



## Original Article

# The relationship between psychological resilience, perceived stress, and anxiety levels of nursing students during the COVID-19 pandemic process

Hamide Nur Çevik Özdemir,<sup>1</sup> Pakize Özyürek,<sup>1</sup> İbrahim Kılıç<sup>2</sup>

<sup>1</sup>Department of Nursing, Faculty of Health Science, Afyonkarahisar Health Sciences University, Afyonkarahisar, Türkiye

<sup>2</sup>Department of Biostatistics, Faculty of Veterinary Medicine, Afyon Kocatepe University, Afyonkarahisar, Türkiye

### Abstract

**Objectives:** This study was conducted to determine the psychological resilience, perceived stress, and anxiety levels of nursing students during the coronavirus disease (COVID-19) pandemic and to examine the relationships between these concepts.

**Methods:** A total of 315 students studying in the nursing department of the Faculty of Health Sciences participated in this descriptive and correlational study. The data were evaluated using an introductory information form, the Brief Resilience Scale (BRS), Perceived Stress Scale (PSS), and Generalized Anxiety Disorder 7-item (GAD-7) scale. Frequency, percentage, t-test, analysis of variance, correlation analysis, and clustering analysis were used to analyze the data.

**Results:** Nursing students' BRS ( $X \pm SD = 3.10 \pm 0.88$ ), PSS ( $2.99 \pm 0.62$ ), and GAD-7 ( $1.07 \pm 0.78$ ) scores were intermediate. Negative and strong ( $r = -0.624$ ), positive and strong ( $r = 0.605$ ), and negative and moderate ( $r = -0.530$ ) correlations were found between psychological resilience and perceived stress, perceived stress and anxiety, and psychological resilience and anxiety, respectively. Additionally, BRS, PSS, and GAD-7 scores differed remarkably according to students' individual characteristics. The students were divided into four groups in terms of the BRS, PSS, and GAD-7: feeble, frontier, passable, and sturdy.

**Conclusion:** The results of the study showed that nursing students, especially in the feeble and frontier groups, were at risk of psychological resilience, perceived stress, and anxiety during the COVID-19 pandemic process. Empowerment programs should be prepared to support and encourage nursing students during this challenging period, and longitudinal studies should be planned with larger sample groups.

**Keywords:** Anxiety; COVID-19; resilience; nursing students; stress.

On March 11, 2020, the World Health Organization declared the novel coronavirus disease (COVID-19) a global pandemic.<sup>[1]</sup> With the onset of COVID-19 period, many governments had to take various measures, such as social distance rules, curfews, quarantine regulations, and changes in working hours, to reduce the spread of the virus, which is highly contagious.<sup>[1,2]</sup> In many parts of the world, face-to-face education activities have been suspended and distance education has been replaced.<sup>[3]</sup>

In many European countries and Turkey, programs with direct clinical applications such as nursing faculty, were forced to interrupt their patient and hospital-based training in clinics and practices during this process.<sup>[4,5]</sup> However, the rapid increase in the number of cases and the insufficiency of the number of health personnel has caused an increase in the workforce in hospitals. Therefore, students in nursing faculties have also started to be employed in health institutions.<sup>[3,4]</sup>

**Address for correspondence:** Hamide Nur Çevik Özdemir, Afyonkarahisar Health Sciences University, Afyonkarahisar, Türkiye

**Phone:** +90 272 246 28 34 **E-mail:** hamidenur43@hotmail.com **ORCID:** 0000-0002-1199-8801

**Submitted Date:** November 06, 2021 **Revised Date:** September 17, 2022 **Accepted Date:** October 16, 2022 **Available Online Date:** June 15, 2023

©Copyright 2023 by Journal of Psychiatric Nursing - Available online at [www.phdergi.org](http://www.phdergi.org)



**What is presently known on this subject?**

- Public health emergencies substantially affect the mental health of nursing students.

**What does this article add to the existing knowledge?**

- This study reveals that the psychological resilience, perceived stress, and anxiety levels of nursing students are moderate during the COVID-19 pandemic process, and shows that it is necessary to prepare empowerment and intervention guidance programs for students.

**What are the implications for practice?**

- The results of this study show that nursing students' concerns about the COVID-19 pandemic are related to their sociodemographic and personal characteristics as well as the presence of COVID-19 in their family members and personal hygiene. The results of this study, which reveal the resilience levels and social support needs of nursing students who are faced with a global health problem for the first time, can be a guide for future studies.

