

Original Article**The Relationship between Traumatic Stress Symptoms and Psychological Resilience in Nurses Working During the COVID-19 Pandemic****Hilal Ozbek, PhD**

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Correspondence: Hilal Ozbek, PhD, Assist. Prof. Tokat Gaziosmanpasa University Faculty of Health Sciences, Department of Midwifery, Tokat, Turkey e-mail: h.ozzbek@gmail.com**Place of work:** The study consisted in a hospital located in the Central Anatolia Region of Turkey.**Abstract****Purpose:** This study was conducted to determine the relationship between traumatic stress symptoms and psychological resilience in nurses working during the COVID-19 pandemic.**Methods:** The sample of this descriptive and correlational study consisted of 202 nurses working in a state hospital in Turkey. The data were collected using the Personal Information Form, the Traumatic Stress Symptom Checklist and the Brief Resilience Scale.**Results:** Post-traumatic stress disorder symptoms were found in 14.9% of nurses, and comorbid depressive symptoms were found in 17.3%. A moderate negative correlation was found between the Brief Resilience Scale scores and post-traumatic stress disorder symptoms ($r = -0.542$; $p = 0.000$) and between the Brief Resilience Scale scores and comorbid depressive symptoms ($r = -0.487$; $p = 0.000$). In multiple regression analysis, perception of health, perception of psychological status and working hours of nurses were factors affecting post-traumatic stress symptoms ($R = 0.242$; $R^2 = 0.210$; $F = 7.691$; $p = 0.000$) and comorbid depressive symptoms ($R = 0.241$; $R^2 = 0.210$; $F = 7.676$; $p = 0.000$).**Conclusion:** There are post-traumatic stress and comorbid depressive symptoms in nurses working during the COVID-19 pandemic. Post-traumatic stress disorder and depressive symptoms increased as psychological resilience levels decreased.**Key Words:** COVID-19 pandemic, Nurse, Psychological resilience, Traumatic stress**Introduction**

Coronavirus disease (COVID-19) is not only a health problem globally; it is also the largest socioeconomic threat (Rampal & Seng, 2020). This disease first emerged on December 29, 2019, after a group of people working in the seafood wholesale market were admitted to a hospital in Wuhan, China with an unknown cause of pneumonia (Hu et al., 2020; Zhu et al., 2020). The new Coronavirus 2 (SARS-CoV-2) was found to cause this disease, and it was named COVID-19 (Dong et al., 2020). The rapidly spreading virus was recognised as a pandemic by the World Health Organization on March 11, 2020 (Rampal

& Seng, 2020). After the virus first appeared, COVID-19 was detected in about two million people in 185 countries around the World (Anwar et al., 2020). Social and economic life has been endangered due to the negative effects of COVID-19, which is a major health problem, and this disease posed a threat both physically and psychologically (Cai et al., 2020).

Healthcare professionals are one of the occupational groups with a very high risk of transmission of COVID-19 (Blake et al., 2020; Ragó et al., 2020). Nurses constitute the primary healthcare professionals who directly provide care for COVID-19 patients. Therefore, nurses may be

negatively affected psychologically by the disease due to their direct contact with these patients, being a relative of a sick or deceased person, spreading the disease to friends and colleagues and being exposed to stigmatisation and quarantine (Aksoy & Kocak, 2020; Lai et al., 2020). In addition, a heavy workload, lack of protective equipment and supplies, stressful decision-making process, ethical conflicts, fighting against a deadly virus and feeling pressured due to stress negatively affect their psychological status (El-Hage et al., 2020; Que et al., 2020; Santarone et al., 2020). It is reported that they experience symptoms such as stress, anxiety, depression and psychological burden due to these problems (Bohlken et al., 2020; Lai et al., 2020; Pouralizadeh et al., 2020; Spoorthy et al., 2020; Xiao et al., 2020). These stressful situations can also cause post-traumatic stress disorder (Chen et al., 2020; R. Chen et al., 2021). A study showed that healthcare professionals working with COVID-19 patients had significantly higher anxiety, depression and secondary traumatisation scores than other workers (Arpaciglu et al., 2021). Another study showed that the stress levels and post-traumatic stress disorder symptoms of nurses increased significantly after working in the COVID-19 unit (Li et al., 2021).

