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Determination of children's anxiety levels and influencing factors after the earthquake: The case of Kahramanmaraş province

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Abstract

Earthquakes are one of the unpredictable disasters that pose the greatest threat to the physical, mental, and social welfare of individuals in society. Children constitute one of the most vulnerable groups against the destructive effects of earthquakes, especially due to their high sensitivity to trauma. This study was conducted to evaluate the anxiety levels of 4-6 year old children affected by earthquakes and the factors affecting these levels. This methodological, descriptive and cross-sectional study was conducted with mothers of children aged 4-6 years (n=268). Data were collected with the descriptive information form and the preschool anxiety scale. The mean age of the mothers who participated in the study was 32.05±5.99 years and the mean age of their children was 5.03±0.70 years. The mean total score of the scale was 44.69±22.33 and the anxiety levels of the children were found to be below the average. In the study, it was observed that six-year-old children had higher anxiety levels than four-year-old children and girls had higher anxiety levels than boys. In addition, it was found that the anxiety scores of children whose nuclear family members were buried under the earthquake, who were disabled, one of the relatives died, who had bad dreams/nightmares, and who experienced anxiety and distress when they remembered the earthquake were statistically significantly higher ($p<0.05$). The findings of the study highlight the need to develop special structured programs (therapeutic play, art therapy, etc.) that take into account age, gender, and individual differences to support children's psychosocial well-being in the post-disaster period.

Keywords: Earthquake, children, anxiety, nursing care

Introduction

Natural disasters are events that deeply affect individuals' lives in physical, social and psychological dimensions. Earthquakes are one of the unpredictable disasters that threaten the emotional and mental health of individuals the most. [1,2]. Especially children are more vulnerable to the stress and trauma caused by disasters due to their developmental characteristics [3]. Children are especially in need of protection due to their dependency on adults and may experience regression in their social, emotional and psychological development [1,3]. The psychological effects of earthquakes extend from direct victims to witnesses and can potentially cause trauma-related stress symptoms [3,4]. Anxiety, posttraumatic stress disorder (PTSD) and depression are among the psychological problems frequently seen in children after earthquakes [2,4]. These problems can be influenced by both individual and environmental factors and can profoundly affect the child's daily life and general well-being [3,4].

Studies reveal that earthquakes significantly affect children's emotional and behavioral development and cause various psychological problems in this process. Children exposed to earthquakes often experience problems such as fear of separation from their families, anxiety, sleep disorders and anger outbursts, which severely limit their daily life skills [4,5]. In this context, anxiety stands out as the most common mental health problem in children affected by disasters and limits their capacity to maintain their daily lives [3,5]. Uncertainty experienced after earthquakes is one of the most important factors that negatively affect the psychological state of children. Children may be in a constant state of anxiety due to the fear and anxiety they experienced at the time of the earthquake, thinking that a similar

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event may occur again in the future. This uncertainty damages children's sense of trust and increases their anxiety levels [6]. The rate of posttraumatic stress disorder in children ranges from 19.2% to 24.4% in the first two years after an earthquake [6,7]. Moreover, children's anxiety levels are directly related to a number of individual and environmental factors such as age, gender, social support system, family dynamics, and losses experienced in the earthquake. Past earthquakes in Türkiye have paved the way for important studies investigating the traumatic effects on children. These studies, which started with the Erzincan (1992) and Dinar (1995) earthquakes, gained intensity with the Marmara (1999) earthquake. In a study conducted with with 9-year-old children after the Dinar earthquake, it was stated that children's anxiety and depression levels were directly related to the destructiveness of the earthquake. In addition, in this study, it was found that the anxiety levels of young children were higher [8]. In studies conducted with children aged 12-13 years after the Marmara earthquake, it was reported that psychological problems such as sleep disorders, depression, anxiety, acute stress disorder and attention deficit/hyperactivity disorder were common in children and adolescents [9,10]. Bulut (2009) reported that symptoms of posttraumatic stress disorder were high in secondary school students who experienced the Bingöl earthquake [11].

