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Disaster Affect Levels of Individuals Experienced by 2023 Kahramanmaraş Earthquake: A Case Study of Hatay

2023 Kahramanmaraş Depremini Yaşayanlarda Depremden Etkilenme Düzeyleri: Hatay Örneği

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ABSTRACT

Aim: Earthquakes are significant natural disasters with profound medical, economic, and societal impacts. Unlike other disasters, they occur suddenly, causing extensive destruction, death, and injuries, which lead to numerous additional problems. This study aims to assess the levels of trauma and stress among individuals who experienced the earthquake in Hatay on February 6, 2023, and to identify potential influencing factors.

Materials and Methods: This descriptive study surveyed individuals residing in Hatay, who experienced the Kahramanmaraş earthquake. A convenience sampling method was used to select 200 participants. Data were collected using a questionnaire covering socio-demographic characteristics, earthquake experiences, and the Trauma Scale for Earthquake Survivors.

Results: 17% of the 200 participants stated that they were injured in the earthquake, 57% stated that they lost their loved ones and 78% stated that they suffered financial losses. Additionally, 46% reported their homes were "moderately/heavily damaged," and 68% indicated a need for financial support. The average trauma scale score was 65.8±17.3. Higher trauma scores were found among female participants, those who lost their relatives, suffered financial losses, had collapsed homes, or received/needed psychological support.

Conclusion: The study reveals that women, individuals with psychiatric illnesses, those who lost relatives, and those experiencing financial losses were significantly impacted by the earthquake. Key factors influencing trauma levels included gender, psychiatric illness, loss of relatives, financial support status, and income.

Keywords: Earthquakes, disasters, psychology, trauma

ÖZ

Amaç: Depremler, derin tıbbi, ekonomik ve toplumsal etkileri olan önemli doğal afetlerdir. Diğer afetlerden farklı olarak, aniden meydana gelirler ve geniş çapta yıkım, ölüm ve yaralanmalara yol açarak birçok ek probleme neden olurlar. Bu çalışma, 6 Şubat 2023'te Hatay'da depremi deneyimleyen bireyler arasındaki travma ve stres düzeylerini değerlendirmeyi ve bu düzeyleri etkileyen potansiyel faktörleri belirlemeyi amaçlamaktadır.

Gereç ve Yöntem: Bu tanımlayıcı çalışmada, Kahramanmaraş depremine tanık olan Hatay'da yaşayan bireyler araştırıldı. 200 katılımcı, kolayda örnekleme yöntemi kullanılarak seçildi. Veriler, sosyo-demografik özellikler, deprem deneyimleri ve Deprem Sonrası Travma Ölçeği'ni kapsayan bir anket kullanılarak toplandı.

Bulgular: 200 katılımcının %17'si depremde yaralandığını, %57'si sevdiklerini kaybettiğini ve %78'i maddi kayıp yaşadığını belirtti. Ayrıca, katılımcıların %46'sı evlerinin "orta/ağır hasarlı" olduğunu ve %68'i maddi destek ihtiyaç duyduklarını bildirdi. Ortalama travma ölçek puanı 65,8±17,3 idi. Kadın katılımcılar, yakınlarını kaybedenler, maddi kayıplar yaşayanlar, evleri yıkık olanlar veya psikolojik destek alan/almayı düşünenler daha yüksek travma puanlarına sahipti.

Sonuç: Çalışma, kadınların, psikiyatrik hastalığı olan bireylerin, yakınlarını kaybedenlerin ve maddi kayıplar yaşayanların depremden önemli ölçüde etkilendiğini ortaya koymaktadır. Travma düzeylerini etkileyen ana faktörler arasında cinsiyet, psikiyatrik hastalık, yakın kaybı, maddi destek alma durumu ve gelir durumu bulunmaktadır.

Anahtar Kelimeler: Deprem, afet, psikoloji, travma

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INTRODUCTION

Natural disasters have historically resulted in a large number of casualties and suffering. Earthquakes are significant natural disasters with wide geographical impact affecting a large population, and they entail medical, economic, and societal consequences[1].

