

Original Article



Assessment of Disaster and Emergency Preparedness in Surgical Centers of Kurdistan, Iran: A Cross-Sectional Study

Mansour Arad¹ , Rasoul Goli² ✉, Kamal Salehi³ , Arsalan Azizi⁴ , Erfan Fatahi⁵

¹ Department of Medical-Surgical Nursing, Clinical Care Research Center, Research Institute for Health Development, Kurdistan University of Medical Sciences, Sanandaj, Iran

² (Corresponding Author) Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Urmia University of Medical Sciences, Urmia, Iran

³ Department of Medical-Surgical Nursing, Clinical Care Research Center, Research Institute for Health Development, Kurdistan University of Medical Sciences, Sanandaj, Iran

⁴ Department of Medicine, School of Medicine, Kurdistan University of Medical Sciences, Sanandaj, Iran

⁵ Department of Medicine, School of Medicine, Kurdistan University of Medical Sciences, Sanandaj, Iran.

✉ **Corresponding Author:** Tel: (+98) 4412752303 ; Email: Rasoulgoli94@gmail.com

Received: August 7, 2026

Revised: August 15, 2026

Accepted: August 18, 2026

Citation: Arad M, Goli R, Salehi K, Azizi A, Fatahi E. Assessment of Disaster and Emergency Preparedness in Surgical Centers of Kurdistan, Iran: A Cross-Sectional Study. J Surg Trauma. 2026. DOI: jsurgery.bums.ac.ir



Abstract

Introduction: Surgical centers play a pivotal role in responding to disasters, providing critical emergency care, coordinating patient flow, and maintaining essential services during crises. Given this central role, the present study aimed to assess disaster and emergency preparedness across departments in two major surgical centers affiliated with Kurdistan University of Medical Sciences, Iran.

Methods: A cross-sectional census of Shafa and Imam Khomeini hospitals in Saqqez was conducted from June to September 2024. Data were collected using the validated “Unexpected Incidents Preparedness Assessment Checklist,” evaluating multiple hospital departments. Preparedness scores were analyzed using descriptive statistics, and differences across departments were assessed with the Chi-square test using SPSS (version 18).

Results: Disaster preparedness varied considerably across hospital departments. Management demonstrated the highest level of preparedness (68.2 ± 1.10), followed by the Emergency Department (66.7 ± 1.32), Security (64.7 ± 1.70), Administration (64.3 ± 1.60), and Human Resources (61.9 ± 1.80), all of which were classified as having good preparedness. Wards (50.0 ± 1.10), Transfer Services (46.7 ± 1.50), Admission (41.7 ± 2.01), and Education (41.2 ± 1.40) demonstrated moderate preparedness, whereas the Financial Department showed the lowest preparedness score (33.3 ± 1.90), corresponding to a poor level of preparedness. A statistically significant difference in preparedness levels was observed across hospital departments ($p < 0.05$), indicating considerable variation in disaster preparedness among organizational units.

Conclusion: Disaster preparedness differs across departments, with support units being most vulnerable. Enhancing institutional resilience requires prioritizing these departments through dedicated budgets, staff training, interdepartmental coordination, integration of disaster protocols, and ongoing monitoring of preparedness.

Keywords: Disasters; Disaster Planning; Hospitals; Hospital Administration; Emergency Service, Hospital

Introduction

Disasters, whether natural (e.g., earthquakes, floods, pandemics) or human-made (e.g., industrial accidents, armed conflicts), pose serious threats to human life, infrastructure, and community stability. The World Health Organization defines disasters as events that disrupt essential services and overwhelm local capacity to respond (1). With the growing

frequency and intensity of such events worldwide, disaster preparedness has become a critical concern for health systems (2).

Hospital disaster and emergency preparedness has emerged as an essential element of healthcare resilience, particularly following the COVID-19 pandemic, which revealed major vulnerabilities in hospitals' ability to manage large-scale crises (3, 4).



