Clinical and Experimental Health Sciences

Predictive Role of The Trauma Level of Nursing Students Affected by The Earthquake Disaster in Turkey on Their Psychological Distress

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Received: 22.09.2023 **Accepted:** 22.09.2023

ABSTRACT

Objective: The study investigated the predictive role of the post-earthquake trauma level of nursing students affected by the earthquake on their psychological distress.

Methods: This study has a descriptive and cross-sectional design. The research sample consisted of 217 nursing students enrolled in a university in the western part of Türkiye who were affected by the earthquake. Data were collected using the Nursing Students Information Form, The Scale Determining the Level of Trauma, and the General Health Questionnaire-12.

Results: The level of risk of psychological distress was high for 59% of the students. There was a statistically significant difference between their level of psychological distress in relation to their characteristics such as gender, income status and damage to the house/apartment and their level of trauma. According to the results of the regression analysis, the risk of experiencing psychological distress was 2.5 times higher for those whose houses/apartments were damaged than for those whose houses/apartments were not damaged. The risk of experiencing psychological distress was 6.6 times higher for those with high levels of trauma than for those with low levels of trauma.

Conclusion: The present study was to the predictive role of post-earthquake trauma level of nursing students affected by the earthquake on their psychological distress. It was emphasized that the results of the present study are important because they revealed the factors that affect the psychological distress of nursing students who were affected by the last two earthquakes in Türkiye.

Keywords: Earthquake, psychological distress, disaster, trauma

1. INTRODUCTION

Natural disasters are events that cause significant damage to humans and nature. One of the most hazardous natural disasters faced by the world is earthquakes. Since it is not easy to erase the traces of earthquakes in people's hearts, the possibility of new earthquakes constantly threatens societies. Earthquakes are special among natural disasters because they occur suddenly, destroy property, and cause deaths and injuries (1). In addition, earthquakes are traumatic events because of their negative psychological, social, political, and economic effects on people (2-4). Traumatic events are defined as phenomena experienced or witnessed by people that threaten not only their lives but also their physical and mental well-being, pose a real threat to their lives and physical health, and cause serious injury (5). Traumatic events can affect people's physical and mental health.

Health is a dynamic process in which individuals maintain their well-being by adapting to the situations in their internal and external environments (6). Natural disasters such as earthquakes can affect individuals' adaptation processes, the level of perception of their health, and their physical and psychological health (7). One of the conditions that affect people's health is psychological distress. The transition from adolescence into young adulthood, in which mental, physical, cognitive, and social changes are evident and important, coincides with university years; thus, university students are at risk of developing psychological distress (8,9). In studies conducted with university students, the authors state that the psychological distress levels of health students are higher than those of non-health students (10,11). The research by Labrague et al. indicated that nursing students encountered greater stress levels than the general student population (12). A longitudinal study involving 622 nursing students in Italy revealed that more than 70% of participants experienced substantial psychological distress (13). In a study involving

DOI: 10.33808/clinexphealthsci.1364904

121 nursing students from a university in England, researchers found that these students displayed elevated levels of psychological distress relative to the general population (14). Eweida et al. (2023) discovered that implementing the psychological first-aid model during the pandemic mitigated psychological distress among nursing students (15). A study investigating the impact of mindfulness-based interventions on post-traumatic stress disorder in nursing students found that such interventions effectively reduced post-traumatic stress symptoms among this population (16).

In addition to all these, understanding the mental health effects of earthquakes on people living in a country that has many active earthquake faults and was recently struck by strong earthquakes and raising them as individuals ready to cope with such effects are of great importance. In a previous study, the authors emphasized the importance of identifying groups at risk for psychological distress in raising generations resistant to the negative mental effects of a possible trauma (17). Two earthquakes of magnitude (Mw) 7.8 and 7.5, whose epicenters were the Pazarcık and Elbistan districts of Kahramanmaraş, a province located in south Türkiye, struck 11 provinces on February 6, 2023. The earthquakes affected 16% of Türkiye's population, or 14 million people. According to the United Nations Development Report, the earthquakes left 1.5 million people homeless (18). The official death toll announced by the government was 50,783 (19). A state of emergency was declared for three months in 10 of the 11 provinces hit by the earthquakes, and the World Health Organization declared the post-earthquake situation in Türkiye a level 3 emergency (20).

