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The Relationship Between Trauma Level, Anxiety, Stress, and Coping of Earthquake-Stricken University Students

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Original Research

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Abstract

Objective: This study aimed to examine the relationships between post-earthquake trauma, anxiety, stress, and stress coping strategies among university students who survived the Kahramanmaraş earthquakes.

Methods: This cross-sectional study included 384 university students who survived the Kahramanmaraş earthquakes. Data were collected using a personal information form and standardized scales assessing post-earthquake trauma, anxiety, stress, and stress coping strategies. Descriptive statistics, group comparisons, and correlation analyses were performed.

Results: Among the participants, 35.7% had lost a relative, 47.8% had lost a friend, 10.0% reported that their homes were destroyed, 54.0% reported home damage, and 3.1% had been trapped under rubble. A strong positive correlation was found between post-earthquake trauma and anxiety scores ($r = 0.714$). Participants who had lost a family member, relative, or friend had significantly higher trauma and anxiety scores than those who had not. Trauma scores were also significantly higher among those who were injured, trapped under rubble, or involved in rescue efforts. Significant relationships were found between post-earthquake trauma, anxiety, stress, and stress coping strategies.

Conclusions: Earthquake-related experiences were associated with increased trauma, anxiety, and stress and with stress coping strategies. Early psychological assessment and psychosocial support may help reduce the psychological effects of earthquakes on university students.

Introduction

The earthquakes, which occurred in Türkiye at 04.17 local time on February 6, 2023, in Kahramanmaraş Pazarcık district as the epicenter with a magnitude of 7.8 and lasting for 65 seconds, and in Kahramanmaraş Elbistan district with a magnitude of 7.6 and lasting for 45 seconds, resulted in many life and property losses in 11 provinces. The death toll rose to 50,096 and the casualties to 107,204 people in this earthquake.[1] In the 2023 earthquake, a total of 17.406 people died and 71.866 people were injured, including 4.879 deaths and 9.243 injuries in Kahramanmaraş, 2.141 deaths and 11.563 injuries in Gaziantep, 304 deaths and 4.663 injuries in Şanlıurfa, 212 deaths and 899 injuries in Diyarbakır, 408 deaths and 7.450 injuries in Adana, 3.105 deaths and 11.778 injuries in Adıyaman, 289 deaths and 7.300 injuries in Malatya, 878 deaths and 2.224 injuries in Osmaniye, 5.111 deaths and 15.613 injuries in Hatay, 74 deaths and 754 injuries in Kilis, and 5 deaths and 379 injuries in Elazığ.[2,3]

According to the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V), a traumatic event is "a case of facing actual or threatened death, serious injury, or sexual violence, which has been directly experienced or directly witnessed, or that has happened to a family member or close friend, or that has been experienced professionally." The definition of traumatic events in DSM-V also includes natural disasters.[4] Due to their effects, they are considered a critical traumatic event in human life, both in terms of the destruction they cause in people and their impact on normal life with their sudden emergence. The loss of life and property caused by Kahramanmaraş earthquakes and the negative experiences seen after the earthquake indicate that the effects of the earthquake will last for a very long time. Although the psychological problems caused by earthquake trauma rarely manifest themselves at the time of the trauma, they may appear more frequently and repeatedly in the future. The reactions observed include intense panic, anxiety, hopelessness, and unhappiness. Since a traumatic event is an occurrence outside of normal human experiences, it has a structure that tests people in every way and changes the person.[5] In addition, natural disasters affect many people at once and cause some health problems.[5,6] Traumatic events reduce people's sense of security in their current location, remind individuals of the reality of death, and have direct negative effects on mental health.[6]

Cardiovascular problems, respiratory diseases, and the severity of many existing diseases in earthquake victims increase, infectious diseases develop, and mental health disorders such as

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depression and anxiety are observed.[7] Post-traumatic stress disorder (PTSD), one of the mental health disorders, is the most common health problem.[8] It includes persistent remembering of the traumatic event, avoidance of trauma-related stimuli, negative changes in cognition and mood related to the traumatic event, and a major increase in arousal or response to the traumatic event.[9] However, PTSD is not the only mental health disorder observed after earthquakes. Anxiety disorders also represent a significant psychological consequence among earthquake survivors.[10,11]

Another psychiatric problem frequently observed following an earthquake is anxiety. Generalized anxiety disorder (GAD) is characterized by excessive and persistent worry about specific events or activities, accompanied by the expectation that negative outcomes will occur.[13] Studies have shown that the incidence of GAD increases among earthquake survivors.[14] Psychological trauma experienced after earthquakes can have long-lasting consequences for mental health, with adverse effects that may persist throughout an individual's life. Evidence indicates that these mental health consequences can endure for many years; for example, one study found that psychological effects were still evident among students eight years after an earthquake.[15] Without adequate psychological support and effective stress-coping strategies, survivors may develop a wide range of mental health disorders, and these psychological difficulties may also adversely affect the people around them.[16]

