety Disorder 7-Item (GAD-7) test. According to the participants' socio-demographic variables, BIS scores were evaluated with the chi-square test. At the same time, regression analysis was used to examine the fear of COVID-19 scale and GAD-7 test scores on BLS scores in the study. In this statistical analysis, the level of significance was determined as $p < 0.05$.

Results

In our study, it was found that the average age of the nursing students was 21.44, 82.9% were female, 37.5% of them were in the 4th grade, 97.6% were single, 56.7% lived in the city center, 94.9% lived with their family, 80.4% did not smoke, 78.2% did not drink alcohol, 92.6% had no chronic disease, 87.3% complied with the COVID-19 precautions, and 90.5% had no family members or relatives diagnosed with COVID-19 (Table 1).

The mean score of the fear of COVID-19 scale of the nursing students participating in our study was found to be 18.23 ± 6.31. Women (18.89 ± 6.20) and those with chronic diseases (20.47 ± 6.81) had higher COVID fear scale scores ($p < 0.05$) (Table 2).

It was determined that 70.9% of the students experienced anxiety (39.9% mild, 20.8% moderate, and 10.2% severe). In addition, higher anxiety levels were found for those who were women, were in the 1st grade, stopped smoking (9.67 ± 5.83), stopped drinking alcohol (8.91 ± 5.66), have chronic diseases (9.45 ± 5.19), use regular drugs (8.48 ± 5.07), do not comply with the COVID-19 precautions, and whose relatives were diagnosed with COVID-19 (Table 2). It was found that 51.8% of the nursing students had sleep problems.

In our study, fear of COVID was found to predict anxiety and insomnia significantly and positively (R^2 0.383, $p = 0.001$) (Table 3).

Discussion

Fear of COVID-19 in nursing students during the pandemic

Measuring the fear of COVID-19 has an important role in understanding the effects of the pandemic on mental health, reducing the possible psychological problems that may develop due to the pandemic, and designing interventions to reduce the fear of COVID-19 [2]. In a meta-analysis conducted by Luo et al. 44 articles were reviewed (n: 52,462), and the mean COVID-19 fear level was found to be 18.57 [22]. Consistent with the literature, in our study, it was found that the mean score of the students on the fear of COVID-19 scale was 18.23 ± 6.31. In other studies, it was found that the COVID-19 fear level of nursing students was moderate and high [23–27]. In the study by Beisland et al. nursing students' COVID-19 fear level was found to be higher than in the general population [2]. National and international studies

Table 1 Descriptive characteristics of students (*n*: 1222)

Descriptive characteristics	Mean ± SD (min–max)	
Age (years)	21.44 ± 2.14 (18–40)	
	n	%
Gender		
Female	1013	82.9
Male	209	17.1
Grade		
1	210	17.2
2	270	22.1
3	284	23.2
4	458	37.5
Maritial status		
Single	1193	97.6
Married	29	2.4
Where he lives		
Province	693	56.7
District	331	27.1
Town/village	198	16.2
Who lives with		
Family	1160	94.9
Relative/friend	44	3.6
Alone	18	1.5
Does she smoke?		
Yes	982	80.4
No	128	10.5
Quit smoking	112	9.2
Does she use alcohol?		
Yes	962x	78.7
No	125	10.2
Quit smoking	135	11.2
Do you have any chronic diseases?		
Yes	90	7.4
No	1132	92.6
Do you take regular medication?		
Yes	108	8.8
No	1114	91.2
Are you complying with the precautions taken due to Covid-19?		
Yes	1067	87.3
No	155	12.7
Do you have someone close to you who has been diagnosed with Covid-19?		
Yes	116	9.5
No	1106	90.5

Min minimum, *Max* maximum, *SD* standard deviation

reveal that the fear of COVID-19 is universal among nursing students. In the study by De Los Santos et al. it was found that the fear of COVID-19 increases the tendency of students to drop out of school [23]. Thus, it is important to detect this fear as early as possible to minimize adjustment problems, depression, irritability, anxiety, and anger.