Nursing students have been identified as the group of students most affected by exceptional situations such as natural disasters and pandemics (21,22). Nursing is a social profession that requires sensitivity. This sensitivity begins in the early years of nursing education and increases throughout the professional life (23). For this reason, assessment of the mental health of nursing students can guide the provision of psychosocial support according to their needs. Psychosocial support for nursing students can reduce the negative effects of disaster in physical, mental, social, and spiritual dimensions. In this way, the role and contribution of nursing students in health services can be more effectively sustained. Disasters such as earthquakes can affect health services. Nursing students should be prepared to ensure the continuity of health services by acquiring the skills to cope with such situations. Following traumatic events such as earthquakes, health professionals should have the skills to deal with the post-traumatic stress that can occur after such events. Nursing students' stress management skills can reduce long-term psychological effects (22,24). For this reason, the stress and emotional reactions experienced by health students, such as nursing students, who will be the health professionals of the future, during emergencies such as earthquakes are essential. For this reason, the emotional reactions of health students, such as nursing students, who will be the health professionals of the future, during emergencies such as earthquakes are essential.

Earthquake trauma experienced by nursing students is thought to increase their risk of developing psychological distress and negatively affect their health. This study investigated the impact of the major earthquake disaster that struck 11 provinces, including Kahramanmaraş, in Türkiye on 6 February 2023 on students' psychological distress, revealing a gap in the literature. In this study, it is investigated that the predictive role of post-earthquake trauma level of nursing students affected by the earthquake on their psychological distress.

2. METHODS

2.1. Study Design

This study was descriptive and cross-sectional.

2.2. Participants

The research population consisted of 350 students studying at a university in the west of Türkiye who were affected by the earthquake because the school was closed for the semester break and were with their families in the earthquake zone. A total of 217 nursing students affected by the earthquake were accepted into the study. The participation rate in the research was 59.40%. Inclusion criteria; Volunteering to participate in the research, being over 18 years old, studying at the Faculty of Nursing, and being affected by the earthquake. The exclusion criterion was to be a student unaffected by the earthquake zone.

2.3. Data Collection Tools

The data were collected by the Nursing Students Information Form, The Scale that Determines the Level of the Trauma, and General Health Questionnaire-12.

2.3.1. Nursing Students Information Form: The researchers developed this 6-item form to assess the participants' characteristics such as age, gender, year of school, income level, place of residence, and damage to the house/apartment (25).

2.3.2. Post-Earthquake Trauma-Level Determining Scale: The scale that determines the level of the trauma, developed by Tanhan and Kayri in 2013. It was used for 1505 individuals (401 females, 1104 males) aged between 15 and 86 years living in the areas affected by the Van earthquake in 2012 to assess the impact of the disaster on various health and psychological outcomes (26). The scale consists of 20 questions evaluating behavioral problems, emotional limitation, affective cognitive configuration, and sleep problems. There is no cut-off score for the scale. Items 11 and 12 are scored reverse-scored. Responses given to the items are rated on a five-point Likert-type scale ranging from 1 to 5 ("I do not agree at all," "I agree on little," "I agree at a moderate level," "I agree very much," and "I completely agree"). The lowest and highest possible scores obtained from the scale are 20 and 100, respectively. The increase in the scores obtained from the scale indicates that the individuals' levels of were affected by the earthquake increases. A score of 52.385±5.051 obtained from the

scale indicates the threshold value at which individuals are traumatized. A score above this threshold value indicates a high level of traumatization, whereas a score below this threshold value indicates a low level of traumatization. The Cronbach's alpha value of the scale was 0.87 in Tanhan and Kayri's study and .93 in the present study.

2.3.3. General Health Questionnaire-12: The General Health Questionnaire was developed by David Goldberg to reveal the psychological distress and mental illness levels of the general population and those of patients presenting to nonpsychiatric clinics. This easy-to-apply questionnaire is administered to assess the mental symptoms of a person within the last week. The General Health Questionnaire has 12-, 28-, 30-, and 60-item forms (27); however, the 12-item form is widely preferred because its sensitivity and specificity in separating cases is high, and it can be used in various sociocultural settings (17,28,29). There are four response options for each item: 1= Never, 2= As usual, 3= More often than usual, and 4= Very often. Responses given to the items can be scored either on a four-point Likert-type scale or by giving "0" points to each of the first two options and "1" points to each of the last two options. A person with a score of four or more has a high level of psychological distress, a person with a score of 2 or 3 has a moderate level of psychological distress, and a person with a score less than 2 has a low level of psychological distress. Participants whose General Health Questionnaire score is ≥4 are in the at-risk group for mental illnesses. The validity and reliability study of the Turkish version of the General Health Questionnaire was conducted by Kılıç; the specificity was .84. In this study, the sensitivity of the questionnaire was .74, and Cronbach's alpha value was .87.