The World Health Organization defines health as "a state of complete physical, mental, and social well-being"[2]. Health is a holistic concept recognized and accepted legally, in addition to being acknowledged in theory and practice alongside medicine. While some survivors may sustain physical injuries during earthquakes, all individuals affected by the earthquake experience psychological impacts. The term "earthquake victim" in Turkish refers to all survivors and implies that all survivors are affected. Earthquakes, as a traumatic event within society, not only affect individuals but also lead to the loss of family members, relatives, individuals from their social circles, and material possessions, thus having lifelong consequences[3,4]. It is a well-known fact that disasters can have short- and long-term psychological effects, and they can become traumatic events for individuals[1,5,6]. Individual responses to trauma can vary. Not every traumatic event elicits similar responses in individuals, and even individuals experiencing the same traumatic event may respond differently[7]. Considering the effects of traumatic events on individuals, two periods can be identified: the acute phase and the post-traumatic period. Natural disasters are included in the definition of traumatic events in the DSM-V[8].

Earthquakes exhibit distinct characteristics from other traumatic events. They occur suddenly, leading to destruction, death, and injuries, thus giving rise to numerous additional problems. Moreover, due to aftershocks, they can also create chronic effects, making them particularly unique among natural disasters[9]. One of the variables closely associated with trauma is the concept of hopelessness. Hopelessness is generally defined as a feeling that a situation or problem cannot be resolved or corrected[10]. This feeling can lead individuals to lose their positive expectations about the future and their sense of hope[11].

A disaster like an earthquake can be the cause and initiator of psychological disorders in individuals. The emergence of psychological disorders disrupts individuals' work capacity, motivation, and mental focus. On the other hand, the loss of a spouse, child, parent, relative, friend, neighbor, and material possessions in an earthquake, as well as changes in living environment, can affect individuals' work capacity and productivity even without a disorder, through a natural psychological response called grief (mourning)[3,11-13].

In countries like Turkey, where major and destructive disasters occur frequently, it is essential to utilize appropriate measurement tools to assess individuals' experiences of disasters to improve the quality of preventive mental health services[3,14]. Early detection of post-traumatic stress and related symptoms is crucial for secondary preventive mental health services[5,6]. The aim of this study is to determine the levels of trauma and stress experienced by individuals who lived through the earthquake that occurred on February 6, 2023, in Hatay province, and to examine the influence of potential variables.

MATERIALS AND METHODS

The population of this descriptive study consists of individuals living in Hatay, who experienced the earthquake that occurred in Kahramanmaraş on 6 February 2023. The population of Hatay before the earthquake was 1.686.043. Since the current population data after the earthquake could not be reached, convenience sampling method was preferred in the sample selection process. Convenience sampling is a non-random sampling method in which the sample segment to be selected from the main mass is determined by the judgement of the researcher. In cases where it is not possible to determine the main mass (disaster, extraordinary situation, etc.), the researcher may have to resort to non-random sampling methods. In convenience sampling, data are collected from the main mass in the easiest, fastest and most economical way[15]. With 85% power, α=0.05 and 0.2 design effect, the sample size was calculated as 182; considering the possible data loss, 10% was added and the final sample size was determined as 200 people. The study was conducted between March 1 and June 30, 2023 by face-to-face interviews with individuals who were in the center of Antakya and who had experienced the earthquake, and by filling out the questionnaires through Google Forms. Our study is not a prospective study.

Data Collection Instruments

1. Survey Form: This form consists of 24 questions developed by the researchers based on literature findings. It includes questions about the sociodemographic characteristics of earthquake survivors (gender, marital status, age, parental status, education, income, etc.) and their experiences during the earthquake.

