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Hatice Mutlu, Mesut Can Türkoğlu & Kübra Sezen Erküvün

Disaster management in Türkiye: a qualitative study on healthcare professionals

1) Name of the First Author: Hatice MUTLU (PhD)

Mailing Address: Vocational School, Department of Medical Data Processing Technicianship, Istanbul Galata University, Galata Campus, Istanbul, Türkiye

ORCID: 0000-0002-7022-454X

Tel: +90 5057559070

e-mail: hatice.mutlu@galata.edu.tr

web address: https://www.galata.edu.tr/tr/meslek-yuksekokulu/akademi-detay-sayfa/meslek-yuksekokulu-akademik-kadro

2) Name of the Second Author: Mesut Can TÜRKOĞLU* (Lecturer, PhD(c)) (* Corresponding Author)

Mailing Address: Health Services Vocational School, Department of Management of Health Institutions, Kırklareli University, Kavaklı Campus, Kırklareli, Türkiye

ORCID: 0000-0001-7955-0520

Tel: +90 5438816200

e-mail: mesutcan.turkoglu@klu.edu.tr

web address: https://personel.klu.edu.tr/mesutcan.turkoglu

3) Name of the Third Author: Kübra SEZEN ERKÜVÜN (Research Assistant, PhD(c))

Mailing Address: Faculty of Engineering-Architecture, Department of Industrial Engineering, Istanbul Beykent University, Ayazaga-Maslak Campus, Istanbul, Türkiye

ORCID: 0000-0003-2193-3478

Tel: +90 5343592636

e-mail: kubrasezen@beykent.edu.tr

web address: https://akademik.beykent.edu.tr/kubra-sezen

Abstract

Background Disasters pose complex challenges that extend beyond immediate emergency response, requiring well-coordinated, resilient, and health-centered disaster management systems. In disaster-prone countries such as Türkiye, understanding how health services, particularly specialized medical rescue teams, function in real disaster settings is critical for identifying systemic gaps and improving preparedness, coordination, and response capacity. The aim of this study is to examine the managerial and organizational challenges encountered in disaster management processes based on the experiences of UMKE personnel who have served during various disasters in Türkiye, and to derive implications for strengthening disaster preparedness and response capacity.

Methods The study was conducted using a qualitative research design. In-depth interviews were carried out with healthcare professionals who participated in disaster response. The data were analyzed using thematic analysis, and the findings were categorized into five main themes: shortages of logistics and equipment; working conditions and training; social awareness; lack of coordination, communication, and organization; and institutional structure and local empowerment.

Results The findings revealed that road damages hindered transportation and that alternative transportation plans were inadequate. Disaster training were not fully adapted to field conditions. Public disaster literacy was found to be low. Insufficient coordination and communication disrupted interventions. In addition, the study identified psychosocial support, community-based education, and institutional capacity building as critical components of effective disaster management.

Conclusions This study was designed to capture the personal perspectives of healthcare professionals who directly confronted disasters and gained first-hand experience of related processes. Therefore, it provides a unique contribution by presenting a disaster

management framework through the lens of healthcare professionals and by highlighting areas in need of improvement for policymakers in this field.

Keywords: Disaster; Disaster management; Healthcare professionals; Semi-structured interviews

Introduction

Disasters are events that cause ecological and psychosocial disruptions that vastly exceed the coping capacity of affected communities (1). According to another definition, disasters are events that result in widespread human, material, economic, or environmental losses and impacts, and cause a serious disruption in the functioning of a society, to the extent that the affected community cannot cope using its own resources (2). For any event to be classified as a disaster, it must occur in populated areas and cause impacts severe enough to disrupt the functioning of the social structure (3). With this in mind, events such as earthquakes, floods, wildfires, hurricanes, and landslides are considered disasters (4). Furthermore, recent pandemics such as COVID-19 have demonstrated that global pandemics also constitute a critical type of disaster, particularly in relation to the capacity of healthcare systems and the resilience of healthcare workers (5). In addition to disasters such as earthquakes, floods, and landslides that have been frequently observed in the past, pandemics have emerged as one of the major challenges of the contemporary era. Pandemics cause significant disruptions in national economies, education, working life, and public transportation, and they also create unprecedented pressures on health systems due to the disproportionate increase in healthcare needs (6,7). Therefore, disasters that exceed the capacity of communities to respond using their own resources require external support, as they surpass the local resource capacity of the affected area (8). These characteristics highlight the need for a systematic approach to disaster

management, encompassing preparedness, risk reduction and prevention, response, and recovery as interrelated and complementary processes (9). In this context, the United Nations Sustainable Development Goals (SDGs) address disasters from a sustainability perspective and aim to strengthen community resilience. SDG11 (Sustainable Cities and Communities) promotes resilience of cities and settlements, while SDG13 (Climate Action) emphasizes policies and measures to reduce disaster risks linked to climate change (10). Therefore, managing disasters as a continuous process is essential to sustain global resources and minimize exposure to disasters.

In Türkiye, the Disaster and Emergency Management Presidency (AFAD) is responsible for risk reduction, preparedness, response, recovery activities, inter-institutional coordination, and humanitarian aid operations in the context of disasters (11). According to AFAD data, 7,767 disasters were recorded in Türkiye in 2024. The majority consisted of forest fires (69%) and floods (23%), followed by landslides (4%) and earthquakes (3%) (12). Globally, 393 natural disasters were reported in 2024, resulting in 16,753 deaths and affecting 167.2 million people. The global economic loss was reported as 241.95 billion USD (13). In Türkiye alone, the earthquakes centered on Kahramanmaraş on February 6, 2023, caused 45,784 deaths (14). This situation indicates that Türkiye is a disaster-prone country and requires further improvement in preparedness and response.

