

# Reflections of Children Victims of the Turkey Earthquake on February 6, 2023 to a Pediatric Emergency Department Far Away

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## ABSTRACT

**Objective:** After the earthquake, which was called the 'Disaster of the Century', which affected 11 provinces in our country on February 06, 2023 we presented the reflection of the grievances of children who were not trapped under the rubble in a pediatric emergency clinic 700 km away from the region. This study was aimed to evaluate the pediatric 'earthquake victims' patients, who were not trapped under the rubble, applied to the pediatric emergency department (PED) of a tertiary care children's hospital.

**Material and Methods:** Between 7 February 2023 and 22 February 2023, the data of pediatric 'earthquake victims' who applied in the first 15 days after the earthquake to the PED of our hospital and were not trapped under the rubble, evaluated retrospectively. The admission times of the patients were divided into three groups as early, mid-term and late admissions. The age, gender, nationality, complaint and clinical characteristics of the patients, the province where they were exposed to the earthquake, the time from the moment of the earthquake to the application, the mode of transportation to the hospital diagnosis and treatments were recorded.

**Results:** The study included 719 earthquake victim children. Median age of patients was 49 months (IQR 16 – 105), 387 were male (53.8%). According to age classification, infancy (n=131; 18.2%), early childhood (n=192; 26.7%) and middle childhood (n=207; 28.8%) were the most frequent admissions. The first admission to our hospital after the earthquake was 19 hours later. Thirty five (4.8%) patients were applied due to accidents during the earthquake. The leading diagnoses of the patients applied were upper respiratory tract infection (URTI) (33.9%), acute gastroenteritis (14.4%) and otitis media (11.2%). Six hundred and sixty (91.8%) patients were discharged from the emergency department, 59 (8.2%) were hospitalized.

**Conclusion:** In the first days, while secondary accidents were at the forefront of the earthquake, in the following days, infections followed. Children are the most vulnerable group in disasters. For this reason, good planning should be done to deal with secondary accidents, infectious diseases and special medical conditions that may occur during the 'healing' period after disasters.

**Key Words:** Disaster, Earthquake, Emergency, Pediatric



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## ÖZ

**Amaç:** Bu çalışmada üçüncü basamak bir çocuk acil servisine başvuran, enkaz altında kalmayan pediatrik ‘deprem mağduru’ hastaların değerlendirilmesi amaçlandı.

**Gereç ve Yöntemler:** 7 Şubat 2023 ile 22 Şubat 2023 tarihleri arasında hastanemize depremden sonraki ilk 15 gün içinde başvuran ve enkaz altında kalmayan pediatrik ‘deprem mağdurlarının’ verileri geriye dönük olarak değerlendirildi. Hastaların başvuru süreleri erken, orta ve geç başvurular olmak üzere üç gruba ayrıldı. Hastaların yaşı, cinsiyeti, uyuşu, şikâyeti ve klinik özellikleri, depreme maruz kaldıkları il, deprem anından başvuruya kadar geçen süre, hastaneye ulaşım şekli, tanı ve tedavileri kaydedildi.

**Bulgular:** Araştırmaya 719 depremzede çocuk katıldı. Hastaların ortalama yaşı 49 aydı (IQR 16 – 105), 387’si erkekti (%53.8). Yaş sınıflamasına göre infant (n=131; %18.2), oyun çocukluğu (n=192; %26.7) ve okul çocukluğu (n=207; %28.8) en sık başvuru yapılan yaş grubuydu. Depremden sonra hastanemize ilk başvuru 19 saat sonra gerçekleşti. Otuz beş (%4.8) hasta deprem sırasındaki kazalar nedeniyle başvurdu. Başvuran hastaların önde gelen tanıları üst solunum yolu enfeksiyonu (ÜSYE) (%33.9), akut gastroenterit (%14.4) ve orta kulak iltihabı (%11.2)’di. Hastaların 660’ı (%91.8) acil servisten taburcu edildi, 59’u (%8.2) hastaneye yatırıldı.

**Sonuç:** Depremin ilk günlerinde ikincil kazalar ön plana çıkarken, ilerleyen günlerde enfeksiyonlar takip etti. Afetlerde en savunmasız grup çocuklardır. Bu nedenle afet sonrası ‘iyileşme’ döneminde oluşabilecek ikincil kazalar, bulaşıcı hastalıklar ve özel tıbbi durumlarla başa çıkmak için iyi planlama yapılmalıdır.