Copyright © 2026, Journal of Surgery and Trauma. This is an open access article distributed under the terms of the Creative Commons Attribution License (CC-BY-NC4.0: <https://creativecommons.org/licenses/by-nc/4.0/legalcode/en>), which permits use, distribution, and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

Globally, many healthcare facilities remain underprepared, facing shortages of critical supplies, limited staff training, and poor coordination mechanisms (5, 7).

In Iran, and specifically in Kurdistan province, unique challenges compound these risks. The region's mountainous geography, limited healthcare resources, and history of both natural and human-induced emergencies create additional pressures on hospitals (8). Within these systems, surgical centers play a particularly vital role. They depend heavily on complex equipment, sterile environments, uninterrupted power, and highly specialized teams. These dependencies make surgical departments especially vulnerable during disasters, when resource supply chains, infrastructure, or workforce capacity may be disrupted (9, 10).

Despite their importance, the preparedness of surgical centers in Iran remains underexplored. Most previous studies have focused on general hospitals or emergency departments, with limited attention to surgical units. Therefore, this research aims to assess the disaster and emergency preparedness of two major surgical centers affiliated with Kurdistan University of Medical Sciences in Saqqez, Iran. By addressing this gap, this study offers context-specific evidence to inform targeted strategies for strengthening hospital resilience in resource-limited settings.

Study Method

Study Design

The present study employed a cross-sectional descriptive design to evaluate the disaster preparedness of two major hospital-based surgical centers affiliated with Kurdistan University of Medical Sciences in Saqqez, Iran. Data were collected from June to September 2024, providing a temporal context for the findings.

Participants

The research included Shafa and Imam Khomeini hospitals in Saqqez, as they are the only surgical centers in the region, representing a census of available facilities. While this approach ensured full coverage of the study setting, the limited number of hospitals reduces the generalizability of the findings.

The unit of analysis was the hospital as an organization; senior managers and department heads served as key informants, completing the checklist on behalf of their departments, a total of 29 respondents across the two hospitals.

Inclusion criteria comprised institutional consent and approval from hospital authorities to participate and provide access to relevant departments for data collection. Checklists were excluded if they were incomplete or returned after the prespecified deadline.

Data Collection

The “Unexpected Incidents Preparedness Assessment Checklist” was used for data collection. This 210-item instrument evaluates preparedness across multiple domains, including emergency, admission, transfer services, management, wards, security, education, financial, human resources, and administration (13). It was originally developed through the integration of 12 national and 8 international tools (e.g., American Hospital Association, Infectious Disease Center, Massachusetts Public Health Department).

Although the checklist had been validated previously, for the purpose of this study it was culturally and contextually adapted to fit the operational environment of the two surgical centers in Saqqez. Adaptations included: (1) revising terminology to align with Iranian hospital structures (e.g., replacing “logistics” with “supply unit”), (2) removing items related to facilities not present in the local context (e.g., helicopter landing sites), and (3) adding two items on regional coordination and power backup systems. The content validity of the adapted version was reviewed by a panel of five experts in hospital disaster management, who rated the relevance and clarity of each item. The overall Content Validity Index (CVI) was 0.89, indicating high content validity.

Each item was scored dichotomously (Yes=1, No=0). Total scores were aggregated into departmental and overall hospital scores, and then classified into five categories: Very Poor (0–20), Poor (21–40), Moderate (41–60), Good (61–80), and Very Good (81–100).

Regarding reliability, previous Iranian studies employing this checklist reported strong inter-rater agreement, with Cohen's Kappa values ranging from 0.82 to 0.91, denoting excellent reproducibility (13, 14). In the present study, internal consistency reliability was also evaluated using Cronbach's alpha, which yielded a coefficient of 0.93, confirming the high reliability of the adapted tool.

Procedure

After approval of the research proposal by the

Faculty of Nursing and Midwifery at Kurdistan University of Medical Sciences, and with Ethical Clearance (IR.MUK.REC.1401.417), data collection was initiated. The researcher visited the selected healthcare centers during office hours, carrying an official letter of introduction. Upon receiving approval from hospital directors and security offices, the researcher explained the objectives and importance of the study to the designated participants.

