MHA MEDIHEALTH ACADEMY

Eurasian Journal of
Anesthesiology & Intensive Care

Original Article

doi
10.51271/EAJAIC-0029

Impact of consecutive earthquakes on pediatric anesthesia and analgesia practices in Turkiye

Aslı Ayaz, Serkan Solak, Ahmet Murat Gül, Hisarcan Kutan, Gülsen Keskin, Aslı Dönmez
Department of Anesthesiology and Reanimation, Ankara Etlik City Hospital, Ankara, Turkiye

Cite this article: Ayaz A, Solak S, Gül AM, Kutan H, Keskin G, Dönmez A. Impact of consecutive earthquakes on pediatric anesthesia and analgesia practices in Turkiye. *Eur J Anesthesiol Intens Care.* 2025;2(2):48-53.

Corresponding Author: Aslı Ayaz, asli.ayaz@yahoo.com

Received: 06/02/2025 ◆ **Accepted**: 20/03/2025 ◆ **Published**: 07/05/2025

ABSTRACT

Aims: The study aims to describe anesthesia and analgesia techniques, accompanying crush syndrome or complex conditions like dialysis, along with perioperative management, for 78 pediatric earthquake victims ranging from 10 days old to 18 years, who underwent multiple consecutive surgeries.

Methods: Following approval from the ethics committee, this study was conducted retrospectively using the medical records of all pediatric patients—ranging in age from 10 days to 18. Between February 6 and March 6, 2023, the demographic data, surgical procedures, anesthesia method and anesthesia duration of 78 patients who underwent 216 surgical procedures were recorded from the medical records and subjected to statistical analysis.

Results: The number of surgeries for children started on the second day of the earthquakes and continued until the first month, with a gradually decreasing number. The average age of patients is 10.45±4.59 and commonly performed orthopedic surgeries include debridement (121%, n=55.8%), fasciotomy (17.1%, n=37) for compartment syndrome, multiple fractures (6.5%, n=14), and limb amputations at different levels (17%, n=7.8). Patients who were included in the hemodialysis program (5.1%, n=11) also underwent consecutive surgical procedures during this process. Intraoperative blood transfusion was performed on 20 patients (9.2%). There were no intraoperative morbidities or perioperative mortality. The most commonly used method in the analgesia approach was the administration of intravenous opioids (50.46%).

Conclusion: Centers with well-structured multidisciplinary system, intensive care units, dialysis units, and blood banks are likely to have lower rates of morbidity and mortality during natural disasters like earthquakes, particularly for pediatric patients.

Keywords: Earthquake, disaster, anesthesia, pediatric anesthesia, Crush syndrome

INTRODUCTION

In 2023, two devastating earthquakes struck Turkiye, causing over 60.000 deaths and widespread injuries, overwhelming local healthcare facilities. These potent seismic events occurred consecutively on February 6th, with magnitudes of 7.8 and 7.5, respectively (Figure 1). Rescue efforts were hampered by infrastructure damage, making transportation of supplies and personnel difficult. The focus was immediate trauma care and surgical interventions. Pediatric surgical care readiness requires careful planning, specialized training, and established protocols for rapid response, triage, and integrated care.[1] Children's distinct physiological and psychological needs necessitate individualized anesthesia and analgesia.[2] Successful pediatric post-earthquake management requires a multidisciplinary approach integrating surgical care with effective anesthetic and perioperative protocols. Appropriate anesthesia minimizes patient stress.[3] Following devastating earthquakes, numerous children have tragically lost their parents and urgently need medical care. When these children arrive at the hospital for surgery or other procedures, getting informed consent becomes particularly complicated. Medical staff must consider both legal and ethical implications in order to protect the wellbeing and rights of these vulnerable children. If parents are not present, consent may be needed from a legal guardian or through judicial approval. It is important for healthcare professionals to explain the procedures in terms that are clear and

appropriate for the child's age and emotional condition.[4] Procedures must be explained clearly, age-appropriately, and with sensitivity. Both general and regional anesthesia are applicable.