Disasters often lead to various public health problems such as infectious diseases, physical injuries, mental health issues, and environmental hazards (15). Effective management of health services in disasters is necessary to mitigate these destructive impacts (16). The World Health Organization (WHO) emphasizes the critical role of health systems in disaster management. The Health Emergency and Disaster Risk Management (Health-EDRM) framework identifies health systems as central actors before, during, and after disasters (17). This framework requires integrating all health system components (service delivery, workforce, financing, etc.) into the disaster management cycle. It particularly emphasizes addressing the needs of disadvantaged groups such as the elderly, disabled, and migrants. Similarly, the Sendai Framework for Disaster Risk Reduction (2015-2030), developed by the United Nations Office for Disaster Risk Reduction (UNDRR), designates

strengthening health systems at national and local levels as one of the core priorities (18). Thus, health service delivery is among the most essential actions to restore community health after disasters.

In Türkiye, the National Medical Rescue Teams (UMKE) under the Ministry of Health are deployed to provide on-site medical interventions and emergency healthcare during disasters. UMKE consists of healthcare professionals who are specially trained and equipped to deliver medical rescue and emergency care at the disaster site and during transfer (19). These teams play a vital role in providing access to the injured, coordinating, and delivering care immediately after disasters. They are recognized as the 30th international team with this status (20). In post-disaster rescue operations, coordination and harmony among rescue teams are critical determinants of intervention effectiveness. According to Hamilton et al. (21), poor coordination, inefficient resource utilization, transportation challenges, and communication failures significantly hinder disaster response operations. Therefore, both intra-team coordination and inter-team communication across different chains of command are crucial criteria for effective disaster interventions (22).

Existing research on disasters has largely focused on employees' perceptions, experiences, preparedness levels, and the operational challenges encountered during disaster response processes (23-31). While these studies provide valuable insights into disaster response processes, evidence remains limited regarding the managerial and system-level implications of challenges encountered in disaster management from the perspective of healthcare professionals. Drawing on the experiences of healthcare professionals who have actively served in disaster settings, the present study suggests that the challenges observed in disaster management extend beyond operational disruptions and may also be associated with factors such as institutional structures, coordination mechanisms, human resource capacity, and disaster literacy at the societal level.

Accordingly, the aim of this study is to examine the managerial and organizational challenges encountered in disaster management processes based on the experiences of

UMKE personnel who have served during various disasters in Türkiye, and to derive implications for strengthening disaster preparedness and response capacity. Healthcare professionals who have directly participated in disaster response were selected as the target group in order to capture needs and challenges that are often difficult to observe externally, and that can be more clearly identified through firsthand experience. In this context, the study seeks to answer the following research question:

Based on the experiences of UMKE personnel who served during various disasters in Türkiye, what managerial and organizational challenges are encountered in disaster management processes, and what implications do these challenges provide for improving disaster preparedness and response capacity?

In this respect, the study is expected to contribute to the literature by providing evidence on how disaster management operates within the health system from the perspective of healthcare professionals, and by offering suggestions that may support the enhancement of disaster preparedness and response capacity.

Materials and methods

Study design

In this study, a qualitative design grounded in an inductive approach and characterized by descriptive features was employed. Qualitative descriptive studies are particularly suitable when direct descriptions of phenomena are sought (32). The primary aim of the inductive approach is to allow research findings to emerge from recurring, dominant, or significant themes in raw data, free from the constraints of highly structured methods (33). Accordingly, this approach enables the present study to examine challenges in disaster management based on the experiences of UMKE personnel who served during various disasters in Türkiye.

Research team

The research team consisted of three (two females and one male) professional academic researchers (HM: PhD, MCT: PhD candidate, KSE: PhD candidate). HM and MCT have published nationally and internationally in health management and policy, while KSE specializes in occupational health and safety. HM has also conducted several qualitative research studies. Two of the researchers are affiliated with foundation universities, while one is affiliated with a public university (HM: Assistant Professor; MCT: Lecturer, and KSE: Research Assistant). Pilot interviews were conducted under HM's supervision (HM, MCT, and KSE: 5 pilot interviews; HM: 15 interviews). No prior relationship was established between the researchers and the participants before the commencement of the study. Although participants were recruited through professional networks, no direct hierarchical or personal relationship existed that could influence the data collection process.

Sample

A combination of purposive sampling and snowball sampling strategies was employed in the study. Participants were selected using purposive sampling to ensure the inclusion of individuals with substantial experience relevant to the research objectives (34,35). Accordingly, participants were selected based on their direct experience and knowledge relevant to the research questions, ensuring that the data collected would both address the study aims and enable in-depth analysis.

Snowball sampling is a commonly used technique in qualitative research to access participants who are difficult to reach or who possess specific characteristics relevant to the research topic (36,37). In this approach, initial participants recommend additional individuals who meet the study criteria, allowing the sample to expand progressively through referral chains (37). In the present study, snowball sampling was preferred because it facilitated access to UMKE personnel who had served in various disasters in

Türkiye and possessed specific field experience. Social networks and professional connections play a crucial role in reaching such specialized and relatively hard-to-access groups involved in disaster response contexts.

