Original article

Disaster preparedness training needs among nurses working at primary healthcare centers in Da Nang City: A qualitative study

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Received: 15/08/2026; **Accepted**: 09/10/2026; **Published:** 15/11/2026

DOI:10.34071/jmp.2026.S-3.7

Abstract

Background: Primary healthcare nurses play a critical role in disaster preparedness and response. However, evidence regarding their disaster preparedness training needs in Vietnam remains limited. This study aimed to explore perceived disaster preparedness training needs among nurses working at primary healthcare centers in Da Nang City.

Materials and Methods: A qualitative study was conducted in May 2026 involving 19 nurses working at 18 primary healthcare centers in Da Nang City. Data were collected through semi-structured in-depth interviews and analyzed using qualitative content analysis.

Results: Five domains of perceived disaster preparedness training needs were identified, including training sources, content, delivery methods, frequency and duration, and learning resources. Participants emphasized the importance of integrating disaster preparedness education into undergraduate nursing curricula and continuing professional development. Frequently mentioned training topics included disaster triage, psychological support for disaster victims, infection prevention and isolation, first aid and patient transport, disaster response procedures, and interprofessional collaboration. Participants favored face-to-face training and disaster response drills as opportunities for practical skills development and coordinated response. They also suggested regular training, with at least twice-yearly sessions of approximately 2 – 3 days, and emphasized the need for accessible learning resources, including handbooks, practical manuals or protocols, and electronic materials incorporating illustrations, diagrams, and instructional videos.

Conclusion: Nurses at primary healthcare centers perceived a range of disaster preparedness training needs spanning educational content, practical training, delivery methods, and learning resources. The findings provide practical insights for developing competency-based, practice-oriented, and context-specific training programs tailored to the operational context of primary healthcare settings.

Keywords: *disaster preparedness; nurses; primary healthcare centers; qualitative study; training needs.*

1. INTRODUCTION

Disasters are sudden events that severely disrupt community functioning and exceed the capacity of communities to respond using routine resources [1]. They may result from natural hazards, dangerous infectious diseases, or human-related factors, causing serious consequences for health, property, and the environment. Regardless of whether they are natural or human-induced, disasters pose major challenges to health systems and their ability to maintain healthcare services [1, 2].

During disaster response, nurses are among the core health workforce involved in preparedness, victim care, response coordination, and post-disaster recovery. Therefore, disaster preparedness is an important component of nurses' professional competence [3]. However, international studies have shown that nurses continue to have limitations in knowledge, skills, and confidence when responding to disasters [4, 5]. Education and training are considered modifiable factors that can improve disaster response capacity [6, 7]. Training needs may vary according to the work setting, nurses' roles, types of disasters, and available resources. In the context of public health preparedness, training needs can be understood as current or anticipated performance deficiencies that can be addressed through training [8]. In disaster preparedness, training needs analysis provides a systematic basis for identifying the types of training required and the individuals or groups who need to be trained [9]. Previous studies indicate that nurses tend to prefer programs that combine theoretical knowledge with practical training, particularly simulation and drills [10, 11].

Most existing studies have focused on nurses working in hospitals, whereas evidence concerning

nurses in primary healthcare settings remains limited. Primary healthcare plays an important role in maintaining continuity of care and addressing the health needs of communities, including vulnerable populations, during disasters [12]. Nurses working in primary healthcare settings are embedded within the community and may contribute to the initial response to disaster-related health needs. Recent evidence indicates that these roles may include providing care for injuries and acute health needs, although nurses' responsibilities during disasters are not always clearly defined [13]. Studies among community health nurses have also identified specific learning needs for disaster preparedness and emphasized the importance of continuing disaster training tailored to community-level roles [10]. Understanding these needs can help align training with nurses' roles, local risks, and actual working conditions.

In Vietnam, strengthening the disaster preparedness capacity of healthcare workers has become increasingly important because of the risk of various natural hazards and emergencies. Da Nang is a coastal city in central Vietnam that is frequently affected by storms, floods, and extreme weather events and is also exposed to infectious disease threats. Recent risk profiling activities in Da Nang have highlighted the city's vulnerability to natural hazards, including floods and landslides, as well as public health threats such as infectious diseases [14]. However, previous research on disaster preparedness in Vietnam remains limited and has mainly focused on military medical personnel or healthcare workers in general [15]. Evidence specifically addressing disaster preparedness training needs among nurses working at primary healthcare centers in Da Nang City appears to be limited.

