

Original Research

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Earthquake; Emergency department; Trauma; Natural disaster; Crush syndrome



Abbreviations:

AFAD, Disaster and Emergency Management Presidency; CO, Carbon monoxide; COPD, Chronic Obstructive Pulmonary Disease; CT, Computed Tomography; ED, Emergency Department; E-FAST, Extended Focused Assessment with Sonography in Trauma; IQR, Inter Quantile Range; Mw, Moment Magnitude Scale; UTC, Universal Time Coordinate

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From Tragedy to Resilience in a University Hospital: Characteristics of Patients in the Aftermath of the 2023 Turkey Earthquake

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Abstract

Objective: This study focuses on adults affected by the February 2023 Turkey earthquakes, aiming to uncover demographic and clinical traits.

Methods: A retrospective analysis of data from adult patients who sought emergency care between February 6 and February 21, 2023, following the earthquakes, was conducted.

Results: Among 3072 patients, 1544 (50.3%) of whom were women, trauma (31.1%) was the most prevalent cause of emergency department presentations. The median age of all patients was 44 y (interquartile range [IQR] 31–61 y). Hatay province accounted for 65.2% of trauma patients as origin. Most of the patients (66.8%) presented to the emergency department by their own means, while this was opposite for trauma patients, of whom 54.5% was transferred by means of Ambulance Service. Half of the total trauma patients were rescued from the debris, and 75.9% sustained limb injuries. Crush syndrome affected 24.7%, and emergency hemodialysis was performed on 9.1%, whereas emergency surgery was performed on 22.8% of all trauma cases. Overall, 10.2% of trauma patients lacked any identification. The rate of emergency department admissions due to respiratory and cardiovascular diseases was higher at the time of the earthquake compared with the previous year ($P < 0.001$).

Conclusions: The insights gained from this study hold valuable implications for disaster response strategies, emphasizing the importance of preparedness, timely intervention, and comprehensive patient care.

On February 6, 2023, the Turkish people experienced one of the most devastating natural disasters in their history. At 04:17 (Universal Time Coordinate [UTC] +03:00) and 13:24 (UTC +03:00), earthquakes with epicenters in Pazarcik/Kahramanmaras and Elbistan/Kahramanmaras, respectively, with Moment Magnitude Scale (Mw) of 7.7 and Mw 7.6 on the Richter scale, occurred. While the effects of these earthquakes were still ongoing, on February 20, 2023, at 20:04 (UTC +03:00), another devastating earthquake with a magnitude of Mw 6.4 occurred with an epicenter in Yayladagi/Hatay. These earthquakes caused major destruction in 11 provinces of Turkey and Northern Syria. According to 2022 Turkish Statistical Institute data, these 11 provinces are home to 14,013,196 people, constituting 16.43% of Turkey.¹ According to official figure's report on June 2, 2023, a total of 50,783 people lost their lives and 115,353 people were injured.² Approximately 2 million people were reported to have migrated from 1 place to another, 90,609 buildings, including 15 hospital buildings, collapsed or were severely damaged, and nearly 1 million people lost their homes, according to the World Health Organization's (WHO's) report on February 23, 2023.³ The Turkish government issued a level 4 alert according to the Turkish Disaster Response Plan the same day after the first earthquake, requested international assistance and declared a state of emergency in the provinces containing the earthquake zones on February 8, 2023.

Adana Province serves as a pivotal hub for land, rail, and air transportation within the region. The Balcali Research and Training Hospital of Cukurova University, with 50 years of service, plays a crucial role in accepting patients transferred by air and ground.

Due to the magnitude of the disaster, patient admissions to Balcali hospital were not limited to earthquake-related traumas. They also included postearthquake traumas such as beatings and traffic accidents, new diseases like pneumonia, scabies, and carbon monoxide poisoning, acute exacerbations of chronic diseases such as cardiac failure and diabetic ketoacidosis, and obstetric complications. This diverse range of cases resulted from disruptions in treatment services and medical supply.