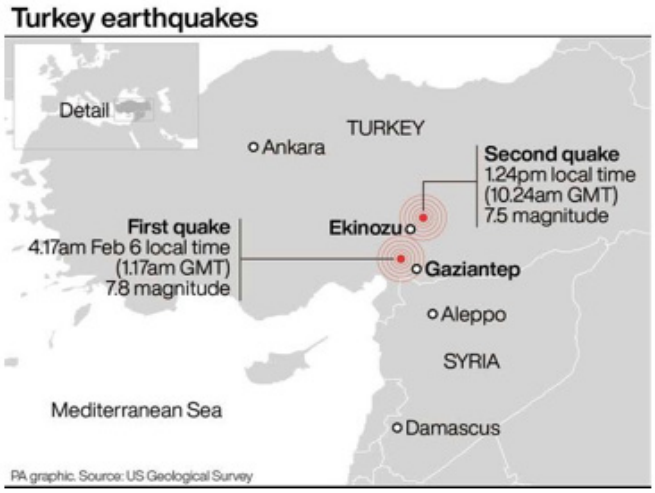

Figure 1. 2023 Feb 6th, Turkiye earthquakes and impact strength

The 2015 Nepal earthquake saw extensive regional anesthesia use due to resource limitations. Advantages include safety for patients with unknown histories, reduced recovery time, and less ICU resource use.[5] The 2018 Indonesia earthquake, with better resources, saw more general anesthesia, especially in pediatric and multiple extremity injuries, though the difference wasn't significant.[6] Safe pediatric transfer from the disaster area to hospitals requires careful management. Healthcare professional involvement, especially anesthesiologists and surgeons, is crucial in the first hour after an earthquake.[7] Anesthesia is vital for pain management. Crush syndrome highlights the need for prompt identification and management of acute conditions. Pediatric anesthesia and analgesia in disasters present unique challenges requiring careful consideration.

The primary objective of this study was to determine the anesthesia and analgesia methods applied to 78 pediatric patients who underwent trauma surgeries, including fasciotomy, debridement, amputation, grafting, flap procedures, and fracture repair, following the 2023 earthquake.

The secondary objective was to determine the factors affecting morbidity and mortality in these patients.

METHODS

The study was conducted with the permission of Ankara Etlik City Hospital Clinical Researches Ethics Committee (Date: 22.03.2023, Decision No: AEH-EKI-2023-022). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. 78 children aged 0 to 18 years were recruited for the study during the period from February 6th to March 6th, 2023, retrospectively (Figure 2).

The data for all patients was gathered from the anesthesia forms completed by the anesthesiologists on duty and from the medical registration system of the hospital.

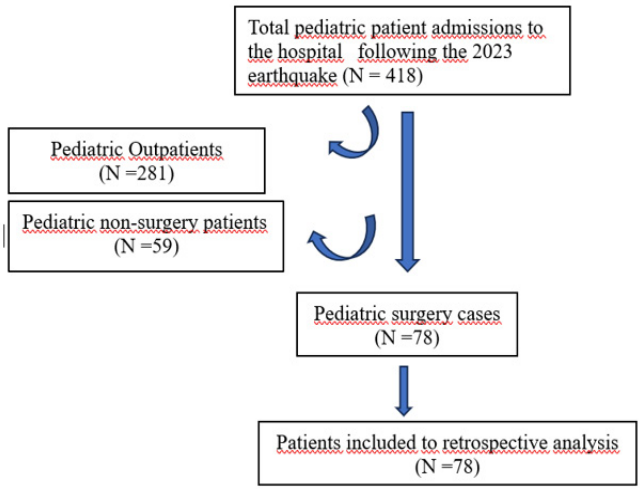

Figure 2. The flowchart illustrating the clinical protocol for pediatric patients at hospital admission

The study focused on the following aspects: demographic data (including age, gender, and other background information of the pediatric patients), surgical procedures (the types and frequency of surgeries performed), anesthesia and analgesia methods (details concerning the anesthetic agents utilized, techniques employed—such as general, regional, or local anesthesia—and pain management strategies), consecutive surgical procedures (the number and types of surgeries each patient underwent and the intervals between procedures), intensive care requirements, and medical conditions, specifically crush syndrome, including the need for hemodialysis and the associated mortality and morbidity rates.

Upon admission to the emergency department, photographs were taken of all children and recorded in the system. Unidentified children were initially assigned a temporary identification starting with the 'G' code, which was utilized from the moment they were rescued from the devastation caused by the earthquake. Patients were assigned new Turkish ID numbers, marked with a 'G' code on their wrists, and admitted to our hospital under this designation.