Participants were purposively selected in accordance with the predefined inclusion criteria, and the sample was further expanded using the snowball sampling technique. The sample consisted of experienced UMKE personnel who had participated in at least three disasters (earthquakes, floods, fires, landslides, avalanches, etc.) in Türkiye. Additional inclusion criteria required participants to be at least 18 years old. To ensure diversity, participants were selected from different regions and disaster contexts. Demographic data, including age, gender, years of experience, disasters attended, and educational background, were collected to enhance the validity and transferability of the study. All participants provided written informed consent. Individuals who did not meet the inclusion criteria or declined to participate were excluded.

In qualitative research, sample size is determined by data saturation rather than statistical representativeness (38). Including participants with varying regional, disaster-type, and experiential backgrounds was therefore central to strengthening transferability. Patton (34) emphasizes that maximum variation sampling provides strategic value in this regard. Furthermore, the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist underscores the importance of presenting detailed participant profiles for scientific transparency (39). For this reason, particular attention was paid to including personnel with experience across different types of disasters. The initial participants included in the sample were identified through the researchers' professional networks. The professionals participating in the research initially invited a few colleagues to join, and then these participants were asked to refer their colleagues to the research. Within this scope, 15 UMKE volunteers who had served in various disasters in Turkey were included in the sample. Thus, other experiences were reflected in the findings. Following interviews with 15 participants, the repetition of similar statements and the absence of new themes or substantive information indicated that data saturation had been reached;

therefore, the data collection process was concluded at this stage (40). No eligible participants refused to participate or withdrew from the study.

Ethical approval for the study was obtained from the Scientific Research and Publication Ethics Committee for Social and Human Sciences at Istanbul Beykent University (Approval No. 163113, Date: 07.10.2024). The research was conducted in accordance with institutional and/or national research ethics standards, as well as the principles of the 1964 Declaration of Helsinki and its subsequent amendments.

Data collection process

Before data collection, interview topics were determined in line with the recommended structure in the literature, and a semi-structured interview guide was developed accordingly (41). Subsequently, the semi-structured interview form to be applied to participants was developed by the researchers specifically for this study. The questions included in the interview form are presented in Appendix 1. The form consisted of two sections and eight questions. The first section collected demographic information, including age, gender, profession, years of professional experience, educational background, and role during disasters. The second section explored participants' views and experiences in disaster contexts through open-ended questions. Before formal data collection, five pilot interviews were conducted with individuals meeting the inclusion criteria to assess the interview form. These pilot interviews were excluded from the analysis. As noted in the literature, pilot interviews in qualitative research serve to test the appropriateness and clarity of interview questions and format, enhance data collection instruments, and strengthen validity (42). Following the pilot phase, the research team confirmed the clarity and suitability of the questions, and data collection was conducted between January 22 and February 13, 2025.

Interviews were conducted via the online platform Zoom and were transcribed verbatim by the three researchers. In addition to verbal responses, non-verbal cues such as body language, pauses, and contextual conditions of the interview setting were systematically recorded. To enhance validity and trustworthiness, strategies such as "prolonged

engagement" and "persistent observation," as recommended for qualitative research, were applied (43). At the end of each interview, participants were invited to add any further comments. Interview transcripts were completed on the same day to facilitate the identification of research foci and the assessment of data saturation. In this study, interviews were concluded once participants began repeating similar points and no new themes, patterns, or codes emerged, indicating data saturation (44). Interviews lasted between 40 and 60 minutes, with an average of 50 minutes. All interviews were conducted in Turkish, enabling participants to express themselves in their native language. Data were analyzed in Turkish to preserve original meaning and nuance, while significant quotations were translated into English for reporting. To ensure accuracy, the translations were cross-checked by bilingual researchers. Prior to the interviews, participants were informed about the aim of the study and the roles of the researchers. No non-participants were present during the interviews. Repeat interviews were not conducted, as the data obtained from the initial interviews were considered sufficient to achieve data saturation.

Data analysis

In this study, thematic analysis was employed as the data analysis method. According to Braun and Clarke (45), thematic analysis is a flexible approach that enables the identification, categorization, and interpretation of patterns (themes) within data. This method allows for systematic analysis and comprehensive answers to research questions. Beyond identifying surface-level themes, thematic analysis also uncovers contextual relationships and subthemes, enabling researchers to generate deeper meanings and construct a coherent narrative (45,46). Nowell et al. (47) further highlight its reliability and transparency in revealing underlying structures within data, making it a powerful tool for understanding complex social phenomena and interpreting participant experiences holistically.

For the present study, the research team adopted the six-phase thematic analysis process outlined by Lincoln and Guba (48). The analysis was conducted in accordance with the thematic analysis approach outlined by Braun and Clarke (45), and the analytical steps were implemented based on this framework. Each phase was led by designated

researchers in collaboration with the whole team. MCT and KSE carried out data familiarization and initial coding (phases 1-2), while HM led theme generation and review (phases 3-4). The final phases, defining and naming themes and producing the report, were undertaken jointly by all researchers. The researchers' diverse expertise enriched the analysis, enabling the integration of disaster management, health policy, and occupational health and safety perspectives. To minimize potential bias, each researcher carried out independent coding, followed by regular team meetings to discuss codes and themes until consensus was reached. Since there were no administrative or hierarchical ties between researchers and participants, participants could share their experiences freely.

