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The Earthquake Disaster in Türkiye: A Review from Child and Adolescent Psychiatry Perspective

Türkiye'de Deprem Felaketi: Çocuk ve Ergen Psikiyatrisi Perspektifinden Bir Değerlendirme

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ABSTRACT

The earthquake has long-lasting various mental and behavioral effects on children and adolescents. The aim of this review was to discuss the nature and extent of psychiatric problems, management options, and the process of organizing psychological interventions for affected children. Individuals show a range of physically, emotionally, and cognitively healthy responses that can help them cope with the aftermath of a disaster. Psychiatric symptoms such as acute stress reactions, post-traumatic stress disorder, depression, anxiety disorder, increased risk of suicide, sleep disorders, substance use disorders, and psychotic disorders may develop in some children. Comorbidities and sub-clinical syndromes are also common. There are many risk factors and protective factors in the development of mental disorders. Close follow-up of children at high risk and interventions for psychosocial support may prevent the development of mental disorders. It is very important to start the intervention at the earliest period. The psychological impacts of young disaster victims can be addressed by skilled local volunteers, medical professionals, and educators in primary health care programs. With the nation's overall social and economic recovery, children can recover more quickly from traumatic experiences.
Keywords: Earthquake; disaster; child and adolescent psychiatry.

ÖZ

Depremin çocuk ve ergenler üzerinde uzun süre devam eden çeşitli zihinsel ve davranışsal etkileri bulunmaktadır. Bu gözden geçirmenin amacı, psikiyatrik sorunların doğası ve kapsamını, yönetim seçeneklerini ve etkilenen çocuklar için psikolojik müdahaleleri organize etme sürecini tartışmaktır. Bireyler afet sonrasında başa çıkmalarına yardımcı olabilecek bir dizi fiziksel, duygusal ve bilişsel olarak sağlıklı tepkiler gösterir. Bazı çocuklarda ise travma sonrası akut stres reaksiyonları, travma sonrası stres bozukluğu, depresyon, anksiyete bozukluğu, artmış suisid riski, uyku bozuklukları, madde kullanım bozuklukları ve psikotik bozukluklar gibi psikiyatrik belirtiler gelişebilmektedir. Komorbiditeler ve sub-klinik sendromlar da yaygındır. Ruhsal bozuklukların gelişimde çok sayıda risk faktörü ve koruyucu faktör bulunmaktadır. Yüksek risk altındaki çocukların yakın takibi ile psikosoyal destek müdahalelerinde bulunulması ruhsal bozuklukların gelişimini engelleyebilir. Müdahaleye en erken dönemde başlamak çok önemlidir. Genç afet kurbanlarının psikolojik etkileri, vasıflı yerel gönüllüler, tıp uzmanları ve temel sağlık hizmetleri programlarındaki eğitmenler tarafından ele alınabilir. Ulusun genel sosyal ve ekonomik hızlı iyileşmesi ile çocuklar travmatik deneyimlerden daha çabuk kurtulabilir.
Anahtar kelimeler: Deprem; afet; çocuk ve ergen psikiyatrisi.

INTRODUCTION

In February 2023, a series of devastating earthquakes occurred in an area encompassing eleven provinces of Türkiye and affecting more than 13.5 million people. The magnitude of the first earthquake was measured at 7.8 Mw, and the earthquake that followed in the afternoon of the same day was measured at 7.7 Mw. The first one was the second-strongest earthquake in Türkiye, following the 1668 North Anatolia Earthquake (1). After two major earthquakes, unexpectedly, other significant earthquakes occurred in different regions throughout the country. Thousands of aftershocks continue to follow these earthquakes.

The earthquake caused a lot of damage in a large area. A significant portion of Türkiye's population has been affected and 1.5 million people have been displaced and left homeless (2). Many buildings were damaged and some were destroyed. Thousands of people were left under the rubble when the buildings collapsed. Damaged roads, winter storms, and communication disruptions hampered rescue and relief efforts in earthquake zones. All these were disappointing and important issues to be dealt with in the acute period besides the earthquake. Unfortunately, people trapped under the debris died from hypothermia in sub-zero temperatures. During rescue efforts, body parts were often found in the rubble. Hundreds of children who lost their parents or could not reach their families because the hospitals in the area became inoperative, were left orphaned. When we consider what has happened, it is an indisputable fact how compelling it is for the mental health of individuals of all ages.

