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Analysis of Community-Based Nurses' Preparedness in Flood Disaster Emergency Response

Pipin Yunus[1], Ani Retni[1]

[1]*Universitas Muhammadiyah Gorontalo, Indonesia*

**Corresponding Author: Pipin Yunus*
Email: pipinyunus@umgo.ac.id

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Abstract

Flood disasters are one of the major threats in Gorontalo Province, with significant impacts on communities and the health service system. Nurses, as frontline health workers, play a strategic role in community-based emergency response, particularly in providing first aid, triage, and health education. This study aims to analyze the preparedness level of community-based nurses in responding to flood disasters in Limboto Barat District, Gorontalo Regency. A descriptive quantitative design with a cross-sectional approach was applied. The sample consisted of all 30 nurses working at Limboto Barat Public Health Center, selected through a total sampling technique. Data were collected using questionnaires and analyzed univariately. The results showed that most respondents were aged 31-40 years (36.7%), female (73.3%), had a bachelor's degree in nursing (56.7%), and had more than five years of work experience (60%). Nurses' preparedness was still low in terms of knowledge, with 73.3% categorized as poor. Regarding attitudes, 60% of respondents showed poor preparedness, while skills were mainly in the fair (46.7%) and poor (46.7%) categories. These findings indicate that community-based nurse preparedness is still not optimal, especially in the dimensions of knowledge, attitude, and skills. In conclusion, structured interventions through continuous training, disaster simulations, and cross-sectoral collaboration are required to strengthen nurses' preparedness capacity in responding to flood disasters.

Introduction

Disaster preparedness is an essential professional skill for nurses, as nurses with strong critical thinking and readiness can provide effective assistance to disaster victims. In addition, nurses are capable of delivering comprehensive management services such as disaster site mapping, disaster mitigation provision, patient triage, and the organization of first aid, which involves cross-sectoral collaboration and interdisciplinary professional teams (Najafi et al., 2017; Sultan, 2024; Hajri & Salim, 2024; Onyejesi et al., 2025; Adobor, 2025; Nila et al., 2025; Wu et al., 2025; Suva et al., 2022).

Nursing preparedness can be measured using the following eight dimensions: triage and basic first aid; detection; access to resources and essential reporting; the incident command system (ICS); isolation, quarantine, and decontamination; psychological issues; epidemiology and clinical decision-making; as well as communication and connectivity. However, emergency preparedness competencies tend to emphasize professional competence in disaster response, maintaining personal disaster preparedness, and reporting to duty after an incident (Biu, 2023; Zhang et al., 2024; McEntire et al. 2023; Waring et al., 2021; Gallego et al., 2023; Li et al., 2022; Hertelendy et al., 2021).

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In Gorontalo Province, from 2020 to 2024, there were 77 flood events that resulted in 25,817 displaced people, 102,879 affected individuals, 5 deaths, 3 injuries, and 1 missing person. Flood disasters have severe impacts on individuals, communities, and the environment (Almukhlifi, 2024; Yu et al., 2022; Houston et al., 2021; Merz et al., 2021; Rana et al., 2023).

Previous research indicates that the preparedness of healthcare workers remains suboptimal, primarily because regional assessments within community health centers (Puskesmas) have not been effectively implemented, flood-prone area mapping has not been maximized, and community-based cadre development has not been fully carried out. Consequently, healthcare workers' flood response efforts have been largely limited to providing health services to affected populations, despite the importance of broader disaster management strategies (Biu, 2023; Topacio, Tuppal, Al-Mahdaly, Narvaez, & Kabristante, 2025). Therefore, the urgency of this study highlights the need for a community-based emergency response concept, which emphasizes the role of healthcare workers, including nurses, in collaborating with communities to enhance disaster preparedness and response (Budiana, 2024; Isangula et al., 2023; Emaliyawati et al., 2021; Farokhzadian et al., 2024). Nurses hold a strategic role within the healthcare system, particularly in disaster situations, by providing community education, victim triage, and post-disaster recovery support (Budiana, 2024; Fredricks et al., 2017)

Hospitals and other healthcare facilities are vital assets for communities, especially during disasters, when they are often required to accommodate patient loads that exceed normal operational capacity. Hence, the role of nurses is critical in ensuring an effective disaster response.

Based on the background and previous research, the present study is motivated to investigate community-based nursing preparedness in flood disaster emergency response, with the aim of enhancing nurses' readiness to play a vital role in flood disaster management.