Data were collected through a combination of structured interviews, document reviews, and direct observation. In each center, the checklist was completed with input from responsible officials, including the Hospital Manager, Head of Emergency, Admissions Officer, Transportation Officer, Security Officer, Public Relations Officer, Educational Supervisor, Support Officer, and Human Resources Supervisor. When a designated official was unavailable, their deputy or assistant was consulted. In cases where officials lacked specific information about preparedness, records from hospital crisis committees were reviewed to ensure accuracy. Additionally, certain items on the checklist required direct observation by the researcher to confirm the presence or absence of facilities and services.

Sample size

The present study employed a complete census of all available surgical centers in Saqqez, namely Shafa Hospital and Imam Khomeini Hospital, which

are the only two facilities providing surgical services in the region. Therefore, no statistical sample size calculation was performed. The unit of analysis was the hospital as an organizational entity. Data were collected from all senior managers and department heads responsible for the relevant units across both hospitals ($n=29$). This census approach ensured full coverage of the target facilities while limiting the generalizability of the findings to similar settings.

Data analysis

The collected data were entered into SPSS version 18 (IBM Corp., Armonk, NY, USA) for statistical analysis. Descriptive statistics, including frequencies, percentages, means, and standard deviations (SDs), were used to summarize the characteristics of hospital disaster preparedness across departments. Inferential analysis was performed using the Chi-square (χ^2) test to compare preparedness levels among hospital departments. A two-sided P -value of < 0.05 was considered statistically significant.

Results

A total of 665 participants were included in the study. The mean age of the participants was 36.48 ± 8.75 years, and the majority were female (51.9%), married (76.6%), had 6–10 years of work experience (45.3%), and held a bachelor's degree (61.4%). Detailed demographic characteristics are presented in Table 1.

Table 1. Demographic characteristics of the participants in the study

Variables		Frequency	Percentage
Gender	Male	320	48.12
	Female	345	51.88
Marital status	Single	156	23.45
	Married	509	76.55
Work experience	1–5 yrs	269	40.45
	6–10 yrs	301	45.26
	10–15 yrs	95	14.29
Educational degree	Bachelor's degree	408	61.35
	Master's degree	230	34.58
	Ph.D.	27	4.07
Age		Mean $\pm$ SD	
		36.48 ± 8.75	

According to the predefined rating scale, departments such as Emergency, Management, Security, Human Resources, and Administration achieved “Good” levels of preparedness, while

Admission, Transfer Services, Wards, and Education scored at a “Moderate” level. The Financial Department exhibited the lowest preparedness among departments, falling into the

"Poor" category (Table 2).

Table 2. Disaster and Emergency Preparedness Scores Across Hospital Departments

Department	Mean ± SD	Preparedness Level
Emergency Department	66.7 ± 1.32	Good
Admission Department	41.7 ± 2.01	Moderate
Transfer Services	46.7 ± 1.50	Moderate
Management	68.2 ± 1.10	Good
Security	64.7 ± 1.70	Good
Wards	50.0 ± 1.10	Moderate
Education	41.2 ± 1.40	Moderate
Financial	33.3 ± 1.90	Poor
Human Resources	61.9 ± 1.80	Good
Administration	64.3 ± 1.60	Good

The Chi-square test was applied to compare disaster preparedness levels across hospital departments. The results demonstrated a statistically significant difference in preparedness levels among the departments ($P<0.05$).

When preparedness scores were analyzed separately for each hospital, Shafa Hospital

demonstrated a slightly higher overall preparedness score (Mean±SD: 55.1±4.0) compared with Imam Khomeini Hospital (52.3±4.4). Nevertheless, both hospitals were classified within the moderate level of disaster preparedness according to the predefined scoring system (Table 3).

Table 3. Overall Disaster Preparedness Scores by Hospital

Hospital	Mean ± SD	Preparedness Level
Shafa Hospital	55.1 ± 4.0	Moderate
Imam Khomeini Hospital	52.3 ± 4.4	Moderate

Note. Preparedness levels were classified according to the predefined scoring system: Very Poor (0–20), Poor (21–40), Moderate (41–60), Good (61–80), and Very Good (81–100).

