

## POST-TRAUMATIC STRESS DISORDER FOLLOWING THE WORST DISASTER OF THE LAST 100 YEARS

SON 100 YILIN EN KÖTÜ FELAKETİNİN ARDINDAN TRAVMA SONRASI STRES BOZUKLUĞU

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### ABSTRACT

The purpose of this research was to examine the effects of these two separate major earthquakes, involving hitherto unseen characteristics, on the psychological states of women experiencing them and to contribute to the adoption of measures by which to minimize such problems in future disasters.

The study was conducted in Public Hospital Obstetric Clinic two months after earthquakes. Data were collected using the Post-Earthquake Trauma Level Determining Scale. Data collection was performed over 30 days. A total of 440 participants were included. Demographic characteristics including age, sex, education, occupation, marital status, number of children, and income were recorded.

Mild trauma scores were observed in 112 (25.45%) participants, moderate trauma in 170 (38.63%), severe trauma in 139 (31.59%), and very severe trauma in 19 (4.31%). Trauma scores differed significantly among the groups in terms of damage inflicted on the home ( $p < 0.001$ ) and with poor income status ( $p = 0.009$ ). Individuals whose homes had collapsed or suffered severe damage registered higher trauma scores than those with moderate, little, or no damage to their homes ( $p < 0.001$  for all).

Etiological factors leading to trauma must be considered in the aid and support to be provided.

**Keywords:** earthquake, posttraumatic stress disorder, woman

### 1. INTRODUCTION

Disasters are traumatic events experienced by large numbers of individuals and that can lead to a wide range of mental and physical health problem<sup>1</sup>. Post-traumatic stress disorder (PTSD) is a psychological entity that frequently emerges following traumatic events and disasters<sup>1</sup>. Natural disasters across the world raise awareness of such phenomena. An urgent need has therefore arisen to determine areas of joint action planning consensus and in particular for the frequent emphasizing of road maps to be constructed<sup>2</sup>. Türkiye experienced two major earthquake with an instrumental size of  $M_w = 7.6$  and  $7.7$  approximately nine hours apart. The total death toll in the two quakes has been put at 50,399. The feature distinguishing the 6 February events from previous earthquakes is their 'strike-slip' character, in other words, they were more destructive and wider. It was called one of the world's worst natural disasters, known as the 'disaster of the century', due to their type, magnitude, and intensity, and their effects being felt in a highly populated region.

PTSD is clearly described in the Diagnostic and Statistical Manual of Mental Disorders (DSM V). Various methods are available for coping with PTSD once this has been diagnosed. However, professional support should be considered if the individual continues to experience fear and distress for longer than two weeks despite these methods<sup>3</sup>.

The purpose of this research was to examine the effects of these two separate major earthquakes on the psychological states of women experiencing them and to contribute to the adoption of measures by which to minimize such problems in future disasters. This study also has the potential to serve as a guide to early intervention that can minimize the long-term psychological outcomes of disasters, which may impose a greater societal burden than that of early-onset short-term, transient PTSD.

To the best of our knowledge, this is the first study to examine the effects on women victims of the world's worst natural disasters.

## 2. MATERIAL AND METHOD

Approval for the study was granted by the Atatürk University ethical committee, Erzurum, Türkiye. Informed consent forms were also obtained from all participants. The study was conducted in Gaziantep province in Türkiye two months after earthquakes. Women aged 18-55 were included. Data were collected using the Post-Earthquake Trauma Level Determining Scale<sup>4</sup>. The participants in the study were informed how to answer the questions in the scale. The participants were then asked to respond to the questions in the form and the items in the scale. Data collection was performed over 30 days. We planned to complete the study with 500 participants presenting for various reasons to the Gaziantep Public Hospital Obstetric Clinic, which is very close to the provinces of the earthquake region. Demographic characteristics including age, sex, education, occupation, marital status, number of children, and income were recorded. Women aged 18-55 living in the earthquake region and with no known previous psychiatric disease were included. The age range was determined in consideration of the women's ability to complete the forms given out during the interviews. Individuals with substance or drug use, with other diseases capable of leading to PTSD, with previously identified psychiatric diseases, those unwilling to speak or complete the questionnaire, women aged under 18 or over 55, since these might be unable to understand the questions, and those normally living in the earthquake region but who were elsewhere at on that day were excluded from the study. Patients in whom high or very high post-earthquake trauma levels were detected were referred to the psychiatry clinic.

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### Post-Earthquake Trauma Level Determining Scale

#### Behavioral Problems

- 1- I experience loss of appetite.
- 2- I have become more angry/irritable.
- 3- I have nightmares.
- 4- I cannot enter closed spaces for fear there will be an earthquake.

#### Excitatory Irritability

- 5- I have lost my feeling of confidence regarding the future.
- 6- Life no longer seems to have any meaning.
- 7- I have less will to live in the wake of my experiences.
- 8- My regrets over the things I have done in my life increased after the earthquake.
- 9- I feel helpless/weak.

### Emotional

- 10- Being in need hurts my pride.
- 11- I have begun being much more careful over my behavior/relationships since the earthquake.
- 12- I appreciate the value of life much more.
- 13- I have become very emotional/I suddenly start crying.