Since women are perceived as more vulnerable, weaker, and more fragile in terms of gender in our culture, it is more culturally acceptable for women to be sick and to talk about their illness, complaints, and fears. Men, on the other hand, are perceived as more courageous and stronger due to their gender roles, so voicing their health problems and fears is interpreted as weakness [1]. The higher fear levels of female students than those of males in our study may be due to the cultural structure. This finding can also be interpreted as meaning that men are less sensitive to health than women. Similarly, other studies conducted with nursing students indicated the fear levels of female students were significantly higher.

In our study, the fear levels of students with chronic diseases were found to be significantly higher. During the pandemic process, all information sources emphasized that COVID-19 has a greater effect on people with chronic health problems, and it has been reported that having one or more chronic health problems increases the death rate [1]. Such information may have naturally played a role in increasing the COVID-19 fear levels of students with any chronic disease in our study.

In the study by Medina Fernández et al. insufficient knowledge of COVID-19 and high stress levels caused high levels of fear in nursing students [28]. In our study, significantly higher fear levels were found for students reporting inadequate information about COVID-19. Insufficient information may have increased the fear, as it will bring uncertainty and obscurity about the future.

Anxiety in nursing students during the pandemic

The emergence of mental symptoms and complaints is inevitable because of the lack of an effective treatment for the COVID-19 disease, the increase in the number of cases, the hindrance of the disease in interpersonal social relations, and the changes in daily routines [7, 24]. In the literature, it is reported that the rate of students with high stress levels during the quarantine increased 6 times compared to the pre-quarantine period, and that the rate of moderate to severe anxiety and depression increased approximately 3 to 4 times [7]. In our study, 70.9% of the students experienced anxiety (39.9% mild, 20.8% moderate, and 10.2% severe). In the study by Savitsky et al. the level of anxiety in nursing students was high during the pandemic process (42.8% moderate anxiety and 13.1% severe anxiety) [8]. In the study conducted by Kuru Alici and Ozturk Copur, 3% of the students reported low level anxiety, 39.2% moderate anxiety, and 51.5% severe anxiety [24]. In the study by Deo et al. it was found that 71.7% of the students had normal anxiety levels, 14.3% had mild anxiety, 10.32% had moderate anxiety, 3.2% had severe anxiety, and 0.5% had extremely severe anxiety [29]. In the study by Cici and Yilmazer, due to the

Table 2 Scale score averages according to the descriptive characteristics of the students (*n*: 1222)