To address this gap, this study aimed to explore the disaster preparedness training needs of nurses working at primary healthcare centers in Da Nang City.

2. MATERIALS AND METHODS

2.1. Participants

The participants were 19 nurses working at 18 primary healthcare centers in Da Nang City. Eligibility criteria included holding a nursing license and currently working at primary healthcare centers. Nurses who were on maternity leave, sick leave, or extended leave during the data collection period were excluded.

2.2. Research methods

Study design

A qualitative study using semi-structured in-depth interviews was conducted to explore nurses' perceived needs for disaster preparedness training. This study was conducted as the second phase of a research project following a preceding quantitative study involving 267 nurses from primary healthcare centers in Da Nang City. While the quantitative study assessed nurses' disaster preparedness, the qualitative phase explored their training needs and preferences in greater depth.

Sampling and sample size

Participants were purposively selected from nurses who had participated in the preceding quantitative study. The principal investigator (PI) selected 19 nurses from different primary healthcare centers to obtain variation in age, sex, professional qualifications, work position, and years of nursing experience. Because the preceding survey was conducted online, the PI had no prior personal or professional relationship with the participants before the qualitative interviews. Managers of the primary healthcare centers were not involved in participant selection, and participation was entirely voluntary.

Data collection and analysis were conducted concurrently. Data saturation was reached after the 17^{th} interview, when no substantially new information relevant to the research questions emerged. Two additional interviews were conducted to confirm saturation, and no substantially new information was identified. A total of 19 nurses were therefore included in the final analysis.

Data collection instrument

A semi-structured interview guide was developed based on a review of the relevant literature and focused on nurses' perceived needs for disaster preparedness training. The initial areas of inquiry included training content, delivery methods, training duration and frequency, and learning resources. The guide was reviewed and revised based on feedback from three experts with experience in qualitative research and was pilot-tested with three nurses to assess the clarity and appropriateness of the questions and the estimated interview duration.

Participants were encouraged to describe additional issues that they considered relevant to their training needs. These issues were explored through follow-up questions and incorporated into the subsequent analysis. The domain of training sources emerged from participants' accounts during the interviews rather than being specified in the initial interview guide.

Data collection

Data were collected in May 2026. All interviews were conducted by the PI, a nurse educator with

experience in mixed-methods research. Potential participants were initially contacted by telephone to determine their willingness to participate, and interviews were scheduled at times convenient for them. Interviews were conducted through Zalo audio calls because participants worked at geographically dispersed primary healthcare centers across Da Nang City, making face-to-face interviews difficult to arrange. Most participants also preferred to be interviewed outside working hours, particularly in the evening. Telephone interviewing therefore provided greater scheduling flexibility and minimized disruption to participants' work. No substantial connectivity or audio-quality problems were encountered during the interviews.

Before each interview, the PI provided a brief explanation of the concept of disaster, including both natural and human-made disasters, to establish a common understanding of the term. At the beginning of each interview, the PI explained the study procedures and obtained verbal consent to participate and to audio-record the interview. With participants' permission, all interviews were audio-recorded. Each interview lasted approximately 20–45 minutes.

Data analysis

One nursing assistant transcribed the audio-recorded interviews verbatim. The PI checked each transcript against the original audio recording to ensure transcription accuracy. Data were analyzed using qualitative content analysis [16], combining deductive and inductive approaches. The initial areas of the interview guide provided broad deductive analytic directions, while additional codes and categories emerged inductively from the interview data.

The PI repeatedly read the transcripts to become familiar with the data, identified meaningful segments relevant to the research questions, and assigned initial codes. Related codes were then grouped into categories based on similarities in meaning. The research team subsequently reviewed the categories and organized the findings into broader domains of nurses' disaster preparedness training needs. Thus, the domains served to organize the findings, whereas the specific training needs within each domain were derived from the interview data. No qualitative data analysis software or formal codebook was used. Coding was primarily conducted by the PI. One additional member of the research team cross-checked the codes and categories against all 19 transcripts. Differences were discussed among the research team with reference to the original transcripts to reach consensus; when consensus could not be reached, the PI made the final decision. An audit trail documenting key analytic decisions was maintained throughout the analysis process.