This earthquake is supposed to lead to material damages amounting to at least 84 billion dollars according to the United Nations Development Program Türkiye Office (3). Housing damage constitutes the majority of this loss. The International Organization for Migration (IOM) prepared a report titled ‘2023 Earthquakes Displacement’, which stated that the disaster resulted in 2.7 million people leaving the affected region. The lives of people who migrated from the earthquake area have suddenly undergone great changes. The survivors, who lost many relatives, were unemployed in different cities, in unfamiliar homes, and had to deal with many fears for the future. The survivors who had to stay in the region continue to have problems with shelter, heating, and clean water. Another important risk is epidemic diseases. Problems such as corpses that cannot be removed from the rubble, insufficient toilets, and the inability of earthquake victims to use clean water increase the risk of epidemics (4). Meeting the basic care of all earthquake victims in terms of both physical and mental health should be the primary goal. Without meeting basic care, an individual cannot attain mental well-being.

Natural disasters can cause traumatic effects on both survivors and witnesses. To reduce mental health issues, prompt psychosocial support is crucial after meeting basic care, with ongoing follow-up. Delayed care-seeking after disasters increase the risk of psychological problems, particularly in children (5).

Türkiye is a developing country and has a substantial child population with a rate of 26.9% according to the Turkish Statistical Institute (Türkiye İstatistik Kurumu, TUIK)’s 2021 data. Most of the earthquake-affected provinces have a higher percentage of children than the national average (6). Although Türkiye is prone to earthquakes and has a significant child population, scientific research on the developmental and psychological effects of earthquakes on this vulnerable population is limited. Comprehensive researches are needed to recognize the psychological reflections and develop effective mental health programs for early diagnosis of psychopathology in young people affected by natural disasters.

In this context, the aim of this review was to compile the short and long-term psychological effects of the earthquake on children and adolescents, based on the current literature with the goal of minimizing these effects and reviewing protective measures. The articles in this review were selected by searching Pubmed, Web of Science, and Google Scholar with the keywords "child and adolescent psychiatry, trauma, disaster, earthquake". Related articles referenced in the articles were also reviewed and included.

The Psychological Impact of the Earthquake on Children and Adolescents

The earthquake not only results in fatalities, injuries, destruction of buildings, and loss of livelihoods and materials but also severe and maybe permanent psychological consequences on the people living through the trauma. Common psychiatric problems following a disaster include acute stress reactions, post-traumatic stress disorder (PTSD), anxiety disorder, depression, panic disorders, and phobias in children and adolescents (7-10).

Healthy Human Responses to Earthquake

Healthy human responses to earthquakes involve a range of physical, emotional, and cognitive reactions that can help individuals cope with the aftermath of the disaster. Some of the healthy human responses to earthquakes include seeking social support, practicing self-care, maintaining a positive attitude, and also engaging in problem-solving activities. These responses can help individuals maintain a sense of control, reduce feelings of isolation and promote resilience in the face of adversity. Another normal reaction is to grieve. Normal grief typically lasts a few months and survivors should be viewed as normal people in abnormal situations. A prolonged, intense, and disabling form of grief that interferes with an individual’s ability to function in daily life is called complicated grief (11). It is important to distinguish between normal and complicated grief because complicated grief requires specialized treatment.

Acute Stress Reactions/Disorder (ASD)

After a natural disaster, children may develop stress reactions to cope with the event, which can differ based on age, developmental stage, severity and duration of the event, and family and environmental conditions (12). Symptoms of acute stress disorder (ASD) can include intrusive thoughts, memories, and images of the traumatic event; avoidance of the reminders of the event; negative changes in mood; hyperarousal and dissociative symptoms. These symptoms typically appear within a month of the traumatic event and last for a minimum of three days and a maximum of one month (11).

