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The Impact of Adverse Childhood Experiences on Post-Earthquake Trauma Levels and Coping with Earthquake Stress in Adolescent Survivors Olumsuz Çocukluk Deneyimlerinin Ergen Depremzedelerde Deprem Sonrası Travma Düzeyleri ve Deprem Stresiyle Başa Çıkma Üzerindeki Etkisi

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ABSTRACT

Aim: This study examines the relationship between adverse childhood experiences (ACEs), post-earthquake trauma levels, and coping mechanisms among adolescent survivors of the 2023 earthquakes in Türkiye.

Material and Method: A cross-sectional and descriptive design was used. Data were collected from 312 adolescents aged 15–19 years residing in 11 earthquake-affected provinces between November and December 2023. The Adverse Childhood Experiences Scale (ACEs), Post-Earthquake Trauma Symptoms Scale, and Coping with Earthquake Stress Scale (CESS) were administered via an online survey. Descriptive statistics, correlation, and regression analyses were performed.

Results: The adolescents had moderate ACE scores and above-average trauma levels. Those with higher ACEs reported significantly higher trauma symptoms and lower scores in religious coping. Female participants and those with higher income demonstrated better coping abilities. Regression analysis revealed that ACEs predicted 8% of the variance in trauma symptoms and religious coping.

Conclusion: Adverse childhood experiences negatively impact adolescents' ability to cope with earthquake-related stress and contribute to elevated trauma levels. Strengthening early childhood protection and implementing psychosocial interventions post-disaster may support recovery in vulnerable youth. Health professionals, particularly nurses, should be equipped to deliver trauma-informed care in disaster contexts.

Keywords: Adolescent, Coping, Earthquake, Adverse Childhood Experiences

ÖZET

Amaç: Bu çalışma, 2023 Türkiye depremlerinden etkilenen ergenlerde olumsuz çocukluk deneyimleri (ÇÇD), deprem sonrası travma düzeyleri ve başa çıkma mekanizmaları arasındaki ilişkiyi incelemektedir.

Gereç ve Yöntem: Kesitsel ve tanımlayıcı nitelikteki bu çalışmada, Kasım–Aralık 2023 tarihleri arasında depremden etkilenen 11 ilde yaşayan 15–19 yaş aralığında 312 ergenden çevrim içi anket yoluyla veri toplanmıştır. Veri toplamada Olumsuz Çocukluk Deneyimleri Ölçeği (ÇÇDÖ), Deprem Sonrası Travma Belirtileri Ölçeği ve Deprem Stresi ile Başetme Ölçeği (DSBÖ) kullanılmıştır. Betimsel istatistikler, korelasyon ve regresyon analizleri uygulanmıştır.

Bulgular: Ergenlerin ÇÇD puanları orta düzeyde, travma düzeyleri ise ortalamanın üzerindedir. Yüksek ÇÇD puanına sahip bireylerde travma düzeyleri artmakta, dini başa çıkma puanları düşmektedir. Kadınlar ve gelir düzeyi yüksek olanlar daha etkili başa çıkma göstermiştir. Regresyon analizine göre ÇÇD puanları, travma ve dini başa çıkma düzeylerindeki varyansın %8'ini açıklamaktadır.

Sonuç: Olumsuz çocukluk deneyimleri, ergenlerin deprem stresiyle başa çıkma becerilerini olumsuz etkileyerek travma düzeylerini artırmaktadır. Erken çocuklukta koruyucu yaklaşımlar ve afet sonrası psikososyal müdahaleler, risk altındaki gençlerin iyileşmesine katkı sağlayabilir. Hemşirelerin bu süreçte travma odaklı bakım verecek şekilde donatılması gerekmektedir.