Informed consent was obtained from accompanying first-degree relatives for those children, and from legal guardians for children who had lost their parents, prior to their operations.

This description outlines the anesthetic procedure for pediatric patients undergoing surgery, particularly those with anxiety, pain, or bilateral lower extremity injuries. For children who are anxious or in pain, sedation is administered while still on the stretcher. This step uses midazolam at a dose of 0.1 mg/kg intravenous (IV) to help calm the patient before moving them to the operating table. In emergency situations or when rapid admission to the operating room is necessary, general anesthesia is typically used. Propofol is used at a dose of 2 mg/kg IV for inducing anesthesia. Rocuronium at 0.5 mg/kg is administered if muscle relaxation is required. Anesthesia is maintained with inhalation of sevoflurane at 1.5 MAC (Minimum Alveolar Concentration) along with an initial IV infusion of remifentanil at 0.01 mcg/kg to provide additional anesthesia and analgesia. If stronger pain relief is needed, fentanyl is administered at a dose of 0.5-1 mcg/kg IV. After the surgical procedure, based on clinical evaluation

and the patient's condition, they are transferred to either an inpatient unit or an intensive care unit for recovery and further monitoring.

Statistical Analysis

While frequency (n) and percentages (%) are used to represent categorical variables, descriptive statistics for continuous variables include mean, standard deviation, median, and interquartile range. The Kolmogorov-Smirnov test was used to verify that the variables were normal. Two groups' non-normally distributed continuous variables were compared using the Mann-Whitney U test. Using Fisher's exact or Chi-square tests, relationships between categorical variables were investigated. IBM SPSS version 25 was used for all analyses, and a significance level of $p<0.05$ was taken into account.

RESULTS

Anesthesia and analgesia data were retrospectively analyzed for 216 procedures performed on 78 pediatric patients who were admitted to our hospital beginning one day after the earthquakes.

The accompanying table (Table 1) provides comprehensive details regarding the demographic parameters, location of injury, types of surgery and operations performed, need of dialysis and transfusion. The number of patients having 1 operation was n=34 (43.5%). The number of patients having >1 operation n=44 (56.4%).

The most commonly performed surgeries were orthopedic, which included fasciotomies for compartment syndrome (n=37, 17.1%), treatment of multiple fractures (n=61, 28,1%), and limb amputations at various levels (n=11, 5.1%).

A subset of patients with renal complications who required hemodialysis also underwent other surgical procedures, highlighting the need for integrated perioperative and dialysis care.

The renal parameters (blood urea nitrogen [BUN] and creatinine levels) and liver function tests (aspartate aminotransferase [AST] and alanine aminotransferase [ALT] levels) were regularly monitored. These parameters were crucial in managing patients with crush syndrome, as they are indicative of kidney and liver stress or damage.

Hemoglobin and hematocrit levels were tracked to assess the patients' anemic status and overall blood volume, which were critically important due to potential blood loss from injuries and surgeries (Table 2).

Crush syndrome occurred in a significant number of patients, requiring all-encompassing care that included fluid therapy and, in certain situations, renal replacement therapy such as hemodialysis (Table 3).

Crush injury and dialysis status were found to be significantly correlated; patients with crush injuries had a significantly higher percentage of dialysis patients (45.5%) than those without (2.9%) ($p<.001$). Amputation and crush injury were also found to be significantly correlated, with patients with crush injuries having a significantly higher amputation rate (27.3%) than those without ($p=.013$). Crush injury and transfusion status, however, did not significantly correlate ($p>.05$).