2. The Scale That Determines the Level of the Trauma after the Earthquake: This scale was developed by Fuat Tanhan and Murat Kayri in 2013[16]. It consists of a total of 20 items and 5 subscales: behavioral problems (4 items), emotional constriction (5 items), sensory constriction (4 items), cognitive constriction (4 items), and sleep problems (3 items). Permission to use the scale was obtained from Fuat Tanhan. In the Likert-type scale, questions numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 16, 17, 18, 19, and 20 are rated as "completely agree" with a score of 5 points, "strongly agree" with 4 points, "moderately agree" with

3 points, "slightly agree" with 2 points, and "not at all agree" with 1 point. Questions numbered 11 and 12 are reverse-scored. The lowest possible score from the scale is 20, and the highest is 100. An increase in scores indicates an increase in the level of individuals' earthquake impact. Reliability analyses of the scale resulted in Cronbach's alpha coefficients of 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 Cronbach's alpha coefficient calculated for all items of the scale was found to be 0.87.

Data Collection: Data were collected through online (individuals also completed the online form in a face-to-face interview) and face-to-face interview methods. During the data collection process, participants were informed about the purpose of the research, and their consent was obtained. Each interview lasted an average of 25-30 minutes.

Data Analysis: Data were analyzed using IBM SPSS Statistics 21.0 software. Descriptive statistics, Student's t-test, Mann-Whitney U test, ANOVA test, and Tukey post-hoc, Games Howell post hoc tests were used in evaluating the findings. A significance level of $p<0.05$ was considered statistically significant in the results[17].

The study obtained approval from Trakya University Faculty of Medicine Deanship Non-invasive Scientific Research Ethics Committee (decision number: 10/06, date: 05.06.2023). Necessary permissions were obtained from Trakya University Dean's Office and the developers of the scale to conduct the research.

RESULTS

Of the 200 participants in the study, 123 (61.5%) were female and 121 (60.5%) were married. The mean age of the participants was 34.5±12.7 years. The descriptive characteristics of the participants are presented in Table 1. Thirty-four (17%) participants reported being injured in the earthquake centered in Kahramanmaraş on February 6, while 114 (57%) reported losing their loved ones in this earthquake. When asked if they experienced financial loss due to the earthquake, 156 people (78%) answered "yes." Regarding the condition of participants' homes after the earthquake, 17.5% were "collapsed," 46% were "moderately/heavily damaged," and 36.5% were "undamaged/slightly damaged." The number of participants who reported needing financial assistance due to the earthquake was 137 (68.5%), while 44 (22.0%) answered "yes" to the question "Are you currently receiving financial assistance?". While 54% of participants believed they needed psychological support, only 7.5% reported receiving psychological support. Some characteristics related to the earthquake experienced by the participants are presented in Table 2.

Table 1. Descriptive characteristics of participants

Descriptive Features	Number	Percentage (%)
Gender		
Female	123	61.5
Male	77	38.5
Marital Status		
Married	121	60.5
Single	79	39.5
Parental Status		
Yes	113	56.5
No	87	43.5
Number of children		
0	84	42.0
1-2	74	37.0
3-4	42	21.0
Education level		
Primary or middle school graduate	32	16.0
High school graduate	67	33.5
University graduate	101	50.5
Place of residence		
Container/tent/dormitory	40	20.0
With family/relatives	54	27.0
Rented house	68	34.0
Own house	38	19.0
Employment status before the earthquake		
Employed	129	64.5
Unemployed	71	35.5
Current employment status		
Employed	107	53.5
Unemployed	93	46.5
Chronic disease status		
Yes	51	25.5
No	149	74.5
Psychiatric disease status		
Yes	27	13.5
No	173	86.5
Tobacco use		
Yes	70	35.0
No/Quit	130	65.0
Income assessment		
Income exceeds expenses	33	16.5
Income equals expenses	58	29.0
Income falls short of expenses	109	54.5
Total	200	100.0