The final analysis was organized into five domains: (1) sources of training; (2) training content; (3) training delivery methods; (4) training frequency and duration; and (5) learning resources. Representative quotations were used to illustrate the findings.

Several strategies were used to enhance the trustworthiness of the qualitative findings. Credibility was supported through repeated reading of transcripts, cross-checking of coding and categorization by a second research team member, and member checking. A summary of the findings was shared with three participating nurses, who were invited to provide feedback on whether the findings accurately reflected their views. Dependability and confirmability were enhanced by maintaining an audit trail of key analytic decisions, checking transcripts against the original audio recordings, and discussing differences in coding and categorization within the research team. Transferability was supported through purposive sampling to obtain variation in participants' demographic and professional characteristics and through detailed descriptions of the study setting and participants.

2.3. Ethical considerations

The study was approved by the Biomedical Research Ethics Committee of Da Nang University of Medical Technology and Pharmacy under Decision No. 04/CT-HĐĐĐ dated November 12, 2025.

Potential participants were initially contacted by telephone and asked whether they were willing to participate in the interview. For those who expressed willingness, an interview was scheduled at a time convenient for them. At the beginning of each interview, the PI explained the purpose and procedures of the study and requested permission to audio-record the interview. Participants provided verbal consent to both participation and audio recording before the interview began. Participation was voluntary, and participants were free to decline or withdraw without consequences.

To protect confidentiality, each transcript was identified using a participant code (P1-P19) rather than the participant's name. Audio recordings were stored on the PI's password-protected computer and were accessible only to the PI. Identifying information was removed from the transcripts after transcription to maintain participant confidentiality.

3. RESULTS

3.1. Characteristics of participants

Nineteen nurses participated in the in-depth interviews. Most participants were female and held a bachelor's degree. Participants' ages ranged from 30 to 53 years, and their professional experience ranged from 5 to 29 years. The participants included staff nurses, deputy heads, and heads of primary healthcare centers (Table 1).

Table 1. Characteristics of participants (n = 19)

Characteristic	n (%)	Mean ± SD (Min – Max)
Sex		
Female	17 (89.5)	
Male	2 (10.5)	
Age (years)		41.4 ± 6.0 (30 – 53)
Professional experience (years)		15.6 ± 6.6 (5 – 29)
Professional qualification		
Bachelor's degree	16 (84.2)	
College degree	3 (15.8)	
Work position		
Staff nurse	9 (47.4)	
Deputy head or head of primary healthcare center	10 (52.6)	

SD: standard deviation

3.2. Perceived disaster preparedness training needs

Qualitative content analysis identified five domains describing participants' perceived disaster preparedness training needs, including training sources, training content, training delivery methods, training frequency and duration, and learning resources (Table 2).

Table 2. Disaster preparedness training needs among nurses (n = 19)

Domain	Category	n*
Training sources	Formal nursing education	19
	Continuing education and periodic training	19
Training content	Disaster triage	18
	Psychological support for disaster victims	18
	Infection prevention and isolation	13
	First aid and patient transport	11
	Disaster response procedures and interprofessional coordination	10
Training delivery methods	Face-to-face training	18
	Disaster response drills	14
	Online training	7
	Workshops or professional meetings	3
Training frequency and duration	At least twice a year	16
	2 – 3 days per course	16
	≤ 1 day per course	2
	3 – 5 days per course	1

Domain	Category	n*
Learning resources	Handbooks, manuals, and practical protocols	12
	Electronic materials	12
	Illustrations, diagrams, and instructional videos	10
	Dedicated disaster preparedness website	7
	Printed or handout materials	3
	Simulation scenarios or scripts	2

**n represents the number of participants who mentioned each category during the interviews. Participants could mention more than one category.*

(1) Training sources

Participants expressed a need for continuous disaster preparedness training, beginning during formal nursing education and continuing throughout professional practice through continuing education and periodic training. Participants emphasized that disaster preparedness content should be incorporated into undergraduate nursing curricula and updated regularly after graduation. This view was expressed by all participants.

"I think that disaster-related courses should be included in the training curriculum for nursing students because disasters can happen at any time. In addition, while working, nurses should receive regular training to update their knowledge" (Female, 38 years, staff nurse).

(2) Training content

Participants identified multiple areas of training content, with disaster triage and psychological support for disaster victims being particularly prominent in their accounts. These topics were each identified by 18 of the 19 participants. Other reported training needs included infection prevention and isolation, first aid and patient transport, and disaster response procedures and interprofessional coordination.