In Israel, >1600 nursing students have voluntarily worked in hospitals and community health centers to support the need for staff in healthcare institutions.<sup>[6]</sup> In countries such as UK and USA, nursing students were asked to return to practice and be active in hospitals from the second year of their undergraduate programs to support healthcare professionals with the increasing number of patients in national health services.<sup>[4]</sup> Similarly, in some nursing faculties in Türkiye, it was found appropriate for intern nursing students to do clinical practice.<sup>[5]</sup>

The intense demand for nursing students during the pandemic process caused anxiety and stress in students, causing them to experience the confusion of thoughts and feelings.<sup>[4]</sup> Health problems such as depression, fear, and post-traumatic stress disorder were observed in university students who continued their education during the pandemic period.<sup>[7]</sup> In a study, it was reported that 42.8% and 13.1% of nursing students experienced moderate and severe anxiety, respectively, during the pandemic process.<sup>[6]</sup> Senior nursing students in Spain have expressed fear of becoming infected and infecting family members.<sup>[8]</sup> It is stated in the literature that global public health problems can have many psychological effects on nursing students such as anxiety, fear, and concern.<sup>[6,9,10]</sup> In the literature review, no study has evaluated the psychological resilience, perceived stress, and anxiety of nursing students during the pandemic using cluster analysis. In light of this information, it is thought that determining the psychological resilience levels and mental health problems of nursing students who encounter global health problems for the first time and continue their clinical practice will contribute to the literature. Therefore, this study aimed to determine the psychological resilience, perceived stress, and anxiety levels of nursing students during the COVID-19 pandemic and to examine the relationships between them. The framework of this aim and answers to the following questions were sought in this study: Is there a remarkable relationship between psychological resilience and perceived stress levels among nursing students? Is there a remarkable relationship between perceived stress and anxiety levels among nursing students?

Is there a remarkable relationship between the psychological resilience and anxiety levels among nursing students?

## Materials and Method

### Study Design

This was a descriptive and correlation study.

### Research Population and Sample

The study population consisted of 484 students studying at Afyonkarahisar Health Sciences University, Faculty of Health Sciences, Nursing Department. The sampling method (stratified sampling method) was used in the study owing to time and cost constraints. The minimum sample size was calculated using the formula  $(n = s^2 \cdot Z_{\alpha/2}^2 / d^2)$ .<sup>[11]</sup> Accordingly, as a result of the pilot study of 30 participants, the standard deviation, significance level, and effect size were 1, 0.05, and 0.1, respectively, and the minimum sample size was calculated as 241. Accordingly, 325 questionnaires were administered, of which 315 were analyzed considering incomplete and erroneous data.

### Data Collection Process

The data for this study were collected between September 2 and November 2, 2020, as an online survey due to the distance education format resulting from pandemic conditions. The questionnaire was administered to nursing students with a link created through Google forms. Students were invited to answer the survey via e-mail. Online permission was obtained from the participants by informing them about the purpose, duration, survey forms, and voluntary basis of their participation in this research. The link address of this study questionnaire was sent to participants who agreed to fill it out. The data collection form consisted of four parts: the personal information form, Brief Resilience Scale (BRS), Perceived Stress Scale (PSS), and Generalized Anxiety Disorder 7-item (GAD-7). Each participant took approximately 10–12 min to answer the questionnaire.

### Data Collection Tools

**Personal Information Form:** The data collection form, which was prepared by the researchers in line with the literature,<sup>[3,6]</sup> included 15 questions to determine the demographics (age, gender, class, place of residence, etc.) and some individual characteristics related to COVID-19.

**BRS:** To determine the psychological resilience levels of the participants, the BRS, consisting of six items and one dimension developed by Smith et al.<sup>[12]</sup> and adapted to Turkish by Doğan,<sup>[13]</sup> was used. Each item on this scale was subjected to a 5-point Likert-type grading and scored as follows: 1, strongly disagree; 2, disagree; 3, neutral; 4, agree; and 5, strongly agree. Items 2, 4, and 6 on the scale are coded in reverse. The minimum and maximum scores that can be obtained from the scale are 6 (1×6) and 30 (5×6), respectively. In the evaluation of the scale according to the Likert rating, scores of 1.00–2.99,

3.00–4.30, and 4.31–5.00 are defined as low-, normal-, and high-level resilience, respectively. Cronbach's alpha coefficients for reliability were 0.830 and 0.826 in the Turkish adaptation study<sup>[13]</sup> of the scale and this study, respectively.