After the earthquake, trauma and disaster outpatient clinics were established in various cities throughout Türkiye in a very short amount of time. During the first days and weeks after the earthquake, many families sought help for their children's stress reactions at polyclinics. Post-disaster psychological reactions in children can be cognitive, emotional, behavioral, and somatic-physiological. Symptoms can vary but typically include anxiety, fear, and behavioral changes. Fear of staying alone, fear of bad things happening to loved ones, fear of recurrence of the earthquake, avoidance behaviors, sleep disturbances, irritability, agitation, difficulty in concentration, and psychical symptoms such as headaches, stomachaches, and muscle tension are the most common symptoms we encounter in the outpatient clinic.

The most common diagnosis in children and adolescents two weeks after the 1999 Marmara earthquake was ASD, with a rate of 74.5% (13). A study conducted within a month of the Wenchuan earthquake in China found that the incidence of ASD was 54.3%. The study also showed a significant difference between genders, with a higher rate of 63.6% in females compared to 44.0% in males (14). We know that girls are at a higher risk for developing ASD than boys depending on socio-cultural, biological, and environmental factors (14-16). Studies indicated that the strongest predictors for ASD were being trapped or injured under rubble, amputation of body parts, injury to parents or relatives, and loss of home (14,15). The impact of acute stress symptoms on duration, severity, and functionality should be evaluated by experts, and interventions for children in the risk group should be planned in the early period, which may prevent the development of mental disorders in the long term (17).

Post-Traumatic Stress Disorder (PTSD)

Post-traumatic stress disorder (PTSD) is the most prevalent negative psychological reaction experienced by survivors after an earthquake (18). Symptoms of PTSD can include re-experiencing the trauma through nightmares or flashbacks, avoidance of reminders, negative moods like depression and anxiety, increased arousal, irritability, and difficulty sleeping and concentrating in children and adolescents (11).

In children, the prevalence of PTSD after an earthquake varied a wide range between 2.5% and 60.0% depending on age, gender, the severity of the trauma, medical history, cultural factors, measurements, and evaluation time (19,20). A study in Türkiye three years after the 1999 Marmara earthquake found 56% of children and adolescents had severe PTSD symptoms (21). Another study following the 2011 Van earthquake in Türkiye found 40.69% of participants had severe PTSD symptoms six months after the earthquake (22).

Considering the high rates of PTSD, a question arises as to "Why do some children and adolescents develop PTSD after an earthquake while others do not?".

The risk factors of developing PTSD after an earthquake are heightened by various factors, such as the severity of the earthquake, extensive exposure to trauma, pre-existing mental health issues, history of trauma, loss of a family member, inadequate social support, and limited access to resources (19,22-24). Age, developmental stage, and personality characteristics such as obsessive-compulsive traits are important factors too (25). Younger children may have difficulty understanding what has happened and may have a harder time expressing their feelings and emotions. Adolescents, on the other hand, may have a greater awareness of the event and its impact, which can lead to feelings of helplessness and hopelessness. It is necessary to assess each patient separately based on their characteristics. A recent meta-analysis has indicated that the absence of psychological support in areas affected by trauma significantly heightens the risk of PTSD among survivors (26). Children with a history of trauma were at a higher risk of developing PTSD after an earthquake (27). The exact mechanism of this process is not fully understood. Previous trauma may lead to alterations in brain structure and function, particularly in areas involved in stress regulation and emotional processing. The alterations may make individuals more susceptible to PTSD in response to subsequent traumatic events (28). Prior to the earthquakes, as in the whole world the coronavirus disease 2019 (COVID-19) pandemic had already caused trauma to children and adolescents in Türkiye. The pandemic brought about the fear of infection and death, loss of loved ones, limited communication with peers, quarantine measures, social isolation, disruptions to education, and ongoing exams for high school and university admission. As the COVID-19 pandemic continues to cause psychological distress, the recent earthquakes have become a secondary source of trauma for these young individuals. In Türkiye, the youths have been faced with numerous psychological stress factors. These include the ongoing refugee crisis that began in 2011, as well as past natural disasters such as earthquakes, floods, and fires. Political instability and the failed coup attempt of 2016 have also contributed to feelings of insecurity and fear. Economic challenges including high unemployment and inflation have added to the stress. Furthermore, the highly competitive nature of the education system and academic pressure have also impacted the mental health of youths. We must be aware of and follow the proper process in clinical practice, as we anticipate encountering mental disorders that are both frequent and severe.