Despite the growing evidence on the long-term psychological consequences of earthquakes, research focusing specifically on university students who have experienced earthquake-related trauma remains limited. There are very few studies investigating post-earthquake trauma-related stress, post-traumatic stress disorder,[17] anxiety, or hopelessness levels[5,16] among university students who are earthquake survivors. Therefore, this study was conducted to examine the relationship between trauma level, anxiety, stress, and coping with stress in university students who are earthquake survivors.

Materials and Methods

Type of the Study

This is a descriptive and correlational study.[18]

Research Questions

1. What are the anxiety and trauma levels of the students?
2. What are the students' strategies for coping with earthquake stress?
3. Is there a relationship between the students' trauma level, anxiety, stress, and coping with stress?
4. Is there a relationship between the students' sociodemographic characteristics and trauma level, anxiety, stress, and coping with stress?

The Setting of the Research

This study was conducted among university students who experienced the Kahramanmaraş-centered earthquakes that occurred in Türkiye on February 6, 2023, and were affected by them. Data were collected online between May 15, 2023, and September 15, 2023, after obtaining ethics committee approval and the necessary institutional permissions.

Population and Sample

The population of the study consisted of university students who were victims of the Kahramanmaraş earthquake. The sample size was calculated using the formula for an unknown population. Based on this formula, the minimum required sample size was calculated as 384. A total of 389 university students participated in the study and were included in the analysis.

Participant Recruitment and Eligibility Criteria

Participants were recruited on a voluntary basis using an online questionnaire created with Google Forms. The survey link was shared electronically with university students who met the inclusion criteria. The questionnaire was available only in Turkish, and completion of the online survey indicated informed consent to participate in the study.

Inclusion Criteria

- University students who were victims of the Kahramanmaraş earthquake.
- Students who voluntarily agreed to participate in the study.

Data Collection

The questionnaire was developed by the researchers following a review of the relevant literature. Data was collected using an online questionnaire created with Google Forms. Participants completed the questionnaire in approximately 10 minutes.

Sociodemographic Questionnaire

The questions were created following a review of the literature.[5,19]

The Beck Anxiety Inventory

This scale was developed by Beck et al. It is a self-rating scale used to determine the frequency of anxiety symptoms experienced by individuals. It has a Likert-type scale consisting of 21 items. Total scores range between 0 and 63. A high total score indicates that the level of anxiety experienced by the person is high. Total test scores are interpreted as follows: 0-7, minimal anxiety; 8-15, mild anxiety; 16-25, moderate anxiety; 26-63, severe anxiety. The validity and reliability study of the scale in Turkey was conducted by Ulusoy et al.[20,21]

The Post-Earthquake Trauma Level Determination Scale (PETLDS)

This is a 5-point Likert-type scale (1 = never-5 = always) consisting of 5 sub-dimensions and 22 items. It was developed and tested for validity and reliability by Tanhan and Kayri. It is used to measure the stress level experienced by individuals following an earthquake. The lowest score that can be obtained from the scale is 20, and the highest is 100. High scores on the scale indicate high levels of earthquake impact on the individual. As a result of the reliability analysis of the scale, Cronbach's alpha internal consistency coefficient was found to be 0.64 for the first subscale, 0.75 for the second subscale, 0.61 for the third subscale, 0.68 for the fourth subscale, and 0.70 for the fifth subscale. The internal reliability coefficient

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(Cronbach's alpha) calculated for all items of the PETLDS was found to be 0.87.[22]

The Strategies of Coping With Earthquake Stress Scale (SCWSS)

Yöndem et al. developed this scale and performed its Turkish validity and reliability study in 2016 in the same study. The scale is used to reveal strategies for coping with earthquake stress. It has a 4-point Likert scale (1 = never–4 = always) and 16 items. Scores on the scale vary from 16 to 64. A high score on a dimension indicates that the individual uses that coping strategy more, while a low score indicates the use of that coping strategy less. The subscales are religious coping, positive reappraisal, and seeking social support, which are the most commonly used strategies in response to earthquake stress. Each item is scored between 1 and 4. Religious coping has 5 items (2-8-9-10-11) (5-20 points), positive reappraisal has 6 items (5-12-13-14-15-16) (6-20 points), and seeking social support has 5 items (1-3-4-6-7) (items 3 and 7 are reverse scored) (5-20 points). A high score on a subscale reflects the use of this coping strategy more. In the validity and reliability study of the scale, Cronbach's α internal consistency coefficient was found to be 0.85 for religious coping, 0.69 for positive reappraisal, and 0.74 for seeking social support.[23]

Ethical Aspects of the Research

Written permission from the authors was obtained for the scales used in the research. Institutional permission was obtained from the schools where the research data would be collected. Data were collected on a voluntary basis. Written consent was obtained from the participants before data collection was initiated. Ethics committee permission was obtained (27.04.2023/60).