Preschool children are developmentally more vulnerable to the adverse effects of disasters and their coping skills are not yet fully developed [4,6,7]. Therefore, studies on the psychological reactions of children in this group will shed light on the development of special interventions for their needs. However, in the existing literature, it is seen that children and adolescents are generally handled together or focused on a certain age group. Since the psychological responses specific to each developmental period differ, it is very important to plan studies specific to these age groups. Understanding the reactions and coping strategies of preschool children to disasters will increase the effectiveness of protective interventions for this age group. In this study, it was aimed to determine the anxiety levels of children and the factors affecting these levels after the February 6, 2023 earthquake centered in Kahramanmaraş. The study aims to provide a basis for the development of strategies to ensure children's well-being and to establish more effective protective approaches in possible future disasters.

Material and Methods

Study Type and Design

This study was designed as a methodological, descriptive and cross-sectional study to evaluate the anxiety levels of children aged 4-6 years and the factors affecting these levels.

The research population consists of all children aged 4-6 years residing in Kahramanmaraş province of Türkiye in November-December 2024. According to the Ministry of National Education Formal Education 2023-24 Statistics, a total of 25,909 preschool children continue their education in the province [12]. The study population consisted of mothers with children aged 4-6 years between the dates of data collection. Using the 'sample selection formula for a known population group' [(n=Nt2pq/[d2(N-1)+t2pq), (N=25.909, p=0.5, q=0.5, d=0.05, t=1.96)], the minimum required sample size was calculated to be 268 with a 95% confidence interval. Snowball sampling method was used to reach the sample of the study and the electronic data collection forms created through Google Forms were first sent to the mothers of certain children by the researchers. The participants were then asked to forward the research link containing these data collection forms to other mothers of the same age group they knew. All mothers who met the sampling criteria and agreed to participate on the specified dates were included in the sample. A total of 350 mothers were reached within the scope of the study. However, a total of 82 participants who did not meet the inclusion criteria were excluded from the study for various reasons (not being in the city during the earthquake: 50, moving from the city after the earthquake: 32). Data collection was completed when 268 participants who constituted the sample of the study were reached. Before the survey, mothers were informed about the study, and their verbal consent was obtained.

Inclusion criteria were: being present in Kahramanmaraş during and after the earthquake, having no communication problems, and the child not being diagnosed with any psychiatric illness before the earthquake. Mothers who did not meet these criteria were excluded from the study.

Measurements

Within the scope of the study, an online survey tool consisting of two parts was developed. The first part was a questionnaire form including the descriptive characteristics of the mothers and their children created by the researchers in line with the literatüre [5,8-10,13,14], and the second part was collected using the preschool anxiety scale (parent report).

Descriptive Information Form: This form, developed by the researchers, consists of 18 questions to collect socio-demographic characteristics of children and their families. The form includes questions about the child's age, gender and health status as well as the parents' educational status, occupation, age and health status.

Preschool Anxiety Scale (PAS) (Parent Report): This scale developed by Spence, Rapee, McDonald, and Ingram (2001) [13] was adapted into Turkish by Şahin (2020). The original scale includes 28 items measuring social anxiety, separation anxiety, *Fear of Physical Injury*, general anxiety and obsessive-compulsive disorder [14]. In the Turkish adaptation, 5 additional items related to posttraumatic stress disorder were added and the validity and reliability studies of the scale were conducted with these additional items. The scale has a 5-point Likert-type rating system and each item is scored between 0 and 4. A high total score indicates a high level of anxiety in preschool children; a low score indicates a low level of anxiety. Cronbach's alpha coefficient for the Turkish version of the scale was calculated as 0.93, indicating high reliability [14]. The Cronbach's alpha coefficient for this study was 0.92.