Table 2. Participants' earthquake experience

		Number	Percentage (%)
Earthquake injury status	Yes	34	17.0
	No	166	83.0
Previous experience of disaster	Evet	57	28.5
	Yes	57	28.5
Loss of relatives in the earthquake	No	143	71.5
	Yes	114	57.0
Financial loss due to the earthquake	Yes	156	78.0
	No	44	22.0
Damage status of the house due to the earthquake	Damaged/ slightly damaged	73	36.5
	Moderate/ severely damaged	92	46.0
	Collapsed	35	17.5
Had to receive financial support after the earthquake?	Yes	137	68.5
	No	63	31.5
Are you currently receiving financial support?	Yes	44	22.0
	No	156	78.0
Are you currently receiving psychological support?	Yes	15	7.5
	No	185	92.5
Do you think you need psychological support?	Yes	108	54.0
	No	92	46.0
Total		200	100.0

Of the participants, 57 (28.5%) stated that they had experienced a disaster before. When asked about the type of disaster experienced, the most frequently reported first three types of disasters were earthquake (61.4%), flood (26.3%), and COVID-19 pandemic (21.0%). The mean scale scores of the participants were 65.8±17.3.

The scores obtained from the scale by participants' socio-demographic characteristics are presented in Table 3.

It was found that female participants scored higher on the scale compared to male participants, and participants with psychiatric disorders scored higher on the scale compared to those without. When comparing the scores obtained from the scale with the situation of losing a loved one in the earthquake, it was found that the scores of those who lost their loved ones were higher. Participants who experienced financial loss after the earthquake scored higher on the scale compared to those who did not; similarly, those who had to receive financial assistance scored higher on the scale compared to those who did not receive assistance. In terms of income assessment among participants, those who indicated "my income is less than my expenses" scored higher on the scale compared to those who indicated "my income is equal to my expenses" and "my income is more than my expenses" (with respective p values of p=0.012 and p=0.005). When comparing the condition of the residence after the earthquake with the scores obtained from the scale, it was found that the scale score of participants whose residence was "collapsed" was higher compared to those whose residence was "undamaged/

Table 3. Participants' scores on the scale according to some sociodemographic characteristics

Variable		Scale score	p value
Mean ± standard deviation gender	Female	65.6±17.0	**0.005**
	Male	61.5±17.0	
Marital status	Married	66.5±15.5	0.498
	Single	64.8±19.7	
Childbearing status	Yes	66.6±15.1	0.505
	No	64.9±19.7	
Number of children*	0	64.5±19.6	0.480
	1-2	65.8±15.1	
	3-4	68.5±15.6	
Eğitim durumu*	Primary/secondary school graduate	70.0±14.5	0.307
	High school graduate	64.5±18.4	
	University graduate	65.4±17.1	
Chronic disease status	Yes	67.0±16.2	0.583
	No	65.5±17.6	
Psychiatric disease status**	Yes	74.0±14.2	**0.007**
	No	64.6±14.3	
Tobacco product use status	Yes	69.1±16.7	0.050
	No	64.1±17.3	

Table 3. Continued

Variable		Scale score	p value
Previous disaster experience	Yes	66.1±17.2	0.888
	No	65.7±17.3	
Earthquake injury status	Yes	67.2±20.7	0.601
	No	65.6±16.5	
Loss of relatives in the earthquake	Yes	69.3±16.2	**0.001**
	No	61.2±17.6	
Financial loss due to the earthquake	Yes	67.3±16.8	**0.018**
	No	60.4±17.9	
Monthly income assessment[1]	My income is less than my expenses	69.8±16.3	**0.001**
	My income is equal to my expenses	62.0±16.7	
	My income is more than my expenses	59.3±18.0	
House damage status due to the earthquake[2]	Undamaged/slightly damaged	61.2±18.4	**0.004**
	Moderate/severe	67.0±16.9	
	Collapsed	72.5±12.6	
Post-earthquake accommodation	Container/tent/dormitory	68.0±17.4	0.056
	Family/relative's place	67.7±16.4	
	Rented house	66.9±16.0	
	Own house	59.0±19.1	
Had to receive financial support after the earthquake?	Yes	69.3±15.5	**0.000**
	No	58.2±18.6	
Are you currently receiving financial support?	Yes	69.4±14.4	0.124
	No	64.8±17.9	
Are you currently receiving psychological support?[3]	Yes	75.8±15.4	**0.015**
	No	65.0±17.2	
Do you think you need psychological support?	Yes	72.6±14.6	**0.000**
	No	58.0±16.8	