Table 1. The sociodemographic and medical characteristics of the patients

Total admission	**n**	**Percentage (%)**	
Gender	78	100.0	
Male/female	48/30	61.54/38.46	
	n (%)	**Male, n (%)**	**Female, n (%)**
Age (y)	78		
0-2	5 (6.4)	2 (4.1)	3 (10)
2-5	11 (14.1)	9 (18.7)	2 (6.6)
5-10	23 (29.4)	10 (20.8)	13 (43.3)
10-15	26 (33.3)	12 (25)	14 (46.6)
15-18	12 (15.3)	9 (18.7)	3 (10.0)
Weight (kg)	78	46.07±25.63	40.00 (30.00-70.00)
ASA physical status			
ASA II	119 (55.09)	65 (30.1)	54 (25.0)
ASA III	83 (38.42)	43 (19.9)	40 (18.5)
ASA IV	14 (6.48)	8 (3.7)	6 (2.7)
Location of injury			
Head and neck	5 (6.4)	3 (6.2)	2 (6.6)
Upper limb	28 (35.8)	16 (33.3)	12 (40.0)
Lower limb	42 (53.8)	22 (45.8)	20 (66.6)
Trunk	3 (3.8)	1 (2.0)	2 (6.6)
Primary surgery			
Orthopedic surgery	65 (83.3)	37 (77.0)	28 (93.3)
Plastic surgery	4 (5.1)	2 (4.1)	2 (6.6)
Neurosurgery	6 (7.6)	2 (4.1)	4 (13.3)
Other	3 (3.8)	2 (4.1)	1(3.3)
Operation duration (min)	216	108.53±56.72	95.00 (75.00-120.00)
Dialysis			
-	67 (85.89)		
+	11 (14.1)	7 (8.97)	4 (5.13)
Transfusion			
-	57 (73.08)		
+	21 (26.92)	11 (14.1)	10 (12.82)
Amputation			
-	67 (85.89)		
+	11 (14.1)	6 (7.7)	5 (6.4)

Table 2. Preoperative renal, hepatic, and hematological monitoring parameters

	n	**Mean±SD**	**Median (Min-Max)**
Hematocrit (%)	216	30.13±4.92	30.00 (27.10-32.90)
Hemoglobin (g/dl)	216	9.98±2.53	9.70 (8.90-10.70)
BUN (mg/dl)	216	29.71±27.27	19.90 (12.00-34.15)
Creatinin (mg/dl)	216	.72±.90	.39 (.25-.60)
AST (IU/L)	216	211.57±367.63	52.00 (25.00-172.00)
ALT (IU/L)	216	96.52±139.19	46.50 (19.75-105.25)

SD: Standard deviation, Min: Minimum, Max: Maximum, BUN: Blood urea nitrogen, AST: Aspartate aminotransferase, ALT: Alanine aminotransferase

Table 3. Comparison of the values of certain parameters according to Crush condition and relation between dialysis, transfusion and amputation

	Crush syndrome (-)		Crush syndrome (+)		
	Mean±SD	**Median (Min-Max)**	**Mean±SD**	**Median (Min-Max)**	**p**
Age (y)*	10.41±4.63	11.00 (7.00-14.00)	11.18±4.00	12.00 (8.00-14.00)	.697
Weight (kg)*	45.69±25.34	40.00 (25.00-70.00)	53.27±30.99	40.00 (30.00-85.00)	.379
Hematocrit (%) **	30.14±4.95	30.05 (27.10-32.85)	29.90±4.49	29.70 (26.80-34.70)	.876
Hemoglobin (g/dl) *	9.98±2.58	9.70 (8.90-10.58)	9.95±1.37	9.80 (8.90-10.90)	.617
BUN (mg/dl) *	27.35±23.93	19.30 (11.70-30.10)	73.24±45.56	81.20 (25.50-102.00)	.001
Creatinin (mg/dl) *	.64±.75	.37 (.24-.55)	2.23±1.80	2.21 (.40-3.48)	.003
AST (IU/L) *	172.69±316.74	49.00 (25.00-128.50)	930.80±506.22	910.00 (546.50-1424.0)	<.001
ALT (IU/L) *	81.73±110.43	43.00 (19.00-91.00)	368.50±284.39	350.50 (136.00-510.25)	<.001
	n	**%**	**n**	**%**	
Dialysis***		5			<.001
+	5	6.9	6	7.2	
Transfusion***					.606
+	21	26.92	-	-	
Amputation***					.013
+	6	7.2	5	6.9	

*Mann-Whitney Test; **Independent Samples t-test, *** Fisher's Exact test, SD: Standard deviation, Min: Minimum, Max: Maximum, BUN: Blood urea nitrogen, AST: Aspartate aminotransferase, ALT: Alanine aminotransferase

The following table provides an overview of analgesia techniques for pediatric earthquake victims (Table 4).