**Anahtar Sözcükler:** Deprem, Felaket, Acil durum, Çocuk

## INTRODUCTION

Disasters are events that negatively affect the health care system by causing mortality and serious morbidity. Türkiye is a country where natural disasters are frequently experienced due to its geological structure and climatic characteristics (1). In our country, which has witnessed high earthquakes throughout its history, on 06.02.2023, at 04:17 and 13:24 Turkish time, two earthquakes occurred with a magnitude of Mw 7.7 and 7.6 on the Richter scale, with the epicenters in Pazarlık (Kahramanmaraş) and Elbistan (Kahramanmaraş) (2). These two earthquakes, which occurred nine hours apart, affected 11 provinces in a wide area and attracted the attention of the whole world as the “Disaster of the Century”. According to the official figures, more than forty-seven thousand people died and many were injured due to this disaster (3). Approximately 15 million people, 1.7 million of whom were foreign nationals, were victims of the earthquake and about 5 million of them were children (4,5). Children are the most vulnerable group in disasters.

After the first interventions of the earthquake victims who were rescued from the rubble were carried out in the nearest health institutions, the transfer of the patients to the surrounding provinces was ensured safely. After the earthquake, the people whose houses and workplaces were destroyed started to migrate to the surrounding provinces. Children who are exposed to earthquakes may have physical injuries due to being under the rubble, psychosocial factors should not be ignored after the earthquake as well. Factors such as exposure to cold weather due to the destruction of their homes, inadequate nutrition, increase in infectious diseases and inability to access clean drinking water can be cited among the non-traumatic effects of the earthquake on children (6). While there are many studies on trauma management in children under the rubble, studies evaluating the victimization caused by the earthquake are limited.

Our hospital is a tertiary pediatric hospital in Ankara, the Turkish capital, and approximately 700 km away from the earthquake zone. In this study, it was aimed to evaluate the pediatric ‘earthquake victims’ patients, who were not trapped under the rubble, applied to the pediatric emergency department (PED) of our Hospital.

## MATERIALS and METHODS

Between 7 February 2023 and 22 February 2023, the data of pediatric ‘earthquake victims’ who applied to the PED of our hospital and were not trapped under the rubble, evaluated retrospectively. In the first 15 days after the earthquake, all patients aged 0-18 years who were not trapped under the rubble and who applied to the PED of our hospital were included. The age, gender, nationality, complaint and clinical characteristics of the patients, the province where they were exposed to the earthquake, the time from the moment of the earthquake to the application, the mode of transportation to the hospital (ambulance, own means), diagnosis and treatments were recorded. Cases of children who were trapped under the rubble were excluded from the study. Patients were grouped according to age using a standard classification (7). The admission times of the patients were divided into three groups as early, mid-term and late admissions (admission on days 0-5, between 6-10 days, between 11-15 days). Admission diagnoses were evaluated according to groups.

The study was approved by the local ethics committee with reference number Ankara Etilik City Hospital-EK1-2023-021.

### Statistical analysis

Data analysis was performed using IBM statistical package for social sciences version 22 for Windows (SPSS Inc., Armonk, NY, IBM Corp., USA). Descriptive statistics were presented with frequency, percentage, mean, standard deviation, median, minimum (min) and maximum (max) or interquartile range (IQR) values.

## RESULTS

The study included 719 earthquake victim children. Median age of patients was 49 months (IQR 16 – 105), 387 were male (53.8%). According to age classification, infancy n=131 (18.2%), early childhood n=192 (26.7%) and middle childhood n=207 (28.8%) were the most frequent admissions (Table I). The main earthquake-affected provinces were Kahramanmaraş (n=216, 30%) and Hatay (n=197, 27.4%). While 698 children (97.1%) came with their own means, accompanied by a companion, 21 children (2.9%) were transferred from the earthquake zone by emergency ambulance.

The first admission to our hospital after the earthquake was 19 hours later. The median time from the earthquake exposure of the patients to the admission to our hospital was 9 days (min-max: 1 day-15 days). 109 (15.2%) patients applied between 0-5 days, 439 (61.1%) patients applied between 6-10 days, and 171 (23.8%) patients applied between 11-15 days.

Thirty five (4.8%) patients were applied due to accidents (burns, falling objects while escaping, etc.) during the earthquake. The leading diagnoses of the patients applied in the first 5 days were upper respiratory tract infection (URTI) (24.3%), soft tissue injury (17.1%) and health check-up (13.5%); in the second 5 days URTI (37.1%), acute gastroenteritis (AGE) (14.4%) and acute otitis media (13.5%), in the third 5 days URTI (31.9%) and AGE (16.2%). The diagnoses of the patients according to the application days are given in Table II. Twenty (2.7%) patients applied for the treatment of chronic diseases such as intravenous immunoglobulin therapy, erythrocyte suspension transfusion, diabetes mellitus and epilepsy. Forty-two (5.8%) children applied for health check-up. Five (0.6%) patients applied with psychiatric problems that started due to the earthquake.