Anahtar kelimeler: Ergen, Başa Çıkma, Deprem, Olumsuz Çocukluk Deneyimleri



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INTRODUCTION

Every year, many different types of natural disasters occur worldwide and in Turkey. Natural disasters are unavoidable devastating events with an acute onset that differ in scale and severity, often resulting in significant loss of life and property. In particular, earthquakes can lead to fatalities, physical damage, economic and social loss, and also psychologically affect survivors (Koç & Yalçın, 2023; Zhou, Han & Fan, 2016). Due to its geographical location, Turkey lies within two major active seismic fault lines, including East Anatolian and North Anatolian Fault Lines. Yet, according to the US Geological Survey (USGS), many buildings in Turkey are not built to withstand large earthquakes, making the destruction worse (Boston University, 2023). Historically, Turkey was hit by 269 earthquakes between 1900 and 2023, causing numerous casualties and property damage (Relief, 2023). In a recent study, it was reported that 22,000 people lost their lives in earthquakes in Turkey between 1995 and 2018 (Limoncu, 2018). In Turkey, two major earthquakes with magnitudes of 7.8 and 7.5 occurred nine hours apart on February 6, 2023, with the epicenter in Kahramanmaraş. According to official records, at least 50,783 people lost their lives and over 122,000 were injured (Koç & Yalçın, 2023).

Each year, millions of children and adolescents worldwide are exposed to natural or human-made disasters and are affected in various ways (S. Bulut, 2009; Nakajima, 2013). Earthquakes do not only trigger physiological responses but also have significant psychological, social, and behavioral impacts (Yavuz & Dikmen, 2016). It is generally considered that exposure to a natural disaster may trigger the onset of psychopathological symptoms and problems in children and adolescents (Cankardas & Sofuoglu, 2019; Gibbs et al., 2015; İşmen, 2016). In a study examining the effects of earthquakes on children, Ismen (2016) reported that natural disasters such as earthquakes and floods may cause short and/or long-term psychological consequences in children (İşmen, 2016). Adolescents represent a group in which psychological trauma, anxiety disorders, depression and stress are highly prevalent after natural disasters. The negative or positive past or childhood experiences of adolescents have a significant effect on the level of psychological problems. While mental health problems may occur in disaster survivors of all

ages, sleep disorders, substance use, anxiety, mood disorders, post-traumatic stress disorder (PTSD), emotional distress, depression, complicated grief, and behavioral problems are common in adolescents and young children exposed to a natural disaster (Limoncu, 2018). Studies conducted after earthquakes reveal that, similar to adults, the most commonly observed long-term effect in children and adolescents after earthquakes is PTSD. Children who were injured, witnessed death, lost a family member, or had a parent showing extreme reactions during the earthquake appear to be at an increased risk for developing PTSD and depression (S. Bulut, 2010; Ekşi, 2016; Omaç Sönmez, Nazik & Pehlivan, 2017). Mental problems experienced after natural disasters can also be associated with events the child experienced in their social life before the disaster occurred. In other words, psychological problems emerging after a disaster do not solely stem from the negative effects of the disaster itself. Adolescence is a transition phase between childhood and adulthood involving many biological, psychosocial and cognitive changes, which makes adolescents particularly vulnerable. Therefore, being exposed to a natural disaster during this adaptation phase leads to even more negative effects on their psychological well-being (Erden, Erman & Öztan, 2011). Mechanisms for coping with mental health problems after a natural disaster are related to the individual characteristics of the adolescent, their education level, religious beliefs, cultural and societal factors, the family's economic status, adverse childhood experiences, the extent of damage caused by the disaster, the loss of family members, friends, and loved ones, as well as the social support provided to disaster victims after the event (Tatebe & Mutch, 2015).

In studies examining the impact of natural disasters such as earthquakes on children and adolescents, various aspects have been explored, including PTSD, anxiety, stress reactions, psychological responses, academic performance, substance use, and suicidal ideation (Felix et al., 2011; Hansel, Osofsky & Osofsky, 2015; Cheng, Lian, Fu & Liu, 2018). It has been noted that adolescents are more severely affected by natural disasters including earthquakes compared to other age groups. Identifying the impact of earthquakes on adolescents, their reactions, coping strategies, and adverse childhood experiences can provide valuable guidance for developing mechanisms to address their psychological needs (Mermer,

Dönmez & Daghan, 2018; Eisma, Lenferik, Chow, Chan & Li, 2019; Karabulut & Bekler, 2019; Bulut, 2023). On February 6, 2023, two devastating earthquakes with magnitudes of 7.8 and 7.5 struck southeastern Türkiye, resulting in widespread destruction and psychological trauma, particularly among adolescents. Considering the potential lifelong impact of adverse childhood experiences on individuals, this study sought to investigate the effects of adverse childhood experiences on post-earthquake trauma levels and coping with earthquake stress among adolescents.

