

## ORIGINAL RESEARCH

# Challenges Faced by Jordan's Search and Rescue Team in the 2023 Turkey Earthquake; A Qualitative Study from Readiness to Response

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**Abstract:** **Introduction:** Many international search and rescue teams were deployed to the devastating earthquake of Southeastern Turkey and Northern Syria on February 6th, 2023, including the Jordan International Search and Rescue Team (JSAR). This study aims to explore the challenges faced by the JSAR team members during their deployment. **Methods:** We employed a qualitative face-to-face semi-structured interview approach. Eighteen respondents were interviewed using an interview guide. Interviews took between 25 and 60 minutes (mean 45 minutes). Data were transcribed verbatim and an inductive thematic approach was used to analyze data and develop codes, categories, and themes. **Results:** The challenges were categorized into three main themes; logistical, coordination, and environmental. Logistical challenges included delays in deployment due to government and flight arrangements, difficulties in transporting excess equipment, and a lack of fuel upon arrival that led to delays in setting up camp and heating. Coordination challenges involved disruption in operation schedule and difficulties working with local volunteer responders. Environmental challenges encompassed extreme cold temperatures, which affected personnel comfort and performance, and recurrent aftershocks, which complicated rescue operations and posed safety risks. **Conclusion:** The JSAR experience highlights that technical readiness alone is insufficient for effective disaster response. Findings from this study underscore significant gaps in logistics, coordination, and environmental adaptation. These gaps can be addressed through improved pre-deployment coordination, context-specific resource planning, and better collaboration mechanisms between host countries and international teams, which would be crucial for enhancing the effectiveness of international search and rescue operations. Host governments, International Search and Rescue Advisory Group (INSARAG) stakeholders, and emergency management bodies can build on these lessons to better integrate specialized teams, reduce procedural delays, and enhance global disaster response systems.

**Keywords:** Emergency Preparedness; Disasters; Relief Planning, Disaster; Rescue Work; Earthquakes

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## 1. Introduction

On the early morning of February 6th, 2023, a 7.8 magnitude earthquake hit Southeastern Turkey and parts of northern Syria, followed by a series of aftershocks measuring up to 7.5 in magnitude (1,2). Collectively, these earthquakes impacted an area of about 13,000 square kilometers and a population of 13.5 million, including two million Syrian refugees (1,2). This devastating event resulted in a death toll of 50,339 peo-

ple, and collapsed or extensively damaged around 311,000 houses in 11 provinces of Turkey (3).

In response to this devastating disaster, the Turkish government called for international aid to support search and rescue efforts as well as medical assistance. The Disaster and Emergency Management Presidency (AFAD) in Turkey played a crucial role coordinating local, national, and international relief operations in severely impacted regions such as Hatay and Gaziantep (4). Over 11,320 search and rescue personnel from 255 international urban search and rescue (USAR) teams representing 90 countries were deployed, including 59 teams certified by the International Search and Rescue Advisory Group (INSARAG) (5).

Responding to international disasters is inherently complex, as each event presents unique characteristics and challenges. International USAR deployed in disaster settings perform their duties under immense pressure, making timely decisions in dangerous and demanding environments (6). Despite Turkey's experience as an earthquake-prone country with a history of past disasters (7,8), the sheer scale of destruction and the widespread needs posed significant challenges for search and rescue teams from various countries (4).

Despite the documented importance of international USAR teams in large-scale disasters, limited research has explored the real-world experiences and operational challenges they face during rapid deployment. The Jordan International Search and Rescue team (JSAR), was among the responders to the Turkey earthquake (9,10). By examining response challenges under INSARAG frameworks, we could identify potential response gaps and provide insights and recommendations that would improve future international response to disasters. This study aimed to explore the experienced challenges by the JSAR team during their deployment to the impacted area of Turkey.