Immediately after the earthquake, all hospital staff were called to action, activating the hospital's disaster plan. Specialized crush units and intensive care units were established for earthquake victims. The operating room and hemodialysis unit were re-scheduled, and patients were welcomed in the emergency department (ED). ED physicians conducted initial medical evaluations, and patients were then directed to final treatment based on their condition and

triage priorities. Patients with delayed hospitalization were carefully monitored and treated in ED observation and critical care rooms.

Civilians volunteered actively at the hospital, providing crucial supplies such as blankets, clean water, and nourishment for the disaster-affected areas. These resources were organized near the ED and distributed to patients in need within the hospital. With the help of volunteers and health-care experts, these relief items were loaded onto ambulances and vehicles that transported patients to and from the disaster zone.

The devastating earthquakes that struck Turkey has had a profound impact on the affected region, in particular, significantly increased the number of patients requiring emergency medical care. Understanding the demographic characteristics of patients seeking emergency care after such a major seismic event is of great importance for effective disaster preparedness and response strategies. While prior studies have focused on earthquake-related injuries and medical needs, a comprehensive analysis of the demographic profiles of post-earthquake patients in Turkey were limited.^{4,5} This study aims to address this research gap by shedding light on the demographic and clinical characteristics of individuals seeking medical care and allowing clinicians to align medical resources and interventions more precisely and efficiently during similar disasters in the future.

Methods

This study was designed as a retrospective, cross-sectional clinical study. The data of all patients aged 18 y and over who admitted to the ED starting from February 6, 2023, at 04:17 until February 21 at 16:00, since Balcali hospital was evacuated due to the earthquake on February 20 due to damage, were evaluated. In addition to demographic data such as age, gender, admission type and province, triage, reason for admission, organ system traumatized, mechanisms of injury, screening methods applied in the ED, surgical intervention, and ED outcome data recorded in the ED were obtained from the hospital automation system and ED record forms. To make comments on the effects of earthquake on emergency health-care system, we summarized the previous year's ED applications in the same time period.

The identification of crush syndrome was determined using established clinical criteria, including indicators such as prolonged compression, muscle injury, and the potential for subsequent renal complications. Additionally, diagnostic parameters encompassing elevated serum levels of creatine kinase and myoglobin, electrolyte imbalances, and the risk of acute kidney injury were considered in the classification process.⁶

In the ED where the study was conducted, the triage system applied by experienced triage personnel and ED residents during the disaster and non-disaster periods is the color-coded triage system determined by the Ministry of Health of the Republic of Turkey and categorizes all patients (trauma and non-trauma).⁷ Accordingly, the green-coded patients are low-risk patients who do not require immediate intervention, and can be treated in primary care or outpatient clinics such as urinary tract infections, sore throat, or slightly injured trauma patients; the yellow-coded patients are those who have problems to be addressed and treated in the ED and but evaluation and treatment may take hours such as acute cholecystitis or extremity fractures without circulatory disorders; the red coded patients are those with life-threatening medical conditions such as acute myocardial infarction, major

trauma, who require rapid and aggressive treatment and cannot wait.

The study has the ethical approval of the Cukurova University Non-Interventional Research Ethics Committee dated March 10, 2023 (decision no:131).

Statistical Analysis

IBM SPSS Statistics 29.0.1.0 package program is used to analyze the study data. Continuous variables were evaluated by Shapiro-Wilks test, histogram, and q-q plots to determine whether they conformed to normal distribution. Continuous variables conforming to normal distribution were reported as mean and standard deviation; those not conforming to normal distribution were reported as median and interquartile range (IQR). Categorical variables were defined by number and frequency. Chi-squared test was used for comparisons of categorical variables. The predetermined level of statistical significance was established as $P < 0.05$.

Results

In this study, the data of 3072 patients, 1544 (50.3%) of whom were women, were analyzed from the year 2023. The most common presenting complaint was trauma ($n = 955$; 31.1%), followed by respiratory ($n = 452$; 14.7%) and gastrointestinal ($n = 305$; 9.9%) complaints (Figure 1).