**PSS:** To evaluate the stress perceptions of individuals, the PSS developed by Cohen et al.,<sup>[14]</sup> with 14 items and 2 subdimensions, which was adapted to Turkish by Eskin et al.,<sup>[15]</sup> was used. Each item on this scale was scored on a 5-point Likert-type scale and scored as follows: 0, never; 1, almost never; 2, sometimes; 3, fairly often; and 4, very often. The minimum and maximum scores that can be obtained from the scale are 0 (0×14) and 56 (4×14), respectively. In the evaluation of the total score of the scale, scores of 0–14, 15–28, 29–42, and 43–56 are considered low-, medium-, high-intermediate-, and high-level perceived stress, respectively, the Cronbach's alpha coefficients were calculated to be 0.840 and 0.873, respectively.<sup>[15]</sup>

**GAD-7 scale:** GAD-7, consisting of seven items and one dimension, developed by Spitzer et al.<sup>[16]</sup> and adapted by Konkan et al.,<sup>[17]</sup> was used to determine the anxiety levels of individuals. Each item on this scale was scored on a 4-point Likert-type scale and scored as follows: 0, not at all; 1, several days; 2, more than half the days; and 3, nearly every day. The minimum and maximum scores that can be obtained from the scale are 0 (0×7) and 21 (3×7), respectively. In the evaluation of the total score of the scale, anxiety was evaluated as mild, moderate, high, and severe between 0 and 4, between 5 and 9, between 10 and 14, and between 15 and 21, respectively.<sup>[17]</sup> Cronbach's alpha coefficients were calculated as 0.852 and 0.891 in the Turkish version<sup>[17]</sup> of the scale and this study, respectively.

### Ethical Considerations

For the study to be implemented, first of all, permission from the Ministry of Health General Directorate of Health Services Scientific Research Platform (2020-05-10T00-00-24) and research permission from the Afyonkarahisar Health Sciences University Scientific Research Ethics Committee (Decision no: 2020/37) and Afyonkarahisar Health Sciences University Faculty of Health Sciences were obtained. This study was conducted in accordance with the principles of the Declaration of Helsinki.

### Statistical Analysis

The frequency and percentage distribution of the individual characteristics of nursing students were calculated in this study. Explanatory factor analysis was performed for the construct validity of the scales, and internal consistency values for the reliability analysis were calculated using Cronbach's alpha coefficient. Additionally, each scale and subscale is described using mean and standard deviation values. In this study, the conformity of the data to the normal distribution was evaluated using the Kolmogorov–Smirnov test, which was found to be suitable for a normal distribution. For this reason, a t-test and one-way analysis of variance were applied to the samples independent of parametric tests to compare students' BRS, PSS, and GAD-7 levels according to individual characteristics.

Moreover, the relationships between psychological resilience, perceived stress, and anxiety were determined using Pearson's correlation analysis. Students were classified according to their psychological resilience, perceived stress, and anxiety levels using Ward's hierarchical clustering method. Quadratic Euclidean distance was used as the distance criterion. One-way ANOVA was used to determine whether there was a substantial difference between the obtained clusters, and the Tukey test, a multiple comparison method, was used for paired comparisons. The findings were evaluated at a significance level of  $p < 0.05$ .

## Results

The average age of the nursing students was  $20.95 \pm 1.77$  ( $\pm$ SD). The distribution of students according to certain individual characteristics is shown in Table 1. According to Table 1, 82.9% of the students were women and 83.8% were health and vocational high school graduates. Of these students, 31.4% were in their third academic year. The income of 73.0% of the students' families was equal to their expenses, and 77.5% lived in the province and district during the pandemic process. Of the students, 90.2% did not have a chronic disease and 68.3% reported that they follow websites as their main source of information.

The descriptive statistics of the students related to COVID-19 are presented in Table 2. Only three nursing students were infected with COVID-19, and family members of 9.2% of the students had been infected. Of the students, 76.5% reported that they were worried about being infected with the virus.

The factor analysis (eigenvalues and variance explanation ratio), Cronbach's alpha coefficients, and arithmetic mean and standard deviation values of the BRS, PSS, and GAD-7 scales used in the study are presented in Table 3. The Kaiser–Meyer–Olkin and Bartlett's test results for all scales revealed that factor analysis was applicable and that the sample size was sufficient. Conversely, all Cronbach's alpha values calculated for the internal consistency of all scales and subscales were above 0.70, indicating that the reliability levels of the scales were high.

As a result of the applied factor analysis, the PSS eigenvalue was gathered under two factors (perceived insufficient self-efficacy and perceived stress–distress), which explained 61.98% of the total variance. The arithmetic averages in Table 3 indicate that the students' general psychological resilience ( $=3.10$ ) was at a normal level, and their general perceived stress ( $=2.99$ ) and general anxiety ( $=1.07$ ) levels were moderate.