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Statistical Analysis

Data analysis was performed using IBM SPSS software version 25. Descriptive statistics are presented as number (n), percentage (%) and median with minimum and maximum values. Normality of continuous variables was assessed by Kolmogorov-Smirnov test. Additionally, whether the data showed a normal distribution was examined with kurtosis and skewness values. Normal distribution of the data depends on the skewness and kurtosis values being between ±3. The independent sample t-test was applied for comparisons between two independent groups, and one-way analysis of variance (ANOVA) was applied for comparisons between three or more independent groups. Statistical significance level was determined as $p<0.05$.

Ethical Approval

This study received ethical approval from the Scientific Research and Publication Ethics Committee of the Kahramanmaraş İstiklal University (Approval number: 2024/13-07, date: 30.10.2024).

Results

The mean age of the mothers participating in the study was 32.05±5.99 years (min: 23-max: 47) and the mean age of their children was 5.03±0.70 years (min: 4-max: 6). When Table 1 was examined, it was found that 50% of the children were 5 years old and 50.7% were girls, 75.4% of the mothers were between the ages of 18-35, 31% had secondary education, 50.7% stated that their income was less than their expenses, 73.9% were housewives and 9.9% of their children had a chronic disease. According to the statements of the mothers who participated in the study, no significant difference was found between the PAS and maternal age, marital status, parental education level, economic level, family type, mother's employment status and number of children; however, a statistically significant difference was found between the age, gender and presence of chronic disease (p=0.001, 0.042, 0.024, respectively). Accordingly, the mean scale scores of those whose children were under six years of age were significantly higher than those whose children were four years of age, and those who were female and had chronic diseases (Table 1).

Table 1. Comparison of the difference between family sociodemographic variables and preschool anxiety scale (n=268)

Variables		n	%	Preschool Anxiety Scale Mean±SD	test	p
Child age	**4 (1)**	62	23.1	42.94±21.11	F: 3.542	**0.001**^{**,a}
	5 (2)	134	50.0	44.00±23.18		
	6 (3)	72	26.9	48.55±23.87		
Mother age	**18-35**	202	75.4	45.71±22.50	t: 0.952	0.343
	36 and above	66	24.6	41.57±21.82		
Child gender	**Girl**	136	50.7	47.00±21.91	t: 1.253	**0.042***
	Male	132	49.3	42.31±22.66		
Marital status	**Married**	221	82.4	44.19±23.15	-0.568	0.571
	Single	47	17.6	47.00±18.20		
Mother education level	**Primary school (1)**	75	28.0	39.95±22.10	F: 2.401	0.070
	Middle school (2)	83	31.0	45.97±21.42		
	High school (3)	76	28.3	51.12±23.04		
	University (4)	34	12.7	37.77±20.76		
Father's education level	**Primary school (1)**	70	26.1	39.21±22.08	F: 1.447	0.232
	Middle school (2)	89	33.2	46.12±21.36		
	High school (3)	74	27.6	49.30±21.74		
	University (4)	35	13.1	42.31±25.44		
Perceived economic level	**My income is less than my expenses (1)**	136	50.7	46.34±21.97	F: 0.734	0.482
	My income is equal to my expenses (2)	102	38.1	41.79±23.40		
	My income is more than my expenses (3)	30	11.2	47.00±20.38		
Family type	**Nuclear family (1)**	202	75.4	43.88±22.86	F: 0.308	0.736
	Extended family (2)	49	18.3	47.69±21.85		
	Broken family (3)	17	6.3	45.55±18.23		
Employment status	**Working**	70	26.1	40.24±22.49	t: -1.414	0.160
	Housewife	198	73.9	46.25±22.16		
Number of children in the family	**Only child (1)**	28	10.4	38.93±18.11	F: 0.961	0.385
	2 children (2)	83	31.0	47.81±25.54		
	3 and above (3)	157	58.6	44.07±21.15		
Presence of chronic disease in the child	**There is**	26	9.9	57.42±24.19	t: 2.281	**0.024***
	No	242	90.1	43.29±21.76		