One of the important features that protect from the negative effects of stress and provide coping is psychological resilience (Zhao et al., 2016). Psychological resilience is the positive adaptation of individuals to adverse conditions and risk, the ability to recover from difficult life experiences and the ability to overcome problems (Bajaj & Pande, 2016). Studies have found that people with high levels of resilience experience low levels of psychological distress and the effects of the distress experienced in the work environment are reduced (Hunter & Warren, 2014; McGillivray & Pidgeon, 2015). In addition, it has been reported in the literature that there is a negative relationship between psychological resilience and stress (Li et al., 2021; Manomenidis et al., 2019).

During the COVID-19 pandemic, the measures that are taken and supportive practices for the psychological health of nurses have become insufficient, and the negative psychological effects of the pandemic have been ignored (Wu et al., 2020). However, every practice to increase the psychological resilience of nurses will contribute to the fulfilment of their professional responsibilities more effectively and reduce their stress levels (Chen et al., 2020). In this context, it

is thought that the findings to be obtained will contribute to the determination of support and approaches to be applied to nurses. This study was conducted to determine the relationship between traumatic stress symptoms and psychological resilience in nurses working during the COVID-19 pandemic.

Subjects and Methods

Design: The research is of a descriptive and correlational type.

Participants: The population of the study consisted of nurses working in a hospital located in the Central Anatolia Region of Turkey. Because of the power analysis, the sample size was calculated as 202, with a 90% confidence level and a 5% error margin. The data were collected between July 1 and September 30, 2020. There were 202 nurses, who met the inclusion criteria, worked at the state hospital during the COVID-19 pandemic, did not have any obstacle in answering the questions, and volunteered to participate in our study, and they constituted the sample of the study.

Measures Tools

Personal Information Form: The form was created to determine the socio-demographic characteristics of nurses, and included 20 questions about age, education, family type, socio-economic and health status, among other information.

Traumatic Stress Symptom Checklist (TSSC): The scale was developed by Basoglu et al. (2001) to measure the presence of Post-Traumatic Stress Disorder (PTSD) symptoms, and studies have been conducted to determine its validity and reliability. It is a 4-point Likert-type scale that consists of 23 items, and individuals evaluate themselves for the past month. Each item is scored between 0–3. The first 17 items question the symptoms of Post-Traumatic Stress Disorder (PTSD) specified in the DSM-IV (Diagnostic and Statistical Manual of Mental Disorders), and the last six items question the comorbid depressive symptoms. The cut-off score of the scale is 25 when considering the 17-item PTSD symptoms, and 8 when considering the depression items. In the validity and reliability study, the internal consistency coefficient of 17 items measuring PTSD symptoms was 0.92, and the internal consistency coefficient of six items measuring depression was 0.84. The scores of the scale measuring PTSD symptoms and comorbid depressive symptoms were used in the analyses.

The Brief Resilience Scale (BRS): The scale developed by Smith et al. (2008) was adapted into Turkish by Dogan (2015). BRS is used to determine the psychological resilience levels of individuals. The scale is one-dimensional and consists of six items in total. This 5-point Likert type scale is responded to on a rating from 5: 'strongly agree' to 1: 'strongly disagree'. The lowest possible score from the scale is 6 and the highest score is 30. Higher total scores indicate that individuals' psychological resilience levels are higher. In the adaptation study of the scale to Turkish, the internal consistency coefficient was found to be 0.83 (Dogan, 2015).

Data collection: Considering the risks of the pandemic period, the data collection tools used in the research were applied online. A Google form was created for this purpose. The forms created were opened to access between July 1 and September 30, 2020 and sent to the participants via e-mail and WhatsApp. In the introduction part of the form, informed consent with explanations about the purpose and scope of the research was included for the participants. After the participants read and approved this informed consent, the Personal Information Form, TSSC and BRS were made available to the participants. Filling out the forms took 10 minutes.

Ethical considerations: Ethical approval was obtained from the Non-Interventional Clinical Research Ethics Board (decision number: 2020-06/02), and written permission was obtained from the Ministry of Health of Turkey and from the institution where the study was conducted. In the informed consent, it was clearly stated that the data obtained would remain confidential, would be used only within the scope of the research, the decision to participate in the study was entirely their own, and they could refuse to fill out the forms whenever they wanted. The study was conducted following the Principles of Helsinki Declaration.