## 2. Methods

### 2.1. Study design and setting

A qualitative study employing semi-structured, face-to-face interviews was conducted to collect data. A qualitative design was deemed appropriate for capturing rich, context-specific insights into the team's operational realities, consistent with consolidated criteria for reporting qualitative research (COREQ) guidelines (11). Semi-structured interviews, while guided by a set of predetermined questions, allowed the interviewer to probe further and gather more in-depth information, exploring the participants' insights and perspectives in greater detail (12). Ethical approval was obtained from the Institutional Review Board (IRB) at Jordan University of Science and Technology (ID No: 2023/511). Approval was also obtained from the Public Security Directorate, the participant employer, prior to starting data collection. Written consent was secured prior to participation, and participants were informed of the potential risks and benefits, their

rights, the voluntary nature of their involvement, and assured confidentiality. All identifying information was removed from transcripts, and data were stored in a secure, password-protected system accessible only to the research team.

### 2.2. Participants

The JSAR team was established in 1999 as a local search and rescue team. In 2013, the team was classified as a "heavy team" by the INSARAG, being among the first teams in the region with such a classification (10). The team comprises five units: search, rescue, medical, logistic, and management, with a total of 99 personnel. The team undergoes extensive training year-round and responds to local and international events.

The principal researcher contacted the team leader to schedule a site visit and arrange the interviews. After obtaining the required ethical and logistical approvals, an initial meeting with the team leader secured support for the study.

We used a purposive sampling strategy, a widely used method in the qualitative design (12,13). We recruited participants from all five units of the team who were deployed in the mission. Initial participants were identified during a site visit based on their immediate availability and willingness to participate, with the goal of securing representation from different units. As the interviews progressed, we transitioned to a more targeted approach, specifically seeking out 'information-rich' participants, under-represented units, or participants with specific roles (e.g., logistics) to fulfill potential gaps in the data and ensure depth and diversity of experiences (13). The final sample was heterogeneous in terms of years of service, ranks, age, and professional background.

From the total eligible pool of 99 deployed members, a subset was present and available during the data collection period. All members who were directly approached and invited to participate (n=18) agreed to take part, resulting in no refusals. The absence of refusals, while facilitating recruitment, is noted in the context of the team's hierarchical culture, where social desirability may influence the decision to participate.

### 2.3. Data collection

An interview guide was developed based on prior research (14–18). The interview guide was pilot-tested with the first two participants, whose transcripts were reviewed by the research team to refine question flow. Minor adjustments were made to enhance clarity, but core content remained unchanged (table 1). However, these two interviews were excluded from final analysis.

All interviews were conducted by the principal researcher, who possessed qualitative expertise and held no direct supervisory role. A research assistant supported the process by taking field notes. The interviews were conducted over a two-month period, from September 1 to November 1, 2023, approximately seven to nine months after the team's return

from the earthquake response. Interviews were scheduled during the participants' duty hours at their workplace. Each interview was conducted in a private, quiet location with only the participant, the principal researcher, and the research assistant present. This setting was chosen to minimize interruptions, reduce the potential for peer influence, and encourage participants to freely express their views. Before each interview, participants were informed of the study's goals, assured of confidentiality, and asked to sign a written consent form. All interviews were audio-recorded with the participants' consent to ensure accuracy and maintain the flow of discussion. Data saturation was reached after three consecutive interviews yielded no significant new codes or thematic insights into the research question. The final three interviews (interviews 16, 17, and 18) confirmed this, as they did not generate any new codes but instead provided further illustrative examples of the already established themes. This judgment was made through consensus by the principal researcher and a second member of the research team.

We recognized the importance of reflexivity in qualitative research and considered how the researchers' backgrounds might influence the study. The lead researcher, who conducted all interviews, is an academic professor with expertise in emergency management and qualitative methods. While not a member of JSAR and holding no supervisory role, the researcher's professional interest in the topic and prior knowledge of disaster response frameworks constituted a pre-understanding of the field. To mitigate potential bias, this positionality was actively acknowledged throughout the research process. The use of a semi-structured interview guide helped ensure consistent questioning, and open-ended probes were used to encourage participants to share their own narratives freely. During analysis, the research team engaged in iterative discussions to challenge interpretations and ensure that the emerging themes were grounded in the participants' accounts rather than the researchers' pre-conceptions.