Anxiety Disorders, Depression, and Suicide

Children affected by disasters may develop increased fear, anxiety, and phobia against stimuli directly related to the disaster (29). Common fears among those who experienced a traumatic event include darkness, being alone, death, and the possibility of re-experiencing the event or new trauma. Reminders of the traumatic event can evoke distressing thoughts or images, leading to feelings of helplessness, hopelessness, and fear (11). Grief reactions are seen intensely in children who suddenly lose their homes, schools, friends, and relatives, and they usually manifest themselves as crying, sadness, depression, separation anxiety, and restlessness. Children, in particular, may experience intense feelings of guilt and shame if their traumatic event involves the death of others and their survival (30,31).

Post-disaster depression and anxiety symptoms are common. Three years after the Wenchuan Earthquake, a study found that rates of PTSD, depression, and anxiety

were correspondingly 29.6%, 44.8%, and 37.6% (32). The prevalence of PTSD, depression, and anxiety was found to be 13.1%, 19.8%, and 37.3%, respectively, in the study, which included 6132 teenagers who lived three years after the 2013 Ya'an earthquake. Participants with PTSD also had 71.5% anxiety and 49.7% depression (33).

Among subjects with PTSD, co-morbidity rates of depression range from 21% to 94% and anxiety from 39% to 97% (34). Moreover, substance use disorders and psychotic-like experiences are common in post-earthquake adolescents, although to a lesser extent than depression and anxiety (35,36). The various prevalence rates for mental diseases in the research may be due to a variety of factors, including the locations, the type of disaster, the duration of the disaster, cultural factors, and available social support.

Researches suggests that natural disasters including earthquakes can increase the risk of suicide in both adults and children/adolescents. The risk of suicide can be increased in many mental disorders including PTSD, depression, anxiety, and hopelessness. Depression symptoms were shown as the biggest predictor of suicidal ideation after the earthquake (37). Suicide risk may increase if one is exposed to a family member's death or a friend's or family member's suicide (38). Children who are protected from suicide by high-quality parenting before the disaster may increase the risk of suicide if the quality of parenting declines after the disaster (39). There are reports of the risk of suicide in earthquake survivors decreased (40), increased (41), and remained the same over time (42).

Parental mental health can have a significant impact on the mental well-being of children after an earthquake. After an earthquake, parents with mental health conditions may struggle to cope, creating a challenging environment for children that negatively affects their mental health. Children with a genetic predisposition to mental health conditions may be more likely to develop issues. It is crucial for healthcare providers and caregivers to monitor children and adolescents for depression symptoms after an earthquake and to provide appropriate support and resources to help them cope with the aftermath of the disaster.

Sleeping Disorders

Sleep problems are common in children and adolescents after the earthquake. Short sleep duration, daytime dysfunction, difficulty falling asleep, difficulty in maintaining sleep, and recurrent nightmares after natural disasters are common symptoms of sleep disorders in adolescents (12). Half of the young people with mental health problems after the earthquake experience sleep disorders (33). Additionally, sleep problems can impact the symptoms and severity of diseases. While sleep disorder increases the risk of PTSD and depressive symptoms, it also causes the symptoms to persist (14). Insufficient sleep is associated with anxiety and depression. Nightmares and difficulty falling asleep can be associated with PTSD (33). Sleep disorders after the earthquake can worsen mood and increase suicidal ideation (15). A study revealed that short sleep duration in children aged 4-6 and oversleeping in children aged 7-15 years pose a higher risk for mental health (13). Adolescent earthquake survivors often and persistently experience sleep difficulties. The increased risk of sleep problems may be associated with a variety of demographic, psychological, and earthquake-related factors (12). It's important for parents and caregivers to be aware of these potential issues and seek help from a mental health professional if necessary.

What about Children and Adolescents with Developmental Disorders? How Are They Affected?

Children and adolescents with developmental disorders are particularly vulnerable in the aftermath of earthquakes, as they may have difficulty understanding what is happening and communicating their needs. They may also struggle with disruptions to their routines and environments, which can exacerbate their existing symptoms and cause new problems.

The earthquake experience in Central Italy, for example, showed that individuals with autism struggled with communication, daily living, social interaction, and motor skills during the first few months following the earthquake. However, with prompt and intensive intervention, there can be some improvement in their adaptive functioning (43). A study about the experiences of Japanese mothers caring for children with special needs after two earthquakes revealed that these mothers faced negative social interactions including discrimination and stigmatization. They also adopted various coping behaviors (44).