Statistical analysis: The data obtained from the study were evaluated using the SPSS 23 program. The Kolmogorov-Smirnov test was used to determine whether the data were normally distributed. The number and percentage distribution were used in the evaluation of socio-demographic characteristics, and mean and standard deviation were used in the evaluation of scale scores. The relationship between variables was evaluated using Pearson's correlation analysis and multiple regression analysis. While the predictor (independent) variables of the multiple regression analysis conducted in the study were perception of health, perception of psychological status and working hours, the

response (dependent) variables were PTSD, comorbid depressive symptoms and BRS scores. The significance level was 0.05 for all tests and we calculated 90% confidence intervals.

Results

Socio-demographic characteristics

The mean age of the participants was 31.99 ± 8.21 (range: 21–60). Of the nurses, 87.1% were women, 81.2% were university graduates, 63.9% were married, 92.6% lived in a nuclear family, and 46% lived with their spouses, children and family elders. Most of the participants (62.4%) stated that their income was equal to their expenses, 54% usually evaluated their health as "moderate", and 45% usually perceived their psychological status as "good" (Table 1).

While 33.7% of the participants worked in the COVID-19 unit, 66.3% worked in other clinics of the hospital. Of the nurses, 43.1% have been working in the profession for 5 years, 54% worked in 24-hour (from 8 am to 8 am next day) shifts, and 51.5% stated that "they are happy to perform this profession".

Results related to PTSD, comorbid depressive symptoms and psychological resilience

Table 2 shows the PTSD symptoms and comorbid depressive symptoms of nurses, and the total mean scores of BRS. In the study, the mean BRS score of nurses was found to be 19.50 ± 3.66 . Since BRS scores can be from 6 to 30, the psychological resilience levels of nurses were above the average. The mean score for PTSD symptoms was 14.16 ± 8.85 , and the mean score for comorbid depressive symptoms was 4.05 ± 3.32 . Because the cut-off score for PTSD symptoms was 25 and above, and the depression symptoms cut-off score was 8 and above, 14.9% of nurses had PTSD symptoms and 17.3% had comorbid depressive symptoms

A moderate negative correlation was found between BRS scores and PTSD symptoms ($r = -0.542$; $p = 0.000$) and between BRS scores and comorbid depressive symptoms ($r = -0.487$; $p = 0.000$). Accordingly, as the psychological resilience levels of nurses decreased, their PTSD symptoms and comorbid depressive symptoms increased (Table 3)

According to the multiple regression analysis, it was determined that nurses' perception of health, their perception of psychological status, and working hour variables (independent variables)

together affected PTSD symptoms (dependent variable) ($R = 0.242$; $R^2 = 0.210$; $F = 7.691$; $p = 0.000$). These three variables explain 21% of PTSD symptoms. It was found that all three independent variables were significant predictors of PTSD symptoms (Table 4).

According to the multiple regression analysis, it was determined that nurses' perceptions of health, their perception of psychological status, and working hour variables (independent variables) together affected depressive symptoms (dependent variable) ($R = 0.241$; $R^2 = 0.210$; $F = 7.676$; $p = 0.000$). These three variables explain 21% of depressive symptoms. It was found that perception of health, perception of psychological

status and working hour variables were significant predictors of depressive symptoms (Table 4).

In addition, according to the results of multiple regression analysis, perception of health and perception of psychological status (independent variables) were among the variables that affected the BRS total score (dependent variable) ($R = 0.130$; $R^2 = 0.094$; $F = 3.618$; $p = 0.001$). These independent variables explain 9% of the psychological resilience levels of nurses. It was determined that perception of health and perception of psychological status were variables that significantly predicted psychological resilience (Table 4)

Table 1: Socio-demographic characteristics of the nurses.