#### 2.4. Data analysis

All audio-recorded interviews were transcribed verbatim and, along with the memos and notes from the principal researcher and assistant, were organized and manually coded using Microsoft Excel. The spreadsheet was structured with columns for transcripts, initial codes, categories, and emerging themes, facilitating an iterative process of data organization and analysis.

We followed the six-step inductive thematic analysis outlined by Braun and Clarke, involving data familiarization, initial coding, searching for themes, reviewing themes, defining/naming themes, and writing up (19).

Two members of the research team independently coded a subset of transcripts to promote inter-coder reliability, discussing discrepancies until consensus was reached. Open coding was initially used to code all transcribed interviews. Then, the codes were refined to merge similar or close codes

(20). The final thematic structure emerged through an iterative process of comparing and refining codes and categories. For instance, initial codes such as "delay at airport," "equipment transport issues," and "no fuel for generator" were grouped into the category "On-Site logistical problems," which later formed the core of the main theme "Logistical challenges." A schematic of the final themes and their constituent challenges is presented in Table 2.

To ensure the credibility and validity of the study, expert members were involved in developing the interview guide, guiding the data analysis process, and assisting with theme development. Additionally, to uphold the integrity of the analysis, the researchers sought feedback from some participants on the themes and findings after the theme development was completed. This feedback process confirmed the accuracy of the findings with the participants' experiences; no changes to the core themes were required as a result of this feedback. Furthermore, the study included extensive reporting of raw data in the form of direct quotations from participants, enabling readers to evaluate the accuracy of data interpretation and reinforcing the credibility of the analysis. Transferability was addressed by offering a detailed description of the setting, participant selection process, and data collection context. These measures ensure that the findings are robust, consistent, and applicable to a broader audience, including clinicians, administrators, and policymakers.

### 3. Results

A total of 18 participants were interviewed for the study. The length of the interviews ranged from 25-60 minutes, with an average of 45 minutes per participant. All participants were male as it is the case for all the team members. Participants' age ranged from 32-45 years with a mean of 38.6 years. Participants represented all team units including search ( $n = 3$ ), rescue ( $n = 4$ ), medical ( $n = 4$ ), logistic ( $n = 3$ ), and management units ( $n = 4$ ).

#### 3.1. Challenges of deployment

The earthquake occurred early morning on Monday, February 6th, 2023. The liaison officer of the team received the first alert at 4:50 a.m. By 7:30 a.m., a cell was formed to assess deployment. The mission received government approval by 3:00 p.m., the same day. The team departed Jordan at 11:00 a.m., on Tuesday, February 7th, and arrived at Adana Airport, Turkey, by 4:45 p.m. Participants were asked about the main challenges they faced during their deployment. Although participants considered their response mission a great achievement, they highlighted numerous challenges throughout their response journey. These challenges can be grouped into three main themes: logistical, coordination-related, and environmental.

#### 3.2. Logistical challenges

Although the team is always ready to deploy as indicated by a logistic participant (P2), deployment approval must

come from the Jordanian government. Logistical challenges emerged early in the deployment process including deployment delays, excess of equipment, and lack of fuel. Even though the team was ready at the time of government approval, the flight's departure was delayed due to timing in securing the flight route and unfavorable weather conditions at the scheduled departure time. Upon arrival to Adana Airport, Turkey, most participants indicated that the team experienced significant delays, including hours spent unloading equipment, meeting with the Reception Departure Center (RDC) to assign an operation site, and waiting for appropriate transportation for the team and 25 tons of equipment. The 200 km journey to the operation site in Hassa (District of Hatay Province) took an additional 5–6 hours due to traffic and road conditions.

"We are not the decision-makers. We wait for approval from higher levels of government. We send reports to senior authorities, as you know, that's the hierarchy in civil defense. In the meantime, we keep them updated through phone calls." (P1, Management unit)

"The delay at the airport was due, in part, to the bulk of tools. The host country wasn't expecting the bulk of our load, so they had to replace the small trucks they had with bigger ones." (P2, logistic unit)

As this was their first international response after becoming INSARAG certified, the team shipped nearly all their tools, perhaps more than necessary. They felt they had excess equipment, especially rescue and medical tools.