Methods

The research was undertaken as a descriptive quantitative research study with the cross-sectional design, where it was not necessary to manipulate independent variables but to describe the level of preparedness among community-based nurses towards flood disasters. This methodological position allowed the researcher to study the phenomenon in its natural setting during one measurement period. The study site was the Limboto Barat Public Health Center in Gorontalo Regency where the floods are common occurrences. The geographical susceptibility of this location stresses the relevance of evaluating the level of preparation to act in the face of real emergencies by nurses.

The target population was composed of the entire sample of nurses who were actively working at the health center. Basing on the fact that the population size was relatively low, a total sampling method was site because all the nurses that fit the inclusion criteria were respondents. The number of nurses involved was 30 and a combination of them represented the whole institution hence the findings were inclusive of the whole community health care setting. This choice helped to create the results that characterize the entire workforce and not a subset thereof, thus giving a holistic representation of the preparedness among the availed nursing resources.

The tool that was used to collect the data was a structured questionnaire, which had been designed to measure the preparedness of nurses in three main areas that were well understood in disaster preparedness assessment: knowledge, attitude and skills. The domains consisted of various statements that the respondents answered depending on their experience and perception. Further categorization of responses as good, fair or poor in line with cumulative scores was done. This multidimensional measurement system is essential, because preparedness is a cognitive knowledge (knowledge of the procedures in case of flood emergency), willingness and sacrifice of acting (attitude) and physical ability to administer first

aid, triage, and evacuation in real-time (skills). The three areas eventually formed the discussion and were discovered to conform to the primary findings of the study in which a significant percentage of nurses belonged under the poor knowledge category, most of them had less supportive attitudes toward preparedness and their skills were near-evenly distributed between the fair and poor segments. The distribution that ensued suggested that theoretical preparation was still not supported by the adequate motivation and experience, thus creating a smooth connection between methodological organization and the interpretation of the results.

Data was collected in the health facility, whereby questionnaires were given directly to the respondents. The process was carried out in the quiet working conditions to enable free and objective answers. Before the questionnaire was filled, every respondent was given a brief description of the purpose and importance of the study and guaranteed that his or her answers would remain confidential. The research was ethically approved prior to the implementation and informed consent documents were signed by the respondents to ensure they took part on a voluntary basis. This research ethics was necessary to protect the right of participants and to maintain the academic integrity of the study.

Data was acquired followed by analysis through univariate descriptive methods. This analytical option was the one that was suitable to the objective of the study as it was rather a description of the distribution of the preparedness levels of the nurses in the measured domains, but not a test of the relationship between variables. The data processed were organized into frequency table and percentages, which has a clear story on the nature of the respondent in terms of age, gender, educational background and working experience, the status of each preparedness dimension. The trends that were formed out of these descriptive findings were the basis of further contemplation in the discussion section that allowed the research to provide not only the quantitative results but also give a reflection of these results in the context of the nursing capacity during flood emergencies.

Result and Discussion

Table 1. Respondent Characteristics by Nurses' Age

Age Group	Frequency	Percentage (%)
20-30 Years	10	33,3 %
30-40 Years	11	36,7%
41-50 Years	8	26,7%
>50 Years	1	3,3%
Total	30	100%

Based on the findings, the majority of respondents (36.7%) were in the 31–40 years age group, followed by the 20-30 years group (33.3%). Meanwhile, 26.7% of respondents were in the 41-50 years group, and only 3.3% were above 50 years of age. The youngest respondent was 25 years old, and the oldest was 52 years old, with a mean age of 35.3 years

Table 2. Respondent Characteristics by Nurses' Gender

Gender	Frequency	Percentage (%)
Female	22	73,3%
Male	8	26,7%
Total	30	100%

The distribution of respondents by gender showed a predominance of female nurses, with 22 respondents (73.3%), compared to 8 male nurses (26.7%).

Table 3. Respondent Characteristics by Nurses' Education Level

Education Level	Frequency	Percentage (%)

Bachelor of Nursing (S1)	17	56,7%
Diploma in Nursing (D3)	13	43,3%
Total		100%

The findings revealed that the majority of nurses held a Bachelor's degree in Nursing (56.7%), followed by those with a Diploma in Nursing (43.3%).

Table 4. Respondent Characteristics by Nurses' Work Experience

Work Experience	Frequency	Percentage (%)
<5 Years	12	40%
>5 Years	18	60%
Total	30	100%

The distribution of respondents based on work experience indicated that 12 nurses (40%) had less than 5 years of experience, while 18 nurses (60%) had more than 5 years of work experience.