		The fear of COVID-19 scale	The Generalized Anxiety Disorder 7-Item Test	Bergen Insomnia Scale	
		Mean ± SD	Mean ± SD	x^2	*p*
Gender	Female	18.89 ± 6.20	7.86 ± 5.18	11.458[a]	0.01
	Male	15.04 ± 5.87	6.11 ± 4.58		
	mwu; *p*	68612.500; 0.01	84740.500; 0.01		
Grade	1	18.19 ± 6.11	8.49 ± 5.24	5.428[a]	0.14
	2	19.01 ± 6.39	8.01 ± 5.15		
	3	17.70 ± 6.03	7.41 ± 5.38		
	4	18.12 ± 6.50	6.97 ± 4.82		
	kwx²; *p*	7.239; 0.06	14.793; 0.02		
Where he lives	Province	18.44 ± 6.44	7.75 ± 5.17	3.311[a]	0.19
	District	17.65 ± 5.95	7.09 ± 4.82		
	Town/village	18.48 ± 6.54	7.68 ± 5.42		
	kwx²; *p*	3.374; 1.18	3.561; 1.69		
Who lives with	Family	18.31 ± 6.29	7.63 ± 5.16	2.607[a]	0.27
	Relative/friend	17.36 ± 6.65	6.75 ± 4.16		
	Alone	15.50 ± 5.96	5.00 ± 4.61		
	kwx²; *p*	4.694; 0.09	5.522; 0.06		
	mwu; *p*	129578.000; 0.07	129210.000; 0.06		
Marital status	Married	19.65 ± 6.32	5.06 ± 5.25	.148[a]	0.70
	Single	18.20 ± 6.31	7.62 ± 5.11		
	mwu; *p*	15158.000; 0.25	11987.000; 0.05		
Does she smoke?	Yes	17.42 ± 6.46	8.88 ± 5.37	21.166[a]	0.01
	No	18.24 ± 6.24	7.15 ± 4.92		
	Quit smoking	19.09 ± 6.66	9.67 ± 5.83		
	kwx²; *p*	3.894; 0.14	32.155; 0.01		
Does she use alcohol?	Yes	17.91 ± 6.17	8.00 ± 5.16	9.959[a]	0.07
	No	18.27 ± 6.35	7.32 ± 5.01		
	Quit smoking	18.26 ± 6.19	8.91 ± 5.66		
	kwx²; *p*	.360; 0.83	12.026; 0.02		
Do you have any chronic diseases?	Yes	20.47 ± 6.81	9.45 ± 5.19	.922[a]	0.33
	No	18.05 ± 6.24	7.41 ± 5.07		
	mwu; *p*	41035.000; 0.02	39775.500; 0.01		
Do you take regular medication?	Yes	18.44 ± 6.32	8.48 ± 5.07	.045[a]	0.83
	No	18.21 ± 6.31	7.47 ± 5.17		
	mwu; *p*	59404.500; 0.83	53038.000; 0.04		
Are you complying with the precautions taken due to Covid-19?	Yes	18.18 ± 6.38	7.45 ± 5.20	.656[a]	0.41
	No	18.62 ± 5.82	8.35 ± 4.51		
	mwu; *p*	78567.500; 0.31	70431.500; 0.03		
Do you have someone close to you who has been diagnosed with Covid-19?	Yes	19.03 ± 7.18	8.75 ± 5.87	3.030[a]	0.82
	No	18.15 ± 6.21	7.44 ± 5.03		
	mwu; *p*	60178.500; 0.27	55937.000; 0.02		

SD standard deviation, *mwu* Mann–Whitney U test, *kwx2* Kruskal–Wallis test, x^2 chi square; $p < 0.005$

[a]Yates corrected

COVID-19, more than half of the student nurses were found to have increased anxiety pandemic, and their perspectives on the profession showed a negative trend [10]. Anxiety negatively affects quality of life, educational performance, and clinical practice; therefore, early detection and necessary precautions are important.

In our study, significantly higher anxiety levels were found for students who were female, at the 1st grade, had

Table 3 Factors affecting students' sleep status ($n = 1222$)

Independent variable	Bergen Insomnia Scale				
	B	SH	β	t	p*
Constant	1.090	0.40		27.039	0.001
The fear of COVID-19 scale	0.010	0.002	0.120	4.236	0.001
The Generalized Anxiety Disorder 7-Item Test	0.034	0.003	0.346	12.198	0.001
R	0.383				
R^2					
F	210.034				
p*	0.001				

β beta, *SD* standard deviation

*$p < 0.05$

a chronic illness, had a relative (relative, friend, etc.) diagnosed with COVID-19, and those who did not comply with COVID-19 precautions The significantly higher fear scores for female students and students with chronic diseases result in higher level of anxiety for these groups. Similar to our study, in the studies conducted, significantly high anxiety levels were found for students who are female [8, 24], in their 1st year [24], and those whose relatives were diagnosed with COVID-19 [6, 8, 24].

Fear of COVID-19 and anxiety in nursing students during the pandemic

In our study, a positive relationship was found between the fear of COVID-19 and the anxiety of nursing students; similarly, Yazici and Ökten reported that anxiety levels increased significantly as fear of COVID-19 increased [27]. As in the other studies, anxiety scores were found to be significantly higher in students in fear of being infected by COVID-19 [8, 10].

Sleep in nursing students during the pandemic

In Mulyadi et al.'s meta-analysis, it was reported that about a quarter (27%) of nursing students experienced sleep disturbances during COVID-19. Since sleep problems can lead to mental health problems such as anxiety, stress, depression, and correspondingly, mental health problems can cause sleep problems, it is important to screen individuals at high risk, such as nursing students, for these problems and to take the necessary precautions through early detection [30]. Deo et al. found that 52.7% of nursing students were found to have insomnia [29], and Kochuvilayil et al. found that 46.4% of nursing students had difficulty sleeping [3].