"We had more equipment than needed, mainly rescue and medical tools. Some of them are heavy and take up a lot of space, and we had more than one of each." (P4, logistic unit)

"There were too many tools that I may not use. Some tools, there were three or four pairs of them, why would I need them!" (part 6, search unit)

Fuel was unavailable on the first day, as it should be provided by the host country as indicated by the logistic unit (P2). This delayed camp setup and heating. Fuel was required for generators to set up the tents, heat them, provide warm water, charge battery-powered tools, and operate fuel-powered tools (90% of which were fuel-operated).

"We requested fuel from local authorities, but the only fuel station in town was out of service. As a result, we had to sleep without heat, which harmed our personnel." (P15, management unit)

"We asked the local authorities to provide us with fuel, as our generators, lights, and machines all run on it." (P11, rescue unit)

### 3.3. Coordination challenges

During their operations, the team faced coordination challenges including operation schedule and dealing with local mine workers. As a certified heavy team, their operation is designed for 24/7 work in two 12-hour shifts. However, for unclear reasons, the local authority requested the team to stop operations at night. Without a 24/7 schedule, the team

had to transport tools and equipment back and forth daily, as they could not leave them unattended at the site.

Additionally, the local authority provided heavy machinery, including a loader and digger, necessary to remove debris and allow rescue personnel to continue their work. The heavy machinery operators, however, used to leave the site at 6:00 pm, which hindered the team's ability to continue operations.

Most participants reported that there were challenges in communication and coordination with the local "coal mine workers" at the operation site. The volunteer mine workers, who had arrived before the JSAR team, used basic tools and were provided with heavy machinery by the local authorities to assist in debris removal. However, many participants noted that the coal mine workers were not trained in search and rescue. While there was minimal collaboration, their actions sometimes hindered the progress of the JSAR operations.

"The coal workers don't wear safety gear, use primitive tools, and believe they are in control, but they aren't. In fact, they make things worse by hindering our progress." (P5, medical unit)

"Their work in coal mines is different from search and rescue work. We work in a professional and fully safe manner. We know it is a disaster, but we use safety first. We don't want any of our team members to get injured or die." (P15, management unit)

### 3.4. Environmental challenges

Most participants indicated that extreme cold temperature and recurrent aftershocks were among the main challenges they faced during their mission. Despite being prepared for cold weather, all participants agreed that the extreme conditions (-9°C) posed challenges, especially in the camp.

"At night, we made fires to keep warm and stayed awake. In the morning, we either worked our shift or slept during the warmer daytime." (P4, logistic unit)

"We were informed of the cold temperature before we depart, and we prepared for that, but this temperature exceeded our expectations". (part 2, logistic unit)

Participants from the search and rescue units indicated that aftershocks posed a significant challenge to them. Additionally, the vibrations from heavy machinery at the site sometimes created confusion for search and rescue personnel working under the rubble, as they could not always differentiate between machinery vibrations and aftershocks, leading to a false sense of security.

"Aftershocks were a big concern. Rescue personnel were cautious, avoiding areas at risk of collapse. They worked professionally, assessing the situation, providing support, and entering when it was safe." (P6, search unit)

"Aftershocks were a real challenge. This was our first real mission, you know, in our local missions there were no aftershocks. We are now in a real disaster, a real earthquake and aftershocks." (P7, management unit)

## 4. Discussion

In this study, we explored the challenges experienced by the Jordanian Search and Rescue Team deployed in response to the Turkey-Syrian earthquake in 2023. Through face-to-face interviews, participants expressed their rich experiences as their first international response mission. The findings revealed significant challenges the team faced throughout their deployment journey that was categorized into three domains: Logistical challenges such as delay in deployment, excess in equipment, and lack of fuel; coordination challenges such as schedule of operations and working with local responders; and environmental challenges such as extreme cold and aftershocks.