Research Questions

1. What is the level of adverse childhood experiences among adolescents?
2. What are the psychological trauma levels among adolescents exposed to an earthquake?
3. What are the mechanisms for coping with earthquake-induced distress among adolescent survivors?
4. Do the adverse childhood experiences have any impact on the post-earthquake psychological trauma levels and coping with earthquake-related stress among adolescents?

MATERIALS AND METHODS

Study Aim and Type

This study was conducted using a cross-sectional and descriptive design to evaluate the relationship between adverse childhood experiences, trauma symptoms, and coping mechanisms among adolescents following the 2023 Türkiye earthquakes. This methodological approach was chosen to enable a systematic assessment of psychological responses within a defined population during a specific post-disaster period.

Study Population and Sample

The study population included adolescents aged 15 to 19 years who were residing in 11 provinces severely affected by the earthquakes on February 6, 2023, with the epicenter in Kahramanmaraş. These provinces experienced significant infrastructural destruction and mass displacement. Adolescents from these areas were targeted due to their developmental vulnerability and heightened exposure to trauma in disaster contexts.

The sample size was determined via a power analysis using G*Power 3.1.9.7, which indicated that a minimum of 265 participants would be required to achieve 95% statistical power, with an effect size of 0.2 and $\alpha=0.05$. Anticipating possible data loss, the study was completed with

a final sample of 312 adolescents. Inclusion criteria required: (1) residence in one of the affected provinces, (2) age between 15 and 19 years, (3) literacy in Turkish, (4) active social media use, and (5) documented parental consent. Adolescents not meeting these criteria were excluded.

Data Collection Tools

The data needed for the research were collected using the Descriptive Data Sheet, the Adverse Childhood Experiences Scale (ACEs), the Post-Earthquake Trauma Symptoms Scale, and the Coping with Earthquake Stress Scale (CESS).

Descriptive Data Sheet: It consisted of a total of 8 questions regarding age, sex, education status, household income, number of children in the household, the location of residence, and experiences during and after the earthquake.

Adverse Childhood Experiences Scale (ACEs): The validity and reliability of the Turkish adaptation of the original ACEs questionnaire developed by Felitti et al. (Felitti et al., 1998) were demonstrated by Gündüz et al. in 2018 (Gündüz, Yaşar, Gündoğmuş & Konuk, 2018). This scale consists of 10 questions regarding childhood traumas such as 'Did a parent or other adult in the household often or very often swear at you, insult you, put you down, or humiliate you? or Act in a way that made you afraid that you might be physically hurt?'. The questions only contain a 'yes' option; otherwise, they are left blank. The total score of ACEs ranges from 0 to 10, and there is no cutoff value. The Cronbach's alpha value (measure of internal consistency) of the ACEs was 0.74 in the original study and 0.73 in the current study.

Post-Earthquake Trauma Symptoms Scale: Developed by Tanhan and Kayri in 2013, the Post-Earthquake Trauma Symptoms Scale aims to measure symptoms of trauma that may occur after an earthquake. The scale comprises 20 items and 5 dimensions. The reliability coefficient was 0.87 in the original study. The total score indicates high or low levels of post-earthquake traumatic symptoms (Tanhan & Kayri, 2013). In the current study, Cronbach's alpha of the Post-Earthquake Trauma Symptoms Scale was 0.93.

Coping with Earthquake Stress Scale (CESS): The CESS was developed by Yondem & Eren in 2016 to assess individuals' strategies for coping with earthquake stress, and tested in a Turkish sample by the same researchers (Yondem & Eren, 2008). The scale includes sub-dimensions of

'Religious Coping,' 'Positive Reappraisal,' and 'Seeking Social Support'. Each item is rated on a scale of 1-4. An overall score cannot be calculated in the scale. The items evaluating religious coping (items 2, 8, 9, 10, 11, score 5-20 points), positive reappraisal (items 5, 12, 13, 14, 15, 16, score 6-20 points), and seeking social support (items 1, 3, 4, 6, 7, with items 3 and 7 reverse scored, scoring 5-20 points) are separately summed for each subscale. Higher scores indicate greater utilization of that coping strategy. In the validity and reliability study of the scale, the Cronbach's alpha was 0.85 for the Religious coping subdomain, 0.69 for the Positive reappraisal subdomain, and 0.74 for the Seeking social support subdomain (Yondem & Eren, 2008). In the present study, the Cronbach's alpha was 0.780 (0.70 for religious coping, 0.80 for positive reappraisal, 0.65 for seeking social support).