Data Analysis

The study data were analyzed using SPSS 22.0 statistical software. Frequency and percentage analyses were used to determine participants' descriptive characteristics, and mean and standard deviation statistics were used to examine the scale. Parametric methods were used to analyze the data. Differences between the ratios of categorical variables in independent groups were analyzed with Chi-square and Fisher's exact tests. The relationships between the dimensions that showed the scale levels of the participants were examined with Pearson correlation and linear regression analyses.[24] Independent-samples t-test, one-way analysis of variance (ANOVA), and post hoc (Tukey, LSD) analyses were used to examine the differences between scale levels according to participants' descriptive characteristics. Cohen (d) and Eta squared (η^2) coefficients were used to calculate the effect size.[25]

Results

Results regarding the descriptive characteristics of the participants are listed below.

Of the participants, 278 (71.5%) were female, 115 (29.6%) were second-year students, 255 (65.6%) were living in a province at the time of the earthquake, and 153 (39.3%) stated the province of residence as "other." According to the findings, 342 (87.9%) of the participants had not moved to another place from their place of residence following the earthquake; 379 (97.4%) had not lost any family members; 250 (64.3%) had not lost any relatives; 203 (52.2%) had not lost any friends; the houses of 350 (90.0%) had not been destroyed; the houses of 210 (54.0%) had been damaged; the house of 285 (73.3%) was slightly damaged; 377 (96.9%) had not been trapped under debris during the earthquake; 362 (93.1%) had not been injured; 238 (61.2%) had been staying in their own homes following the earthquake; 335 (86.1%) had not participated in rescue operations; 235 (60.4%) had never experienced a natural disaster before; 249 (64.0%) had not received disaster-related training before. The mean age of the participants was found to be 22.242±4.815(Min = 18; Max = 56) (Table 1).

The examination of the correlations between the total post-earthquake trauma score, anxiety score, and the total strategies of coping with earthquake stress score indicated that there was a high level, positive($P = 0.000 < 0.05$) correlation(r = 0.714) between the anxiety and the total post-earthquake trauma scores. Correlations between other variables were not statistically significant($P > 0.05$) (Table 2).

In our study, the mean scores of male participants on the total post-earthquake trauma(x = 55.532) were found to be lower than those of females(x = 61.669) (t = −3.187; $P = 0.002 < 0.05$; d = 0.358; $\eta^2 = 0.026$). The mean scores of males on the total anxiety scale (x = 18.640) were found to be lower than those of female participants (x = 23.504) (t = −2.819; $P = 0.005 < 0.05$; d = 0.316; $\eta^2 = 0.020$). In the study, participants' total post-earthquake trauma scores differed significantly according to where they lived during the earthquake (F = 4.205; $P = 0.016 < 0.05$; $\eta^2 = 0.021$). Participants' mean scores on the total post-earthquake trauma scale differed significantly according to which city they were in when the earthquake occurred (F = 5.513; $P = 0 < 0.05$; $\eta^2 = 0.116$). Their anxiety scores, too, differed significantly according to which city they were in when the earthquake occurred (F = 3.339; $P = 0.001 < 0.05$; $\eta^2 = 0.073$). Also, the total scores of the participants on the Strategies of Coping with Earthquake Stress Scale differed significantly according to which city they were in when the earthquake occurred (F = 3.429; $P = 0 < 0.05$; $\eta^2 = 0.075$). The total post-earthquake trauma scores of those who had moved from the city of residence following the earthquake(x = 70.277) were found to be higher than the scores(x = 58.494) of those who had not (t = 4.470; $P = 0 < 0.05$; d = 0.695; $\eta^2 = 0.049$). The anxiety scores of those who had moved from the city of residence following the earthquake(x = 28.106) were found to be higher than the scores(x = 21.292) of those who had not(t = 2.851; $P = 0.005 < 0.05$; d = 0.443; $\eta^2 = 0.021$). The total post-earthquake trauma scores(x = 78.300) of those who had lost a family member were found to be higher than the scores(x = 59.433) of those who had not (t = 3.441; $P = 0 < 0.05$; d = 1.102; $\eta^2 = 0.030$). The anxiety scores of those who had lost a family member(x = 44.200) were found to be higher than the scores of those who had not(x = 21.533) (t = 4.685; $P = 0 < 0.05$; d = 1.501; $\eta^2 = 0.054$). The post-earthquake trauma total scores were found to be higher in participants who had lost a relative in the earthquake(x = 65.914) than in those who had not(x = 56.584) (t = 5.253; $P = 0 < 0.05$; d = 0.556; $\eta^2 = 0.067$). The anxiety scores were higher in participants who had lost a relative(x = 25.540) than in those who had not (x = 20.212) (t = 3.288; $P = 0.001 < 0.05$; d = 0.348; $\eta^2 = 0.027$). The total strategies of coping with earthquake stress scores were lower in those who had lost a relative(x = 43.777) than in those who had not (x = 45.680)(t = −2.359; $P = 0.019 < 0.05$; d = 0.250; $\eta^2 = 0.014$). The total post-earthquake trauma scores were found to be higher in participants who had lost a friend in the earthquake(x = 65.688) than in those who had not (x = 54.631) (t = 6.615; $P = 0 < 0.05$; d = 0.671; $\eta^2 = 0.102$). The