2.4. Data Collection

After the ethical permission was obtained, the Department of Student Affairs of that institution informed the students living in the earthquake zone about the study and shared the contact information of the researchers with the students.

The researchers informed all the students who contacted them about the purpose of the study, told them that this study would not affect their grades, and that participation in the study was voluntary. Then, the students who agreed to participate in the study gave their written consent, and the Google form link was shared with the students. In line with the decision taken by the government after the earthquake, education was conducted online in all universities in Türkiye. Therefore, data were collected between May 2023 and June 2023 which shows the first 5 months' results of the students via a Google form.

2.5. Analysis of The Data

Data were analyzed using IBM SPSS (Statistical Package for the Social Sciences) 29.0. Based on the result of the Kolmogorov –Smirnov test, which is used to test normality, the data were normally distributed. Psychological distress, which was the dependent variable in the primary analysis, was divided into two groups as high (≥4) and low (<4). The independent variables are categorical variables, and their relationship with the dependent variable was analyzed with the X^2 test.

Logistic regression analysis was performed to evaluate the variables (damage to the house/apartment and trauma level) that were significant according to the primary analysis. P-values of .05 were considered statistically significant. The Hosmer-Lemeshow test was conducted to assess the fit of the model. If the P value is above 0.05, the predictive value of the model can be considered high. In this study, the value obtained using the Hosmer-Lemeshow test was .915, which indicated that the model's predictive value was high.

2.6. Ethical Considerations

Before conducting the study, ethical approval (approval number: 2023/16-09) and written permission from the Dokuz Eylül University Noninvasive Clinic Ethics Committee where the study was conducted were gathered (approval number: 8087-GOA). After informing the students about the aim of the study, written and verbal informed consent was obtained.

3. RESULTS

Based on the analysis, the mean age of the participating students was 21.49 years. Of them, 52.10% were men, 54.80% had low income, 79.70% had slightly damaged or undamaged houses/ apartments, 41% lived in tents or containers, and 57.60% suffered from a high level of trauma after the earthquake.

According to the results of the General Health Questionnaire-12, the participating students' psychological distress scores were divided into two groups as low (<4) and high (≥4). The level of the risk of psychological distress was high in 59% of the students. The mean score on the General Health Questionnaire was 4.91 ± 3.72 (0–12).

Psychological distress assessments of the participating nursing students affected by the earthquakes according to their characteristics and trauma levels are presented in Table 1. The total mean score on the post-earthquake trauma level determination scale was 56.89 ± 15.01 (range 21-92). There was a statistically significant difference between their psychological distress levels in terms of their characteristics such as gender, income status, and damage to the house/ apartment, and their trauma levels (relationship between their psychological distress levels and their characteristics such as gender, income status and damage to the house/ apartment and their trauma levels) ($p < .05$) (Table 1). There was not a statistically significant difference between their psychological distress levels in terms of variables such as year at school and place of residence after the earthquakes (relationship between their psychological distress levels and

the variables such as year at school, the place of residence after the earthquakes) (p > .05) (Table 1).

Table 1. *Comparison of participating students' general health questionnaire scores according to their characteristics (n=217)*

Characteristics	The presence of psychologic distress (≥4)	Absence of psychologic distress (<4)		
	n (%)	n (%)	Test	p
Gender			X^2=7.114	**.008**
Women	71 (68.30)	33 (31.70)		
Men	57 (50.40)	56 (49.60)		
Income status			X^2=4.687	**.030**
Income less than expenses	78 (65.50)	41 (34.50)		
Income equal to expenses	50 (51)	48 (49)		
Year at school			X^2=1.127	.771
First-year student	29 (64.40)	16 (35.60)		
Second-year student	32 (54.20)	27 (45.80)		
Third-year student	30 (60)	20 (40)		
Fourth-year student	37 (58.70)	26 (41.30)		
Damage to the house/ apartment			X^2=11.893	**.001**
Yes	36 (81.80)	8 (18.20)		
No	92 (53.20)	81 (46.80)		
The current place of residence			X^2= 862	.650
A relative's house or apartment	30 (63.80)	17 (36.20)		
Tent/container	53 (59.60)	36 (40.40)		
Their own house or apartment	45 (55.60)	36 (44.40)		
Trauma level			X^2= 49.796	**.000**
Low	29 (31.50)	63 (68.50)		
High	99 (79.20)	26 (20.80)		

Note: Bold values indicate statistically significant p values (p < .05).