Ethical Considerations

The study was approved by the Ethics Committee of Kilis 7 Aralık University (Date: 30.11.2023 and Approval Number: 2023/20). The study subjects were informed about the scope and purpose of the research, and online informed consent forms were obtained from consenting participants.

Data Collection

The study data were collected online due to the implementation of online education in high schools and universities following the earthquake. All questions generated for the purpose of data

collection were incorporated into a Google survey form created by the investigator. The survey was sent to parents of children aged between 15-19, with the first page of the survey requesting parental consent and instructing consenting parents to have their children complete the survey. The survey form was distributed to the participants via social media, requesting their responses. Additionally, the participants were provided with an informed consent form explaining the nature and aim of the study, their voluntary participation, and the assurance that the results would not be shared with others. The survey and questionnaires took an average of 15-20 minutes to complete.

Data Analysis

SPSS version 25.0 (IBM Corp, Armonk, NY) was used for data analysis. The data were presented as number, percentage, mean, and standard deviation as appropriate. The normality of data distribution was checked using Kolmogorov-Smirnov test. The difference between normally distributed data in two groups was assessed using the independent samples t-test, and for normally distributed data among three groups, one-way ANOVA was employed. For all statistical analyses, the significance level was set at $p < 0.05$. In the study, Pearson correlation analysis was used for the relationship between the data and linear regression analysis was used for the effect.

RESULTS

Table 1. Socio-Demographic Characteristics of the Participants (N=312)

Characteristics		Mean± SD	Min-Max
Age (years)		17.06 ± 1.23	15.00 - 19.00
Number of children in the household		4.12 ± 1.87	
		n	%
Sex	Female	234	75.0
	Male	78	25.0
Education Level	High school	224	71.8
	University	88	28.2
Household Income	High	34	10.9
	Moderate	247	79.2
	Low	31	9.9
Location of Residence	Province	188	60.3
	Town	69	22.1
	Village	55	17.6
Type of accommodation after earthquake	In a tent	99	31.7
	In a car	51	16.3
	In a house	41	13.1
	In another province	61	19.6
	At municipal facilities	60	19.3
Loss of Family Members	First-degree relatives	25	8.0
	Second-degree relatives	106	34.0
	Third-degree relatives	67	21.5
	None lost	114	36.5
Total		312	100.0

The mean age of the adolescents (n=312) was 17.06 ± 1.23 years, and the mean number of children in the household was 4.12 ± 1.87. Among the participants, 75.00% were female, 71.80% were high school students, 79.20% had a moderate household income and 60.30% were

living in the city center. After the earthquake, 31.70% of the adolescents stayed in tents, 8.00% experienced the loss of their first-degree relatives and 36.50% reported that all of their family members survived (Table 1).

Table 2. Comparison of the Total Scores of Scales and Subdimensions by the Sociodemographic Characteristics