In addition, carbon monoxide poisoning was observed in 8 patients (0.3%), 31 patients had burns (1%), and 7 patients (0.2%) were exposed to cat and dog attacks. In the traumatic group, 70 (7.3%) of the patients had forensic cases other than earthquake-related injuries such as assault, occupational accidents, and gunshot wounds.

The median age of all patients was 44 (IQR 31–61) y, 61.5% ($n = 1588$) were from Adana province and 30.3% ($n = 931$) were from Hatay province. Majority of the patients (66.8%; $n = 2052$) had admitted to the ED by their own means, while 32.8% ($n = 1008$) were transported by ambulance, the transportation method of the 12 (0.4%) patients could not be identified. There were 1428 (46.5%) patients with green triage, 1252 (40.8%) with yellow triage, and 392 (12.8%) with red triage. Although 98 (3.2%) of the patients had been treated and discharged from another health institutions, they were admitted to the institution as a second center by their own wish. Most of the patients (71.6%; $n = 2200$) were discharged from the ED, 570 (18.6%) were admitted to wards, 235 (7.6%) were admitted to the intensive care unit, 8 (0.3%) were admitted to the burn unit, and 59 (1.9%) died before evacuation of the hospital on February 21.

Of the 955 trauma patients, 447 (46.8%) were female, the median age of trauma patients was 43 y (IQR 31–58), and 97 (10.2%) of them had no identification at the time of admission. Patients were most commonly admitted from Hatay ($n = 623$; 65.2%), followed by Adana ($n = 254$; 26.6%). Table 1 summarizes the data of the patients included in the study. While 520 (54.5%) of the traumatized patients were transported by ambulance, 430 (45%) patients were admitted by their own means, and it could not be determined how 5 (0.5%) patients came to the ED (Table 1).

The triage categories of the trauma patients in the ED were as follows: 382 (40%) patients were coded green, 421 (44.1%) were coded yellow, and 152 (15.9%) were coded red. There were 35 (3.7%) trauma patients who applied to ED as an upper-level hospital after being discharged from other hospitals who were also discharged from ED. Figure 2 shows the number of patients

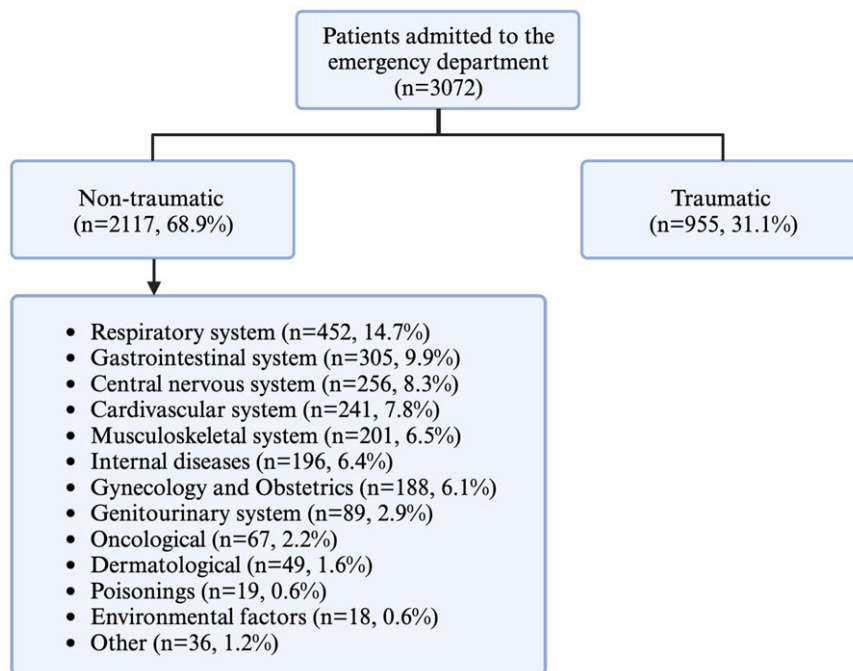


Figure 1. Distribution of patients according to complaints.