[1]ANOVA, Tukey post hoc test, [2]ANOVA, Games Howell post hoc test, [3]Mann-Whitney U test

slightly damaged" (p=0.001). When comparing the situation of receiving psychological support after the earthquake with the scores obtained from the scale, it was found that the scores of those who received psychological support were higher. The scale scores of participants who believed they needed psychological support were higher compared to those who believed they did not need support.

A linear regression analysis was conducted to evaluate the main factors influencing the scale score by creating a model with independent variables that statistically affected the scale score. In the multiple linear regression analysis performed using backward stepwise method, it was found that gender, psychiatric illness status, loss of a loved one in the earthquake, receiving financial assistance due to the earthquake, and income status significantly influenced the scale score ($p<0.05$, Table 4).

DISCUSSION

In this study, the levels of impact of the earthquake centered in Kahramanmaraş on February 6, 2023, on individuals residing in Hatay, and the associated factors were presented. In a study conducted by Bilici et al.[18] on the level of impact of the Elazığ earthquake, it was found that women had significantly higher scores on the Beck Anxiety Scale compared to men, and the prevalence of moderate and severe anxiety was significantly higher among women. Similarly, in our study, the average scores obtained from the scale that determines the level of the trauma were found to be higher for female participants compared to male participants. Another study indicated that gender and earthquake experience were significant factors in the emotions felt after an earthquake. The reasons why women are more affected by earthquakes were highlighted in the study, including women's perception of their strong attachment to their families, higher levels of concern about their families compared to concerns about the earthquake

Table 4. Multiple linear regression model

Coefficient Table						
Model			**Regression coefficient**	**Standard error**	**Corrected regression coefficient**	**p value**
2*	**Intercept**		101.498	7.657		0.000
	Gender	**Female**	7.267	2.265	-0.205	0.002
		Male	Referans			
	Income status	**Less than expenses**	-11.068	3.060	0.320	0.000
		Equal to expenses	-6.025	3.414	0.158	0.079
		More than expenses	Referans			
	Psychiatric illness status	**Yes**	7.331	3.247	0.146	0.025
		No	Referans			
	Loss of a close relative due to the earthquake	**Yes**	5.598	2.359	0.240	0.019
		No	Referans			
	Receiving financial support due to the earthquake	Yes	8.903	3.414	0.240	0.000
		No	Referans			
*Model: F=10.0 p=0.000 R=0.487 R^2= 0.214						

itself, and the generally more emotional nature of women compared to men[19].

In the study by Bilici et al.[18], participants reported that the most common past disaster experiences were earthquakes/floods and similar natural disasters (27.8%). Similarly, in our study, the two most common past disasters experienced by participants were earthquakes (61.4%) and floods (26.3%). In a study examining the relationship between earthquake survivors' experience of property loss and their levels of depression in 2014, it was found that earthquake survivors who experienced a significant amount of property loss had higher levels of depression compared to those who did not experience significant property loss[20]. Consistent with this, our study also found that individuals who experienced financial loss due to the earthquake had higher levels of impact from the earthquake. Additionally, multiple linear regression analysis conducted using a backward stepwise method revealed that receiving financial assistance due to the earthquake and income status significantly influenced the scale score.

According to the results of the same study, there was a significant difference in the levels of depression among earthquake survivors based on the current condition of their homes. The depression levels of earthquake survivors whose homes remained intact were found to be higher compared to those whose homes were destroyed[20]. Similarly, in our study, a significant difference was found between the level of impact from the earthquake and the condition of the participants' homes.