F: One-way ANOVA test; t: Independent Samples t Test; a: 1-3, *p<0.05, **p<0.001

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The mean scores of the PAS and its sub-dimensions are shown in Table 2. In the study, it was found that the mean total score of the scale was 44.69±22.33 and the preschool anxiety levels of the children were below the average according to parental reports. When the sub-dimensions of the scale were examined, it was found that the mean score of the fear of psychological injury sub-dimension was 14.19±7.37, which was at a moderate level.

Table 2. Children's Preschool Anxiety Scale score averages (n=268)

	Minimum	Maximum	Mean±SD
Anxiety scale in preschool children total score	8.00	112.00	44.69±22.33
General anxiety	0.00	20.00	7.03±4.84
Social anxiety	0.00	24.00	8.13±5.48
Fear of phsycal injury	1.00	28.00	14.19±7.37
Anxiety of separation	0.00	20.00	8.16±4.89
Obsessive compulsive disorder	0.00	20.00	7.43±4.06

When the earthquake-related experiences of the families in Table 3 were examined, it was found that 18.3% of the families had a family member under the collapse, 13.4% of them had a disability, 46.7% had losses of relatives, and 21.3% of the children had bad dreams/nightmares about the event. According to the statements of the mothers who participated in the study, a statistically significant difference was found between the PAS and the status of having a member of the nuclear family under the earthquake, having a disability, having a death among relatives, having bad dreams/nightmares, experiencing anxiety and distress (p=0.032, 0.026, 0.001, 0.001, 0.000, respectively) (Table 3).

Table 3. Comparison of the difference between earthquake-related conditions and preschool anxiety scale (n=268)

Variables		n	%	Preschool Anxiety Scale Mean±SD	t test	p
A member of the nuclear family being trapped under the cave-in in an earthquake	**Yes**	**49**	18.3	51.05±24.21	1.338	**0.032***
	No	**219**	81.7	43.70±21.96		
Injury to a family member in an earthquake	**Yes**	**43**	16.1	48.34±24.69	0.857	0.393
	No	**225**	83.9	43.98±21.88		
Disability of a family member in an earthquake	**Yes**	**36**	13.4	51.68±27.10	1.473	**0.026***
	No	**232**	86.6	43.60±21.42		
Death of a relative in an earthquake	**Yes**	**125**	46.7	51.57±21.48	3.563	**0.001****
	No	**143**	53.3	38.71±21.43		
Death of a neighbor/friend in the earthquake	**Yes**	**134**	50.0	43.59±21.13	-.585	0.560
	No	**134**	50.0	45.78±23.56		
Bad dreams or nightmares about the event	**Yes**	**57**	21.3	51.57±21.48	3.563	**0.001****
	No	**211**	78.7	38.71±21.43		
Experiencing anxiety and distress when remembering the event	**Yes**	**89**	33.2	48.21±20.98	2.452	**0.000****
	No	**179**	66.8	40.50±15.98		
Physical symptoms of fear when reminded of the event (e.g. sweating, trembling, heart palpitations)	**Yes**	**25**	9.3	50.00±16.16	-1.682	0.092
	No	**243**	90.7	48.08±19.77		

Discussion

Türkiye is located on an active earthquake zone and earthquakes have a profound impact on the physical, mental and social dimensions of society. One of the most vulnerable groups in the post-earthquake period is children, who are more sensitive to trauma. Children and adolescents face various psychological problems after natural disasters such as earthquakes by experiencing traumatic experiences at individual and social levels. Anxiety, one of these problems, is frequently emphasized in the literature as an important consequence of post-earthquake trauma [4,5].