Table 1. City where patients came from, triage code, and outcome data of the patients

City where patients came from	Patients admitted to the ED n (%)	Trauma patients n (%)
Adana	1888 (61.5)	254 (26.6)
Osmaniye	39 (1.3)	10 (1)
Hatay	931 (30.3)	623 (65.2)
Kahramanmaraş	45 (1.5)	14 (1.5)
Gaziantep	22 (0.7)	11 (1.2)
Kilis	0 (0.0)	0 (0)
Malatya	11 (0.4)	2 (0.2)
Diyarbakir	4 (0.1)	1 (0.1)
Adiyaman	19 (0.6)	9 (0.9)
Sanliurfa	30 (1.0)	4 (0.4)
Elazig	2 (0.1)	0 (0)
Other	11 (0.4)	0 (0)
Unknown	70 (2.3)	27 (2.8)
Triage code		
Green	1428 (46.5)	382 (40)
Yellow	1252 (40.8)	421 (44.1)
Red	392 (12.8)	152 (15.9)
Clinical outcome		
Discharged from ED	2200 (71.6)	502 (52.6)
Ward hospitalization	570 (18.6)	344 (36)
Intensive care hospitalization	235 (7.6)	80 (8.4)
Burn unit	8 (0.3)	2 (0.2)
Exitus	59 (1.9)	27 (2.8)

Abbreviation: ED, emergency department.

according to days of admission and reason for admission, and Figure 3 shows the number of patients according to days of admission and type of admission.

Four hundred seventy-one (49.3%) of the trauma patients were rescued from under the debris after the earthquake, and the median length of stay under the debris was 24 h (IQR 7–48) for the patients with a detectable length of stay under the debris (n = 304). While the earliest patient was rescued in 30 min, the latest patient was rescued after 203 h.

Of the 955 trauma patients, 725 (75.9%) had extremity injuries, and the most common was crush injury without an open injury or amputation (n = 225; 23.6%). In the immediate diagnostic phase, direct radiography was performed in 746 patients (78.1%), computed tomography (CT) in 415 patients (43.5%), and E-FAST (Extended Focused Assessment with Sonography in Trauma) protocol in 174 (18.2%) was performed by the emergency physician (Table 2).

The median time to obtain direct radiograph images was 18 (IQR 9–39) min, and the median time to obtain CT images was 75 (IQR 43–142) min.

Bone fractures in the extremities were the most common (n = 239; 25%) among the trauma patients; acute kidney injury developed in 121 (12.7%) of 236 (24.7%) patients with crush syndrome, and 87 (9.1%) patients underwent emergency hemodialysis. Emergency surgical intervention was performed in 218 (22.8%) of all trauma patients. These data are summarized in Table 3.

For comparison, 2562 nontrauma patients presented to the ED between February 6 and February 21, 2022, were analyzed. Significant differences were found between 2022 and 2023 according to the reasons for ED visits. The rates of reasons for presentation due to respiratory and cardiovascular system diseases are higher in 2023. See Table 4.

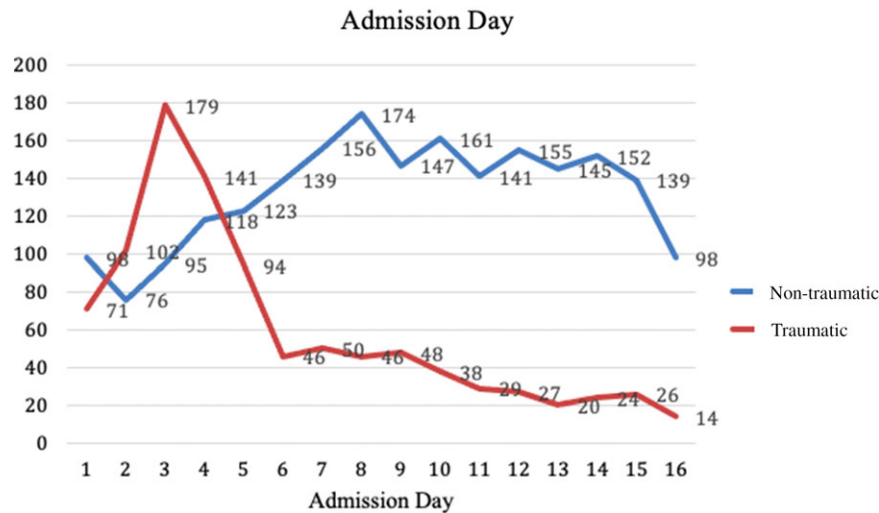


Figure 2. Number of patients according to days of admission.