Characteristics		Adverse Childhood Experiences Scale (ACEs)	Post-Earthquake Trauma Symptoms Scale	Coping with Earthquake Stress Scale (CESS)		
				Subdimensions		
				Religious Coping	Positive Reappraisal	Seeking Social Support
		Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Sex	Female	2.13 ± 1.68	59.21 ± 18.06	17.31 ± 2.34	19.45 ± 3.55	12.87 ± 2.77
	Male	2.43 ± 2.19	56.65 ± 16.19	15.96 ± 3.24	19.37 ± 3.66	11.93 ± 2.82
	Test	t=-1.27	t=1.11	t=3.40	t=0.18	t=2.56
	p-value	p=0.205	p=0.267	p<0.001	p=0.858	p<0.001
Education Level	High school	2.36 ± 1.94	59.11 ± 17.67	16.92 ± 2.74	19.23 ± 3.64	12.48 ± 2.74
	University	1.80 ± 1.42	57.20 ± 17.51	17.10 ± 2.42	19.94 ± 3.34	13.03 ± 2.97
	Test	t=2.45	t=0.86	t=0.52	t=-1.58	t=1.56
	p-value	p<0.006	p=0.389	p=0.604	p=0.116	p=0.134
Household Income	High	2.67 ± 2.08	59.55 ± 19.24	17.29 ± 2.00	20.23 ± 3.30	14.05 ± 2.84
	Moderate	2.06 ± 1.75	57.56 ± 17.45	17.02 ± 2.62	19.36 ± 3.66	12.56 ± 2.79
	Low	2.87 ± 1.92	65.54 ± 15.95	16.29 ± 3.43	19.12 ± 3.04	11.64 ± 2.40
	Test	F=4.03	F=2.43	F=1.31	F=1.01	F=6.57
	p-value	p<0.019	p<0.047	p=0.271	p=0.364	p<0.002
Location of Residence	Province	2.15 ± 1.75	57.02 ± 17.65	16.71 ± 2.62	19.50 ± 3.59	12.63 ± 2.80
	Town	2.28 ± 1.88	59.05 ± 17.89	17.18 ± 2.30	19.65 ± 3.53	13.13 ± 2.60
	Village	2.27 ± 2.04	56.56 ± 2.23	17.60 ± 3.06	18.94 ± 3.58	12.01 ± 3.03
	Test	F=0.17	F=3.02	F=2.65	F=0.67	F=2.41
	p-value	p=0.845	p<0.045	p=0.072	p=0.511	p=0.091
Type of accommodation after the earthquake	In a tent	2.04 ± 1.78	59.04 ± 17.42	17.15 ± 2.43	19.25 ± 3.47	12.75 ± 3.08
	In a car	2.37 ± 2.14	56.13 ± 19.80	17.01 ± 2.69	19.54 ± 3.89	12.31 ± 2.81
	In a house	2.21 ± 1.95	57.24 ± 16.29	16.73 ± 2.81	20.00 ± 3.04	12.60 ± 1.71
	In another province	1.98 ± 1.42	59.01 ± 18.96	17.16 ± 2.33	19.55 ± 3.42	12.65 ± 2.89
	At municipal facilities	2.56 ± 1.88	60.33 ± 15.63	16.63 ± 3.17	19.13 ± 3.97	12.71 ± 2.93
	Test	F=1.12	F=0.48	F=0.52	F=0.46	F=0.23
	p-value	p=0.348	p=0.754	p=0.721	p=0.769	p=0.924
Loss of Family Members	First-degree relatives	2.44 ± 2.23	63.66 ± 17.83	16.56 ± 2.14	18.10 ± 2.98	12.04 ± 3.56
	Second-degree relatives	2.00 ± 1.48	59.36 ± 18.12	17.27 ± 2.43	20.05 ± 3.31	12.65 ± 2.64
	Third-degree relatives	2.77 ± 1.94	63.64 ± 17.30	16.92 ± 3.11	18.65 ± 4.25	12.52 ± 2.95
	None lost	2.00 ± 1.90	53.73 ± 16.17	16.82 ± 2.67	19.59 ± 3.37	12.82 ± 2.72
	Test	F=3.22	F=5.73	F=0.78	F=3.34	F=0.58
	p-value	p<0.023	p<0.001	p=0.508	p<0.020	p=0.629

As shown in Table 2, there is a statistically significant difference in the total ACEs score by the education level, household income, and loss of family members (p < 0.005). The total mean Post-Earthquake Trauma Symptoms Scale score was significantly associated with household income, the location of residence, and loss of family members (p < 0.005). Furthermore, a highly significant association was found between the

religious coping and seeking social support subdimensions of the CESS and sex (p < 0.001). A significant association was also observed between the subdimension of seeking social support and household income (p < 0.005). Moreover, the subdimension of positive reappraisal was significantly associated with loss of family members (p < 0.005) (Table 2).

Table 3. Distribution of Mean Scores of Adolescents on Adverse Childhood Experiences Scale, Post-Earthquake Trauma Symptoms Scale, Coping with Earthquake Stress Scale, and its Subdimensions

Scales and Subdimensions	Mean ± SD	Min-Max
Adverse Childhood Experiences Scale (ACEs)	2.20 ± 1.82	0.00 - 10.00
Post-Earthquake Trauma Symptoms Scale	58.57 ± 17.62	20.00 - 100.00
Coping with Earthquake Stress Scale (CESS)	49.05 ± 6.53	22.00 - 63.00
Religious Coping	16.97 ± 2.65	5.00 - 20.00
Positive Reappraisal	19.43 ± 3.57	6.00 - 24.00
Seeking Social Support	12.63 ± 2.81	5.00 - 19.00

The mean total scores were 2.20 ± 1.82 for ACEs, 58.57 ± 17.62 for Post-Earthquake Trauma Symptoms Scale, and 49.05 ± 6.53 for CESS, respectively. Within the CESS, the mean scores for the subdimensions were 16.97 ± 2.65 for religious coping, 19.43 ± 3.57 for Positive Reappraisal and 12.63 ± 2.81 for Seeking social support, respectively (Table 3).