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Table 1. Distribution of the participants according to their descriptive characteristics

Groups	Frequency (n)	Percentage (%)
Gender		
Male	111	28.5
Female	278	71.5
School year		
1	108	27.8
2	115	29.6
3	60	15.4
4	106	27.2
Place of residence during the earthquake		
Province	255	65.6
County	112	28.8
Village	22	5.7
Province of residence during the earthquake		
Adana	27	6.9
Adıyaman	21	5.4
Diyarbakır	42	10.8
Gaziantep	35	9.0
Hatay	33	8.5
Kahramanmaraş	18	4.6
Malatya	28	7.2
Osmaniye	7	1.8
Urfa	25	6.4
Other	153	39.3
Moving to another place following the earthquake		
Yes	47	12.1
No	342	87.9
Loss of a family member		
Yes	10	2.6
No	379	97.4
Loss of a relative		
Yes	139	35.7
No	250	64.3
Loss of a friend		
Yes	186	47.8
No	203	52.2
Whether the house collapsed during the earthquake		
Yes	39	10.0
No	350	90.0
Whether the house was damaged during the earthquake		
Yes	210	54.0
No	179	46.0
The damage level of the house		
Little	285	73.3
Medium	48	12.3
Heavy	56	14.4
Status of getting trapped under debris		
Yes	12	3.1
No	377	96.9
Status of getting injured		
Yes	27	6.9
No	362	93.1
Place of residence following the earthquake		
A relative's house	87	22.4
A friend's house	24	6.2
Tent	34	8.7
Hospital	2	0.5
Own home	238	61.2
Hotel	4	1.0
Status of participating in rescue operations		
Yes	54	13.9
No	335	86.1
Having previously experienced a natural disaster		
Yes	154	39.6
No	235	60.4
Status of having received disaster-related training		
Yes	140	36.0
No	249	64.0
Having taken earthquake-related measures		
I had our house checked before the earthquake.	67	17.2
I took earthquake insurance.	80	20.6
I made an emergency plan for the earthquake.	67	17.2
I had the installation of the house checked before the earthquake.	24	6.2
I took precautions for chemicals at home.	40	10.3
I took precautions for the items at home before the earthquake.	93	23.9
I prepared an earthquake emergency kit.	99	25.4
I did not do any of them.	178	45.8
	Mean	SD
Age	22.242	4.815

anxiety scores were higher in participants who had lost a friend (x = 27.328) than in those who had not (x = 17.340) (t = 6.695; $P = 0 < 0.05$; d = 0.680; $\eta^2 = 0.104$). The total strategies of coping

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Table 2. Correlation analysis between anxiety, post-earthquake trauma, and strategies of coping with earthquake stress scores

		Post-earthquake trauma	Anxiety	Total strategies of coping with earthquake stress score
Post-earthquake trauma total score	r	1.000		
	p	0.000		
Anxiety	r	0.714**	1.000	
	p	0.000	0.000	
Total strategies of coping with earthquake stress score	r	−0.027	−0.055	1.000
	p	0.597	0.282	0.000

Notes. *<0.05; **<0.01; Pearson correlation analysis.