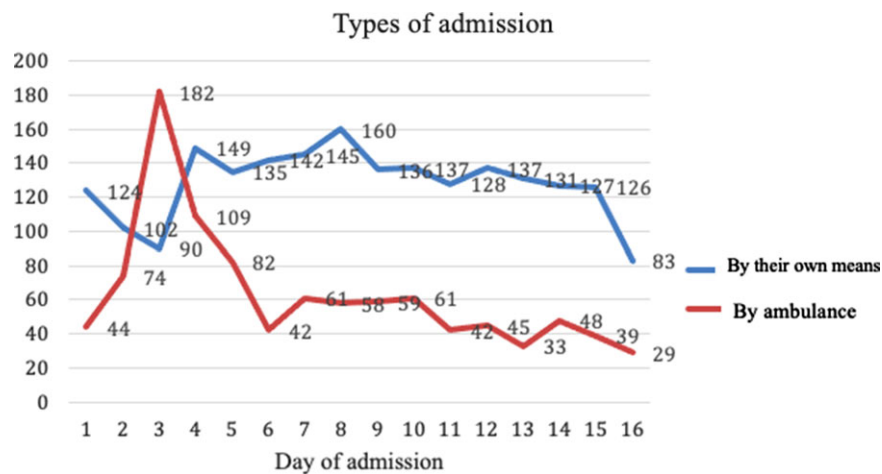


Figure 3. Types of admission to hospital according to the days of admission.

Most of the trauma patients (52.6%; $n = 502$) were discharged from the ED, 344 (36%) were hospitalized in crush units, 80 (8.4%) in the intensive care unit, and 2 (0.2%) in the burn unit. A total of 25 (2.6%) patients, 10 (37%) of whom died in the ED; 2 earthquake victims (0.2%) reached the ED in a deceased state.

The median waiting time in the ED was 90 (IQR 20–240) min for all patients and 169 (50–385) min for trauma patients. The median cost of hospitalization for trauma patients who received health-care services during the time period in this study was 2792.85 Turkish liras (100 US dollars at today's exchange rate) (IQR 189.61–15221.68).

Limitations

While Balçali hospital received a substantial influx of patients as a designated major trauma center, generalizing the data to the entire population is difficult due to the tens of thousands of injuries. The research followed a retrospective analysis of patient records, but the presence of disorganized records for various reasons posed challenges to conducting a thorough patient assessment. Challenges included the evacuation resulting from the February

21 earthquake, the transfer of inpatients to other hospitals, issues with the national medical database (e-nabiz) system, and disorderly medical records, all of which hindered effective patient follow-up.

Discussion

The impact of the February earthquakes in Turkey extended beyond seismic-related traumas, shaping a complex medical landscape encompassing diverse challenges in infrastructure, patient admissions, identification processes, and health-care resource management. In the Iskenderun port of the Hatay province, a major fire broke out, the airport runway was damaged, and some of the train tracks and roads leading to the city were unusable. The city infrastructure was also heavily damaged, with electricity, water, and Internet connections disrupted. Such problems delayed the delivery of aid and search and rescue operations.^{3,8} It was determined that admissions due to earthquake-related trauma intensified in the first week and peaked on the third day. When the ED application types of the patients were examined, the number of patients who arrived by ambulance and by their own means was close to each other in the first 3 d, while the

Table 2. Data on trauma patients' status and duration of time spent under the debris, injury, and imaging findings