Throughout the analysis, reliability was strengthened through systematic coding, categorization, and contextual interpretation (49). The analysis process was conducted using an inductive approach, whereby codes and themes were derived directly from the data without reliance on any predetermined theoretical or conceptual framework. Accordingly, although the coding process was based on well-established stages of thematic analysis, the codes and themes developed were generated specifically from the dataset of this study (33,45,47). The alignment of the themes with the research objectives is therefore explained not by adherence to a predefined structure, but by the meaningful relationship established between the research questions and the patterns that emerged from the data through the inductive analytical process (33,45). NVivo 15 (Lumivero, Denver, CO, USA) software was used to facilitate the analysis. NVivo organizes and categorizes qualitative data systematically, enabling coding at both main and subtheme levels. This systematic approach enabled a more holistic interpretation of participant responses, yielding reliable, in-depth findings. Moreover, NVivo enhanced transparency in the analytic process, thereby contributing to a more comprehensive interpretation of findings (50,51). Participant validation (member checking) was achieved by providing participants with the opportunity to offer additional comments and corrections at the end of the interviews. Furthermore, the credibility of the findings was enhanced through researcher triangulation, iterative coding, and team-based consensus during the analysis process.

Findings

Information on the age, gender, profession, professional experience, education level, and disaster-related duties of the 15 UMKE volunteers comprising the research sample is presented in Table 1. According to the study findings, the mean age of participants was 36.5 years. The majority were male (73.3%, n=11), with an average of 15.7 years of professional experience. Most participants (73.3%, n=11) were employed as emergency medical technicians (paramedics), and the majority held a bachelor's degree (80%, n=12). Regarding their roles during disasters, 46.7% (n=7) were responsible for field medical rescue, 40% (n=6) served in Health Disaster and Coordination Center (SAKOM) units, and 13.3% (n=2) worked as team leaders.

Table 1 Profile of the participants

Participant (P)	Age	Gender	Profession	Professional Experience Duration (Years)	Education Level	The Role of Participants in Disasters
P1	31	Female	Nurse	9	Associate Degree	Field Staff (Medical Rescue)
P2	35	Male	Emergency Medical Technician (Paramedic)	15	Associate Degree	Field Staff (Medical Rescue)
P3	42	Male	Manager	18	Bachelor's Degree	Team Leader
P4	52	Male	Manager	32	Bachelor's Degree	Disaster Coordinator
P5	46	Male	Emergency Medical Technician (Paramedic)	26	Bachelor's Degree	Team Leader
P6	32	Female	Emergency Medical Technician	10	Bachelor's Degree	Disaster Coordinator

			(Paramedic)			
P7	36	Female	Emergency Medical Technician (Paramedic)	13	Bachelor's Degree	Disaster Coordinator
P8	35	Male	Emergency Medical Technician (Paramedic)	14	Bachelor's Degree	Field Staff (Medical Rescue)
P9	28	Male	Health Officer	10	Bachelor's Degree	Disaster Coordinator
P10	33	Male	Emergency Medical Technician (Paramedic)	13	Associate Degree	Field Staff (Medical Rescue)
P11	31	Male	Emergency Medical Technician (Paramedic)	11	Bachelor's Degree	Field Staff (Medical Rescue)
P12	33	Male	Emergency Medical Technician (Paramedic)	11	Bachelor's Degree	Field Staff (Medical Rescue)
P13	37	Male	Emergency Medical Technician (Paramedic)	17	Bachelor's Degree	Disaster Coordinator
P14	31	Female	Emergency Medical Technician (Paramedic)	11	Bachelor's Degree	Disaster Coordinator
P15	46	Male	Emergency Medical Technician (Paramedic)	25	Bachelor's Degree	Field Staff (Medical Rescue)

Table 2 presents the main themes and sub-themes identified in disaster management. These themes, which emerged from the participants' views and experiences, encompass fundamental issues such as logistics, working conditions, training, drills, social awareness, coordination, communication, and institutional structuring.

Table 2 Main themes and sub-themes

Main Themes	Sub-Themes
Shortages of Logistics and Equipment	-
UMKE Working Conditions and Training	Training Personnel Quality and Quantity
Social Awareness	Disaster Literacy and Raising Social Awareness Society Participation, Support, and Assistance Management
Lack of Coordination, Communication, and Organization in Disasters	Role Descriptions and Authority Confusion Organization and Planning Issues Lack of Communication and Information Management Drill, Inter-institutional Cooperation, and Operational Security
Institutional Structure and Local Empowerment in Disaster Management	Updating Legislation and Strengthening Institutional Structures Professionalization and Staff Structure The Role of Local Governments and Local Authorities

Main theme 1: shortages of logistics and equipment

As indicated in Table 3, this theme highlights the logistical and transportation challenges, as well as the inadequacies of technical equipment, encountered during disaster response processes.

Table 3 Main theme 1 and participant views

Description	The participants reported that no significant problems were encountered in the supply of blood and medicine during the earthquake; however, shortages were observed in protective materials, distribution, and basic equipment. Road damage and congestion disrupted transportation, underscoring the need to plan air and sea routes as alternatives. Furthermore, the inadequacy of professional equipment was noted to have limited collaboration with international rescue teams.
Participant Views	“We did not have any problems with blood or medicine during the earthquake, but we had trouble finding simple protective materials like gloves for the staff.” (P3) “We did not have problems with medicine or supplies, but we did face issues with distribution. Since the information about needs in rural areas was not coming in systematically, we

	could not deliver the necessary materials. Teams could be assigned just to collect information and handle communication in the field." (P10) "While working in the field, we felt the lack of equipment like sledgehammers and breaker drills. Later on, these tools were added to UMKE." (P12) "Because of road damage and congestion, we had problems with transportation. That is why including sea routes as an alternative, along with air routes, in disaster plans provides a big advantage." (P6) "The biggest deficiency was professional equipment. The international rescue teams did not let us work with construction machines; they used special techniques. We also need to strengthen ourselves with professional tools and methods." (P14)

Main theme 2: UMKE working conditions and training

As summarized in Table 4, this main theme emphasizes the working conditions of UMKE personnel and the training they receive.