with earthquake stress scores were lower in those who had lost a friend (x = 44.167) than in those who had not (x = 45.764) (t = −2.060; $P = 0.039 < 0.05$; d = 0.209; $\eta^2 = 0.011$). In our study, the total post-earthquake trauma scores of those whose houses had been destroyed in the earthquake (x = 73.539) were found to be higher than the scores of those whose houses had not been destroyed (x = 58.400) (t = 5.349; $P = 0 < 0.05$; d = 0.903; $\eta^2 = 0.069$). The anxiety scores were found to be higher in those whose houses had been destroyed in the earthquake (x = 32.539) than in those whose houses had not been destroyed (x = 20.954) (t = 4.536; $P = 0 < 0.05$; d = 0.766; $\eta^2 = 0.050$). The total strategies of coping with earthquake stress scores were found to be lower in participants whose houses had been destroyed in the earthquake (x = 41.564) than in those whose houses had not been destroyed (x = 45.383) (t = -2,979; $P = 0.003 < 0.05$; d = 0,503; $\eta^2 = 0,022$). The total post-earthquake trauma scores of those whose houses had been damaged in the earthquake (x = 64.957) were found to be higher than the scores of those whose houses had not been damaged (x = 54.006) (t = 6.529; $P = 0 < 0.05$; d = 0.664; $\eta^2 = 0.099$). The anxiety scores were found to be higher in those whose houses had been damaged in the earthquake (x = 25.019) than in those whose houses had not been damaged (x = 18.710) (t = 4.080; $P = 0 < 0.05$; d = 0.415; $\eta^2 = 0.041$). The total strategies of coping with earthquake stress scores were found to be lower in participants whose houses had been damaged in the earthquake (x = 44.019) than in those whose houses had not been damaged (x = 46.151) (t = −2.756; $P = 0.007 < 0.05$; d = 0.280; $\eta^2 = 0.019$). In our study, participants' total post-earthquake trauma scores (F = 26.184; $P = 0 < 0.05$; $\eta^2 = 0.119$), anxiety scores (F = 13.349; $P = 0 < 0.05$; $\eta^2 = 0.065$), and strategies of coping with earthquake stress scores (F = 6.863; $P = 0.001 < 0.05$; $\eta^2 = 0.034$) differed significantly according to the level of damage to the house. The total post-earthquake trauma scores of those who had been trapped under debris during the earthquake (x = 76.250) were found to be higher than the scores of those who had not (x = 59.398) (t = 3.356; $P = 0.001 < 0.05$; d = 0.984; $\eta^2 = 0.028$). The total post-earthquake trauma scores of those who had been injured in the earthquake (x = 70.482) were found to be higher than the scores of those not injured (x = 59.130) (t = 3.321; $P = 0.001 < 0.05$; d = 0.663; $\eta^2 = 0.028$). The anxiety scores of those injured in the earthquake (x = 32,000) were found to be higher than the anxiety scores of those who had not been injured (x = 21.379) (t = 3,483; $P = 0.001 < 0.05$; d = 0,695; $\eta^2 = 0,030$). The total post-earthquake trauma scores (x = 65.611) of those who had participated in rescue operations during the earthquake were found to be higher than the scores of those who had not (x = 59.000) (t = 2.618; $P = 0.009 < 0.05$; d = 0.384; $\eta^2 = 0.017$). In our study, the total post-earthquake trauma scores of the participants who had received disaster-related training (x = 56.179) were found to be lower than the scores of those who had not (x = 62.020) (t = −3.225; $P = 0.001 < 0.05$; d = 0.341; $\eta^2 = 0.026$). The total strategies of coping with earthquake stress scores of those who had received disaster-related training (x = 46.343) were found to be higher than the scores of those who had not (x = 44.245) (t = 2.609; $P = 0.009 < 0.05$; d = 0.276; $\eta^2 = 0.017$) (Table 3).

Discussion

The examination of the relationships between post-earthquake trauma, anxiety, stress, and strategies for coping with stress showed that there was a positive correlation (r = 0.714) between anxiety and total post-earthquake trauma scores ($P = 0.000 < 0.05$). The findings of this study indicate that the earthquake had a substantial psychological impact on university students, as reflected by increased post-earthquake trauma and anxiety scores.[26,27] The results of this study suggest that individuals' quality of life may decrease due to trauma and anxiety that develop following an earthquake. Many studies have shown that earthquakes bring on some psychological symptoms, such as depression, anxiety, and stress,[28,29] reveal post-traumatic stress disorders, and affect individuals' well-being.[30]

The trauma and anxiety scores of women who were earthquake victims were higher than those of men. Some studies in the literature, similar to our study, have shown that women who are earthquake victims have higher anxiety and trauma scores,[7,16,17,31–34] while others have indicated that there is no difference between genders.[35] These inconsistent findings suggest that gender differences in post-earthquake psychological outcomes may vary according to individual, cultural, and contextual factors. However, it has been shown that personal characteristics are more effective in this regard than the general opinion. In general, it has been reported that anxiety is observed more frequently in women at all periods of their lives, and in adulthood in men and decreases after the age of 50.[16]