Generally, international search and rescue teams encounter several logistical obstacles until their arrival at the operation sites (21). While the JSAR team was ready to mobilize and depart within 10 hours in accordance with INSARAG's mobilization guidelines (22), government approvals and airport logistics in the home country caused delays. Further delays at Adana Airport highlighted the need for improved coordination. Delays caused by logistical challenges such as a shortage of appropriate transport vehicles were consistently observed in prior studies (4,23,24), which identified inefficiencies at reception points as significant barriers to timely response. Therefore, specialized search and rescue teams should be provided with all means to arrive quickly at the appropriate working sites and start their search and rescue operations (25). Not doing so results in ineffective use of expensive resources and what is called 'disaster tourism' (26). The JSAR experience emphasized the need for robust transport logistics to expedite response and maximize the life-saving potential of rescue teams, as indicated by previous literature (25,27).

Excessive equipment and personnel proved inefficient and exhausting, underscoring the need for mission-specific deployment while adhering to certification standards. The lack of adequate fuel supplies for camp heating and equipment operation on the first day underscores the importance of pre-coordinated resource allocation with host countries. This finding was highlighted in other studies (28), and aligns with the INSARAG (2020) recommendations for better resource integration between host nations and international teams. It is recommended that the embassies of responding countries coordinate with their USAR teams to secure fuel prior to their arrival, as the host country may be too overwhelmed to provide this service.

The certified heavy teams are designed to work in two separate teams in a 24/7 schedule. Heavy USAR teams maintain 24/7 operations by dividing into four self-sufficient rescue sub-teams, arranged in two 12-hour shifts. At any time, two sub-teams work on-site while the other two rest and recover at the base, ensuring continuous operations without exhausting personnel (22). What happened in this mission is that they had to work for 12 to 14 hours a day only. This created several challenges: first, valuable time was lost in

searching for potential survivors, where each minute counts. Second, the team had to shuttle equipment back and forth from the camp to the site of the operation every day. Third, they also created significant pressure on the camp, as all team members stayed there at night, straining utilities such as beds and restrooms. It is, therefore, essential for local governments to recognize the capacity and capability of the responding team and to scale the operation accordingly (25). Based on this experience, we propose a short operational checklist for host authorities to maximize the effectiveness of incoming heavy USAR teams: (1) Ensure uninterrupted 24/7 access to the assigned operation site; (2) Guarantee the provision of fuel for generators and equipment upon the team's arrival; and (3) Assign dedicated heavy machinery operators who are integrated into the team's round-the-clock shift schedule. Adherence to such a checklist would help bridge the gap between INSARAG doctrine and on-the-ground reality, ensuring that certified teams can operate at their full potential.

JSAR's involvement with volunteer local coal mine workers also shows the challenges in integrating non-professional responders into disaster operations. A previous study highlighted the challenges related to the legitimacy and utility of volunteer workers in search and rescue operations (29). It indicated that issues often arise when integrating and coordinating efforts with these groups. In many cases, volunteers who respond to the scene lack the appropriate equipment needed to ensure their safety during response operations (29). While previous research supports the idea of using trained local workers to help the international team (4,21), JSAR participants found that untrained workers often hindered their efforts. It is recommended that disaster response agencies should provide targeted training and essential equipment to local volunteers. Furthermore, to enable safer and more effective collaboration during a response, we suggest immediate, practical coordination fixes: (a) conducting a mandatory on-site safety briefing for all unaffiliated volunteers; (b) establishing a cache of basic personal protective equipment (PPE) like helmets and gloves for their use; and (c) designating an identified liaison from the volunteer group to communicate with the official JSAR team leadership. These simple measures could mitigate risks and harness the positive intent of local volunteers while minimizing operational interference.

The safety of the rescue team is of utmost priority during search and rescue operations. In Turkey, the JSAR team experienced several aftershocks, which posed a significant safety concern. Like many other USAR teams, our team uses stability monitors as a warning tool in case of shaking caused by aftershocks. However, the Earthquake Early Warning (EEW) system is a promising tool capable of providing alerts a few seconds before the arrival of strong ground shaking at the site. This allows USAR teams to halt operations and move to a pre-designated safe zone, thereby enhancing personnel safety and improving operational efficiency (30).