Parameters	n (%)
Trauma regions	
Extremities	725 (75.9)
Head	240 (25.1)
Chest	237 (24.8)
Abdominal	95 (9.9)
Pelvic	72 (7.5)
Spinal	159 (16.6)
Length of stay under the debris	
Not trapped under the debris	484 (50.7)
Trapped under the debris	471 (49.3)
Injury mechanisms	
Crush injury with no open injury or amputation	225 (23.6)
Injuries caused by falling or hitting while escaping	191 (20)
Crush injury including open injury and amputation	78 (8.2)
Imaging applied	
Direct radiography	746 (78.1)
E-FAST	174 (18.2)
Computed tomography	415 (43.5)
Time spent under the debris (hours) (n = 304)	
Median (IQR)	24 (7–48)
(Minimum-maximum)	0.5–203

Abbreviations: E-FAST, extended focused assessment with sonography for trauma; IQR, interquartile range.

number of patients who arrived by ambulance reached the highest level on the third day. The number of admissions of trauma patients is higher in the first week of the earthquake compared with nontrauma patients. In a study analyzing patients admitted to the ED after the Mw 7.2 earthquake in Van province in 2011, it was observed that the most frequent admission was on the first day.⁹ The reason for these differences is that, although the destruction was less than in neighboring provinces, 11 buildings collapsed in Adana city center, and 418 people lost their lives,¹⁰ while the injured people were mainly transported to nearby state hospitals, and the hospital received referrals from other provinces. Many people were sleeping in their homes when the earthquake struck. Due to the damaged transportation and communication network, search and rescue and health teams were late in reaching the heavily damaged areas,^{3,8} and the number of patients was so high that health teams were inadequate, causing patients to reach hospitals late with emergency aid teams. Due to the damage to hospitals in 2 major districts of Hatay province, 1 of the cities where the devastating impact of the earthquake was felt the most, patients were referred to neighboring provinces, and because the centers on the way were also damaged and their capacities were limited, they were directed to Adana province where there are nearby and large centers. That is why Hatay is the province with the highest number of trauma patients.

In the study examining the patients admitted to hospitals in Izmir in the Mw 6.3 earthquake that occurred in Izmir on October 30, 2020, at 14:51, the patient who was rescued from the debris at the latest was rescued after 91 h.⁵ The August 17, 1999, Golcuk earthquake, 1 of the biggest earthquakes in Turkey's history, occurred at 03:02 with a magnitude of Mw 7.8. In this earthquake, a survivor was rescued from the debris after 146 h.¹¹ Remarkably, almost half of the patients were rescued from under the debris; the median duration of staying under

Table 3. Diagnosis and treatment intervention data of the patients

Diagnosis	n (%)
Crush syndrome	236 (24.7)
Brain damage	31 (3.2)
Thoracic damage	127 (13.3)
Abdominal damage	41 (4.3)
Spinal damage	96 (10.1)
Bone fractures in the extremities	239 (25)
Maxillofacial trauma	66 (6.9)
Vascular damage	16 (1.7)
Acute kidney damage	121 (12.7)
Emergency hemodialysis	87 (9.1)
Fasciotomy location n = 50 (5.2)	
Implemented before arrival	13 (26)
Implemented in our hospital	21 (42)
Implemented both before arrival and implemented in our hospital	14 (28)
Unknown	2 (4)
Amputation location n = 60 (6.3)	
Implemented before arrival	13 (21.7)
Implemented in our hospital	39 (65)
Implemented both before arrival and implemented in our hospital	8 (13.3)
Surgery performed	
Neurosurgery	7 (0.7)
Thoracic surgery	2 (0.2)
Abdominal surgery	11 (1.2)
Spinal Surgery	20 (2.1)
Orthopedic surgery other than amputation and fasciotomy of the extremities	79 (8.3)
Cardiovascular surgery	5 (0.5)
Other surgeries	16 (1.7)

Table 4. Comparison of the reasons for emergency department application in the same period of the previous year