Children with special needs may require specialized medical care which can be challenging in emergency settings where resources are limited and access to medical professionals is restricted. Overall, it is important for caregivers, educators, and emergency responders to have a plan in place to address the unique needs of these children. Schools and teachers play a significant role in the recovery of children with disabilities after providing tailored support can help ensure their well-being during times of crisis.

Risk Factors and Protective Factors

Childhood and adolescence are known to be vulnerable periods for post-disaster psychological disorders (24,33). Risk factors for the development of PTSD in children are female gender and older age. Further research is necessary to examine the underlying psychosocial and biological mechanisms of older girls at greater risk for PTSD after earthquakes. Additionally, adults with lower levels of education and socioeconomic status have a higher likelihood of developing PTSD after earthquakes, while higher education levels in children are associated with a greater risk of PTSD. Child and adolescent psychiatrists work with a high-risk population, so it is important for them to know the risk and protective factors and to monitor them during clinical assessments.

Final-year students due to their heavier academic workload may also experience a higher level of stress, leading to a greater prevalence of PTSD (24). Despite all kinds of disasters, life goes on, which creates additional stress, especially for children and families preparing for university and high school entrance exams. This can lead to many mental health problems, including exam anxiety,

depression, and somatic complaints, in addition to PTSD. At our trauma and disaster outpatient clinic, we have also observed a significant number of complaints related to the inability to focus on studies and prepare for exams in its applications, which cannot be underestimated in this regard.

There are various additional factors that can increase the risk of developing PTSD, such as the severity of exposure to traumatic events (34-36), the extent of family members' loss (34), parental distress linked to trauma, short-term proximity to traumatic events (36), experiencing multiple stressors, previous exposure to stressful events, and coexisting adverse circumstances (37).

Parental psychopathology has different effects on children's psychopathology. The father's traumatic stress predicted the traumatic stress of earthquake survivors while the mother's level of depression predicted the depression experienced by their children (38). When fathers experience symptoms of PTSD such as irritability and detachment after an earthquake, their symptoms have a greater impact on their children (39). Working with children and adolescents cannot be separated from their family members and family dynamics, as they are all interconnected. Therefore, it is important to evaluate the mental health of parents who have experienced a disaster, review their risk factors, closely monitor them, and collaborate with adult psychiatrists when necessary.

Untreated adolescents who experienced severe trauma are at risk of developing chronic PTSD and depressive symptoms (40). Loss of either both parents or just the father is a significant risk factor for depression, but not as much for PTSD (41). In risky situations and following traumatic exposures, many features of parent-child interaction are visible as modulating the underlying causes of anxiety disorders in children. These characteristics, which aggravate children's nervous and avoidant behaviors, may include the reciprocation of avoidance reactions, parental criticism, and parental constraint (42). Current risk factors and protective factors are summarized in Table 1.

Intervention

Planning for disasters should include mental health intervention training. The need of talking to children about trauma and the importance of emotional first aid are both topics that disaster personnel participating in rescue and relief efforts need to be well-trained in preparation. It is preferable to combine mental health care with other disaster relief activities than to provide it

Table 1. Risk factors and protective factors for post-disaster mental health problems in children and adolescents

	Risk Factors	**Protective Factors**
Demographic variables	• Older age • Female gender • Only child • Higher education • Low father education • Low mother education • Rural	• Male gender • Urban • Higher education level of parents
Pre-trauma factors	• Physical illness • Low self-esteem • Negative life events • Prior trauma • Parents with mental health disorders	• High self-esteem • Mentally healthy parents
Objective trauma characteristics	• Bereavement (Family Member) • Family member injured • Other injured/killed (e.g., friend) • Witnessed other injury/death • Separated from family • Personal injury • Hospitalization/surgery/amputation • Trapped/buried • House damage • Loss of property (excluding home)	• Get together with family • Good housing high standard of living
Subjective trauma characteristics	• High-severity trauma • Perceived threat/fear • Negative coping • PTSD-Anxiety-Depression	• Positive coping
Post-trauma environmental factors	• Displacement • Poor social support • Delayed care-seeking • Family violence (e.g., corporal punishment) • Meeting basic care needs	• Early return to routine life • Utilization of mental health services • Adequate social support • Family communication • Lack of basic care needs • Positive school climate