Table 4. Analgesia approaches in pediatric anesthesia procedures for pediatric earhquake victims

Analgesia (drugs/methods)	**n**	**Percentage (%)**
Intravenous drugs	196	96.1
Opioid (fentanyl/tramadol/morphine)	109	50.46
Paracetamol	87	40.27
Neuraxial/regional block	8	4
Infraclavikuler block	3	1.5
Caudal block	3	1.5
Spinal anesthesia	1	0.5
None (entubated/pre-arrest emergency) surgery)	1	0.5

DISCUSSION

Our research, which examines the two February 2023 earthquakes in Turkiye, stands apart from other studies by solely concentrating on pediatric patients. As a pediatric anesthesia unit, we present data from 216 procedures performed on 78 children aged 0-18 years, highlighting the specific challenges, distinctive approaches, and expert skills involved in anesthesia and analgesia. Anesthetic management of pediatric earthquake victims transferred to our hospital from a remote region with widespread damage has been challenging but effective. Due to being one of the largest and most organized pediatric hospitals in the region and our proximity, transfers were primarily made to our institution.

Given the complicated and varying nature of injuries sustained by children during disasters, it is highly recommended that these medical interventions are carried out in fully equipped and multidisciplinary hospitals. This ensures access to essential resources, expert teams, and comprehensive care, which are crucial for the successful management of multiple trauma and crush injury complications. Jacquet et al.[8] reviewed the literature on earthquake-related injuries in the pediatric population to provide recommendations for improving the reporting and classification of pediatric injuries in disasters. They found that crush injuries were reported at a rate of 6.3% to 18.7%. The results of our study support the similarity between our statistical data and this outcome (16.6%).

Similar to all major earthquakes in the past, particularly when they occur in the nighttime when people are asleep, as in our case, orthopedic injuries have been the most common, with orthopedic surgeries being the most frequently performed.[9-11] Consequent surgeries are widely anticipated as a consequence of devastating earthquakes in Turkiye explaining the multiextremity fractures and debridement for children. These data exhibit comparable outcomes to previous significant earthquakes.

Anesthesia management can be particularly challenging for vulnerable populations, such as children, due to constraints, difficulties in approaching the ideal method, and a lack of medications or medical equipment. Compared to adults, who also play a major role in anesthetic management, pediatric patients present unique challenges that clinicians must address to ensure safety and efficacy when administering anesthesia in such chaotic and resource-constrained environments. Several important factors must be considered when choosing anesthetic agents for pediatric patients in disaster situations, such as large earthquakes. First, the selection of agents needs to consider the restricted supply of medical supplies, which could limit the use of conventional anesthetics. Prioritizing agents with a broad therapeutic window, rapid onset, and brief duration of action is crucial in these settings because they enable flexibility in situations that change quickly. Given its rapid onset, swift recovery, and low emetogenic potential, propofol-based total IV anesthesia is frequently selected for pediatric patients, mirroring its use

in adults. Moreover, IV anesthetics like ketamine also may be favored due to their relative safety, rapid induction, and analgesic properties, which are beneficial when additional pain management resources are scarce. Additionally, inhalational agents, if available, can be useful due to their ease of administration and controllable effects.[14] These approaches support our findings as well.

Analgesia in all patients, owing to the repeated surgical procedures and the increasingly serious conditions associated with each procedure, has proven to be quite challenging. Because they are children with multiple traumas, the common practice has been the administration of IV opioids and/or paracetamol infusions in children undergoing general anesthesia. The analgesic approach in our clinic is like that described in the literature for other earthquakes.[15] However, previous studies on analgesia in earthquake victims have typically included a broad age range, often encompassing both pediatric and adult populations. Moreover, these studies have frequently lacked detailed information regarding regional anesthesia or advanced blocks in children. In contrast, our study specifically focuses on pediatric earthquake victims, providing valuable insights into the unique analgesic needs of this population. Almost all the implementation of postoperative analgesia in our patient group demonstrates our commitment to pain management in pediatric patients, even during periods of high workload. IV opioid agents were most commonly used as the analgesic modality; however, due to the high volume of patients, it was observed that pain assessment records for these patients were incomplete.