Table 4. Correlations Between Mean Total Scale and Subdimension Scores (n=312)

		ACEs	Religious Coping	Positive Reappraisal	Seeking Social Support
Religious Coping	r	-0.090			
	p	0.112			
Positive Reappraisal	r	-0.106	0.353**		
	p	0.061	0.001		
Seeking Social Support	r	-0.114*	0.194**	0.263**	
	p	0.044	0.001	0.001	
Post-Earthquake Trauma Symptoms Scale	r	0.242**	0.223**	-0.085	-0.091
	p	0.001	0.001	0.135	0.109

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

The total mean ACEs score showed a weak negative correlation with the mean score of the Religious coping subdimension of the CESS, and a weak positive correlation with the mean total Post-Earthquake Trauma Symptoms Scale score. A moderate positive correlation was found between the mean scores of the Religious coping

and Positive reappraisal subdomains of the CESS. The mean score of the Religious coping subdomain showed a weak positive correlation with the mean total Post-Earthquake Trauma Symptoms Scale score. A moderate positive correlation was identified between the mean scores of the Positive reappraisal and the Social support subdomains of the CESS (Table 4).

Table 5. Regression Analysis

Adverse Childhood Experiences Scale				
Model 1				
	B	Std B	T	p
Religious Coping	-0.104	-0.152	-2.712	0.007
Post-Earthquake Trauma Symptoms Scale	0.029	0.276	4.928	0.001
F			13.51	
p			0.00	
R ²			0.08	
Adjusted R ²			0.07	

The scores from the Adverse Childhood Experiences scale predicted the level of religious coping used after the earthquake and the severity

of post-earthquake trauma symptoms by 8%. It was observed that a one-unit increase in the ACEs score was associated with a decrease in the mean

total CESS score by -0.152 points and an increase in the mean total Post-Earthquake Trauma Symptoms Scale score by 0.276 points (Table 5).

DISCUSSION

In this study, it was determined that adolescents residing in the regions had experienced adverse childhood events and exhibited trauma symptoms above average levels, while also demonstrating a high capacity for coping with earthquake-related stress. Adolescents with adverse childhood experiences displayed higher levels of trauma symptoms and were less effective in coping with earthquake stress compared to those without. Adolescents with lower education levels and lower household income were more likely to have adverse childhood experiences. Additionally, those living in rural areas, those with lower household income, and those who lost first-degree relatives in the earthquake experienced greater trauma after earthquake. Females were more successful than males in coping with earthquake stress, individuals with higher household income were better at seeking social support, and those who lost a first-degree relative in the earthquake displayed poorer positive reappraisal skills.

In a study by Tanhan and Kardaş (2014) measuring trauma levels among adolescents after Van earthquake, it was reported that females were more likely to experience trauma than males, and individuals who lost their relatives in the earthquake had higher levels of earthquake trauma (Tanhan & Kardaş, 2014). Similarly, Kurt and Gulbahce (2019) noted that female students experienced higher levels of PTSD symptoms compared to male students after the earthquake. Additionally, they identified a significant association between students' experiences of feeling the earthquake, loss of relatives in the earthquake, being trapped under the rubble, and their levels of PTSD symptoms (Kurt & Gülbahçe, 2019). The current study revealed that trauma levels were higher in girls compared to boys, which is in line with previous reports. It is thought to be due to the fact that girls in Turkish society are more emotional and attached to the home. It was determined in the present study that individuals who lost first-degree relatives and females had higher levels of trauma. This finding might be related to the psychological resilience of women in our society in coping with adverse events, attributed to their inherent characteristics. Moreover, the elevated trauma levels in those who lost relatives may be explained by the strong

family ties in Turkish society, where the loss of a relative affects the extended family as a whole (Erden et al., 2011; Tatebe & Mutch, 2015; Ekşi, 2016; Omaç Sönmez vd., 2017; Cheng et al., 2018; A. Bulut, 2023).