Table 4 Main theme 2 and participant views

Description	The findings indicate that the training was not suited to field conditions and that inadequacies in personnel selection and numbers reduced overall efficiency. Moreover, deficiencies in motivation, hygiene, nutrition, and psychosocial support were observed in the working environment. These findings underscore that human resource preparedness in disaster management must be addressed not only from a technical perspective but also through physical, psychological, and social dimensions.
Sub-Theme 1: Training **Participant Views**	"We cannot use the devices we saw in the training during a disaster, because we do not actually have them." (P9) "The training needs to be held under field conditions. For example, staying in tents in the field for 3-4 days or working with simulations in places that resemble real debris sites… That way, we would be better prepared for real conditions." (P11)
Sub-Theme 2: Personnel Quality and Quantity **Participant Views**	"The selection of UMKE staff should be based on certain criteria. The person should be healthy and resilient. Their psychology, habits, and even lifestyle should be taken into account. Otherwise, unsuitable personnel can reduce efficiency in the field." (P4) "The lack of personnel is also a big problem. In our province, AFAD has only 10 staff in total, and that number is nowhere near enough in a disaster." (P8) "Not everyone who receives training should automatically become a UMKE volunteer. They should pass exams successfully and be certified." (P11)

Main theme 3: social awareness

As summarized in Table 5, this main theme emphasizes the level of social awareness and disaster literacy during and after disasters.

Table 5 Main theme 3 and participant views

Description	The thematic findings reveal that, in disaster situations, society assumes a supportive role while simultaneously creating various challenges in the field due to gaps in knowledge and awareness. Participant statements underscore that the public should be incorporated into disaster management not merely as passive providers of assistance, but as active and informed stakeholders in the process.
Sub-Theme 1: Disaster Literacy and Raising Social Awareness **Participant Views**	"UMKE and AFAD should be introduced in schools, and teachers should also be included in training. Because if disaster literacy starts at a young age, society becomes more aware, and it makes our work in the field easier." (P1) "UMKE is not known by the people. People expect us to dig through rubble, but our job is medical intervention." (P2) "The public definitely needs to be made aware of issues like rubble safety, keeping silent, and vehicle use." (P10)
Sub-Theme 2: Society Participation, Support, and Assistance Management **Participant Views**	"The people helped us a lot. They met our needs like water, electricity, and generators, and they never left us alone. To raise awareness among people, training could be organized by municipalities, mosques, and in public spaces." (P5) "The people's level of awareness was very weak. There were even people who sent summer clothes in the middle of winter." (P7) "The aid was out of control. We opened one box, and inside there were cancer drugs, birth-related drugs, and insulin altogether. There was no cold chain, so the medicines went to waste. Severe losses happened." (P12)

Main theme 4: lack of coordination, communication, and organization in disasters

As summarized in Table 6, this main theme highlights the coordination and communication failures among individuals and institutions involved in disaster response, as well as a range of managerial challenges.

Table 6 Main theme 4 and participant views

Description	The findings demonstrate that the most significant challenge in disaster situations stems from inadequate coordination and communication. Ambiguities in roles and responsibilities, the inability to implement plans in the field, and a lack of inter-institutional collaboration led to chaos. Irregularities in aid distribution, the assignment of health personnel to tasks outside their professional scope, and disruptions in communication systems further complicated the response. Participants emphasized that conducting drills with the collective involvement of all institutions is critical to preventing such problems.
Sub-Theme 1: Role Descriptions and Authority Confusion **Participant Views**	"Since the duties and authorities are not clearly defined in written regulations, conflicts can arise between institutions in the field. Everyone's responsibilities should be stated very clearly in the regulations and reinforced with inter-institutional drills and training." (P1) "Even though there were enough personnel in disasters, disorganization and confusion about authority created serious problems. That is why there is a need for an official algorithm that clarifies the order of intervention." (P3) "When we first arrived, it was not clear what we were supposed to do or which tasks we would be assigned to." (P6) "Some of the health personnel sent to the disaster area were directed to tasks outside their job descriptions, while others had to wait without being actively involved in the process." (P15)
Sub-Theme 2: Organization and Planning Issues **Participant Views**	"The teams that will work in disasters should be organized on a regional basis; it would have been more efficient. I mean, not just nearby provinces, but nearby regions should support each other." (P2) "Actually, there are plans, but they are not implemented in the chaos. The biggest shortcoming is lack of coordination. The command center makes a plan, but in the field everyone acts differently." (P2) "During the earthquake, a lot of aid came to Hatay, but there was no organization. Trucks tried to enter the city center, and traffic was paralyzed. If they had been stopped on the highway and directed according to needs, it would have been much easier." (P3) "After the earthquake, concentrating transfers in certain centers and shifting personnel to the earthquake zones caused both a shortage of staff and service disruptions in hospitals in other provinces." (P6)
Sub-Theme 3: Lack of Communication and Information Management **Participant Views**	"In the earthquake that affected 11 provinces, communication channels were very inadequate. Systems like a 24/7 open radio line, which are standard for emergencies, should exist nationwide." (P2) "There were problems with the emergency calls received by the command centers. An emergency report made in Province A could end up being directed to Province B." (P5) "After the earthquake, I realized how important it is to record the data of people rescued from the rubble, such as their identity information, physical description, and photographs." (P7)