Parameter	Year		P-Value
	2023, n (%)	2022, n (%)	
Central nervous system	256 (12.1)	322 (12.6)	< 0.001
Respiratory system	452 (21.4)	451 (17.6)	
Cardiovascular system	241 (11.4)	205 (8)	
Gastrointestinal system	305 (14.4)	364 (14.2)	
Obstetrics	188 (8.9)	140 (5.5)	
Genitourinary system	89 (4.2)	155 (6)	
Internal Diseases	196 (9.3)	247 (9.6)	
Oncological	67 (3.2)	84 (3.3)	
Musculoskeletal system	201 (9.5)	447 (17.4)	

the debris was 24 h, the longest was 203 h. The delay in search and rescue operations and the disruptions in the organizational system may have increased the rescue time from the debris. Contrary to the Izmir and Golcuk earthquakes, the fact that the earthquake occurred in winter may have slowed down the metabolism of those under the debris due to hypothermia with less dehydration, allowing them to stay alive longer under the debris.

Due to the scale of the disaster, the reasons for admission and referral of patients to Balcali hospital were not limited to earthquake-related traumas. New diseases (upper respiratory tract infections, pneumonia, carbon monoxide poisoning, etc.) and postearthquake traumas such as beatings, traffic accidents, etc., have also been observed. Additionally, acute exacerbations of chronic diseases such as asthma, acute decompensation of heart failure, and diabetic ketoacidosis, as well as complications related to obstetrics, have contributed to non-traumatic admissions. In addition, there was a significant increase in the number of patients admitted to the ED for reasons other than trauma compared with the previous year. These ailments are exacerbated by the winter season and the inadequate shelter available to earthquake victims and the most of the admissions have been primarily attributed to the lack of medical treatment for comorbid diseases and challenges in the supply of necessary medications. Respiratory and gastrointestinal complaints were the most common among all.

Being the third and fourth most common reasons of applications, central nervous and cardiovascular system complaints might be attributed to the impact of the earthquake and its aftermath. Emergency department visits due to cardiovascular system diseases were higher compared with the previous year. Experiencing significant adrenergic discharge due to fear and anxiety might have resulted in these medical events in the patients within the high-risk category.

During natural disasters, field and hospital triage practices, correct identification of patients, and keeping their records are of critical importance. Patients who are rescued from the debris may be unable to provide their personal identification information or may not be recognized by their relatives. While there are no official data on the number of missing or unidentified people, this situation causes major problems both medically and forensically. Medical history, medications, and allergies are of great importance in the management of patients. Identification of 10.2% ($n = 97$) of the earthquake trauma patients admitted to Balcali hospital could not be made due to reasons such as lack of documents used for identification at the time of admission, and patients not being able to provide information such as being unconscious or not having a companion with them. As a result, patients' medical records could not be accessed through e-nabiz. Over time, these patients were identified; nevertheless, the identifying data required for emergency medical interventions were absent at the required time. The collection of tissue samples from patients for identification is a subject of ethical controversies, and this procedure is deemed unreliable and ineffective during the acute period due to its delayed findings and significant financial burden. Today, facial recognition systems are used in smartphones, passport control points, city security cameras, retina scanning, fingerprints, and finger veins as biomarkers for identification, payment, and banking activities.^{12–14} Furthermore, smart wristbands and watches, which have gained significant popularity, have the capability to store medical identification record data. One of the challenges in early patient identification is the limited use of these methods and devices within the field of health care.

In research conducted by Sari et al. examining patients admitted to Diyarbakir province during the February 2023 earthquake in Turkey,⁴ it was found that extremity traumas were the most common. According to the findings of Bulut et al. (2005),¹⁵ the body area that had the highest frequency of injuries was the extremities. Upon examination of the trauma locations, it was observed that extremity injuries were also the most common. The fact that crush syndrome and bone fractures in the extremities were most common

in the patients evaluated in Balcali hospital is consistent with previous earthquake analyses. In addition, the thoracic and spinal injury rates of the patients are compatible with the literature.^{4,16,17}

Extremity trauma and crush syndrome are among the most common complications among earthquake survivors. These conditions require close follow-up in terms of the need for fasciotomy and amputation, as well as acute kidney injury and the need for urgent dialysis, and infections that may cause sepsis.¹⁸ According to the findings of the study conducted by Bingol et al., the risk of crush syndrome and the need for amputation are increased as the duration of stay under the debris increases.¹⁸ The fact that the number of orthopedic surgical interventions was higher than other surgeries is also compatible with the literature. Extremities were the most afflicted in this study, which explains why there were so many orthopedic procedures.