In this study, the anxiety and trauma scores of those whose houses had been damaged or destroyed in the earthquake were found to be high. In some studies in the literature, while the anxiety scores of those whose houses were damaged or destroyed in an earthquake were high,[12,35,36] in one study, trauma scores were found to be higher.[7] Based on these findings, it can be thought that the likelihood of anxiety and trauma will be higher if one's house is damaged or destroyed in an earthquake. The loss of or damage to one's home may increase feelings of insecurity, displacement, and uncertainty, thereby contributing to greater psychological distress following a disaster. At the same time, individuals whose houses are damaged are seen in the risk group for trauma in the literature.[37] Therefore, this is an expected finding.

While the post-earthquake trauma and anxiety levels of those who had moved from their city of residence following the earthquake were found to be high, this finding suggests that relocation after the earthquake may have been associated with greater psychological distress among the participants.[38] Relocation may have resulted from multiple earthquake-related experiences, including the loss of housing, disruption of daily life, and separation from familiar social environments. However, the underlying reasons for

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Table 3. Differentiation of anxiety, post-earthquake trauma, and strategies of coping with earthquake stress scores by descriptive characteristics

Descriptive characteristics	n	Post-earthquake trauma	Anxiety	Strategies of coping with earthquake stress total score
Gender		Mean ± SD	Mean ± SD	Mean ± SD
Male	111	55.532 ± 17.077	18.640 ± 15.177	45.460 ± 8.657
Female	278	61.669 ± 17.180	23.504 ± 15.443	44.817 ± 7.246
t=		−3.187	−2.819	0.746
p=		**0.002**	**0.005**	0.490
School year		Mean ± SD	Mean ± SD	Mean ± SD
1	108	58.565 ± 16.841	20.759 ± 16.269	44.843 ± 7.134
2	115	60.017 ± 17.488	22.983 ± 14.117	45.617 ± 7.782
3	60	60.317 ± 18.934	22.900 ± 16.653	44.100 ± 7.054
4	106	60.962 ± 16.941	22.113 ± 15.601	45.000 ± 8.418
F=		0.357	0.445	0.537
p=		0.784	0.721	0.657
Place of residence during the earthquake		Mean ± SD	Mean ± SD	Mean ± SD
Province	255	61.408 ± 17.087	23.431 ± 15.417	45.200 ± 7.716
County	112	58.196 ± 17.142	19.973 ± 15.796	44.420 ± 7.239
Village	22	51.409 ± 18.963	17.773 ± 13.522	45.636 ± 9.317
F=		4.205	2.878	0.482
p=		**0.016**	0.057	0.618
PostHoc=		1>3 ($P < 0.05$)		
Province of residence during the earthquake		Mean ± SD	Mean ± SD	Mean ± SD
Adana	27	52.482 ± 14.388	19.444 ± 12.858	44.741 ± 7.289
Adıyaman	21	68.905 ± 13.682	27.381 ± 15.008	42.952 ± 5.518
Diyarbakır	42	69.071 ± 18.042	28.810 ± 14.716	44.691 ± 6.115
Gaziantep	35	60.486 ± 16.353	26.886 ± 14.956	42.771 ± 6.131
Hatay	33	67.212 ± 18.587	25.606 ± 16.217	42.697 ± 6.835
Kahramanmaraş	18	65.333 ± 20.292	22.389 ± 18.455	46.111 ± 6.249
Malatya	28	60.536 ± 13.304	20.143 ± 12.406	43.321 ± 6.464
Osmaniye	7	57.857 ± 5.210	11.429 ± 4.237	41.571 ± 4.036
Urfa	25	62.880 ± 16.937	24.720 ± 18.215	41.640 ± 8.169
Other	153	54.641 ± 16.593	18.575 ± 15.110	47.301 ± 8.628
F=		5.513	3.339	3.429
p=		**0.000**	**0.001**	**0.000**
PostHoc=		2>1. 3>1. 5>1. 6>1. 9>1. 3>4. 3>7. 2>10. 3>10. 5>10. 6>10. 9>10 ($P < 0.05$)	3>1. 3>7. 2>8. 3>8. 4>8. 5>8. 9>8. 2>10. 3>10. 4>10. 5>10 ($P < 0.05$)	10>2. 10>3. 10>4. 10>5. 10>7. 10>8. 10>9 ($P < 0.05$)
Moving to another place following the earthquake		Mean ± SD	Mean ± SD	Mean ± SD
Yes	47	70.277 ± 16.745	28.106 ± 14.840	43.660 ± 7.656
No	342	58.494 ± 16.969	21.292 ± 15.434	45.184 ± 7.664
t=		4.470	2.851	−1.279
p=		**0.000**	**0.005**	0.202
Loss of a family member		Mean ± SD	Mean ± SD	Mean ± SD
Yes	10	78.300 ± 7.790	44.200 ± 21.540	43.000 ± 4.690