The results of the Pearson's correlation analysis applied to the relationship between students' psychological resilience, perceived stress, and anxiety levels are shown in Table 4. All the correlation coefficients between perceived stress and its subscales, psychological resilience, and anxiety, were statistically significant ( $p < 0.01$ ). When the correlation coefficients were examined, a negative and strong ( $0.60 \leq r \leq 0.79$ ) relation-

**Table 1. Distribution of the participants according to socio-demographical characteristics**

Variable	Group	n	%	Variable	Group	n	%
Gender	Female	261	82.9	Living arrangements	Family	299	94.9
	Male	54	17.1		Other	16	5.1
High school graduation (HS)	Health H.S.	64	20.3	Place of residence	Province	152	48.3
	Vocational H.S.	200	63.5		District	92	29.2
	Other	51	16.2		Village/Town	71	22.5
Academic year	1	81	25.7	Smoking	Yes	26	8.3
	2	57	18.1		No	289	91.7
	3	99	31.4	Chronic disease	Yes	31	9.8
	4	78	24.8		No	284	90.2
Income status	< Expenses	41	13.0	Event follow-up	News	100	31.7
	= Expenses	230	73.0				
Internet	80	25.4					
	> Expenses	44	14.0	MoH website	135	42.9	
				TOTAL	315	100.0	

**Table 2. Distribution of participants' characteristics related to COVID-19**

Variable	Group	n	%
Cov-19 infection status	Yes	3	1.0
	No	312	99.0
Infection of family members with Cov-19	Yes	29	9.2
	No	286	90.8
Having a health problem in the last 1 month	Yes	55	17.5
	No	260	82.5
Worrying about being infected with Cov-19	Yes	241	76.5
	Partly	74	23.5
Attention to personal hygiene	Yes	226	71.7
	Partly	76	24.1
	No	13	4.1
Follow-up status regarding Covid-19	Yes	244	77.5
	Partly	71	22.6
TOTAL		315	100.0

ship between psychological resilience and perceived stress ( $r=-0.624$ ;  $p<0.05$ ) and a positive and strong ( $0.60 \leq r \leq 0.79$ ) relationship between perceived stress and anxiety ( $r=0.605$ ;  $p<0.05$ ) were determined. This result revealed that as the students' perceived stress levels increased, their anxiety levels also increased substantially. A negative and moderate relationship ( $r=-0.530$ ;  $p<0.05$ ) was found between psychological resilience and anxiety.

The results of the t-test and analysis of variance performed to compare the BRS, PSS, and GAD-7 levels of nursing students

(Table 5) according to their sociodemographic characteristics showed that there were remarkable differences according to some individual variables. Anxiety ( $=1.12$ ) and perceived stress ( $=3.04$ ) levels of women were higher than those of men, and their psychological resilience ( $=3.03$ ) was lower. It was determined that fourth-year students ( $=3.31$ ) had higher psychological resilience than those in other grades as did smokers ( $=3.41$ ) compared to nonsmokers. The anxiety ( $=1.41$ ) and perceived stress ( $=3.28$ ) levels of those whose family members had been diagnosed with COVID-19 were higher than those

**Table 3. Validity and reliability analysis results of the scale and subscales and some descriptive statistics**

Scale and Subscales	Eigenvalues	Variance (%)	Cronbach's Alpha ( $\alpha$ )	X $\pm$ SD	Total Sc $\pm$ SD	Sonuç	
General BRS	6	4.35	72.68	0.826	3.10 $\pm$ 0.88	18.61 $\pm$ 4.70	Normal
Perceived insufficient self-efficacy	7	5.03	35.91	0.814	2.95 $\pm$ 0.53	20.72 $\pm$ 5.01	Low
Perceived stress-distress	7	3.65	26.07	0.816	3.02 $\pm$ 0.81	21.18 $\pm$ 5.68	Low
General PSS	14	-	61.98	0.873	2.99 $\pm$ 0.62	41.90 $\pm$ 8.78	Medium
General GAD-7	7	4.38	62.56	0.891	1.07 $\pm$ 0.78	7.49 $\pm$ 4.93	Medium

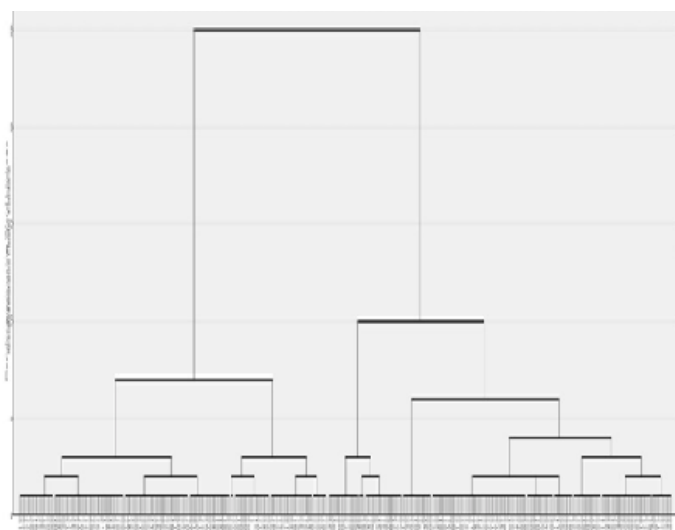
BRS: Kaiser-Meyer-Olkin (KMO)=0.805; Bartlett's Test:718.5; P=0.000; PSS: KMO=0.885; Bartlett's Test:2391.4; P=0.000; GAD-7: KMO=0.902; Bartlett's Test:1159.1; P=0.000