alone (45). Young catastrophe victims can have their psychological effects addressed by skilled local volunteers, medical professionals, and instructors in basic health care programs. Mental health specialists' duties include assisting children with complicated psychiatric symptoms who have been sent to them, providing support for disaster workers whose own emotions may make recovery difficult, and training disaster workers (46). Early detection of children's mental health issues is crucial, as are supportive actions taken at home, at school, and in the community (47).

Children's post-disaster treatments are divided into three time frames: acute, short-term, and long-term. These time frames are arranged around the psychological responses that occur following catastrophes. It is believed that psychological first aid is the most successful intervention since the immediate aftermath of a traumatic incident frequently entails uncertainty and dread and victims exhibit high emotional reactions (48). The fundamental aspects of post-disaster psychotherapy for children are to listen, explain, promote attachment connections, enable symbolic expression in play and art, and to encourage the capacity to envisage healing (49). A lot of kids want to express how they and their families are experiencing. It's crucial to support kids in finding language for their emotions and in understanding them. It is advised to take the child's lead, refrain from prying, just reply to the things the youngster has introduced on their own, and encourage the containment of intense emotions. Facilitating the child's desire to reflect on and communicate about their deceased loved one is necessary after a parent or other family member has passed away (50).

Parent participation in evaluation and intervention is crucial. The management of post-disaster mental health sequels benefits greatly from psychoeducation of the family members and the affected children on the symptoms. Parents also require assistance in comprehending and accepting the fact that their child's puzzling and distressing emotions and actions in the aftermath of a tragedy are "normal" for such an "abnormal" scenario (49). Parents must be more approachable, giving youngsters the knowledge they require while also immediately and honestly responding to their inquiries. Parents ought to stop watching television and refrain from subjecting them to unending replays of horrific pictures (51). The family should be urged to make an effort to resume regular daily activities and accustomed schedules as soon as feasible. In the early aftermath of trauma, children should be near their families since tight mother-child, family, and related interactions are crucial to the healing process. Adopting orphaned children by relatives or foster homes may be very beneficial (52).

The post-acute stage consists of embracing the occurrence, assisting with emotion awareness and processing, acquiring coping skills that may be a source of strength, and concentrating on future adaption (48). To achieve these goals, school-based mental health programs can offer accessible services to children affected by disasters, reduce traumatic psychopathology, and place an emphasis on normalization. These programs are typically carried out in children's and adolescents' own schools and classrooms without interfering with their routines (53,54).

Many government institutions and non-governmental organizations come together and carry out studies in the field of psychosocial intervention. With the psychosocial support tents set up in the earthquake-affected areas, an area where children can play and spend time with educational activities is created (55). Many children and families with mental special needs became more helpless after the earthquake. In this process, it can continue to receive expert support from the experts in tent cities and the Special Child Support System application developed by the Ministry of Health of the Republic of Türkiye (56). In a variety of circumstances, children should be referred to secondary care by mental health specialists for psychiatric examination and treatment. This needs to be covered in the training of emergency personnel. Very severe symptoms of any type, symptoms that continue despite emotional support, suicidal thoughts or actions, psychotic symptoms, disruptive behavior, drug abuse issues, and children with additional life stresses or little social support are typical referral criteria (57). In order to give children a relaxing and encouraging setting where they can adapt and recover more quickly, it may occasionally be necessary to remove them from a stressful situation. The overall social and economic recovery of the community or nation has an impact on how quickly children may recover from traumatic experiences. A thorough disaster recovery program must involve public mental health strategies, such as systematic screening and trauma/grief-focused therapies (58).

CONCLUSION

Available information shows that children may face many psychosocial difficulties after a disaster. It is very important to start the intervention at the earliest period. These interventions should be community-based, multi-level and comprehensive, and long-term involving relevant institutions such as health, education, and local and national governments. An integrated approach using psycho-socio-educational and clinical interventions is expected to yield better results than any single approach. There is a need for more systematization and further research on interventions to be made in post-disaster children and adolescents.

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