Discussion

The present study demonstrated marked variation in Hospital Disaster and Emergency Preparedness across departments within the two surgical centers. These differences highlight not only descriptive disparities in preparedness scores but also deeper systemic and organizational factors influencing hospital readiness for disasters (19-20).

Departments directly involved in emergency response, namely Emergency, Management, Security, Human Resources, and Administration achieved “good” levels of preparedness (19, 21). The relatively higher scores observed in these units may be attributed to their central roles during disasters, clearer responsibilities within hospital emergency plans, and more frequent exposure to emergency drills and real-world crisis situations (22).

In particular, the Emergency Department’s preparedness score reflects its routine engagement with acute care, triage, and surge scenarios (23). Similarly, Security and Management departments often operate within structured command-and-

control frameworks, facilitating rapid decision-making and coordination during emergencies (24). Human Resources and Administration departments are typically involved in workforce allocation and logistical coordination, which may explain their comparatively higher readiness.

Several departments demonstrated “moderate” preparedness, including Admission, Transfer Services, Wards, and Education (19, 21). The Admission Department’s moderate score suggests limited integration into disaster triage and surge capacity planning, despite its critical role in patient flow during emergencies (25). Similarly, Transfer Services may lack standardized protocols for patient movement under disaster conditions (26).

The Education Department’s preparedness score indicates that training efforts may focus predominantly on routine professional development rather than disaster-specific competencies (27). The Wards’ moderate preparedness further suggests gaps in bedside-level disaster response, particularly in evacuation planning and continuity of care during crises (28).

The Financial Department exhibited the lowest

preparedness score, classified as “poor” (19, 21). This finding is particularly concerning, as financial readiness is essential for rapid procurement of supplies, emergency staffing, and infrastructure support during disasters (26). The low score may reflect the absence of dedicated emergency budgets, limited financial flexibility, and insufficient involvement of financial personnel in disaster planning processes (27).

The observed pattern, higher preparedness in clinical and operational departments and lower preparedness in administrative and support units, is consistent with findings from other studies conducted in low- and middle-income countries (19, 20). In these settings, departments with immediate visibility during crises tend to receive greater institutional attention, training, and resources, whereas support units remain under-prioritized (28, 29). This imbalance reinforces vulnerabilities in overall hospital resilience (30).

These findings suggest that improving hospital disaster preparedness requires a more balanced, system-wide approach. Cross-departmental training, inclusion of non-clinical staff in disaster simulations, and the development of emergency-specific financial mechanisms are critical steps toward addressing existing gaps.

The generalizability of this study is limited by its focus on only two hospitals within a single region. Additionally, the descriptive nature of the analysis precluded examination of associations between staff characteristics and preparedness levels. Future studies employing mixed-methods or longitudinal designs could provide deeper insights into organizational barriers and facilitators of disaster readiness.

Conclusion

The present study revealed substantial variation in disaster preparedness across hospital departments. Clinical and operational units, including Emergency, Management, Security, Human Resources, and Administration, demonstrated “good” levels of readiness, whereas support and administrative departments, such as Admission, Education, and Financial, showed “moderate” to “poor” preparedness. These findings emphasize the need for targeted interventions, including department-specific training programs, updated admission protocols, structured disaster education for staff, and dedicated financial planning for preparedness activities. Strengthening underperforming

departments while maintaining the strengths of well-prepared units can contribute to a more resilient and responsive hospital system. Future studies should investigate tailored interventions and assess their impact through mixed-methods designs to inform evidence-based policy and practice.

Ethics Approval and Consent to Participate

The research proposal was approved by the Faculty of Nursing and Midwifery at Kurdistan University of Medical Sciences and received Ethical Clearance (IR.MUK.REC.1401.417). Written informed consent was obtained from all participants for participation and for publication of the findings. A copy of the consent form is available for review by the Editor-in-Chief upon request.