Characteristics

Mean age	31.99±8.21 (range: 21-60)
Gender	Female 176 (87.1) Male 26 (12.9)
Educational status	High school 16 (7.9) University 164 (81.2) Master and doctorate 22 (10.9)
Marital status	Married 129 (63.9) Single 73 (36.1)
Family structure	Nuclear 187 (92.6) Extended 15 (7.4)
People living with	Spouse and himself/herself 47 (23.3) Spouse, children and family elders 93 (46.0) Mother, father, siblings 40 (19.8) Alone 22 (10.9)
Income and expense status	Income less than expenses 40 (19.8) Equal income and expense 126 (62.4) Income more than expenses 36 (17.8)
Perception of overall health status	Good 87 (43.1) Moderate 115 (56.9)
Perception of overall psychological status	Good 91 (45.0) Moderate 89 (44.1) Bad 22 (10.9)

Table 2. The Brief Resilience Scale, Post-Traumatic Stress Disorder and Depressive Symptoms Scale mean scores of nurses.

Scales	Min-Max*	Min-Max**	Mean ± SD	
PTSD symptoms	0-51	0-34	14.16 ± 8.85	
Depressive symptoms	0-18	0-12	4.05 ± 3.32	
BRS total	6-30	Mean 11-30	Min	19.50 Max 66
PTSD Symptoms	14.16	8.85	0	34
Depressive Symptoms	4.05	3.32	0	12
BRS total	19.50	3.66	11	30

*Min-max scores that can be obtained from the scale; **Min-max scores of nurses; PTSD: Post-Traumatic Stress Disorder; BRS: Brief Resilience Scale

Table 3: The correlation between The Brief Resilience Scale and The Post-Traumatic Stress Disorder and Depressive Symptoms Scale of nurses.

	PTSD Symptoms	Depressive Symptoms
BRS	r= -0.542*	r=-0.487*
	p=0.000	p=0.000

*p<0.001; Test: Pearson correlation analysis; PTSD: Post-Traumatic Stress Disorder; BRS: Brief Resilience Scale

Table 4: The regression between nurses' post-traumatic stress disorder symptoms, depression symptoms and BRS according to some variables.

Independent Variables	Standardised regression coefficients	t	p
PTSD Symptoms			
Perception of health	0.155	2.254	0.025*
Perception of psychological status	0.317	4.510	0.000*
Working hours	0.198	2.922	0.004*
R=0.242; R ² = 0.210; F = 7.691; p = 0.000			
Comorbid Depressive Symptoms to PTSD			
Perception of health	0.156	2.268	0.024*
Perception of psychological status	0.329	4.672	0.000*
Working hours	0.136	2.017	0.045*
R=0.241; R ² = 0.210; F = 7.676; p = 0.000			
BRS			

Perception of health	-0.148	-2.013	0.046*
Perception of psychological status	-0.249	-3.299	0.001*

R=0.130; R² = 0.094; F = 3.618; p = 0.001

*p<0.005; Test: Multiple regression analysis; PTSD: Post-Traumatic Stress Disorder; BRS: Brief Resilience Scale

Discussion

Studies have shown that psychological problems such as depression, fear and anxiety are common among healthcare professionals working during the COVID-19 pandemic (Pouralizadeh et al., 2020; Que et al., 2020; Shreffler et al., 2020). Recurrent traumatic events during the pandemic period may increase the risk of PTSD and make it difficult for healthcare professionals to perform their professional and personal duties (Benham et al., 2020). Therefore, there is a need for studies to determine the psychological changes that may occur in healthcare professionals and to determine psychological resilience.

In our study conducted to determine the relationship between traumatic stress symptoms and psychological resilience in nurses working during the COVID-19 process, PTSD symptoms were found in 14.9% of nurses, and comorbid depressive symptoms were found in 17.3%. In the study conducted by Chen et al, 13.3% of the participants stated that they had trauma symptoms (R. Chen et al., 2021). In other studies, it was found that psychological problems such as anxiety, depression and fear occurred in a significant number of healthcare professionals (D. Hu et al., 2020; Lai et al., 2020; Li et al., 2021). Our findings support the literature and reflect the negative psychological effects of the COVID-19 pandemic on healthcare professionals.

In our study, psychological resilience levels of nurses were found above the average. Psychological resilience is a positive force that allows one to cope with traumatic life events and protects from the negative effects of stress (Bozdag & Ergün, 2020; Zhao et al., 2016). Therefore, it is thought that nurses who encounter difficulties use this power positively. It is reported in the literature that physicians constitute the group with the lowest psychological resilience compared to nurses and other healthcare professionals (Bozdag & Ergün, 2020; Lin et al., 2020). In other studies that support our study, psychological resilience levels of nurses were found to be moderate (Guo et al., 2017; Labrague & De los Santos, 2020; Manomenidis et al., 2019).