**Table 4. Correlation coefficients for the relationship between psychological resilience, perceived stress, and anxiety**

Scales and subscales	General BRS	Perceived insufficient self-efficacy	Perceived stress-distress	General PSS	General GAD-7
General BRS	-	-0.450**	-0.567**	-0.624**	-0.530**
Perceived insufficient self-efficacy	-0.450**	-	0.348**	0.764**	0.337**
Perceived stress-distress	-0.567**	0.348**	-	0.845**	0.655**
General PSS	-0.624**	0.764**	0.845**	-	0.605**
General GAD-7	-0.530**	0.337**	0.655**	0.605**	-

\*\*Correlation is significant at the 0.01 level (2-tailed).

who had not. Students who had health problems in the last 1 month had higher anxiety (=1.34) levels, and their psychological resilience (=2.89) was lower than those without health problems. The results revealed that students who paid partial attention to their hygiene had higher perceived stress (=3.17) and lower psychological resilience (=2.88) levels than others.



**Figure 1.** Dendrogram using Ward's hierarchical clustering method

The nursing students were classified according to their BRS, PSS, and GAD-7 levels using the Ward method, and the relevant dendrogram is presented in Figure 1. When the dendrogram was examined, the students were divided into two groups. Each set was further divided into two groups. As a result, four clusters were obtained at distances of 7.

The four groups obtained using the Ward clustering method were compared in terms of the BRS, PSS, and GAD-7 levels, and the findings are presented in Table 6. The results showed remarkable differences between the groups. Accordingly, Group 1, consisting of 47 (14.9%) students, had the highest anxiety (=2.17) and stress (=3.64) levels and the lowest psychological resilience (=2.20) levels. This group was therefore named "feeble." Group 4, which consisted of 130 (41.3%) students, had the lowest anxiety (=0.66) and stress (=2.54) levels and highest psychological resilience (=3.79) levels. Therefore, this group was named "sturdy." Groups 2 and 3 were named the "frontier" and "passable," respectively.

### Discussion

A total of 315 students participated in this study, which aimed to determine the relationships between the BRS, PSS, and GAD-7 levels of nursing students during the COVID-19 process. The results of this study reflect the intermediate BRS,

**Table 5. Comparison of students' BRS, PSS and GAD-7 levels according to individual characteristics**

Variable	Group	BRS		PSS		GAD-7	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Gender	Female	3.03	0.74	3.04	0.59	1.12	0.70
	Male	3.43	0.87	2.75	0.71	0.81	0.62
	P		0.000*		0.003*		0.003*
Academic year	1	3.17 <sup>b</sup>	0.81	3.00	0.72	1.05	0.74
	2	2.94 <sup>c</sup>	0.67	3.14	0.53	1.18	0.66
	3	3.02 <sup>b</sup>	0.83	2.98	0.59	1.10	0.69
	4	3.31 <sup>a</sup>	0.71	2.87	0.60	0.95	0.69
	P		0.004*		0.108		0.287
Smoking	Yes	3.41	0.88	2.78	0.84	1.07	0.84
	No	3.07	0.76	3.01	0.60	1.06	0.69
	P		0.036*		0.079		0.960
Cov-19 diagnosis in the family	Yes	3.01	0.89	3.28	0.57	1.41	0.74
	No	3.11	0.77	2.96	0.62	1.03	0.69
	P		0.542		0.009*		0.005*
Health problem during the past month	Yes	2.89	0.80	3.13	0.62	1.34	0.73
	No	3.14	0.77	2.96	0.62	1.01	0.68
	P		0.032*		0.060		0.001*
Attention to personal hygiene	Yes	3.17 <sup>a</sup>	0.78	2.92 <sup>b</sup>	0.64	1.02	0.71
	Partly	2.91 <sup>b</sup>	0.75	3.15 <sup>a</sup>	0.49	1.18	0.67
	No	2.99 <sup>b</sup>	0.67	3.09 <sup>a</sup>	0.87	1.16	0.78
	P		0.016*		0.009*		0.234