Binary logistic regression analysis was used to assess the effects of the characteristics and trauma levels of the participating nursing students affected by the earthquakes on their psychological distress. Significant variables in the primary analysis, such as gender, income status, damage status of the house/apartment, and trauma levels, were included in the logistic regression analysis. The created regression model correctly predicted the psychological distress levels of the participating nursing students affected by the earthquake at a rate of 74.7% (Table 2). According to the results of the regression analysis, the risk of psychological distress was 2.5 times higher in those whose houses/apartments were damaged than in those whose houses/apartments were not damaged. The risk of psychological distress was 6.6 times higher in those with a high level of trauma than in those with a low level of trauma. According to the logistic regression analysis results, gender and income status variables did not have a predictive effect on the psychological distress levels of the participating nursing students affected by the earthquakes (Table 2).

Table 2. *Examining the risk factors affecting the psychological distress levels of the participating student nurses (n=217)*

Risk factors	Odds ratio	95% C.I. for OR		p
		Lower	Upper	
Gender	.735	.383	1.412	.355
Income status	.546	.290	1.028	.061
House damage	2.532	1.029	6.229	**.043**
The presence of trauma	6.657	3.473	12.763	**.000**
Nagelkerke R^2: 0.325, p<0.001				
The rate at which the model correctly predicts psychological distress: 74.7%				
The Hosmer-Lemeshow test p-value of the model: 0.915 The predictive value of the model is high. Because the p-value of the model is greater than .05, it has a sufficient fit.				

Note: Bold values indicate statistically significant p values (p < .05).95% confidence interval for OR; C.I.: Confidence Interval

4. DISCUSSION

In this study, it was investigated the predictive role of the individual characteristics and trauma levels of nursing students affected by the earthquakes that hit Türkiye on February 06, 2023, in their psychological distress levels. Based on the results of this study, having a damaged house and a high level of trauma increased the risk of psychological distress. People who lost their houses/apartments after the Great East Japan Earthquake suffered from depression and post-traumatic stress disorder (30). According to Kin and Onuma (2012), reasons such as witnessing death-related events, experiencing physical pain, having losses, having a disrupted routine, having to leave the place where one lives, and experiencing loss of income and occupation can expose individuals to trauma (31). In the study conducted by Arata et al. on medical students, students experienced loss, injury, or damage to their surroundings during the disaster, much of which was due to damage to homes and property. Based on the results, the proportion of students who experienced the destruction of buildings or injury to themselves or others was approximately 5%; these were possible sources of trauma (32).

The loss of a house/apartment may have disrupted routines and may have affected the students' psychological distress levels. In addition, the participating students witnessed their houses/apartments being damaged by the earthquakes. They were in their hometowns as the earthquakes that hit them coincided with their mid-term break. So that they were caught in the earthquake in their homes when the first earthquake occurred early in the morning. Sociologically, home is not only a place where the need for shelter is met but also a place full of memories in which people feel safe and comfortable (33). Damage to the house/apartment may have affected individuals' perception of security and thus caused them to experience psychological distress.

The findings of the study revealed nursing students affected by the earthquake with high levels of trauma were at greater risk of developing psychological distress than nursing students with low levels of trauma. In a study conducted with 188 individuals who were caught in the February 6

earthquakes whose epicenters were Kahramanmaraş, the participants had high levels of trauma after the earthquakes (34). In another study, it was stated that the Kahramanmaraş earthquake caused post-traumatic stress disorder in 43.50% of medical students (35). In a study conducted with medical students after the Great East Japan Earthquake in 2011, 20% of the participants suffered from physical and mental problems even six months after the earthquake (32). After the earthquake in Japan, it has been reported that medical students experienced negative emotions such as feeling confused, angry, sad, guilty, or anxious (22). Earthquakes adversely affect earthquake victims' mental health both in the short and long term. The fact that the participants of the present study suffered from high levels of trauma was probably because the earthquake was long-lasting and devastating in a wide region affecting 11 provinces and because it was a major disaster in which 50,783 people died, according to official figures (20). Several studies in the literature describe the relationship between post-traumatic stress disorder and depression (36-39). In a study, Cheng et al. (2018) pointed out that the symptoms of post-traumatic stress predicted future depression (40). In the study conducted by Arata et al. on medical students, the trends in disaster-related harm and physical and mental distress were found to be significant. The results demonstrated that each type of problem gradually decreased in the year following the disaster, although physical and mental distress took two years to resolve (32). Within the scope of the prevention of mental illnesses, it seems important to screen individuals displaying trauma symptoms and having high levels of trauma and to refer them to healthcare professionals to receive psychological support as soon as possible. Since the Kahramanmaraş earthquakes in Türkiye occurred over a wide area, it is a great possibility for nurse educators in Türkiye to encounter nursing students affected by the earthquakes. The results of this study also indicate the importance of nurse educators identifying these students and referring them to healthcare professionals to receive psychological support.