Six hundred and sixty (91.8%) patients were discharged from the emergency department, 59 (8.2%) were hospitalized. Three (0.4%) brothers received hyperbaric oxygen therapy due to carbon monoxide intoxication. One patient with a diagnosis of sickle cell anemia was applied because of cold-induced vaso occlusive crisis and received a transfusion of erythrocyte suspension. Three (0.4%) technology-dependent such as home mechanical ventilation patients were applied to the palliative care service for social reasons and followed up. One patient (0.1%) applied to get their glasses again because they were broken during the earthquake. Two patients (0.2%) were applied due to stray dog bites and were vaccinated against rabies.

All patients were consulted to the social services for identity check, accompaniment and post-medical care accommodation needs for patient safety during emergency service applications, and after the follow-up, they were discharged after taking the necessary measures in line with the functioning of the Ministry of Family and Social Policies in our country. 5 (0.6%) of the

**Table I: Demographic characteristics of the patients and the provinces they were exposed to earthquakes**

Age*	
Neonatal (Birth – 27 day)	39 (5.4)
Infancy (28 day – 12 month)	131 (18.2)
Toddler (13 month – 2 year)	54 (7.5)
Early Childhood (2 – 5 year)	192 (26.7)
Middle Childhood (6– 11 year)	207 (28.8)
Early adolescence (12- 18 year)	96 (13.4)
Gender*	
Female	332 (46.2)
Male	387 (53.8)
Nationality*	
Turkish	655 (91.1)
Refugee†	58 (8.1)
Unknown	6 (0.8)
Province*	
Kahramanmaraş	216 (30)
Hatay	197 (27.4)
Gaziantep	84 (11.7)
Malatya	81 (11.3)
Adiyaman	71 (9.9)
Şanlıurfa	27 (3.8)
Adana	22 (3.1)
Diyarbakır	14 (1.9)
Osmaniye	4 (0.6)
Elazığ	2 (0.3)
Mardin	1 (0.1)

\*: n(%), †:Patients from Syria, Iraq, Afghanistan

patients were consulted to child and adolescent mental health clinicians for psychiatric support.

## DISCUSSION

It has been shown that children's basic and/or medical needs increase after sudden and unexpected natural disasters. Although patient management is well defined in publications related to earthquake survivors; data on children who are not trapped under the rubble are limited and planning for patient management and organization is insufficient (8). To the best of our knowledge this is the first study of 'earthquake victims' children who are not trapped under rubble.

While applications due to accidents that occurred during and after the earthquake were highest in the first five days, the frequency of applications for this reason gradually decreased in the following days. In the second five days after the earthquake, the number of patient admissions increased and infectious diseases came to the fore.

In addition to acute medical complications after disasters, an emergency disaster plan should also be prepared for health effects due to post-disaster displacement (9). Health care services may be inadequate for many reasons, such as physical damage to hospitals after an earthquake, personnel providing health care services are also earthquake victims and multiple individuals needing simultaneous medical care (10). Lack of

**Table II: Diagnosis of the patients according to the application day**

Diagnosis, n (%)	Total (n=719)	First 5 Days (n=111)	Second 5 Days (n=436)	Third 5 Days (n=172)
Upper Respiratory Tract Infection	244 (33.9)	27 (24.3)	162 (37.1)	55 (31.9)
Acute Gastroenteritis	104 (14.4)	13 (11.7)	63 (14.4)	28 (16.2)
Urinary Tract Infection	26 (3.6)	2 (1.8)	13 (2.9)	11 (6.3)
Otitis Media	81 (11.2)	7 (6.3)	59 (13.5)	15 (8.7)
Conjunctivitis	15 (2.0)	0 (0)	9 (2.0)	6 (3.4)
Lower Respiratory Tract Infection	59 (8.2)	7 (6.3)	35 (8.0)	17 (9.8)
Routine Health Checkup	42 (5.8)	15 (13.5)	19 (4.3)	8 (4.6)
Chronic Disease	20 (2.7)	3 (2.7)	11 (2.5)	6 (3.4)
Other*	65 (9.0)	13 (11.7)	33 (7.5)	19 (11)
Scabies	9 (1.2)	0 (0)	8 (1.8)	1 (0.5)
Soft Tissue Injury **	35 (4.8)	19 (17.1)	12 (2.7)	4 (2.3)
Social Reason Referral ***	19 (2.6)	5 (4.5)	12 (2.7)	2 (1.1)

\*Constipation, arthritis, urticaria, carbon monoxide intoxication, psychological problems, foreign body aspiration, acute appendicitis, drug intoxication, preseptal cellulitis, lymphadenitis, dental abscess, inguinal hernia, animal bite, anal fissure, myalgia, dysmenorrhea, \*\*Burns, domestic accidents, injury while escaping during an earthquake, \*\*\*Patients who were referred from another hospital in the disaster area because they did not have a parent.

transportation and logistics are other important problems for medical needs (11). Although our hospital is a tertiary center that accepts intensive referral from the earthquake zone, it is quite far from the earthquake zone. Therefore, the first patient who applied to our hospital as a victim of earthquake could reach our hospital 19 hours later.