\*P&lt;0,05

**Table 6. The result of ANOVA for comparison of cluster attitudes**

Scales	Group	n	%	$\bar{X}$	SD	P
BRS	1. Feeble	47	14.9	2.20 <sup>d</sup>	0.59	0.000*
	2. Frontier	102	32.4	2.67 <sup>c</sup>	0.42	
	3. Passable	36	11.4	3.00 <sup>b</sup>	0.37	
	4. Sturdy	130	41.3	3.79 <sup>a</sup>	0.51	
PSS	1. Feeble	47	14.9	3.64 <sup>a</sup>	0.54	0.000*
	2. Frontier	102	32.4	3.25 <sup>b</sup>	0.38	
	3. Passable	36	11.4	3.07 <sup>c</sup>	0.16	
	4. Sturdy	130	41.3	2.54 <sup>d</sup>	0.57	
GAD-7	1. Feeble	47	14.9	2.17 <sup>a</sup>	0.50	0.000*
	2. Frontier	102	32.4	1.15 <sup>b</sup>	0.51	
	3. Passable	36	11.4	0.90 <sup>c</sup>	0.56	
	4. Sturdy	130	41.3	0.66 <sup>d</sup>	0.45	

Abbreviation: ANOVA, analysis of variance; \*P<0.001; <sup>a</sup>Means of groups followed by different letters differ significantly at P<.01.

PSS, and GAD-7 levels of nursing students during the pandemic process.

The sources of anxiety, trauma, and stress brought about by the pandemic process can negatively affect the mental health and psychological resilience of individuals. The psychological resilience of individuals is a factor that both affects and is affected.<sup>[18]</sup> The results of this study showed that the psychological resilience of the nursing students was normal. Likewise, studies<sup>[19-21]</sup> have stated that the psychological resilience of nursing students and healthcare workers is moderate. The differences in the study results can be attributed to sample groups from different regions. The individual characteristics and perceptions of life of the students can be the reason for their different levels of psychological resilience.<sup>[21]</sup>

Although student nurses do not carry the same level of clinical responsibility as working nurses, they experience stress due to the nature of student nursing.<sup>[21]</sup> In this study, it was found that the perceived stress scores of nursing students were moderate. Similarly, it was stated that approximately half of the nursing and university students have moderate and high perceived stress levels, respectively.<sup>[22-24]</sup> According to the results of this study, the high perceived stress levels of students can be predicted as an impact of the pandemic process. Furthermore, these differences in perceived stress levels could be due to the measurements taken at different times during the COVID-19 pandemic. Although perceived high stress is generally considered to be related to the pandemic, cross-cultural differences, academic characteristics,<sup>[21]</sup> and current conditions (traumas) should be considered predictors of stress when explaining perceived stress in student populations.

Nursing students in this study had moderate levels of anxiety. According to previous studies, students experience anxiety even under normal conditions.<sup>[3]</sup> Nursing students in Sri Lanka experienced moderate anxiety.<sup>[25]</sup> Situations that threaten public health can cause anxiety and concern in university students.<sup>[10, 26]</sup> Social isolation, economic instability,<sup>[3]</sup> challenges of distance education,<sup>[6]</sup> uncertainties in future employment,<sup>[6]</sup> and others could be related to students' anxiety. Additionally, factors such as the increase in the numbers of infected patients, suspected cases, and healthcare workers infected with the virus;<sup>[3]</sup> the inadequacy of personal protective equipment in hospitals; and the fear of infection could have increased students' anxiety.<sup>[6]</sup>

The results of this study showed that perceived stress levels greatly decreased as the psychological resilience of nursing students increased. Nursing students with high levels of psychological resilience have low levels of perceived stress. Resilience is considered a protective factor for mental health and is seen as a fundamental attribute for success in the nursing profession.<sup>[27]</sup> Resilience plays an important role in helping nursing students overcome stressful experiences. It was stated that endurance and psychological well-being among Chinese nursing students are associated with less stress levels.<sup>[21]</sup> Although the psychological resilience levels of nursing

students decreased, their anxiety levels increased remarkably. Aslan et al.<sup>[23]</sup> (2020) also found a negative and remarkable relationship between the resilience of university students and anxiety. Savitsky et al.<sup>[6]</sup> (2020), found a substantial and negative relationship between the resilience factors of nursing students and moderate and severe anxiety. Nursing students who believed they had strong personalities were less likely to experience severe and moderate anxiety levels.<sup>[6]</sup> In this study, as the perceived stress of nursing students increased, their anxiety also increased substantially. Coping with anxiety and stress is extremely important in terms of the impact of anxiety and stress on health.<sup>[6]</sup> Factors such as professional readiness, level of knowledge, professional experience, and awareness may affect the stress levels of students. Additionally, the knowledge that many patients with COVID-19 can remain asymptomatic can affect the perception of stress among nursing students.<sup>[9]</sup> The lack of masks and disinfectants in health institutions, sensational news headlines in the media, and erroneous news reports also contribute to the increase of anxiety and stress levels in this process.<sup>[28]</sup>