In our study, half of the students reported sleep problems, and it was determined that the fear and anxiety they experienced negatively affected their sleep. De Los Santos

et al. concluded that the sleep quality of nursing students was moderate and was negatively affected by the fear of COVID-19 [23]. In the study by Köktürk Daracalı et al. it was found that the students had moderate anxiety levels and sleep quality, 28.2% had interrupted sleep, and there was a positive correlation between anxiety and sleep quality [13].

Conclusion and recommendations

In our study, it was found that COVID-19 caused fear, anxiety, and insomnia problems in students, and that the fear of COVID-19 increased students' anxiety and sleep problems. Our study determined that these problems were experienced during the pandemic process, and it has therefore formed the basis for evidence-based applied studies to prevent these problems.

In line with our results, these problems may adversely affect nursing students' educational life, and it has been suggested that clinical environments should be designed so as to reduce students' fear and anxiety during clinical practices; training should be given to help students to protect themselves, and evidence-based studies should be conducted to reduce these problems.

Strengths and limitations

There is no study in the literature examining the fear of COVID-19, anxiety, and sleep levels of nursing students. The large sample size of nursing students in our study increases the generalizability of our findings. The profession of nursing requires gaining practical experience in care during studentship. Like other healthcare professionals, during their education, nursing students have to deal with many challenges during the pandemic process as they are in one-to-one communication with patients in clinical practices. For this reason, it is important to determine the problems that they face in this process and to develop their coping skills. This study provides evidence for the fear of COVID-19, anxiety, and sleep problems experienced by nursing students, and provides basic data for future studies.

Since our study was conducted among Turkish nursing students, our study results can only be generalized to the Turkish population.

Declarations

References

1. Bakioglu F, Korkmaz O, Ercan H (2021) Fear of COVID-19 and positivity: mediating role of intolerance of uncertainty, depression, anxiety, and stress. Int J Ment Health Addict 19(6):2369–2382

2. Beisland EG, Gjeilo KH, Andersen JR et al (2021) Quality of life and fear of COVID-19 in 2600 baccalaureate nursing students at five universities: a cross-sectional study. Health Qual Life Outcomes 19(1):198

3. Kochuvilayil T, Fernandez RS, Moxham LJ et al (2021) COVID-19: knowledge, anxiety, academic concerns and preventative behaviours among Australian and Indian undergraduate nursing students: a cross-sectional study. J Clin Nurs 30(5–6):882–891

4. Wang C, Zhao H (2020) The impact of COVID-19 on anxiety in Chinese university students. Front Psychol 22(11):1168

5. Odriozola-González P, Planchuelo-Gómez Á, Irurtia MJ, de Luis-García R (2020) Psychological effects of the COVID-19 outbreak and lockdown among students and workers of a Spanish university. Psychiatry Res 290:113108

6. Fitzgerald A, Konrad S (2021) Transition in learning during COVID-19: student nurse anxiety, stress, and resource support. Nurs Forum 56(2):298–304

7. Kim SC, Sloan C, Montejano A, Quiban C (2021) Impacts of coping mechanisms on nursing students' mental health during COVID-19 lockdown: a cross-sectional survey. Nurs Rep 11(1):36–44

8. Savitsky B, Findling Y, Ereli A, Hendel T (2020) Anxiety and coping strategies among nursing students during the covid-19 pandemic. Nurse Educ Pract 46:102809

9. Cao W, Fang Z, Hou G et al (2020) The psychological impact of the COVID-19 epidemic on college students in China. Psychiatry Res 287:112934

10. Cici R, Yilmazel G (2021) Determination of anxiety levels and perspectives on the nursing profession among candidate nurses with relation to the COVID-19 pandemic. Perspect Psychiatr Care 57(1):358–362

11. Lei L, Huang X, Zhang S et al (2020) Comparison of prevalence and associated factors of anxiety and depression among people affected by versus people unaffected by quarantine during the COVID-19 epidemic in southwestern China. Med Sci Monit 26:e924609-1-e924609-12