Participants described disaster triage in relation to prioritizing victims according to urgency and psychological support in relation to communication and reassurance.

"Training should include essential nursing skills, such as basic first aid and cardiopulmonary resuscitation. Nurses also need to be trained in disaster triage so that they can classify victims according to priority and know who should receive emergency care first. I think this skill among nurses at primary healthcare centers is currently only at a moderate level. Another important area is psychological and emotional care for victims. Nurses need communication skills and should know how to reassure and calm them" (Male, 36 years, staff nurse).

Psychological care was also described as extending to families affected by disasters.

"An important topic, I think, is training nurses in how to provide psychological care for people affected by disasters and for families who have lost someone in a disaster" (Female, 45 years, deputy head of a primary healthcare center).

These accounts illustrate the range of training needs identified by participants, from basic emergency nursing and victim prioritization to psychological support for affected people and families.

(3) Training delivery methods

Participants described several preferred approaches to disaster preparedness training. Face-to-face training was the most frequently mentioned approach, followed by disaster response drills. Online training and workshops or professional meetings were also mentioned.

Participants described face-to-face training as providing opportunities for practical exercises and direct feedback from instructors.

"I think face-to-face training would be more effective. With face-to-face training, we can combine it with practical exercises, and instructors can observe and provide timely support" (Female, 48 years, deputy head of a primary healthcare center).

Disaster response drills were described as involving disaster scenarios and coordinated response activities.

"Another approach that I think would be useful is disaster response drills, in which disaster scenarios are developed and nurses participate in coordinated response activities" (Male, 43 years, staff nurse).

These accounts indicate a preference for practical and interactive approaches that allow nurses to apply knowledge, practice skills, and receive direct feedback.

(4) Training frequency and duration

Sixteen participants recommended providing disaster preparedness training at least twice a year

and considered 2–3 days per course appropriate. Participants linked the appropriate duration to the training content and the need to avoid excessive disruption to routine work.

"The training duration depends on the content, but I think 2–3 days would be appropriate. It should be provided at least twice a year. If training lasts too long, it could interrupt routine work […]" (Female, 30 years, staff nurse).

(5) Learning resources

Participants mentioned several types of learning resources, including handbooks, manuals, and practical protocols; electronic materials; illustrations, diagrams, and instructional videos; and a dedicated disaster preparedness website. Printed or handout materials and simulation scenarios or scripts were mentioned less frequently. Across these suggestions, participants emphasized the importance of resources that were concise, visual, practical, and easily accessible.

"I think the materials should be designed as response procedures for each type of disaster, perhaps in the form of a handbook, with concise content and illustrations and diagrams to make it more visual. The materials could be provided through QR codes or stored online so that they can be accessed when needed" (Female, 30 years, staff nurse).

Another participant highlighted the usefulness of visual materials, videos, and step-by-step instructions.

"We work at the primary healthcare level, and most of us are older nurses. Therefore, materials presented in the form of illustrations and diagrams would be easier to remember and visualize. Alternatively, training materials could be developed as videos, which would make it easier for nurses to watch and follow the instructions. In addition, materials could also be developed in the form of handbooks or manuals, but they should be organized into short, step-by-step instructions to be effective" (Female, 49 years, deputy head of a primary healthcare center).

4. DISCUSSION

This study showed that nurses at primary healthcare centers in Da Nang City perceived disaster preparedness training as a continuing need that encompasses educational content, practical training, delivery methods, and accessible learning resources. Importantly, the findings highlight the need to align disaster preparedness training with the operational context of primary healthcare settings. These findings provide practical evidence to inform the development of training programs tailored to primary healthcare nurses.

Participants viewed disaster preparedness training as a continuing need, beginning with formal nursing education and extending through continuing professional development. These perspectives suggest that disaster preparedness is a competence that should be developed before entering practice and reinforced throughout nurses' careers. This finding supports the view that disaster nursing competence requires ongoing educational reinforcement rather than a single training intervention [4, 6, 7, 17].