The results of this study showed that the concerns of nursing students about the COVID-19 pandemic were related to individual characteristics, such as gender, academic year of education, smoking, COVID-19 diagnosis in family members, any past illnesses, and personal hygiene. In this study, female students had higher levels of anxiety and stress than male students. Similarly, previous studies have revealed that the anxiety level of female students was generally higher than that of male students.<sup>[29,30]</sup> Other studies have also reported higher anxiety levels in women than in men.<sup>[31,32]</sup> The high prevalence of anxiety can be explained by the fact that women constituted the majority of our study population. The reason for the high prevalence of anxiety among female students may be related to the living conditions and circumstances during the ongoing COVID-19 outbreak.

This study has some limitations. First, an internet-based online questionnaire was used; therefore, responses from students in regions without internet access could not have been obtained. Second, because there are no comparative data on nursing students before and after the COVID-19 pandemic, this study may fall short of determining whether the COVID-19 event affected nursing students. Third, only students from a university nursing school were included in the study; studies involving all nursing students are needed.

Despite these limitations, the strength of this study is that it reveals the relationships between the psychological resilience, stress perceptions, and anxiety among nursing students during the COVID-19 pandemic. These data will contribute to the literature and can be used as a reference.

## Conclusion

Public health emergencies can remarkably affect the mental health of nursing students. During the COVID-19 pandemic,

the BRS, PSS, and GAD-7 levels of nursing students were moderate. The risk factors for perceived stress and anxiety were the presence of relatives infected with the virus and any recent health problems. Considering the global health problem that is expected to last for a long time, it may be recommended to empower nursing students in this process and educate them with preparation and intervention guidance programs.

### Acknowledgments

We are grateful to the nursing students who agreed to participate in this study.

**Conflict of interest:** There are no relevant conflicts of interest to disclose.

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

**Authorship contributions:** Concept – H.N.Ç.Ö.; Design – H.N.Ç.Ö.; Supervision – H.N.Ç.Ö., P.Ö., İ.K.; Fundings - H.N.Ç.Ö., P.Ö.; Data collection &/or processing – H.N.Ç.Ö., P.Ö.; Analysis and/or interpretation – İ.K, H.N.Ç.Ö.; Literature search – H.N.Ç.Ö.; Writing – H.N.Ç.Ö.; Critical review – H.N.Ç.Ö., P.Ö., İ.K.