In summary, experiences in deploying the JSAR team to Turkey-Syrian earthquake of 2023 highlighted a glimpse of operational gaps, which should be a crucial area of improvement in international disaster response. The deployment delay, mismanagement of resources, and difficulties in coordination were the major challenges expressed by the team. The findings underscore the critical need for better preparedness, smooth deployment procedure, and improved host-country coordination. It is imperative that the international teams are deployed in a timely manner, operate efficiently, and are able to coordinate with the local responders in order to be effective within the critical early hours of disaster response. Future works should focus on refining the operational framework that moves closer to eradicating inefficiencies and, in return, may save more lives in time-critical operations.

## 5. Limitations

Several limitations were inherent in this study. The quasi-military nature of the JSAR team is a limitation because the team members could not fully express their experiences, particularly the negative aspects of their response to the mission. In addition, gender bias was a limitation of this study because all team members were male due to the nature of their operations. Given that the JSAR team operates under INSARAG guidelines, the findings may have limited generalizability to teams operating in different contexts or structures. However, the JSAR experience may offer learning opportunities for other teams operating in similar conditions to those in Turkey.

## 6. Conclusions

This study sheds lights on the deployment challenges faced by the Jordanian Search and Rescue team for their first international response following the 2023 Turkey-Syrian earthquake. Despite being INSARAG-certified and operationally ready, the team faced a series of logistical, coordination, and environmental challenges. These include prolonged deployment, excess in equipment, shortage in fuel, and disruption in operation schedule, as well as the difficulty of integrating with the local responders.

These gaps illustrate the importance of strengthening pre-deployment coordination, context-specific resource planning, and better collaboration mechanisms between the host country and international teams. The JSAR experience shows that while technical readiness is essential, operational effectiveness depends on systemic efficiency, flexible logistics, and collaboration. Host governments, INSARAG stakeholders, and emergency management bodies can build on these lessons to better integrate specialized teams, reduce procedural delays, and enhance overall disaster responsiveness. By addressing these gaps, future international disaster response efforts can better leverage specialized teams like JSAR to save lives, foster resilience, and enhance global preparedness for disaster response.

## 7. Declarations

### 7.1. Acknowledgments

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### 7.2. Author contributions

Dr. Mahmoud Alwidyan: Conceptualization, Data curation, Validation, Formal analysis, Funding acquisition, Methodology, Project administration, Resources, Writing original draft, Writing - review & editing. Dr. Abdulhadi Alruwaithi: Conceptualization, Data curation, Validation, Formal analysis, Methodology, Resources, Writing - review & editing. Dr. Ahmad Alrawashdeh: Conceptualization, Methodology, Formal analysis, Validation, Writing - review & editing. Dr. Haitham Bashier: Formal analysis, Validation, Writing - review & editing. Marwan Al-smeiat: Formal analysis, Validation, Writing - review & editing. Dr. Zuhair Ikhwayleh: Formal analysis, Validation, Writing - review & editing. Dr. Abdullah S. Alruwailli: Formal analysis, Validation, Writing - review & editing. Dr. Yousef S. Khader: Formal analysis, Validation, Writing - review & editing. The final version of the manuscript was approved by all authors.

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### 7.4. Statement of competing interests

The authors report no competing interests

### 7.5. Ethical approval

Ethical approval was obtained from the Institutional Review Board (IRB) at Jordan University of Science and Technology (ID No: 2023/511). Approval was also obtained from the Public Security Directorate, the participant employer, prior to starting data collection. Written consent was secured prior to participation, and participants were informed of the potential risks and benefits, their rights, the voluntary nature of their involvement, and assured confidentiality. All identifying information was removed from transcripts, and data were stored in a secure, password-protected system accessible only to the research team.

### 7.6. Using artificial intelligence chatbots

The idea for this study, as well as the writing and conceptualization stages, was conducted without the use of artificial intelligence technologies.