(*Continued*)

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Table 3. (*Continued*)

Descriptive characteristics	n	Post-earthquake trauma	Anxiety	Strategies of coping with earthquake stress total score
No	379	59.433 ± 17.275	21.533 ± 14.916	45.053 ± 7.729
t=		3.441	4.685	−0.835
p=		**0.000**	**0.000**	0.404
Loss of a relative		Mean ± SD	Mean ± SD	Mean ± SD
Yes	139	65.914 ± 17.687	25.540 ± 16.101	43.777 ± 7.342
No	250	56.584 ± 16.265	20.212 ± 14.858	45.680 ± 7.777
t=		5.253	3.288	−2.359
p=		**0.000**	**0.001**	**0.019**
Loss of a friend		Mean ± SD	Mean ± SD	Mean ± SD
Yes	186	65.688 ± 16.559	27.328 ± 14.968	44.167 ± 6.888
No	203	54.631 ± 16.384	17.340 ± 14.444	45.764 ± 8.264
t=		6.615	6.695	−2.060
p=		**0.000**	**0.000**	**0.039**
Whether the house collapsed during the earthquake		Mean ± SD	Mean ± SD	Mean ± SD
Yes	39	73.539 ± 16.264	32.539 ± 18.349	41.564 ± 6.286
No	350	58.400 ± 16.819	20.954 ± 14.735	45.383 ± 7.721
t=		5.349	4.536	−2.979
p=		**0.000**	**0.000**	**0.003**
Whether the house was damaged during the earthquake		Mean ± SD	Mean ± SD	Mean ± SD
Yes	210	64.957 ± 17.295	25.019 ± 15.563	44.019 ± 6.921
No	179	54.006 ± 15.492	18.710 ± 14.766	46.151 ± 8.336
t=		6.529	4.080	−2.756
p=		**0.000**	**0.000**	**0.007**
The damage level of the house		Mean ± SD	Mean ± SD	Mean ± SD
Little	285	56.316 ± 16.102	19.737 ± 14.484	45.428 ± 7.756
Medium	48	68.604 ± 18.274	28.771 ± 15.971	46.396 ± 7.621
Heavy	56	70.804 ± 15.688	28.518 ± 16.884	41.625 ± 6.358
F=		26.184	13.349	6.863
p=		**0.000**	**0.000**	**0.001**
PostHoc=		2>1. 3>1 ($P < 0.05$)	2>1. 3>1 ($P < 0.05$)	1>3. 2>3 ($P < 0.05$)
Status of getting trapped under debris		Mean ± SD	Mean ± SD	Mean ± SD
Yes	12	76.250 ± 12.271	35.500 ± 23.000	42.583 ± 4.033
No	377	59.398 ± 17.248	21.690 ± 15.057	45.077 ± 7.747
t=		3.356	3.070	−1.109
p=		**0.001**	0.063	0.063
Status of getting injured		Mean ± SD	Mean ± SD	Mean ± SD
Yes	27	70.482 ± 18.213	32.000 ± 16.300	46.482 ± 7.345
No	362	59.130 ± 17.051	21.379 ± 15.212	44.890 ± 7.691
t=		3.321	3.483	1.041
p=		**0.001**	**0.001**	0.299

(*Continued*)

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Table 3. (*Continued*)

Descriptive characteristics	n	Post-earthquake trauma	Anxiety	Strategies of coping with earthquake stress total score
Status of participating in rescue operations		Mean ± SD	Mean ± SD	Mean ± SD
Yes	54	65.611 ± 18.192	25.889 ± 15.495	45.315 ± 8.538
No	335	59.000 ± 17.063	21.508 ± 15.444	44.949 ± 7.532
t=		2.618	1.934	0.325
p=		**0.009**	0.054	0.746
Having previously experienced a natural disaster		Mean ± SD	Mean ± SD	Mean ± SD
Yes	154	60.604 ± 17.799	22.727 ± 15.531	45.370 ± 7.744
No	235	59.468 ± 17.076	21.715 ± 15.508	44.757 ± 7.626
t=		0.631	0.629	0.770
p=		0.528	0.530	0.442
Status of having received disaster-related training		Mean ± SD	Mean ± SD	Mean ± SD
Yes	140	56.179 ± 15.620	21.093 ± 14.986	46.343 ± 7.043
No	249	62.020 ± 17.944	22.691 ± 15.790	44.245 ± 7.913
t=		−3.225	−0.976	2.609
p=		**0.001**	0.330	**0.009**

F: ANOVA test; t: Independent-samples t-test; Post hoc: Tukey, LSD.

this association were not investigated in the present study and should therefore be interpreted with caution.