Consent for Publication

Not applicable.

Data availability

The data, materials, and codes that support the findings of this study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that there is no conflict of interest.

Funding Statement

This study was not granted by any public or private funding sources.

Authors' contributions

MA and RG contributed to the conception and design of the study, data collection, and drafting of the manuscript.

KS contributed to data collection, data analysis, and critical revision of the manuscript.

EF and AA contributed to critical review and validation of the manuscript content.

All authors approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

Declaration of Generative Artificial Intelligence (AI) in Scientific Writing

As the authors are non-native English speakers, the initial draft was reviewed and refined using ChatGPT to correct grammatical and structural issues and enhance fluency. No AI tools were used

for data analysis, interpretation, or generation of scientific content.

Acknowledgements

We express our gratitude to the officials of Kurdistan University of Medical Sciences for their cooperation and support. We also thank the staff and all participants who assisted with this study.

References

1. Seyedin H, Moslehi S, Sakhaei F, Dowlati M. Developing a hospital preparedness checklist to assess the ability to respond to the COVID-19 pandemic. *East Mediterr Health J*. 2021 Feb 25;27(2):131-41. [DOI: [10.26719/2021.27.2.131](https://doi.org/10.26719/2021.27.2.131)]
2. Al-Hajj S, Abou-El-Hassan H, Khalil L, Kaafarani HM, El Sayed M. Hospital disaster and emergency preparedness (HDEP) in Lebanon: A national comprehensive assessment. *Int J Disaster Risk Reduct*. 2020;51:101889. [DOI: [10.1016/j.ijdrr.2020.101889](https://doi.org/10.1016/j.ijdrr.2020.101889)]
3. Yari A, Hassanzadeh H, Akhbari K, Motlagh ME, Rahmani K, Zarezadeh Y. Hospital preparedness assessment for road traffic accidents with mass casualties: a cross-sectional study in Kurdistan Province Iran. *BMC Emerg Med*. 2024;24(1):68. [DOI: [10.1186/s12873-024-00981-4](https://doi.org/10.1186/s12873-024-00981-4)]
4. World Health Organization. 2022. World Health Organization. WHO guidance on research methods for health emergency and disaster risk management, revised 2022. Geneva: World Health Organization; 2022. [URL: [WHO guidance on research methods for health emergency and disaster risk ... - World Health Organization - Google Books](https://www.who.int/publications/m/item/who-guidance-on-research-methods-for-health-emergency-and-disaster-risk-management-revised-2022)]
5. Gul M, Yucesan M. Hospital preparedness assessment against COVID-19 pandemic: a case study in Turkish tertiary healthcare services. *Math Probl Eng*. 2021;2021:1-8. [DOI: [10.1155/2021/2931219](https://doi.org/10.1155/2021/2931219)]
6. Baker OG. Preparedness assessment for managing disasters among nurses in an international setting: Implications for nurses. *Int Emerg Nurs*. 2021;56:100993. [DOI: [10.1016/j.ienj.2021.100993](https://doi.org/10.1016/j.ienj.2021.100993)]