In our study, which evaluated the anxiety levels of children and the factors affecting these levels after the earthquake in Kahramanmaraş province, especially six-year-old children were found to have higher anxiety levels compared to four-year-old children. Increased cognitive awareness in early childhood has been associated with a higher sensitivity to environmental stressors [15]. The ability of older children to better comprehend environmental events and the accumulation of previous traumatic experiences may be effective in increasing anxiety levels in this age group [15-17]. In addition, it is consistent with previous studies that elementary school-age children are more vulnerable to posttraumatic stress reactions and this is more pronounced compared to older age groups [11,15,16]. These findings emphasize the need to understand the long-term effects of traumatic events such as earthquakes on children and to manage these effects with interventions that differ according

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to age and individual characteristics [5,18]. In particular, the management of anxiety levels in early childhood is critical for ensuring children's psychosocial well-being and contributing to a healthy recovery process.

When the findings of the research were analyzed, it was found that girls' anxiety levels were higher than boys' in terms of gender. Many studies have found that female students experience higher levels of anxiety and depression than male students [19,20]. In the literature, this is explained by the fact that girls are more prone to anxiety due to genetic, biological and social factors [19,21]. In addition, girls are more sensitive in expressing their emotional experiences and may experience differences in stress coping mechanisms due to social expectations [21-23]. One of the other findings of this study was that the presence of chronic diseases was determined as another important factor that increased the anxiety levels of children. Chronic diseases negatively affect not only physical health but also psychosocial adaptation processes in children [24]. Also, these children require continuous care and monitoring due to their health condition [25]. This can increase children's stress levels and lead to the emergence of anxiety symptoms. Ma et al. (2021) reported that children with chronic illness have higher anxiety levels than healthy children [26]. In addition, these children may experience difficulties in social interactions due to the physical limitations and treatment processes brought about by their illnesses, coupled with traumatic events such as disasters can increase children's psychological burden and anxiety levels. It is stated that access to psychological support mechanisms for children with chronic diseases in the post-disaster period is of critical importance [5,27]. It may be suggested that future studies should be carried out in this field.

Previous studies highlighting the importance of interventions such as structured psychosocial support programs and family trainings to support children's well-being after disasters support the results of this study [5,18]. In addition, it is recommended to adopt holistic approaches including collaboration between health and education professionals to reduce the effects of disasters. The findings of this study provide an important basis for developing more effective protective approaches in possible future disasters. These findings may guide the development of strategies to ensure children's well-being after disasters. In addition, taking into consideration the anxiety levels of children, which differ according to their demographic characteristics, may enable individualization of interventions

Another finding of this study was that there was a statistically significant correlation between traumatic events such as a nuclear family member being trapped under a cave-in (18.3%), disability (13.4%), death of a relative (46.7%) and children having bad dreams or nightmares (21.3%). All of these factors significantly increased children's Preschool Anxiety Scale scores. The findings reveal the importance of significant factors affecting anxiety levels in children after trauma. The literature widely supports the psychological effects of natural disasters on children. Especially in the post-disaster period, children may experience various difficulties in cognitive, emotional and behavioral adaptation processes [5,18,28]. These difficulties are related to children's reactions to traumatic events and the long-term effects of these events [29]. Studies reveal that traumatic events such as earthquakes commonly trigger psychological disorders such as posttraumatic stress disorder, anxiety and depression in children [5,22,27]. Direct exposure to trauma, such as a nuclear family member being trapped under a collapse or becoming disabled, is among the main risk factors that increase the severity of posttraumatic symptoms in children [29,30]. This emphasizes the importance of interventions to address the impact of traumatic events, especially in early childhood.

In our study, it was observed that the death of a relative increased children's anxiety levels. In the literature, it has been reported that traumatic events related to emotional ties such as loss of relatives weaken the sense of trust in children and this increases their anxiety levels [31,32]. In addition, sleep disorders, such as children having bad dreams or nightmares, are often a reflection of anxiety that develops due to traumatic experiences [27,31,32]. This finding once again demonstrates the importance of monitoring children's sleep patterns and providing psychological support in the posttraumatic period.