	"If a drill is going to be held, it should be done with all institutions. Without water, electricity, sewage, and infrastructure, health services cannot continue." (P6)
Sub-Theme 4: Drill, Inter-institutional Cooperation, and Operational Security **Participant Views**	"Even though earthquake drills are done, I have never seen a large-scale fire drill in my professional life. We do small-scale UMKE drills, but there has never been an inter-institutional fire drill." (P2) "Our biggest problem was not being able to be in the field at the same time as the rescue teams, because we could not enter the area until they went in and created a safe intervention space for us." (P7) "For public health measures to be taken in disaster areas, public health specialists must definitely take part in the field." (P9) "Planning should be done at regional and provincial levels according to disaster risks, such as earthquakes or landslides, by taking the opinions of experts on these natural disasters, and these experts should be included in the planning teams." (P14)

Main theme 5: institutional structure and local empowerment in disaster management

As summarized in Table 7, this main theme emphasizes disaster-related legislation, institutional structuring, and the role of local administrations in disaster management.

Table 7 Main theme 5 and participant views

Description	The findings indicate the need to update disaster management legislation, establish professional cadres, and enhance institutional coordination. Furthermore, strengthening local administrations and involving regional actors in the process are critical for ensuring a rapid and effective response.
Sub-Theme 1: Updating Legislation and Strengthening Institutional Structures **Participant Views**	"The UMKE regulation needs to be reviewed periodically, taking needs into consideration." (P3) "Even though the plans look good on paper, managing a disaster requires experience. That's why it is essential for administrators to be experienced and trained in the field." (P8) "One of the biggest changes that needs to be made is the establishment of a Ministry of Disasters. Also, local administrations should be strengthened, and the fire department should take on more responsibility." (P9) "To ensure good coordination between institutions, a Ministry of Disasters should be established. Non-governmental organizations (NGO), miners, and foresters should be professionally included in the process." (P10) "The Turkish Armed Forces (TSK) must definitely take a more active role in the field. Search and rescue teams, like the Gendarmerie Search and Rescue (JAK), should be established within the TSK and included in the disaster plan." (P12)

Sub-Theme 2: Professionalization and Staff Structure **Participant Views**	"There should be ready UMKE teams and stations in every province. Right now, when something happens, it takes us at least 45 minutes just to gather and go. It should move away from being voluntary, and professional staff should be established." (P3) "The frequent changes of hospital administrators negatively affect the sustainability of the importance given to disaster planning." (P9) "When people who do not have enough training or experience in disaster management try to handle the post-disaster process, it can cause a lack of coordination in the field." (P10)
Sub-Theme 3: The Role of Local Governments and Local Authorities **Participant Views**	"Strengthening local administrations in disaster management is important. Because personnel who come with rotation may not know the region well enough, while local administrators are more connected to the area and, since they are elected, they are also aware of their responsibilities." (P15) "In Van, village guards were given 'drop-cover-hold on' training against avalanche risk, so that until AFAD arrived, they could respond in their villages with their own means. The fact that the guards are local and permanent is a major advantage. This is a good example of providing local training for region-specific risks, and it should be implemented in every region." (P15)

Discussion

This study aims to explore the managerial and organizational challenges arising in disaster management processes through the experiences of UMKE personnel involved in various disasters in Türkiye, and to generate implications for enhancing disaster preparedness and response capacity. The experiences of the professionals consulted were analyzed under five main themes. The findings reflect both current disaster management practices in Türkiye and issues and solutions discussed in the international literature. Findings show that disaster management is not solely technical but also a multidimensional process involving human resources, social awareness, institutional structuring, and coordination. Participants' accounts revealed that existing disaster management mechanisms did not align with field needs, thereby limiting their effectiveness.

Logistical capacity, transportation infrastructure, and the adequacy of technical equipment constitute fundamental structural determinants of effective disaster response.

Damage to transportation networks and traffic congestion can hinder the timely access of healthcare teams to affected populations, underscoring the importance of integrating alternative transportation channels, such as air and maritime routes, into disaster preparedness planning. Similarly, deficiencies in the equipment and technological infrastructure required during response operations may directly compromise the continuity and quality of healthcare services. Qualitative evidence from the 2023 Türkiye earthquakes indicates that transportation constraints, communication limitations, and logistical bottlenecks constitute core factors shaping the effectiveness of disaster response operations (52,53). These challenges highlight the critical need to strengthen logistics planning, supply chain management, and technological capacity within disaster preparedness frameworks. Similar challenges related to early-phase logistics, deployment conditions, and field-level resource adequacy have also been emphasized in previous research on medical rescue teams operating in large-scale disasters (31). Studies examining first responders involved in the 2023 Türkiye earthquakes further highlight the importance of communication technologies, inter-organizational coordination, and adequate resource allocation in improving operational effectiveness during disaster response (54). A study in Yemen similarly noted that health workers entered disaster response with insufficient knowledge and resources, resulting in severe disruptions (55). In Bangladesh, research found that supply chain interruptions significantly delayed aid, while a lack of trust and insufficient information sharing further complicated logistics (56). Integrating technology into the response process offers a potential solution. Lurie & Carr (57) emphasized that telehealth applications facilitate care delivery and support health services in contexts with limited logistical capacity. Thus, disaster logistics should not be confined to equipment supply but must also include alternative transportation routes and digital innovations.