According to the results of the present study, variables such as gender and income status did not affect the participants' psychological distress levels. Unlike this study's results, a study conducted on medical students after the 2019 Albania Earthquake found that women experienced more post-traumatic distress than men (41). In the study conducted by Öztürk and Dönmezler (2024) on medical students after the February 6 Kahramanmaraş earthquake, female participants had significantly higher post-traumatic distress symptom severity compared to their male counterparts with a large effect size (35). Consistent with the study results, in another study conducted in 2019, there were no differences between men and women in terms of developing psychological distress (42). The literature demonstrated that the results of this study on the gender variable were different from those of other studies, which suggests that further research should be conducted to investigate the effect of gender on psychological distress after disasters such as earthquakes that affect large masses.

Like the gender variable, the income status variable did not affect psychological distress. The results of the study conducted on medical students after the Kahramanmaraş earthquake are similar to this study. In that study, age, years in medical school, household income, and financial losses post-earthquake were not significantly associated with post-traumatic distress (35). Within the scope of psychological first aid activities, meeting individuals' physical needs in the acute period positively protects their psychological health (43). The present study was conducted in the early stages after the two earthquakes, the basic physical needs (water, food, clothing, etc.) of people affected by the earthquake were met with aid provided by the government, people from the regions of Türkiye that were not affected by the earthquakes, and other countries. Therefore, in this study, it is believed that income status did not affect psychological distress in the early stages of the earthquake.

4.1. Limitations

This study has some limitations. Earthquake trauma leads to different psychological effects in the early and long term. Since this study was conducted in the early stages after the earthquakes, it only reflects the first 5 months' results of the psychological distress of the students. Therefore, further studies should be conducted to reveal the long-term psychological effects of earthquakes. In this study, no questions were asked about whether students received psychological support. It is unclear how psychological support affects nursing students' psychological distress and trauma levels.

5. CONCLUSION

It was emphasized that the results of this study are important because they revealed the factors affecting the psychological distress of nursing students who were affected by the last two earthquakes in Türkiye, which caused many deaths. Nurse educators' screening nursing students affected by the earthquake regarding psychological distress and referring them to psychosocial support when deemed necessary seem important. They can refer their students to universities' psychological support services. Within the scope of the study findings, it is recommended that the psychological support needs of students whose trauma levels are high and whose houses/apartments are damaged should be questioned. For these students, cognitive behavioral therapy or social support group-based psychoeducation sessions can be provided by psychiatry nurse specialists. It is considered that creating a psychosocial support network with counseling systems in nursing schools for these students and referring them to health professionals for psychosocial support will improve their mental health and prevent them from developing mental illness. It is recommended that longitudinal studies be conducted to investigate the psychological distress and trauma levels of nursing students.

Acknowledgements: *We would like to thank the students of Dokuz Eylül University Faculty of Nursing for participating in this study.*

Funding: *The author(s) received no financial support for the research.*

Conflicts of interest: *The authors declare that they have no conflict of interest.*

Ethics Committee Approval:

This study was approved by Ethics Committee of Dokuz Eylul University, Noninvasive Clinic Ethics Committee (Approval date: 2023/16-09); Number: 2023/16-09*)*

Peer-review: *Externally peer-reviewed.*

Author Contributions: (Initials only)

Research idea: BÇ; OSY; EAK

Design of the study: BÇ; OSY; EAK

Acquisition of data for the study: BÇ; OSY; EAK

Analysis of data for the study: BÇ; OSY

Interpretation of data for the study: BÇ; OSY; EAK

Drafting the manuscript: BÇ; OSY; EAK

Revising it critically for important intellectual content: BÇ; OSY; EAK

Final approval of the version to be published: BÇ; OSY; EAK

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How to cite this article: Çelik B, Yüksel ÖS, Kankaya EA. Predictive Role of The Trauma Level of Nursing Students Affected by The Earthquake Disaster in Turkey on Their Psychological Distress. Clin Exp Health Sci 2024; 14: 1120-1126. DOI: 10.33808/clinexphealthsci.1364904