## References

- Swift A, Al-Rish M, Seferis L, Akbari R. Solidarity at scale: Local responder perspectives and learning from the first week of the earthquake response in Syria and Türkiye. 2023. Available from: [https://www.humanitarianoutcomes.org/sites/default/files/publications/ho-ukhieh\\_syria\\_turkey\\_2\\_28\\_23.pdf](https://www.humanitarianoutcomes.org/sites/default/files/publications/ho-ukhieh_syria_turkey_2_28_23.pdf)
- Kolivand P, Karimi Kivi H, Hasheminezhad SE, Saberian P, Shamspour N. The Presence of International Relief Teams in the 2023 Turkish Earthquake: Challenges, Strengths, and Lessons Learned. *Prehosp Disaster Med.* 2023;38(3):419–20.
- WHO. Türkiye earthquake. External situation report. 2023. Available from: <file:///C:/Users/JUST/Downloads/WHO-EURO-2023-7145-46911-69358-eng.pdf>
- Sert H, Horzum MB, Eren GM, Pelin M, Ucgul K. The disaster of the century, Kahramanmaraş earthquake: A qualitative study on the experiences of the earthquake victims and search and rescue teams. *Int J Disaster Risk Reduct.* 2024;107:104462.
- INSARAG AAR. 2023 Türkiye and Syria – Earthquakes: A Comprehensive Report of INSARAG’s Largest International Search and Rescue Operation. 2023. Available from: [chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.insarag.org/wp-content/uploads/2024/04/INSARAG\\_AAR\\_Turkiye\\_Syria.pdf](chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.insarag.org/wp-content/uploads/2024/04/INSARAG_AAR_Turkiye_Syria.pdf)
- Gustavsson ME, Juth N, Arnberg FK, von Schreeb J. Dealing with difficult choices: a qualitative study of experiences and consequences of moral challenges among disaster healthcare responders. *Confl Health.* 2022;16(1):1–19.
- Oral M, Yenel A, Oral E, Aydin N, Aydin N. Earthquake experience and preparedness in Turkey. *Disaster Prev Manag An Int J.* 2015;24(1):21–37.
- Bayrak Y, Öztürk S, Hakan Ç, Tsapanos TM, Koravos GC, Leventakis G. Estimating earthquake hazard parameters from instrumental data for different regions in and around Turkey. *Eng Geol.* 2009;105(3-4):200–10.
- The Jordan Times. Jordan sends multiple batches of humanitarian aid for Syria, Turkey relief efforts. 2023. Available from: <https://jordantimes.com/news/local/jordan-sends-multiple-batches-humanitarian-aid-syria-turkey-relief-efforts>
- Public Security Directorate. Jordan International Search and Rescue Team [Internet]. 2023. Available from: <https://psd.gov.jo/en-us/civil-defense/jordan-international-search-and-rescue-team/>
- Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *Int J Qual Heal Care.* 2007;19(6):349–57.
- Berg B, Lune H. *Qualitative Research Methods for the Social Sciences.* Eighth ed. Karen Hanson; 2012.
- Palinkas LA, Horwitz SM, Green CA, Wisdom JP, Duan N, Hoagwood K, et al. Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Adm Policy Ment Heal.* 2016;42(5):533–44.
- Kohloff SA, Crouch B, Robin PM, Fertel B, Pruitt D, Berg DE, et al. Evaluation of Hospital Mass Screening and Infection Control Practices in a Pandemic Influenza Full-Scale Exercise. *Disaster Med Public Health Prep.* 2012;6(4):378–84.
- Broby N, Lassetter JH, Williams M, Winters BA. Effective International Medical Disaster Relief: A Qualitative Descriptive Study. *Prehosp Disaster Med.* 2018;33(2):119–26.
- Dhungana N, Cornish F. Beyond performance and protocols: early responders’ experiences of multiple accountability demands in the response to the 2015 Nepal earthquake. *Disasters.* 2021;45(1):224–48.
- Khatri JKC, Fitzgerald G, Poudyal Chhetri MB. Health risks and challenges in earthquake responders in Nepal: A qualitative research. *Prehosp Disaster Med.* 2019;34(3):274–81.
- Shipman SJ, Stanton MP, Tomlinson S, Speck PM. Qualitative analysis of the lived experience of first-time nurse responders in disaster. *J Contin Educ Nurs.* 2016;47(2):61–71.
- Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol.* 2006;3(2):77–101.
- Merriam S. *Qualitative Research: A guide to Design and Implementation.* Jossey-Bass; 2009.
- Peleg K. Notes from Nepal: Is there a better way to provide search and rescue? *Disaster Med Public Health Prep.* 2015;9(6):650–2.
- INSARAG. INSARAG Guidelines 2020. Vol. 11, OCHA. 2020. Available from: [chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://insarag.org/wp-content/uploads/2021/06/INSARAG\\_20Guidelines20Vol20II2C20Man20B.pdf](chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://insarag.org/wp-content/uploads/2021/06/INSARAG_20Guidelines20Vol20II2C20Man20B.pdf)
- Statheropoulos M, Agapiou A, Pallis GC, Mikedi K, Karma S, Vamvakari J, et al. Factors that affect rescue time in urban search and rescue (USAR) operations. *Nat Hazards.* 2015;75(1):57–69.
- Tayfur İ, Bayramoğlu B, Şimşek P, Gunduz A. Medical Response to the February 6, 2023, Earthquakes in Hatay: Challenges Faced in the Deadliest Disaster in the History of Türkiye. *Disaster Med Public Health Prep.* 2024;18, e45.
- Okita Y, Shaw R, Minato Y. Regulating incoming international search and rescue teams in the response phase. *J Contingencies Cris Manag.* 2021;29(1):108–14.
- Van Hoving DJ, Wallis LA, Docrat F, Vries S De. Haiti disaster tourism-A medical shame. *Prehosp Disaster Med.* 2010;25(3):201–2.
- Fisher JR, Bela M, Rexhepi ZK. International Response To Turkey 2023 Earthquake: a Policy Analysis. *Knowl - Int J.* 2023;60(1):175–80.
- Şenol Balaban M, Doğulu C, Akdede N, Akoğlu H,