Many studies have demonstrated that exposure to traumatic events leads to neurobiological changes, increasing an individual's vulnerability to the effects of traumatic events and consequently raising the risk of experiencing further post-traumatic stress (Zhang et al., 2012; Zheng, Fan, Liu & Mo, 2012). Silwal et al. (2018) found that the psychiatric symptoms experienced by adolescents were strongly associated with individual and earthquake-related factors. They reported that adolescents who were previously exposed to traumatic events had a higher risk of developing symptoms of PTSD and depression compared to those who did not experience such events (Silwal, Dybdhal, Chudal, Sourander & Lien, 2018). Several studies have consistently shown a link between prior exposure to trauma and PTSD symptoms. For example, it was found that PTSD symptoms were more likely to occur in cases where children and adolescents were physically injured, family members went missing, or homes sustained severe damage (Zhang et al., 2012; Pan et al., 2015; Baldini & Di Stefone, 2023; McCollum & Teeters, 2023; Trovini, Amici & Bauco, 2023). With a disaster such as an earthquake, the belief that the world is a safe and controllable place may be destroyed. PTSD and anxiety symptoms were found to be more prevalent and long-lasting after earthquakes (Newnham et al., 2022; Kuman Tunçel, 2023). In this study, it was observed that adolescents with adverse childhood experiences had higher levels of earthquake trauma. This could be attributed to the fact that those with adverse childhood experiences may not be as psychologically resilient as those without and may exhibit heightened panic responses, thereby increasing their trauma levels with each negative experience. In our study, female adolescents were found to cope better with earthquake stress compared to their male counterparts. In line with our finding, in a study by Erdogan and Aksoy (2020), a significant difference was observed between sexes in terms of positive reappraisal, with girls showing higher mean scores compared to boys in that subdomain (Erdogan & Aksoy, 2020). Individuals who experienced adverse childhood experiences, also known as toxic stress, often exhibit higher rates of suicide, neglect, abuse, bullying, and

harassment, and also, they tend to struggle more in coping with adversity (Baldini & Di Stefone, 2023; Hüseyin & Amanda, 2023). Adverse childhood experiences have been associated with various physical and mental disorders, low academic achievement, and challenges in managing stressful situations and preventing harmful habits including substance use (McCollum & Teeters, 2023). Our study revealed that individuals with adverse childhood experiences had greater difficulty coping with earthquake trauma, which is consistent with literature findings. This might be related to re-traumatization of the adolescents as a result of recalling adverse childhood experiences after being exposed to earthquake.

Limitations

Our study has several limitations. The first limitation is that it is restricted to individuals who use smartphones and social media, and therefore, the findings cannot be generalized to the broader population. The second limitation is that the study is focused specifically on earthquakes and cannot be generalized to other types of disasters. The third limitation is that the adolescent age group can vary across different countries, which means that the results cannot be generalized to all adolescents.

CONCLUSION

The study revealed that adverse childhood experiences negatively impacted coping with earthquake-related stress and were associated with increased post-earthquake trauma. Preventing adverse childhood experiences in children forms the foundation for effective coping with trauma related to earthquakes and other disasters. Immediate intervention following an earthquake, particularly targeting children and adolescents, is crucial in preventing long-term psychological distress. Studies on long-term psychological monitoring and prompt intervention for children and adolescents exposed to an earthquake would contribute to the literature. In this context, it is vital that nurses are prepared for extraordinary situations such as disasters, employing preventive, therapeutic, and rehabilitative psychosocial support practices. Such readiness and implementation of targeted strategies by nurses could be highly beneficial in effectively managing disaster-related trauma.

Ethics Committee Approval

Ethics committee approval was received for this study

from the Kilis 7 Aralık University Ethical Committee (Date: 30.11.2023 and Approval Number: 2023/20)

Author Contributions

Idea/Concept: A.B.C., E.E.; Design: A.B.C., S.Y.A.; Supervision/Consulting: E.E., M.B.; Analysis and/or Interpretation: S.Y.A., N.C.Ş.; Literature Search: A.B.C., S.Y.A.; Writing the Article: A.B.C., S.Y.A.; Critical Review: M.B., N.C.Ş.

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Conflict of Interest

The authors have no conflict of interest to declare.

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