In the same study, the location where earthquake survivors stayed after the earthquake was examined, and no significant difference was found in their levels of depression based on their current living situation[20]. Likewise, in our study, no significant difference was found between the level of impact from the earthquake and the location where participants stayed after the earthquake.

In another study, the experience of loss within the family during an earthquake was associated with a diagnosis of Post-Traumatic Stress Disorder[21]. Consistent with this finding, in our study, individuals who lost a family member during the earthquake had significantly higher scores on the scale.

Similarly, in a study conducted in 2023 using the scale that determines the level of the trauma after the Earthquake, it was found that individuals who received psychosocial support after an earthquake had significantly higher scale scores compared to those who did not receive psychosocial support post-earthquake[22]. In alignment with these results, our study also found that individuals who felt the need for psychological support after the earthquake and those who actually received psychological support had significantly higher scale scores.

Study Limitations

Our study has several limitations. Firstly, since this study was conducted on individuals affected by the earthquake in Hatay, the results may not be generalizable to all earthquake survivors in other regions. Additionally, due to the information that a portion of the Hatay population relocated from the city and some residential areas were destroyed after the earthquake, a non-probabilistic sampling method had to be employed. Finally, another limitation is the method of data collection, as the data were obtained through both online surveys and face-to-face interviews. This method may have led participants to provide biased or randomly filled responses to the questions.

CONCLUSION

The earthquake that occurred on February 6, 2023 in Kahramanmaraş affected a region where approximately 13.5 million people resided across 10 provinces, resulting in the loss of 50,096 lives[23]. This study investigates the levels of impact and associated factors of the February 6, 2023 earthquake centered in Kahramanmaraş among individuals residing in Hatay.

According to the findings of the study, one in every five participants was injured during the earthquake, with more than half losing a relative. Three-quarters of the participants reported experiencing financial losses due to the earthquake, while two-thirds stated that their homes became uninhabitable. Furthermore, over half of the participants expressed a need for psychological support, yet less than 10% reported currently receiving such support. Research results indicate that individuals affected by the earthquake, particularly women, those with psychiatric conditions, individuals who lost relatives, experienced financial losses, needed financial assistance post-earthquake, had lower income, resided in severely damaged homes, expressed a need for psychological support, and those currently receiving psychological support, exhibited higher levels of earthquake-induced distress according to the scale that determines the level of the trauma after the earthquake. Gender, psychiatric condition, loss of relatives, financial losses due to the earthquake, and income status were identified as factors contributing to increased scale scores, thereby exacerbating individuals' negative impacts from the earthquake.

To minimize the adverse effects of earthquakes, disaster awareness should be promoted in the community during pre-, during, and post-earthquake periods. Given that earthquakes can affect large populations, many individuals may experience various health issues and psychosocial disorders. Thus, proactive multidisciplinary approaches should be prioritized to expedite the rehabilitation processes of affected individuals. Considering that disadvantaged groups are more susceptible to the adverse effects of earthquakes, targeted interventions should be prioritized for these groups. The psychosocial support network should be structured to reach every individual both before and after earthquakes. Policies aimed at preparedness for disasters should be implemented to mitigate their impacts effectively.

Ethics

Ethics Committee Approval: The study obtained approval from Trakya University Faculty of Medicine Deanship Non-invasive Scientific Research Ethics Committee (decision number: 10/06 date: 05.06.2023). Necessary permissions were obtained from Dean's Office and the developers of the scale to conduct the research.

Informed Consent: During the data collection process, participants were informed about the purpose of the research, and their consent was obtained

Footnotes

Authorship Contributions

Concept: B.B.E., G.D., G.E., Design: B.B.E., G.D., G.E., Data Collection or Processing: B.B.E., G.D., Analysis or Interpretation: B.B.E., G.D., G.E., Literature Search: B.B.E., G.D., Writing: B.B.E., G.D., G.E.

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