### Cognitive Structuring

- 14- I am worried for my children/mother-father/friends and relatives.
- 15- The idea that an earthquake could happen at any moment makes me anxious.
- 16- I sometimes relive images of the earthquake.
- 17- I am anxious for the future.

### Sleep Problems

- 18- I wake up suddenly.
- 19- I find it difficult to fall asleep.
- 20- I sleep less.

**NOTE:** Items 11 and 12 are reverse scored. The scale has no cut-off point. The Likert-type responses are 'I disagree completely,' 'I agree a little,' 'I agree in moderation,' 'I strongly agree,' and 'I completely agree.' The lowest possible score on the scale is 20, and the highest possible score is 100. Higher scores indicate a greater impact of the earthquake.

### 2.1. Statistical Analysis

The data obtained from the sample group were transferred to a computer environment (SPSS version 20.0) for analysis. Arithmetic mean and standard deviation values were employed to express the participants' scale scores. Categorical data were expressed as number and percentage, and numerical data as mean plus standard deviation. The Kolmogorov-Smirnov normality test was applied to establish whether the data were normally distributed. In addition, two-stage clustering analysis was performed to divide the scores into homogeneous subgroups in order to conduct more detailed examinations of the participants' scale scores. The relationship between the homogeneous subgroups thus constituted was investigated using chi-square analysis. Stress following low, moderate, and high-level stress was examined using Chaid analysis. Relationships among the participants' scale scores were investigated using Spearman correlation analysis.

### 3. RESULTS

Four hundred forty participants were included in the study. Their demographic characteristics and mean trauma scores are shown in Table 1. Mild trauma scores were observed in 112 (25.45%) participants, moderate trauma in 170 (38.63%), severe trauma in 139 (31.59%), and very severe trauma in 19 (4.31%). A comparison of trauma scores in terms of income status revealed that participants with poor income status exhibited higher trauma scores than the other groups ( $p=0.009$ ) (Table 2). No difference was determined in trauma scores according to education levels ( $p=0.445$ ) (Table 3). However, trauma scores differed significantly among the groups in terms of damage inflicted on the home ( $p<0.001$ ). Individuals whose homes had collapsed or suffered severe damage registered higher trauma scores than those with moderate, little, or no damage to their homes ( $p<0.001$  for all) (Table 4). Comparison of trauma scores in terms of loss of relatives revealed no significant difference between the groups ( $p=0.225$ ). No

correlation was also found between trauma scores and damage to the home, loss of relatives, or education ( $p > 0.05$ ).

#### 4. DISCUSSION

This study investigated the probable post-earthquake prevalence of PTSD and factors associated with PTSD. A high prevalence of PTSD was observed immediately after the earthquake among surviving women. Participants with low income levels exhibited higher trauma scores. In addition, comparisons based on damage to the home showed that individuals whose homes collapsed registered higher trauma scores than those whose homes were mildly, moderately, or severely damaged.

The prevalence of PTSD reported among victims following earthquakes in previous studies ranges between 10% and 87%<sup>3,5</sup>. Common risk factors for psychological problems in the wake of earthquakes include female gender,<sup>3</sup> previous psychiatric disease,<sup>6</sup> severe damage to property and the home,<sup>7</sup> degree of exposure to the earthquake<sup>3</sup>, lower levels of social support<sup>8</sup>, and low socioeconomic status<sup>9</sup>.

The inconsistent results concerning post-disaster PTSD rates have essentially been attributed to differences in the sizes of the disasters selected for studies, variations in earthquake magnitude, types of exposure, the time elapsing between the onset of the disaster and data collection, and methodological differences, including the sampling and case identification methods employed<sup>10,11</sup>.

Fu M, et al. reported an association between gender and the risk of PTSD in earthquake survivors and that the effects of gender were more powerful than those of other demographic variables. The likelihood of PTSD in the first two months post-earthquake was twice as high in women than in men. In addition, linear regression analysis has shown that female gender may be a long-term risk factor for PTSD<sup>12</sup>. These findings emphasize the importance of studies investigating gender differences in the psychological impacts of disasters. Explanations reviewed within a psychobiological model indicated that the greater risk of PTSD in women may be due to the type of trauma experienced, their being younger when exposed to trauma, stronger perceptions of threat and loss of control, higher levels of peri-traumatic dissociation, and inadequate means of social support. Based on their findings, studies have recommended that health care providers, researchers, and government officials place particular emphasis on meeting the mental health needs of vulnerable sub-groups of affected individuals, such as survivors. We therefore planned our study among women presenting to a gynecology and obstetrics clinic.

This study evaluated the emotional symptoms and relations with PTSD that emerged following the two major earthquakes with epicenters in Gaziantep and Kahramanmaraş on 06.02.2023. The results showed that the earthquakes caused higher trauma scores among women with poor income levels and whose homes were severely damaged. Income level and the degree of damage to the home should therefore be considered before other etiological factors in disaster support planning.