In the context of significant earthquakes, effective pain management is essential for optimizing pediatric patients recovery and minimizing trauma-related stress. Multimodal analgesia, which incorporates diverse analgesic agents and techniques, has the potential to be particularly advantageous. This approach may include the use of regional anesthesia, such as nerve blocks, in combination with systemic medications, such as opioids and non-opioid analgesics. Regional approaches offer the advantage of targeted pain relief with potentially fewer systemic side effects. Furthermore, incorporating non-pharmacological interventions, such as distraction, relaxation techniques, and psychological support, can greatly assist in managing pain and anxiety. A limited use of regional anesthesia and analgesia methods was noted in our patient population. This was due to the substantial increase in workload and time limitations.

Successful pediatric surgery, anesthesia, and critical care disciplines in a hospital during disaster conditions depend on efficient cooperation and communication between medical professionals and all facets of government. Optimizing the use of current medical resources and essential supplies is made possible by upholding open communication and solid partnerships. Additionally, good communication ensures that children who cannot receive the necessary care in the current disaster scenario can obtain the right care through a coordinated referral system.[16,20] The efficient management of the system and the comprehensive documentation of all protocols and decisions significantly contributed to the smooth operation of our work in the hospital during this period.

The second leading cause of death in earthquakes is crush syndrome resulting from muscle trauma. The importance of crush syndrome is rhabdomyolysis, which develops as a result of the release of intracellular components into the systemic circulation in striated muscle cells because of compression of the muscles. Acute kidney injury occurs as a result of impaired renal perfusion due to hypovolemia caused by compartment syndrome. It has been demonstrated that children who experienced crush syndrome following the Marmara earthquake had significantly longer entrapment times compared to adults.[17,18] This finding suggests that children may have been better protected from trauma in confined spaces. In a study by Oda et al.[19], the incidence of acute kidney injury (AKI) was found to be 50.5%, 74.5%, and 100% in children with one, two, and three extremity injuries, respectively. The authors also noted that AKI was present in 14.3% of children with a single extremity injury and in 85.7% of those with multiple extremity injuries, suggesting that the number of affected extremities is a crucial determinant of crush syndrome severity.[19] This underscores the importance of close monitoring and proactive measures in pediatric patients with multiple injuries to mitigate the risk of severe AKI, showing the same results of our analysis.

Limitations

There were limitations of this retrospective study. The success of the analgesia approach may be influenced by the specific skills and experience of the anesthesiologist. This introduces potential bias, as the results may not be replicable in settings with less experienced personnel. The study also didn't compare the combination of regional blocks (ultrasound-guided) with other anesthetic techniques regarding this severe emergency, the shortage of medical supplies was also effective in the decision to apply regional blocks the initiative.

CONCLUSION

To mitigate the impact of large-scale disasters like earthquakes, it is vital to recognize that children, being among the most vulnerable groups, require specialized anesthesia and analgesia practices. Pediatric anesthesia requires careful consideration and expertise, particularly in the context of the complex and severe injuries often seen in such scenarios.

The structured approach to analyzing and managing the surgical and anesthetic needs of pediatric earthquake victims provided valuable insight into how to handle large-scale medical emergencies. This study aims to contribute valuable data towards improving future disaster response protocols (While a comprehensive disaster preparedness protocol is not yet fully established in our country, it is currently under development. The preparation of protocols in such disasters will reduce morbidity and mortality rates, specifically in relation to pediatric care under emergency conditions.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was conducted with the permission of Ankara Etlik City Hospital Clinical Researches Ethics Committee (Date: 22.03.2023, Decision No: AEH-EKI-2023-022).