7. Lestari F, Kadir A, Puspitasari A, Wijaya O, El-Matry HJ, Liana D, et al. Hospital preparedness for COVID-19 in Indonesia. *Front Public Health*. 2023;11:1187698. [DOI: [10.3389/fpubh.2023.1187698](https://doi.org/10.3389/fpubh.2023.1187698)]
8. Elhadi M, Msherghi A, Alkeelani M, Zorgani A, Zaid A, Alsuyihili A, et al. Assessment of healthcare workers' levels of preparedness and awareness regarding COVID-19 infection in low-resource settings. *The Am J Trop Med Hyg*. 2020;103(2):828. [DOI: [10.4269/ajtmh.20-0330](https://doi.org/10.4269/ajtmh.20-0330)]
9. Alreshidi NM, Haridi HK, Alaseeri R, Garcia M, Gaspar F, Alrashidi L. Assessing healthcare workers' knowledge, emotions and perceived institutional preparedness about COVID-19 pandemic at Saudi hospitals in the early phase of the pandemic. *J Public Health Res*. 2020;9(4):2010-20. [DOI: [10.4081/jphr.2020.1936](https://doi.org/10.4081/jphr.2020.1936)]
10. Parizad N, Goli R, Faraji N, Mam-Qaderi M, Mirzaee R, Gharebaghi N, et al. Effect of guided imagery on anxiety, muscle pain, and vital signs in patients with COVID-19: A randomized controlled trial. *Complement Ther Clin Pract*. 2021;43:101335. [DOI: [10.1016/j.ctcp.2021.101335](https://doi.org/10.1016/j.ctcp.2021.101335)]
11. Parizad N, Goli R, Mirzaee R, Baghaie R, Habibzadeh H. Satisfaction with nursing care and its related factors in patients with COVID-19: A descriptive correlational study. *J Educ Health Promot*. 2021;10. [DOI: [10.4103/jehp.jehp_79_21](https://doi.org/10.4103/jehp.jehp_79_21)]
12. Talebi-Azar NA, Anzali BC, Goli RA. COVID-19 and its mental health effects on nurses and health workers: a narrative review. *Pak J Med Health Sci*. 2020;14(4):1453-6. [URL: [COVID-19-and-its-mental-health-effects-on-nurses-and-health-workers-a-narrative-review.pdf](https://www.researchgate.net/publication/354444444-COVID-19-and-its-mental-health-effects-on-nurses-and-health-workers-a-narrative-review/pdf)]
13. KILANITIS, Ioannis, et al. Optimal Transportation of Casualties to Hospitals after Multi-Disaster Mass Casualty Incidents. *International Journal of Disaster Risk Science*, 2026, 17.3: 513-528. [DOI: [10.1007/s13753-026-00725-x](https://doi.org/10.1007/s13753-026-00725-x)]
14. Cords CI, Spronk I, Mattace-Raso FU, Verhofstad MH, Van Der Vlies CH, Van Baar ME. The feasibility and reliability of frailty assessment tools applicable in acute in-hospital trauma patients: A systematic review. *J Trauma Acute Care Surg*. 2022;92(3):615-26. [DOI: [10.1097/ta.0000000000003472](https://doi.org/10.1097/ta.0000000000003472)]
15. Stein C, Gerber L, Curtin D, Oberem N, Wells M. A Comparison of Three Maneuvers and Their Effect on Laryngoscopic View, Time to Intubate, and Intubation Outcome by Novice Intubators in a Simulated Airway. *Prehosp Disaster Med*. 2017;32(4):419-423. [DOI: [10.1017/S1049023X17006392](https://doi.org/10.1017/S1049023X17006392)]
16. Johnson GA, Vindrola-Padros C. Rapid qualitative research methods during complex health emergencies: A systematic review of the literature. *Soc Sci Med*. 2017 Sep;189:63-75. [DOI: [10.1016/j.socscimed.2017.07.029](https://doi.org/10.1016/j.socscimed.2017.07.029)]
17. Al-Tawfiq JA, Memish ZA. Recurrent MERS-CoV Transmission in Saudi Arabia—Renewed Lessons in Healthcare Preparedness and Surveillance. *J Epidemiol Glob Health*.