In our study, it was observed that the damage or death of a relative (nuclear family/relative) increased the anxiety levels of children. In the literature, it has been reported that traumatic events related to emotional ties such as loss of a relative weaken the sense of trust in children and this increases anxiety levels [31-34]. In addition, sleep disorders such as children having bad dreams or nightmares are usually a reflection of anxiety that develops due to traumatic experiences [27,31,32]. This finding once again reveals the importance of monitoring children's sleep patterns and providing psychological support in the posttraumatic period. Studies show that traumatic experiences of family members may create secondary traumatisation effect on children [33,34]. In a meta-analysis study, it was emphasised that family dynamics were one of the most important factors shaping children's responses to traumatic events [35]. These findings draw attention to the importance of psychosocial support programmes for families in the post-disaster period.

When the findings of the study were evaluated, it was found that the preschool anxiety levels of the children were generally below the average according to the parent reports. However, the mean score in the *Fear of Physical Injury* sub-dimension of the scale was 14.19±7.37 and this level was found to be at a moderate level. These findings show that children's anxiety levels are generally at a manageable level, but there are more significant risk factors in certain sub-dimensions. Compared to the literature, it has been reported that children exposed to traumatic events such as disasters show an increase in certain sub-dimensions of anxiety, especially in fears related to physical safety [36,37]. This situation observed in the *Fear of Physical Injury* dimension reveals that children may be worried about

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physical harm or loss of safety related to traumatic experiences such as earthquakes [34,35]. The damage to children's perception of safety by traumatic events such as earthquakes may lead to high scores in this subscale. This finding suggests that the perception of safety should be strengthened to support children's emotional well-being after a disaster.

The fact that general anxiety levels were found to be below the average based on parental reports suggests that children may have some level of protective factors despite their traumatic experiences. The literature emphasizes that the supportive role of parents and children's emotional regulation skills are important in reducing the psychological effects of traumatic events [38,39]. However, some studies support the idea that parents may not fully recognize their children's emotional states due to their own traumatic experiences and may underreport their anxiety levels. This suggests that parents' own past traumas and psychological states may affect their ability to perceive their children's emotional states [38-40]. In this context, the moderate level of fears related to physical safety suggests that children's coping mechanisms with traumatic events still need to be supported. Psychosocial interventions for specific fears, such as *Fear of Physical Injury*, may be effective in reducing children's anxiety resulting from such traumas. A multidisciplinary approach including family counselling programmes and child-centred psychotherapies to increase the perception of safety may be useful in alleviating this situation.

Conclusion

In the results of this study, it was found that age, gender, presence of chronic disease, and traumatic losses in the family significantly increased the anxiety levels of children. In general, although children's anxiety levels were found to be below the average, higher levels were found especially in the *Fear of Physical Injury* sub-dimension. This finding shows that children's perception of safety was damaged after the disaster and the importance of interventions to repair this perception.

Structured psychosocial support programs, family guidance services and child-centered therapy practices should be prioritized to support children's well-being after disasters. In addition, individualized intervention strategies should be developed especially for older children, girls and children with chronic diseases. Educational programs that strengthen the supportive role of parents and community-based psychosocial support mechanisms can be effective in increasing children's emotional resilience.

In order to create more effective protective policies for possible future disasters, health and education professionals need to progress in a holistic approach involving co-operation. Policies sensitive to the psychological needs of children will form an important basis for social recovery processes after disasters. Our study can guide future studies to develop strategies to reduce children's anxiety levels and support their well-being.

Conflict of Interests
The authors declare that there is no conflict of interest in the study.

Financial Disclosure
The authors declare that they have received no financial support for the study.

Ethical Approval
This study received ethical approval from the Scientific Research and Publication Ethics Committee of the Kahramanmaraş İstiklal University (Approval number: 2024/13-07, date: 30.10.2024).

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