- Karakayalı O, Yılmaz S, et al. Emergency response, and community impact after February 6, 2023 Kahramanmaraş Pazarcık and Elbistan Earthquakes: reconnaissance findings and observations on affected region in Türkiye. *Bull Earthq Eng.* 2025;23(3):1053–81.
29. Barsky LE, Trainor JE, Torres MR, Aguirre BE. Managing volunteers: FEMA's Urban Search and Rescue programme and interactions with unaffiliated responders in disaster response. *Disasters.* 2007;31(4):495–507.
30. Auclair S, Gehl P, Delatre M. Needs and opportunities for seismic early warning prior to aftershocks for search and rescue teams: An in-depth analysis of practitioners' perceptions. *Int J Disaster Risk Reduct.* 2021;65:102545.

**Table 1:** interview guide questions

#	Question
1.	Can you briefly introduce yourself and share your experience as a member of the JSAR team?
2.	What are the motivations and challenges in responding to international disasters? Probe: could you tell me more about motivations/challenges
3.	Can you describe your experiences during your deployment to the Turkey-Syria earthquake response? Probe: Were there any notable challenges you encountered during your deployment?
4.	Can you walk me through a typical working day in your search and rescue activities? Probe: Did you encounter any operational challenges? Please tell me more.
5.	In your view, what aspects of the disaster response did not go as planned? Probe: What changes would you suggest to improve those aspects?
6.	What were the most significant challenges you faced during the response? Probe: What solutions or strategies would you recommend to overcome those challenges?
7.	What recommendations would you make to improve future international disaster responses?

**Table 2:** Themes and challenges faced by the team

Themes	Challenges
Logistical challenges	Deployment delays
	Excess of equipment
	Lack of fuel
Coordination challenges	Operation schedule disruption
	Dealing with local mine workers
Environmental challenges	Extreme cold temperature
	Recurrent aftershocks