Training processes and working conditions of UMKE personnel constitute critical determinants of effective disaster response. Ensuring that training content is aligned with field realities and strengthening practice-based learning approaches play a key role in enhancing disaster preparedness capacity. Integrating theoretical knowledge with practical skills improves healthcare professionals' ability to make appropriate decisions

under conditions of uncertainty and time pressure, thereby increasing the effectiveness of response processes. In this regard, existing literature also supports the positive impact of practice-oriented training models on disaster management performance. Kaim et al. (58) showed that the TEAMS 3.0 training package improved teamwork and self-efficacy among interdisciplinary teams. Zhang et al. (59) stressed the need to enhance nurses' disaster literacy, noting its critical role in successful disaster response. Empirical evidence from Türkiye also indicates that disaster preparedness levels among healthcare professionals remain at moderate levels and that prior disaster training is not uniformly widespread, highlighting the need for more structured and continuous preparedness programs (60). Supporting healthcare professionals not only in technical competencies but also in psychological and social dimensions is critically important for effective disaster preparedness. High-stress and uncertainty-intensive disaster environments indicate that psychological resilience and team cohesion are key factors directly influencing the effectiveness of response efforts. Kuday et al. (61) similarly found that health workers' conditions in disasters involved not only trauma from deaths and destruction but also long working hours and insufficient rest. Qualitative findings from nurses who served as first responders during disasters also underline the presence of psychosocial challenges such as emotional burden, feelings of inadequacy, and difficulties experienced during post-disaster recovery processes (62). Therefore, selecting resilient professionals and strengthening human resources through continuous, multidisciplinary, simulation-based training appears essential for an effective response. Considering that pandemics are also recognized as a significant category of disasters (5), evidence indicates that the challenges faced by healthcare professionals extend beyond technical competencies. During the COVID-19 pandemic, healthcare workers were exposed to intense workloads, uncertainty, psychosocial pressure, and coordination difficulties (63,64). The pandemic further demonstrated that health systems can rapidly reach capacity limits, thereby increasing the need for effective inter-institutional coordination and highlighting the critical importance of both physical and psychological resilience among healthcare professionals in disaster management processes (65,66). These findings suggest that the need for training, psychosocial support, and institutional preparedness identified in the

present study is relevant not only for natural disasters but also for large-scale health crises such as pandemics.

The level of public preparedness and disaster literacy constitutes a fundamental determinant of the effectiveness of response processes. Low levels of disaster literacy may lead to uninformed behaviors related to debris safety, maintaining silence during search and rescue operations, traffic management, and the organization of aid, thereby hindering response efforts. Moreover, uncontrolled and non-priority donations may reduce the efficiency of resource management. Empirical evidence from Türkiye indicates that a considerable proportion of society demonstrates insufficient or moderate levels of disaster literacy, and that individuals often evaluate disaster-related services as inadequate, highlighting the need for multidisciplinary interventions aimed at strengthening public preparedness (67). These challenges underscore the critical importance of expanding community-based disaster education and enhancing public awareness in order to improve the overall effectiveness of disaster management processes. Seddighi et al. (68) noted gaps in inclusivity and coordination in disaster education in Iran, with disadvantaged groups often excluded. Similarly, Prasetyo et al. (69) emphasized the need to strengthen communication elements critical for community participation in Indonesia. Overall, the literature underscores the need for holistic, inclusive educational approaches. In this regard, introducing UMKE and AFAD in schools, engaging teachers in disaster education, and expanding programs targeting children could effectively enhance disaster literacy in Türkiye.

Coordination and communication deficiencies emerge as prominent factors affecting the effectiveness of disaster response processes. Ambiguities in roles and responsibilities, insufficient inter-institutional collaboration, and inadequacies in communication channels may contribute to operational disruptions in the field. Research examining disaster response processes following the 2023 Türkiye earthquakes similarly highlights coordination difficulties and communication gaps as key determinants of response effectiveness (52). In addition, the misallocation of medical rescue personnel, including instances in which staff remain underutilized or are assigned tasks outside their areas of

expertise, may lead to inefficient use of human resources. These issues highlight the importance of clearly defined responsibilities, effective coordination mechanisms, and well-structured communication systems, and are largely consistent with findings reported in the international literature. In Iran, unclear leadership and role ambiguity within medical response teams led to coordination failures (70). In Türkiye, Sarı & Özer (71) reported that multiple authority conflicts and ineffective use of social media impeded disaster communication. Xue et al. (26) further highlighted the critical role of nurses' leadership and communication skills in disaster settings, noting that a lack of psychosocial support undermined their performance. Thus, cross-sectoral training and joint drills involving all institutions could play a vital role in strengthening coordination.

Institutional structuring and the strengthening of local capacity emerge as critical governance dimensions for ensuring the sustainability and effectiveness of disaster management processes. Strengthening the institutional framework responsible for disaster management, appointing decision-makers with substantial field experience, and ensuring the active involvement of local administrations, armed forces, and NGOs point to the necessity of a multi-stakeholder and integrated approach to disaster governance. In this context, developing governance models that enhance institutional coordination and reinforce local capacity is of paramount importance. The WHO's (72) civil-military cooperation framework underscores the importance of multi-actor approaches in disaster contexts, while Sobhaninia (73) highlights the role of local administrations, leadership, and NGOs in post-disaster recovery. Research also shows that updating institutional regulations and enhancing local capacity are critical for disaster management (28,74). Equipping health managers with disaster management competencies is also reported to strengthen institutional resilience (75). Therefore, enhancing the institutional capacity and incorporating local actors are expected to play a crucial role in reducing field-level challenges in disaster management.