Secondary accidents during and after the earthquake in the first days constituted the more critical patient group. Unexpected home accidents, displacement, crowdedness and poor living conditions after an earthquake can lead to secondary emergencies such as environmental emergencies. In our study, burns developed in 2 children as a result of a house accident due to the earthquake. After the earthquake, 3 brothers who were exposed to the smoke of the stove they burned in order to warm up in their shelter, applied to our hospital with symptoms of carbon monoxide intoxication and received hyperbaric oxygen therapy. Secondary accidents and environmental emergencies that may occur after a disaster should be kept in mind; organizations should be made to plan healthy and safe shelter areas (12).

The data revealed that the majority of applications occurred between the 6<sup>th</sup> and 10<sup>th</sup> days, with the primary reason being infections. After a certain natural disaster, infectious diseases may occur after 4 days to 4 weeks of action, and an increase in respiratory tract infections, gastrointestinal, vector-borne diseases and skin infections is expected (13). Both emerging diseases and diseases that are already endemic in the affected area can spread and turn into epidemics. In addition, AGE, dehydration and related complications are likely to occur due to contamination of water resources (fecal contamination), contamination of water during transportation and storage, use of water and food containers together, insufficient soap

and contamination of foods (14). In our study, 512 (71.3%) patients applied due to an infectious disease; 54 (10.5%) of these patients applied within the first five days, and 458 (89.5%) after five days. There were 104 cases of AGE developing in the first 14 days. Only 9 patients (1.2%) were diagnosed with scabies. This situation can be explained by the fact that we are a hospital far from the earthquake area and that these cases may have applied to the local health units there.

Household mechanical ventilators, oxygen concentrators and aspiration devices work with electricity. An unexpected increase may occur in the applications of technology-dependent children to the emergency service due to power cuts or inaccessibility to medical equipment after an earthquake (15). Addressing such complex medical needs is not included in emergency plans (16). However, health care providers should also pay attention to children with special health care needs and disabilities (17). These children with access and mobility difficulties, chronic illnesses or mental and developmental disabilities often depend on medications, medical equipments (for example, ventilators, suction devices, and infusion pumps), complex care plans and often electrical sources for support (18). Twenty patients who applied for complaints related to their chronic disease and 3 (0.4%) patients who required special technology-dependent care were referred to our hospital from the earthquake zone only for their care needs.

After the earthquake, children are not only affected physically, but also face many problems such as leaving the place they live, losing family members, communication, transportation and security (19). Children are the responsibility of the state; in addition to their health and rehabilitation, their protection is also important. In our study, 18 (2.5%) newborns were referred from another hospital in the disaster area for social reasons such as

loss of parents. Six patients had no identification information. All patients were consulted to the social services unit, since the parental information of the other patients who applied with a companion was ambiguous. Before discharge, necessary measures were taken in line with the functioning of the Ministry of Family and Social Policies in our country. In this way, it was aimed to reunite the victimized children with the surviving family members. Clinicians should be aware of security vulnerabilities and risks of child abduction in case of simultaneous intensive emergency patient applications such as natural disasters, and this should be taken into account in all child emergency department disaster planning (20).

### Limitations

Our study is a retrospective, single-center study and has some limitations due to its nature. In this study, we evaluated the applications of a pediatric emergency service, which is quite far from the earthquake zone. However, many affected children may have received primary health care in the earthquake area, or children in serious need of treatment may not have reached remote areas or have no access to care at all.

### CONCLUSION

After the earthquake, which was called the 'Disaster of the Century', which affected 11 provinces in our country on February 06, 2023 we presented the reflection of the grievances of children who were not trapped under the rubble in a pediatric emergency clinic 700 km away from the region. In the first days, while secondary accidents were at the forefront of the earthquake, in the following days, infections followed. Children are the most vulnerable group in disasters. For this reason, good planning should be done to deal with secondary accidents, infectious diseases and special medical conditions that may occur during the 'healing' period after disasters. In order to prevent the abduction of unidentified children and to reunite them with their families, patients must be urgently registered by the social services unit.

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