Univariate Analysis

Table 5. Preparedness Level Based on Nurses' Knowledge

Knowledge Level	Frequency	Percentage (%)
Good	1	3,3%
Fair	7	23,3%
Poor	22	73,3%
Total	30	100%

The findings show that the majority of nurses had a poor level of knowledge regarding disaster preparedness (73.3%). Meanwhile, 23.3% of nurses demonstrated a fair level of knowledge, and only 3.3% had a good level of knowledge. The mean score of knowledge was 76.1.

Table 6. Preparedness Level Based on Nurses' Attitude

Attitude Level	Frequency	Percentage (%)
Good	2	6,7%
Fair	10	33,3%
Poor	18	60%
Total	30	100%

The results indicate that most nurses demonstrated a poor level of preparedness in terms of attitude, with 18 respondents (60.0%). Furthermore, 10 respondents (33.3%) showed a fair level of attitude, while only 2 respondents (6.7%) had a good level of preparedness attitude. The mean score for attitude was 78.3.

Table 7. Level of preparedness based on nursing skills

Skill Level	Frequency	Percentage (%)
Good	2	6,7%
Fair	14	46,7%
Poor	14	46,7%
Total		100%

Based on the findings, nurses' preparedness skills were mostly categorized as fair (46.7%) and poor (46.7%). Only 2 respondents (6.7%) demonstrated good preparedness skills. The mean score for skills was 71.3.

Respondent Characteristics

Based on the study results, the majority of nurses who participated as respondents were in the 31-40 years age group (36.7%). This was followed by nurses aged 20-30 years (33.3%), 41-50 years (26.7%), and those above 50 years (3.3%). The mean age of respondents was 35.3 years. These data indicate that productive age range, which is generally associated with optimal cognitive functioning that supports work performance. This finding is consistent with the study by Budiana, (2024) in Ende District, which confirmed that most nurses were in the 30-39 years age group. However, the literature suggests that preparedness in facing critical situations is not solely influenced by age. Other factors, such as work experience, training frequency, and the quality of the work environment, contribute more significantly to shaping preparedness capacity (Budiana, 2024; Hansen et al., 2025).

From the gender perspective, most respondents were female (73.3%). This phenomenon is consistent with the general distribution of nursing personnel in Indonesia, which is predominantly female at the national level (Ministry of Health, 2022). Gender may influence preparedness dynamics, as social and psychological role differences between males and females may affect access to training, field experience, and risk perception toward disaster threats.

Regarding education, more than half of the respondents (56.7%) held a Bachelor's degree in Nursing (S1), while the rest were Diploma in Nursing (D3) graduates. Theoretically, a higher level of education should enhance analytical skills and critical thinking, which are essential foundations for preparedness. However, the findings of this study suggest that higher educational attainment does not necessarily correlate directly with disaster preparedness levels. This highlights the presence of other, more dominant factors in influencing preparedness.

In terms of work experience, 60% of respondents had more than five years of experience. Generally, longer work experience is assumed to positively contribute to preparedness, as individuals have more opportunities to gain practical exposure in patient care and emergency situations (Goniewicz et al., 2021; Bruria et al., 2022; Ayenew et al., 2022). Nevertheless, the findings showed that extended work experience did not necessarily translate into better knowledge, attitudes, or skills in disaster preparedness. This condition supports the results of Yunus & Hiola (2021), who emphasized that field experience alone is insufficient to ensure preparedness unless it is accompanied by routine training, competency updates, and regular participation in disaster simulations. Therefore, it can be concluded that continuous training and structured experience are far more crucial than merely the length of work experience.

Preparedness Based on Knowledge

The findings of this study revealed that the majority of respondents (73.3%) had a low level of knowledge regarding flood disaster emergency response. This condition indicates a significant gap in the educational process and the dissemination of information on disaster management within primary healthcare services. Knowledge serves as a fundamental basis for shaping attitudes and preparedness behaviors, both among the general public and healthcare professionals. This is consistent with (Najafi et al., 2017), who emphasized that adequate knowledge is a primary predictor influencing individuals' readiness and behavioral responses in disaster situations. Consequently, the lack of knowledge among respondents can be regarded as a determining factor contributing to their low level of preparedness in facing flood threats (Munthali et al., 2024; Intaramuean et al., 2024; Elum & Lawal, 2022).