The anxiety and trauma scores were found to be high in those who had lost a family member, friend, or relative. Similarly, according to the study conducted by Önsüz et al.,[35] the anxiety scores of individuals who lost their relatives were high, while some studies showed that individuals' trauma scores were higher.[16,17] These findings suggest that the loss of a loved one may intensify the psychological burden experienced after an earthquake. Bereavement, combined with exposure to the disaster itself, may increase emotional distress and contribute to higher levels of trauma and anxiety.[39]

In this study, the anxiety scores of participants who had been injured in the earthquake were found to be high, while the total trauma scores of those who had been trapped under debris were high. There are studies in the literature that support this finding.[16,35] This finding may be explained by the fact that direct exposure to life-threatening experiences, such as being injured or trapped under debris, can intensify psychological distress and increase the risk of trauma following an earthquake.[40]

In our study, the total trauma scores of those who had been trapped under rubble during the earthquake were found to be statistically higher than the scores of those who had not, while their anxiety and coping with earthquake stress scores were lower. Studies have shown that the anxiety level of those who have experienced trauma before is significantly higher than the level of those who have not.[41–43] At the same time, there are studies on coping with post-traumatic stress, anxiety, and depression following earthquakes in the past.[44,45]

The total post-earthquake trauma scores of those who had participated in earthquake rescue operations were found to be higher than those who had not. A study conducted after the Marmara earthquake showed that post-traumatic stress disorder led to a risk for participating in search and rescue operations.[35] In a study with people who had experienced an earthquake in Pakistan and had participated in rescue operations, Bilici et al. determined the rate of post-traumatic stress disorder as 42.6% and depression and anxiety as 20%. In a study conducted with adolescents after an earthquake in China, PTSD and anxiety were found to be 15.8% and 40.5%, respectively.[7] These findings suggest that participating in rescue operations may increase exposure to traumatic events, which could contribute to higher levels of post-earthquake trauma among rescuers. This interpretation is consistent with the literature indicating that trauma may result not only from direct exposure to a disaster but also from witnessing traumatic events or providing assistance to affected individuals.[46]

It was found that the post-earthquake trauma scores of participants who had received disaster-related training were lower than the scores of those who had not, and the scores for coping with earthquake stress were higher among those who had received training. These findings suggest that disaster-related education may help individuals better cope with the psychological consequences of earthquakes. An earthquake is a natural disaster and cannot be prevented. However, its psychological, social, and material consequences can be mitigated through disaster preparedness and education. In addition to theoretical knowledge, the analysis of the physical or psychological effects of earthquakes on individuals can also be achieved through training.[47] Consistent with our findings; a study conducted in the Marmara region showed that the most important factor determining the behavior of taking precautions against earthquakes was education.[48]

Conclusions

As a result of this research, it was found that there were significant relationships between the participants' post-earthquake trauma level, anxiety, stress, and stress coping strategies. Serious interventions are needed for students following traumas. Preventive and

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health-promoting programs should be carried out to reduce stress and stress-related problems in participants. For this reason, psychoeducational programs may be recommended in schools. Studies can be carried out to inform students both in schools and the public before a disaster and during the disaster preparation process to reduce the negative effects of natural disasters on health. Disaster preparedness plays a critical role in reducing the negative health effects of natural disasters. Preparedness efforts range from individual-level activities (such as first aid training) to household actions (such as stockpiling equipment and supplies), community efforts (such as training and field exercises), and government strategies (such as early warning systems, emergency plans, evacuation routes, and public information). Perceived risk, disaster preparedness knowledge, previous disaster experiences, and some sociodemographic characteristics, such as gender, age, education, and family income, have the potential to influence an individual's emergency preparedness and related behaviors.

Limitations

This study has some limitations. First, its cross-sectional design precludes causal inferences between trauma, anxiety, stress, and coping. Second, the use of self-reported measures may have introduced response bias. Finally, because the study was conducted at a single university, the findings may not be generalizable to all university students affected by disasters. Future longitudinal and multicenter studies are recommended to confirm and extend these findings.

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