Kılıc et al. revealed that physical injury caused by an earthquake is an important risk factor for the development of post-disaster PTSD<sup>9</sup>. Several studies investigating the relationship between PTSD and the death of relatives have reported a positive correlation between such loss and the severity of the stress reaction<sup>4,5</sup>, although others have reported no association, and have attributed this to blurring of survivors' capacity to discriminate emotionally between personal and total losses<sup>9</sup>.

A study of earthquake victims in Nepal in 2015 reported a prevalence of PTSD of 18.9%<sup>13</sup>. PTSD scores were approximately twice as high among illiterate survivors. The

probability of PTSD was also higher among participants whose personal property had been moderately or severely damaged. While no significant difference in terms of education was observed in the disaster victims in our study group, individuals with low income registered higher PTSD scores than those with high income.

In a study performed immediately after an earthquake in the south of Türkiye in 1988, Altındağ et al. reported no association the degree of destruction to the home and the presence of PTSD. They emphasized that this was due to the government's decision to rebuild destroyed homes within a period of 12 months. However, the damage and death toll in that quake were relatively small<sup>14</sup>.

Only one or two studies are typically conducted, generally by local researchers, in the wake of a specific disaster. Considering the unique nature of the Kahramanmaraş-centered earthquake, the present research is important as the first in the area and as a useful guide for aid and strategic planners.

Although disasters occur worldwide and are examined across the world, differences may occur between cultures and races in terms in terms of the nature and severity of their effects. The Japanese are more resilient to these. The most surprising aspect of the 2011 Japanese earthquake was the reaction of the people of the country. The reactions of the Japanese, who took the requisite precautions but then accepted what had occurred with great stoicism, benefiting from the aid services offered to them in a civilized and orderly manner, respecting the rights of others, and silently mourning their losses, differed significantly from those exhibited in similar situations elsewhere in the world<sup>15</sup>.

The course of post-disaster PTSD has been investigated in only relatively few studies. Some studies have even shown that one-third of original cases persist for longer than 10 years after exposure to disasters<sup>16</sup>. Early mental health intervention serves to prevent the chronicization of post-traumatic stress reactions among earthquake victims. However, residents of the affected region rarely seek psychiatric help. It has therefore been reported that a series of special measures, such as mobile clinics and home visits, need to be initiated for the effective provision of psychiatric services<sup>8</sup>.

This cross-sectional study afforded us the opportunity to acquire more information concerning psychological outcomes and etiologies concerning a large-scale disaster in a developing country.

## 5. CONCLUSION

Etiological factors leading to trauma must be considered in the aid and support to be provided. Adequate and well-planned social and health services provided by the state and other bodies will contribute to a decrease in trauma symptoms. It is thought that the scale used in our study will support educational studies as a tool.

### Limitations:

This study was designed to be relational, and is cross-sectional in character. It therefore examined the status of the participants at the data collection stage based on responses to the scale applied. The research was also conducted among women taking part on a voluntary basis. Studies might be performed in the future using experimental or longitudinal models that include other segments of society such as children, adolescents, the elderly, and the disabled.

**Conflict of Interest:** There is no conflict of interest.

**Financial Disclosure:** The authors declared that this study has received no financial support



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**Table 1:** The participants' (n= 440) demographic characteristics and mean trauma scores

	Mean $\pm$ standard deviation	minimum	maximum
Age (years)	30.22 $\pm$ 8.79	15.00	53.00
Gravidity (n)	2.61 $\pm$ 2.14	0.00	17.00
Parity (n)	1.70 $\pm$ 1.60	0.00	7.00
Abortus (n)	0.44 $\pm$ 1.14	0.00	14.00
Surviving (n)	1.66 $\pm$ 1.57	0.00	7.00
Trauma score	17.80 $\pm$ 12.24	0.00	55.00

**Table 2:** Participants' trauma scores according to income and education

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Education level	Illiterate (n= 40 )	Elementary school (n= 130 )	Middle school (n= 66 )	High school (n= 107)	University (n= 97 )	P value
Trauma score	53.7 $\pm$ 19.07	54.00 $\pm$ 17.38	52.56 $\pm$ 15.10	52.46 $\pm$ 17.55	49.76 $\pm$ 16.47	0.445
Income status	Poor (n=117)	Minimum wage (n=7)		Moderate (n=241)	Good (n=75)	P value
Trauma score	61.13 $\pm$ 13.46	53.83 $\pm$ 19.08		52.24 $\pm$ 16.33	47.34 $\pm$ 15.97	0.009

**Table 3:** Participants' trauma scores according to damage to the home and loss of relatives

Loss of relatives	None (n= 159)	Loss of first-degree relative (n= 86 )	Loss of second-degree relative (n= 128)	Loss of third-degree relative (n= 67 )		P value
Trauma score	50.87±16.46	56.04±16.99	52.52±17.59	51.49±17.20		0.225
Damage to the home	No damage (n=89)	Little damage (n= 146)	Moderate damage (n= 60)	Severe damage (n= 101 )	Collapse d (n= 44 )	P value
Trauma score	49.23±14.55	48.82±17.54	52.05±16.39	57.92±17.45	59.06±15.55	0.000