### References

- World Health Organization. Coronavirus disease (COVID-19), Situation Report-107. Available at: [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200506-covid-19-sitrep-107.pdf?sfvrsn=159c3dc\\_2](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200506-covid-19-sitrep-107.pdf?sfvrsn=159c3dc_2). Accessed Jun 22, 2020.
- Jiang Q, Song S, Zhou J, Liu Y, Chen A, Bai Y, et al. The prevalence, characteristics, and prevention status of skin injury caused by personal protective equipment among medical staff in fighting COVID-19: A multicenter, cross-sectional study. *Adv Wound Care (New Rochelle)* 2020;9:357–64.
- Cao W, Fang Z, Hou G, Han M, Xu X, Dong J, et al. The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Res* 2020;287:112934.
- Swift A, Banks L, Baleswaran A, Cooke N, Little C, McGrath L, et al. COVID-19 and student nurses: A view from England. *J Clin Nurs* 2020;29:3111–4.
- The Higher Education Council (YÖK). New decision from YÖK for final year students in nursing programs. 2020. Available at: <https://www.yok.gov.tr/Sayfalar/Haberler/2020/hemsirelik-programlarindaki-ogrencilere-uzaktan-egitim-imkani.aspx>. Accessed Jun 6, 2020.
- Savitsky B, Findling Y, Erel A, Hendel T. Anxiety and coping strategies among nursing students during the covid-19 pandemic. *Nurse Educ Pract* 2020;46:102809.
- Duong V, Pham P, Yang T, Wang Y, Luo J. The ivory tower lost: How college students respond differently than the general public to the COVID-19 pandemic. Available at: <https://arxiv.org/abs/2004.09968>. Accessed Jun 12, 2020.
- Collado-Boira EJ, Ruiz-Palomino E, Salas-Media P, Folch-Ayora A, Muriach M, Baliño P. "The COVID-19 outbreak"-An empirical phenomenological study on perceptions and psychosocial considerations surrounding the immediate incorporation of final-year Spanish nursing and medical students into the health system. *Nurse Educ Today* 2020;92:104504.
- Chen CJ, Chen YC, Sung HC, Hsieh TC, Lee MS, Chang CY. The prevalence and related factors of depressive symptoms among junior college nursing students: A cross-sectional study. *J Psychiatr Ment Health Nurs* 2015;22:590–8.
- Biswas S, Biswas A. Anxiety level among students of different college and universities in India during lock down in connection to the COVID-19 pandemic. *Z Gesundh Wiss* 2023;31:49–55.
- Sekaran U, Bougie R. Research methods for business-A skill building approach. 6th ed. New York: John Wiley and Sons; 2013.
- Smith BW, Dalen J, Wiggins K, Tooley E, Christopher P, Bernard J. The brief resilience scale: Assessing the ability to bounce back. *Int J Behav Med* 2008;15:194–200.
- Doğan T. Adaptation of the brief resilience scale into Turkish: A validity and reliability. *J Happiness Well-Being* 2015;3:93–102.
- Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav* 1983;24:385–96.
- Eskin M, Harlak H, Demirkiran F, Dereboy Ç. The adaptation of the perceived stress scale into Turkish: A reliability and validity analysis. *J New Symp* 2013;51:132–40.
- Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: The GAD-7. *Arch Intern Med* 2006;166:1092–7.
- Konkan R, Senormancı O, Guclu O, Aydin E, Sungur MZ. Validity and reliability study for the Turkish adaptation of the generalized anxiety disorder-7 (GAD-7) scale. *Arch Neuropsychiatr* 2013;50:53–8.
- Cai W, Lian B, Song X, Hou T, Deng G, Li H. A cross-sectional study on mental health among health care workers during the outbreak of Corona Virus Disease 2019. *Asian J Psychiatr* 2020;51:102111.
- Li ZS, Hasson F. Resilience, stress, and psychological well-being in nursing students: A systematic review. *Nurse Educ Today* 2020;90:104440.
- Tarsuslu B, Günaydın N, Koç M. Relationship between educational stress and psychological resilience in nursing students. *Int J Human Sci* 2020;17:79–91.
- Smith GD, Yang F. Stress, resilience and psychological well-being in Chinese undergraduate nursing students. *Nurse Educ Today* 2017;49:90–5.
- Aslan H, Pekince H. Nursing students' views on the COVID-19 pandemic and their perceived stress levels. *Perspect Psychiatr Care* 2021;57:695–701.
- Aslan I, Ochnik D, Çınar O. Exploring perceived stress among students in Turkey during the COVID-19 pandemic. *Int J Environ Res Public Health* 2020;17:8961.
- Luo Y, Meng R, Li J, Liu B, Cao X, Ge W. Self-compassion may reduce anxiety and depression in nursing students: A pathway through perceived stress. *Public Health* 2019;174:1–10.
- Rathnayake S, Ekanayaka J. Depression, anxiety and stress among undergraduate nursing students in a public university in Sri Lanka. *Int J Caring Sci* 2016;9:1020–32.



26. Bahçecioğlu Turan G, Özer Z, Çiftçi B. Analysis of anxiety levels and attitudes of nursing students toward the nursing profession during the COVID-19 pandemic. *Perspect Psychiatr Care* 2021;57:1913–21.
27. Hu T, Zhang D, Wang J. A meta-analysis of the trait resilience and mental health. *Pers Individ Differ* 2015;76:18–27.
28. Ayittey FK, Ayittey MK, Chiwero NB, Kamasah JS, Dzuovor C. Economic impacts of Wuhan 2019-nCoV on China and the world. *J Med Virol* 2020;92:473–5.
29. Lun KW, Chan CK, Ip PK, Ma SY, Tsai WW, Wong CS, et al. Depression and anxiety among university students in Hong Kong. *Hong Kong Med J* 2018;24:466–72.
30. Sanad HM. Stress and anxiety among junior nursing students during the initial clinical training: A descriptive study at college of health sciences. University of Bahrain. *Am J Nurs Res* 2019;7:995–9.
31. Al-Rabiaah A, Temsah MH, Al-Eyadhy AA, Hasan GM, Al-Zamil F, Al-Subaie S, et al. Middle East Respiratory Syndrome-Corona Virus (MERS-CoV) associated stress among medical students at a university teaching hospital in Saudi Arabia. *J Infect Public Health* 2020;13:687–91.
32. Yakar B, Kaygusuz Öztürk T, Pirinççi E, Önalın E, Ertekin YH. Knowledge, attitude and anxiety of medical students about the current COVID-19 outbreak in Turkey. *Fam Pract Palliat Care* 2020;5:36–44.