When considered holistically, the findings indicate that the disaster management system in Türkiye demonstrates substantial operational field experience, yet exhibits certain structural limitations in terms of institutional standardization. The experiences reported

by healthcare professionals suggest that response teams display high levels of motivation, professional commitment, and adaptability to field conditions; however, areas requiring further development remain in relation to the standardization of training content, the effectiveness of inter-institutional coordination mechanisms, the clarity of role definitions, and the integrated structuring of preparedness processes. These observations suggest that disaster management capacity cannot rely solely on accumulated operational experience but depends on the effective alignment of field-based knowledge with institutional coordination mechanisms, standardized training structures, and broader societal awareness. In this respect, the findings contribute to a more comprehensive understanding of the structural challenges encountered in disaster management systems characterized by relatively strong operational capacity but limited institutional standardization.

Conclusion

This study aimed to explore the experiences of health professionals in disasters and to reveal the multidimensional nature of disaster management. The findings demonstrate that logistical and equipment shortages severely constrained service delivery; UMKE personnel require strengthening in terms of training and psychosocial support; social awareness for disasters remains low; inter-institutional coordination problems are widespread; and structural reforms in institutional organization are needed. The study also showed that disaster drills rarely moved beyond theoretical training and were predominantly earthquake-focused, with other disaster types insufficiently addressed. Another striking finding was the need to shift medical rescue teams such as UMKE from a volunteer-based model to entirely professional cadres, with stricter selection criteria. Furthermore, it was found that affected communities had minimal knowledge about disaster response teams and their roles, highlighting low levels of disaster literacy. Considering that a substantial proportion of participants consisted of paramedics who are actively engaged in frontline emergency response and patient transport processes, the findings particularly emphasize operational and coordination-related dimensions of

disaster management. This professional perspective provides valuable insight into field-level challenges that directly affect the effectiveness of disaster response activities.

In light of these findings, several policy implications emerge. Strengthening logistical capacity and transport-communication networks, integrating digital solutions, and ensuring efficient deployment of response teams could enhance the effectiveness of health services in disasters. Continuous, multidisciplinary disaster training should be expanded for both health professionals and the general public, embedded in primary education, adapted to field conditions, and supported by psychosocial interventions. Moreover, empowering local administrations and NGOs, clarifying coordination mechanisms among institutions, and resolving authority conflicts are vital. To ensure unified and effective management of disaster processes, elevating disaster governance beyond the level of the presidency and establishing a dedicated Ministry of Disasters should also be considered.

Despite offering a multidimensional perspective on disaster management processes in Türkiye, this study has certain limitations. It was conducted with a specific group of health professionals, and the findings may have limited generalizability beyond the Turkish context. In addition, the professional composition of the sample was largely dominated by paramedics, which may have influenced the prominence of operational and field-oriented perspectives reflected in the findings. Since paramedics play a central role in frontline emergency response activities, the results primarily highlight challenges encountered during the implementation phase of disaster management processes. Future studies including a more diverse distribution of professional roles (e.g., physicians, nurses, administrators, and other health personnel) may contribute to a more comprehensive understanding of disaster management practices across different institutional levels. Nonetheless, the study underscores that effective disaster health services require an integrated approach encompassing human resources, logistical capacity, institutional structuring, and public awareness. The findings contribute to the development of national disaster policies and the implementation of more flexible, inclusive, and sustainable models. Taken together, the findings suggest that the disaster management system in Türkiye reflects a structure characterized by substantial operational field experience but

partial limitations in terms of institutional standardization. The experiences reported by healthcare professionals indicate that disaster response capacity is not solely determined by technical competence or individual preparedness, but is also shaped by the degree of alignment between institutional coordination mechanisms, standardized training structures, and broader societal disaster awareness. In this respect, the Türkiye case highlights the importance of strengthening institutional learning processes and governance arrangements that enable the integration of field-based knowledge into systematic preparedness frameworks. Such alignment appears to be a critical factor for enhancing the sustainability, adaptability, and effectiveness of disaster management systems. Future research should include different stakeholder groups (patients, volunteers, local administrators, etc.) to provide a more comprehensive understanding of multi-actor disaster management practices.

Abbreviations

AFAD Disaster and Emergency Management Presidency

COREQ Consolidated Criteria for Reporting Qualitative Research

Health-EDRM Health Emergency and Disaster Risk Management

NGO Non-governmental Organizations

SAKOM Health Disaster and Coordination Center

SDG Sustainable Development Goals

UMKE National Medical Rescue Teams

UNDRR United Nations Office for Disaster Risk Reduction

USD United States Dollar

WHO World Health Organization

Declarations

Ethics approval and consent to participate

Ethical approval for the study was obtained from the Scientific Research and Publication Ethics Committee for Social and Human Sciences at Istanbul Beykent University (Approval No. 163113, Date: 07.10.2024). All participants provided written informed consent. The research was conducted in accordance with institutional and/or national research ethics standards, as well as the principles of the 1964 Declaration of Helsinki and its subsequent amendments.

Consent for publication

Not applicable.

Data availability

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare no competing interests.

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Authors' Contributions

Conception and design of the work: H.M., M.C.T. and K.S.E.; Preparing and conducting interview questions: H.M., M.C.T. and K.S.E.; Data analysis: H.M.; Interpretation of data for the work: H.M., M.C.T. and K.S.E.; Drafting the work: H.M., M.C.T. and K.S.E.; Revising it critically: H.M., M.C.T. and K.S.E.; Final approval of the version to be published: H.M., M.C.T. and K.S.E.

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