12. Casagrande M, Favieri F, Tambelli R, Forte G (2020) The enemy who sealed the world: effects quarantine due to the COVID-19 on sleep quality, anxiety, and psychological distress in the Italian population. Sleep Med 75:12–20

13. Köktürk Dalcalı B, Durgun H, Taş AS (2021) Anxiety levels and sleep quality in nursing students during the COVID-19 pandemic. Perspect Psychiatr Care 57(4):1999–2005

14. Romero-Blanco C, Rodríguez-Almagro J, Onieva-Zafra MD et al (2020) Sleep pattern changes in nursing students during the COVID-19 lockdown. Int J Environ Res Public Health 17(14):5222

15. Çilingir D, Hintistan S, Ergene O (2016) Factors affecting the sleep status of surgical and medical patients at a university hospital of Turkey. J Pak Med Assoc 66(12):1535–1540

16. Spitzer RL, Kroenke K, Williams JB, Löwe B (2006) A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Intern Med 166:1092–1097

17. Konkan R, Senormancı O, Guclu O et al (2013) Validity and reliability study for the Turkish adaptation of the Generalized Anxiety Disorder-7 (GAD-7) Scale. Noropsikiyatri Arsivi-Archives of Neuropsychiatry 50:53–58

18. Ahorsu DK, Lin CY, Imani V et al (2020) The fear of COVID-19 scale: development and initial validation. Int J Ment Health Addict 27:1–9

19. Satici B, Gocet-Tekin E, Deniz ME, Satici SA (2020) Adaptation of the fear of COVID-19 scale: its association with psychological distress and life satisfaction in Turkey. Int J Ment Health Addict 19(6):1980–1988

20. Pallesen S, Bjorvatn B, Nordhus IH et al (2008) A new scale for measuring insomnia: the Bergen Insomnia Scale. Percept Mot Skills 107:691–706

21. Bay T, Ergun A (2018) Validity and reliability of Bergen Insomnia Scale (BIS) among adolescents. Clin Exp Health 8:268–275

22. Luo F, Ghanei Gheshlagh R, Dalvand S et al (2021) Systematic review and meta-analysis of fear of COVID-19. Front Psychol 12:661078

23. De Los Santos JAA, Labrague LJ, Falguera CC (2022) Fear of COVID-19, poor quality of sleep, irritability, and intention to quit school among nursing students: a cross-sectional study. Perspect Psychiatr Care 58(1):71–78

24. Kuru Alici N, Ozturk Copur E (2021) Anxiety and fear of COVID-19 among nursing students during the COVID-19 pandemic: a descriptive correlation study. Perspect Psychiatr Care 58(1):141–148

25. Martínez-Lorca M, Martínez-Lorca A, Criado-Álvarez JJ et al (2020) The fear of COVID-19 scale: validation in spanish university students. Psychiatry Res 293:113350

26. Nehir S, Güngör Tavşanlı N (2021) Covid-19 pandemisinin hemşire ve ebe öğrencilerin korku ve kontrol algısı üzerindeki etkisi. Med Sci 16(2):141–150

27. Yazici HGN, Ökten Ç (2022) Nursing students' clinical practices during the COVID-19 pandemic: fear of COVID-19 and anxiety levels. Nurs Forum 57(2):298–304

28. Medina Fernández IA, Carreño Moreno S, Chaparro Díaz L et al (2021) Fear, stress, and knowledge regarding COVID-19 in nursing students and recent graduates in Mexico. Invest Educ Enferm 39(1):e05

29. Deo PK, Budhathoki S, Raut J et al (2020) Factors associated with perceived stress, anxiety, depression, insomnia during COVID-19 outbreak among nursing students. Int J Sci Res 9(9):23–29

30. Mulyadi M, Tonapa SI, Luneto S et al (2021) Prevalence of mental health problems and sleep disturbances in nursing students during the COVID-19 pandemic: a systematic review and meta-analysis. Nurse Educ Pract 57:103228