Regarding training content, the emphasis on disaster triage and psychological support suggests that training should address both immediate clinical priorities and the psychosocial needs of affected communities. These training needs are consistent with the ICN Core Competencies in Disaster Nursing, Version 2.0, which outlines competency domains relevant to disaster preparedness and response, including preparation and planning, communication, incident management systems, safety and security, assessment, intervention, recovery, and law and ethics [3]. The findings also reflect priorities reported in studies from Indonesia and Vietnam, particularly the emphasis on practical disaster response skills [15, 18]. However, in the primary healthcare context, these competencies need to be considered alongside the broader community-based functions of primary healthcare services. Unlike hospital-based nurses, who may primarily respond within a structured clinical facility, primary healthcare nurses may need to provide initial assessment, basic emergency care, community support, and coordination with other services in settings with more limited resources. Thus, future training programs should adopt a competency-based approach, with priority given to practical skills that are relevant to the roles and responsibilities of nurses at primary healthcare centers during disasters.

Participants also emphasized the importance of linking training content to the local disaster context. Rather than focusing solely on generic disaster knowledge, training programs should be adapted to the local context and risk profile. For nurses working at primary healthcare centers, this may help ensure that training addresses tasks and response procedures relevant to the local setting. Such contextualization may be particularly important in primary healthcare, where nurses are closely connected to the local community and may have

responsibilities that extend beyond facility-based care.

In addition, the preference for face-to-face training and disaster response drills suggests that participants valued opportunities to practise skills and receive direct feedback, consistent with previous studies [10, 11, 17-20]. For primary healthcare nurses, drills may provide opportunities to practise disaster scenarios that are less frequently encountered in routine clinical practice. Training scenarios can be developed based on locally relevant situations, thereby helping nurses clarify their roles, response procedures, and mechanisms for coordination with relevant stakeholders. This approach may also help bridge the gap between generic disaster knowledge and the practical responsibilities of nurses working in primary healthcare settings.

Participants' suggestions regarding training frequency and duration may reflect the need to balance regular skills reinforcement with the operational demands of primary healthcare centers, where nurses may have multiple responsibilities. However, these frequencies and durations represent participants' perceptions rather than an established training standard. Regularly scheduled training of manageable duration may provide opportunities for continued learning while minimizing disruption to routine services.

Furthermore, the preference for practical and accessible learning resources suggests a need for learning support beyond formal training. Such resources may support self-directed learning and provide quick reference after formal training. The preference for accessible and practical resources is also in line with previous evidence on electronic and online learning resources [10, 11] and aligns with the ICN recommendation to enhance access to learning resources and knowledge sharing in disaster nursing [3]. In primary healthcare settings, readily accessible resources may be particularly useful for reinforcing competencies when opportunities for formal disaster preparedness training are limited. Thus, face-to-face training may be complemented by ongoing learning support.

Based on these findings, disaster preparedness training programs for nurses in primary healthcare settings should be designed to be competency-based, practice-oriented, and context-specific. The programs should integrate formal nursing education, continuing professional development, practical exercises, and regular disaster preparedness activities, while also developing accessible electronic learning resources to support the maintenance and updating of competencies after training.

This study has some limitations that should be considered. First, the qualitative study involved 19 nurses who were purposively selected; therefore, the findings should not be interpreted as statistically generalizable to all nurses working at primary healthcare centers. Because participants were selected from nurses who had participated in the preceding quantitative study, selection bias could not be excluded. Prior participation in the quantitative study might also have increased participants' awareness of disaster preparedness and potentially shaped their perspectives during the qualitative interviews. Second, the interviews were conducted by telephone, which may have limited the ability to capture non-verbal cues during the interviews. Third, training needs were identified based on participants' perceptions and were not triangulated with objective assessments of practical competence. Future studies could therefore combine objective competency assessments with larger-scale training needs surveys to inform the development of appropriate training programs and assess the generalizability of the findings.

5. CONCLUSIONS AND RECOMMENDATIONS

Nurses at primary healthcare centers in Da Nang City expressed a range of perceived needs for disaster preparedness training, particularly in disaster triage, psychological support, infection prevention and isolation, first aid, patient transport, and response coordination. Participants also emphasized the importance of continuous training, practical exercises and disaster response drills, and accessible and visually oriented learning resources.

To strengthen disaster preparedness among nurses working at primary healthcare centers, training programs should be tailored to the needs and operational context of primary healthcare settings. Such programs should emphasize practical competencies and locally relevant disaster scenarios, provide regular opportunities for training and practice, and be complemented by accessible electronic learning resources to support ongoing learning.

Declaration of conflict of interest

The authors declare no conflict of interest related to the study, authorship, or publication of this article.

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