Informed Consent

Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Gausche-Hill M. Pediatric disaster preparedness: are we really prepared? *J Trauma*. 2009;67(2 Suppl):S73-S76. doi:10.1097/TA.0b013e3181af2fff
2. Naghii MR. Public health impact and medical consequences of earthquakes. *Rev Panam Salud Publica*. 2005;18(3):216-221. doi:10.1590/S1020-49892005000800013
3. Schultz CH, Koenig KL, Noji EK. A medical disaster response to reduce immediate mortality after an earthquake. *N Engl J Med*. 1996;334(7):438-444. doi:10.1056/NEJM199602153340706
4. Kituuka O, Munabi IG, Mwaka ES. Informed consent process for emergency surgery: a scoping review of stakeholders' perspectives, challenges, ethical concepts, and policies. *SAGE Open Medicine*. 2023;11:20503121231176666. doi:10.1177/20503121231176666
5. Lehavi A, Meroz Y, Maryanovsky M, et al. Role of regional anaesthesia in disaster medicine: field hospital experience after the 2015 Nepal Earthquake. *Eur J Anaesthesiol*. 2016;33(5):312-313. doi:10.1097/EJA.0000000000000424
6. Waleoejo CS, Sulistiawan SS, Semedi BP. The anesthetic techniques for earthquake victims in Indonesia *Open Access Emerg Med*. 2022;14:77-84. doi:10.2147/OAEM.S331344
7. Dixon CA, Kwok RK, Ludwig L, et al. Pediatric disaster science: understanding needs, highlighting ımperatives, and leveraging opportunities. *NAM Perspect*. 2024;2024:10.31478/202409a. doi:10.31478/202409a
8. Jacquet GA, Hansoti B, Vu A, et al. Earthquake-related injuries in the pediatric population: a systematic review. *PLoS Currents. PLoS Curr.* 2013;5:ecurrents.dis.6d3efba2712560727c0a551f4febac16. doi:10.1371/currents.dis.6d3efba2712560727c0a551f4febac16
9. Mulvey JM, Qadri AA, Maqsood MA. Earthquake injuries and the use of ketamine for surgical procedures: the Kashmir experience. *Anaesth Intensive Care*. 2006;34(4):489-494. doi:10.1177/0310057X0603400413
10. Waleoejo CS, Sulistiawan SS, Semedi BP. The role of anesthesiologist and selection of effective anesthesia techniques in lombok's earthquake victim's management. *Open Access Emerg Med*. 2022;14:77-84.
11. Çağıran Z, Sertöz N, Karaman S. et al. Our clinical experiences in the earthquake victims who came to our university after the 2020 Aegean Sea earthquake during the COVID-19 pandemic. *Ulus Travma Acil Cerrahi Derg*. 2023;29(3):310-315. doi:10.14744/tjtes.2022.39549
12. 12- Chen G, Lai W, Liu F, et al. The dragon strikes: lessons from the Wenchuan earthquake. *Anesth Analg*. 2010;110(3):908-915. doi:10.1213/ANE.0b013e3181cbc62c
13. Lippert SC, Nagdev A, Stone MB, Herring A, Norris R. Pain control in disaster settings: a role for ultrasound-guided nerve blocks. *Ann Emerg Med*. 2013;61(6):690-696. doi:10.1016/j.annemergmed.2012.03.028
14. Walmsley M, Blum P, Fanzca BS, Disaster management in a low-resource setting: the role of anaesthetists in international emergency medical teams. *BJA Education*. 2017;17(1):22-27. doi:10.1093/bjaed/mkw028
15. Burnweit C, Stylianos S. Disaster response in a pediatric field hospital: lessons learned in Haiti nesth Analg. 2010;111(6):1445-1449. doi:10.1213/ANE.0b013e3181fa3241
16. Aslan N, Yıldızdas D. Pediatric critical care approach for children exposed to earthquakes. *Cam and Sakura Med J*. 2023;3(Suppl 1):25-29. doi:10.4274/csmedj.galenos.2023.2023-9-6
17. Donmez O, Meral A, Yavuz M, Durmaz O. Crush syndrome of children in the Marmara Earthquake, Turkey. *Pediatr Int*. 2001;43(6):678-682. doi:10.1046/j.1442-200x.2001.01469.x
18. Iskit SH, Alpay H, Tuğtepe H, et al. Analysis of 33 pediatric trauma victims in the 1999 Marmara, Turkey earthquake. *J Pediatr Surg*. 2001;36(2):368-372. doi:10.1053/jpsu.2001.20719
19. Oda J, Tanaka H, Yoshioka T, et al. Analysis of 372 patients with Crush syndrome caused by the Hanshin-Awaji earthquake. *J Trauma*. 1997;42(3):470-475. doi:10.1097/00005373-199703000-00015
20. Fabio S, Cuomo C, Sala FD, et al. State of the art in pediatric anesthesia: a narrative review about the use of preoperative time. *J Pers Med*. 2024;14(2):182. doi:10.3390/jpm14020182