As the psychological resilience levels of nurses working during the COVID-19 process decreased, their PTSD symptoms and comorbid depressive symptoms increased. Studies have reported that psychological resilience is negatively correlated to depression (Li et al., 2021; Lin et al., 2020; Manomenidis et al., 2019). In another study, it was reported that nurses who scored higher on the resilience scale had decreased COVID-19 anxiety levels (Guo et al., 2017). Besides, in a study conducted by Bozdag and Ergun (2020) with healthcare professionals, it was reported that positive emotions should be increased to increase psychological resilience. This emphasises that the finding obtained from our study is compatible with the literature and that the importance of psychological empowerment of individuals.

According to multiple regression analysis, the perception of the health and psychological status of nurses is effective on PTSD symptoms and comorbid depressive symptoms. In the study by Pouralizah et al. (2020), it was found that nurses who provided care for COVID-19 patients were more likely to be diagnosed with a general anxiety disorder. In the same study, it was reported that nurses who were suspected to have COVID-19 infection and who did not have adequate personal protective equipment, showed higher levels of anxiety symptoms than other nurses show (Pouralizadeh et al., 2020). It is stated that depression, stress, anxiety and post-traumatic stress disorder are more common among all healthcare professionals (Tan et al., 2020). In addition, it is reported in the literature that anxiety, depression and PTSD symptoms are more common in the majority of workers who provide care for COVID-19 patients (Enli Tuncay et al., 2020). These findings are compatible with our study findings.

In our study, the working hours of nurses (24-hour shift workers) were a factor affecting PTSD symptoms and comorbid depressive symptoms. It is reported in the literature that healthcare workers face long working hours and higher levels of psychological problems during the pandemic (Askin et al., 2020; Kang et al., 2020). A study also showed that the weekly working hours of nurses were one of the main factors affecting their

stress levels (Mo et al., 2020). One of the three main components of burnout is working hours (Giusti et al., 2020), and working hours also affect stress burden scores (Mo et al., 2020). In another study, it was reported that the many suspected COVID-19 cases that healthcare workers were exposed to increased their workload and working hours, leading to emotional tension and physical fatigue (Z. Hu & Chen, 2020).

According to the results of the multiple regression analysis conducted in our study, the perception of health and psychological status of nurses during the COVID-19 period affected their psychological resilience. Studies have shown that negative emotions reduce psychological resilience (Bozdag & Ergün, 2020), and depression and anxiety negatively affect psychological resilience (Cevizci & Müezzin, 2019; Lin et al., 2020). Another study showed that healthcare workers had low levels of anxiety, depression, negative self-perception, somatisation, aggression and general psychological symptoms, and high levels of general psychological resilience (Cevizci & Müezzin, 2019). In addition, a study conducted in Greece suggested that nurses with higher psychological resilience had lower anxiety (Manomenidis et al., 2019). The findings of these studies in the literature support our study's findings.

Conclusions: There are post-traumatic stress and comorbid depressive symptoms in nurses working during the COVID-19 pandemic. Psychological resilience levels are also above the average. Post-traumatic stress disorder and comorbid depressive symptoms increase as psychological resilience levels decrease. While working hours, perception of health and psychological status affect post-traumatic stress and depression symptoms, perception of health and psychological status affects psychological resilience levels. According to these results, it is recommended to organise activities such as training and courses for nurses that will increase their psychological resilience, and it is recommended for them to receive psychological support and counselling to increase their positive feelings. In addition, it is also recommended to organise activities that will strengthen their coping with stress and increase their motivation, and make them take leave to ensure that they rest enough as well as reviewing their working hours.

Limitations: Findings obtained from this study only cover the nurses included in the sample

group. They cannot be generalised to other nurses in Turkey.

Acknowledgment: As researchers, we thank the nurses who were involved in this study during the data collection phase.

Data availability statement: The data that support the findings of this study are available from the corresponding author, upon reasonable request.

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