- 2025;15(1):77. [DOI: [10.1007/s44197-025-00426-6](https://doi.org/10.1007/s44197-025-00426-6)]
18. Khankeh HR, Khorasani-Zavareh D, Johanson E, Mohammadi R, Ahmadi F, Mohammadi R, et al. Disaster health-related challenges and requirements: A grounded theory study in Iran. *Prehosp Disaster Med.* 2011;33:151-8. [DOI: [10.1017/s1049023x11006200](https://doi.org/10.1017/s1049023x11006200)]
 19. Al-Wathinani A, Hertelendy AJ, Alhurishi S, Mobrad A, Alhazmi R, Altuwaijri M, et al. Increased emergency calls during the COVID-19 pandemic in Saudi Arabia: A national retrospective study. *Healthcare.* 2020;9(1):14. [DOI: [10.3390/healthcare9010014](https://doi.org/10.3390/healthcare9010014)]
 20. Habibzadeh H, Jafari K, Alilu L, Arad M, Khalkhali H. Assessment of preparedness of medical education centers of Urmia University of Medical Sciences in facing accidents and disasters in 2018-2019. *Nurs Midwifery J.* 2022;20(9):765-6. [DOI: [10.52547/unmf.20.9.765](https://doi.org/10.52547/unmf.20.9.765)]
 21. Soyege OS, Nwokedi CN, Tomoh BO, Mustapha AY, Mbata AO, Balogun OD, et al. Public health crisis management and emergency preparedness: strengthening healthcare infrastructure against pandemics and bioterrorism threats. *J Front Multidiscip Res.* 2024;5(2):52-68. [DOI: [10.54660/IJFMR.2024.5.2.52-68](https://doi.org/10.54660/IJFMR.2024.5.2.52-68)]
 22. Munasinghe NL, O'Reilly G, Cameron P. Examining the components and validity of hospital disaster preparedness tools. *Prog Disaster Sci.* 2023;20:100305. [DOI: [10.1016/j.pdisas.2023.100305](https://doi.org/10.1016/j.pdisas.2023.100305)]
 23. Moulton AD. A COVID-19 lesson: better health emergency preparedness standards are needed. *Health Secur.* 2022;20(6):457-66. [DOI: [10.1089/hs.2022.0037](https://doi.org/10.1089/hs.2022.0037)]
 24. Janhunen K, Kankkunen P, Kvist T. Nursing staff's perceptions of quality of care for children in emergency departments—high respect, low resources. *J Pediatr Nurs.* 2017;37:e10-5. [DOI: [10.1016/j.pedn.2017.08.029](https://doi.org/10.1016/j.pedn.2017.08.029)]
 25. Nofal A, Alfayyad I, Khan A, Al Aseri Z, Abu-Shaheen A. Knowledge, attitudes and practices of emergency department staff towards disaster and emergency preparedness at tertiary health care hospital in central Saudi Arabia. *Saudi Med J.* 2018;39(11):1123. [DOI: [10.15537/smj.2018.11.23026](https://doi.org/10.15537/smj.2018.11.23026)]
 26. Sondheim SE, Leone RM, Venkatesan S, Char DM, Burdash S, Davis JJ, et al. Hospital boarding creates critical shortcomings in disaster preparedness. *Health Secur.* 2025;23(1):75-9. [DOI: [10.1089/hs.2024.0110](https://doi.org/10.1089/hs.2024.0110)]
 27. Luo Y, Yan H, Tang Y, Wang S, Yang Z, Zhang T, et al. Levels of nurse disaster preparedness: A systematic review and meta-analysis. *Nurse Educ Pract.* [DOI: [10.1016/j.nepr.2025.104372](https://doi.org/10.1016/j.nepr.2025.104372)]
 28. Almukhlifi Y, Crowfoot G, Wilson A, Hutton A. Emergency healthcare workers' preparedness for disaster management: An integrative review. *J Clin Nurs.* 2025;34(12):4958-73. [DOI: [10.1111/jocn.15965](https://doi.org/10.1111/jocn.15965)]
 29. Murray M. Increasing pediatric emergency nurse readiness in mass casualty incidents. *J Emerg Nur.* 2025;52(2):326-1. [DOI: [10.1016/j.jen.2025.11.016](https://doi.org/10.1016/j.jen.2025.11.016)]
 30. Paganini M, Borrelli F, Cattani J, Ragazzoni L, Djalali A, Carenzo L, et al. Assessment of disaster preparedness among emergency departments in Italian hospitals: a cautious warning for disaster risk reduction and management capacity. *Scand J Trauma Resusc Emerg Med.* 2016;24(1):101. [DOI: [10.1186/s13049-016-0292-6](https://doi.org/10.1186/s13049-016-0292-6)]