Although it is not considered long for trauma patients to stay in the ED for a long time considering the overcrowding and functioning of the EDs in Turkey,^{19,20} no comparison could be made with these data related to the functioning of the ED during disasters because they were not evaluated in other studies. After a thorough assessment of all departments, it is clear that integrating inpatient units like dermatology and physiotherapy into hospital's disaster plan for earthquake survivors' hospitalization improved patient admissions and shortened hospital stays compared with nondisaster situations. However, repurposing certain units as temporary lodging for discharged patients lacking housing options reduced available bed capacity. One-third of the annual outpatient clinic examinations in Turkey are performed in the ED, and all possible problems of the patients are attempted to be solved in the ED, and this situation prolongs the waiting time.²¹ The length of these periods is due to the fact that this understanding continues even in extraordinary situations such as earthquakes for patients who will be hospitalized, and for patients who will be discharged, patients stay in EDs for a long time due to problems such as housing and lack of access to social support to receive follow-up treatment. Furthermore, patients requiring early interventions other than surgery, such as hemodialysis, received this treatment first and were re-examined for other injuries once the life-threatening situation had passed. This seems to have prolonged the length of stay in the ED. Among the patients in this study, the one who waited the longest in the ED was admitted to intensive care unit after 5760 min (96 h), and the trauma patient who waited the longest in the ED was admitted to the crush ward after 2880 min (48 h).

In a published report, it was stated that the cost of Kahramanmaraş earthquakes to the Turkish economy was 150 billion US dollars.²² The median cost of earthquake victims to the hospital was calculated to be 2792.85 Turkish Liras, which do not reflect the real amount, because we had to transfer many patients after the hospital was announced to be damaged after February 21. Nonetheless, we hold the view that this calculated cost likely underestimates the true expenses, particularly given that one-third of the patients arrived at the ED by means of ambulance services. Moreover, the potential impact of labor and workforce losses adds another layer of complexity to the overall cost assessment.

This study aimed to determine the earthquake-related medical conditions of patients admitted during a certain time interval. However, the effects of the great earthquake persist and will continue to persist in the cities affected by the earthquake, where debris removal is still ongoing. Poor waste management and limited living conditions in temporary tent/container cities will increase the number of diseases caused by environmental problems in earthquake victims.²³ Carbon monoxide poisoning was observed

in 8 (0.3%) patients and burns in 31 (1%) patients due to inappropriate shelter conditions as well as exacerbations of chronic cardiac and respiratory diseases.

Conclusions

Natural disasters are a part of human existence and earthquakes are both inevitable and extremely destructive events. The February 2023 earthquakes in Turkey damaged numerous hospitals, including Balcali Hospital. Undoubtedly, the best way to prevent destruction is to build seismic resistant buildings. Health-care institutions in earthquake-prone areas should be constantly prepared for possible disaster scenarios, underlining the need to conduct regular drills. To increase resilience, public structures and transportation networks in disaster-prone areas should be reinforced to withstand the impacts of such events.

One of the most critical issues in the aftermath of this natural disaster was the identification of victims. Modern technologies used for identification should be used in the health system.

Chronic diseases, their exacerbations and complications are problems to be addressed as well as trauma in natural disasters. Health services should be prepared to give care to all who seek assistance.

Preparedness should be made for new medical conditions resulting from the indirect consequences of the earthquake. The findings of this study show that the aftermath of earthquake might lead to an increased ED applications of certain patient groups compared with ordinary times, which may also be related to the season, weather and living conditions.

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