The low level of knowledge may be associated with the limited availability of continuous training programs within healthcare facilities, particularly at community health centers (Puskesmas), as well as the insufficient dissemination of official policies and procedures from authorized institutions (Kadar et al., 2022; Alesae et al., 2024; Akbar et al., 2025). Ideally, structured and routine training should serve as the primary mechanism to ensure that healthcare

workers possess adequate understanding of evacuation routes, patient triage systems, logistics management, and cross-sector coordination. Without the reinforcement of knowledge through such training, healthcare workers tend to rely solely on empirical experience, which may not always align with systematic disaster management frameworks. This reliance leaves them vulnerable when confronted with more complex crisis scenarios.

This finding is further supported by Topacio et al., (2025), who highlighted the critical role of contingency plan–based training in enhancing the competencies of healthcare workers in flood-prone areas. Contingency plans are not merely reference documents; rather, they function as practical instruments that emphasize response procedures, the distribution of responsibilities, and adaptive strategies in emergency situations. Nurses who lack conceptual and procedural grounding through contingency plan–based training are more likely to experience disorientation, decision-making delays, and even technical errors when confronted with real disaster conditions (Bray, 2024; Raja, 2024).

Therefore, the low level of knowledge should not be viewed solely as an individual deficiency but rather as a reflection of weak capacity-building systems within healthcare institutions (Dembele et al., 2024). To address this issue, policies should prioritize strengthening capacity through standardized disaster training curricula, complemented by routine simulations and continuous evaluations. Integrating these strategies into healthcare disaster management systems in flood-prone areas is an urgent step to enhance healthcare workers' preparedness, enabling them to respond more rapidly, accurately, and effectively in crisis situations.

Preparedness Based on Attitude

The findings of this study show that the majority of nurses (60%) demonstrated a less supportive attitude toward disaster preparedness. This condition deserves serious attention, as attitude plays a crucial role in bridging theoretical knowledge with practical skills in emergency situations. A negative attitude is often reflected in low participation in training, reluctance to engage in disaster simulations, or limited initiative when facing crises. Several factors may influence the development of such attitudes, including low risk perception of floods, high routine workloads that drain nurses' time and energy, and limited institutional support in providing preparedness facilities. This is consistent with the findings of (Almukhlifi et al., 2024), who identified the lack of supportive facilities and weak intrinsic motivation among healthcare professionals as major barriers to strengthening preparedness attitudes.

Furthermore, nurses' attitudes in disaster situations are closely linked to their level of self-confidence and the prevailing work culture within their organizations. Nurses with high self-confidence tend to display more active, adaptive, and proactive attitudes when confronted with emergencies. Conversely, those with low self-confidence are more likely to be passive, hesitant in decision-making, and reliant on external direction. In this regard, Fredricks et al., (2017) emphasized the importance of community-based collaboration as a mechanism to reinforce positive attitudes. Through direct involvement in disaster mitigation programs, health education activities, and simulation exercises involving the community, nurses gain practical experience while also enhancing their commitment and social responsibility in disaster management.

These findings affirm that preparedness attitudes are not solely the result of individual factors but are shaped by a complex interplay of psychological, social, and organizational aspects. Therefore, strategies to improve preparedness attitudes must be holistic. Efforts may include strengthening personal motivation through the reinforcement of professional responsibility values, creating a work culture that prioritizes safety and preparedness, and building partnership networks with local communities. The implementation of community-based programs that actively involve nurses in prevention, health education, and regular emergency simulations can serve as a strategic step to foster sustainable positive attitudes. With such an

integrative approach, nurses are expected to internalize preparedness as both a professional identity and a social responsibility.

Preparedness Based on Skills

The findings of this study show that the distribution of nurses' disaster preparedness skills was relatively balanced, with 46.7% categorized as moderate and 46.7% categorized as poor, while only 6.7% of respondents achieved a good level. These results highlight that the practical skills of nurses in handling flood-related emergencies remain at a level requiring serious attention. Such skills include the ability to conduct rapid and accurate triage, provide first aid to victims, and carry out emergency evacuations in accordance with standard operating procedures. Due to their technical and applicative nature, these skills cannot be acquired solely through formal education but require intensive training, hands-on practice, and repeated simulation to be effectively mastered.

Biu (2023) underlined that the mastery of practical skills among healthcare workers is often hindered by limited supporting facilities and insufficient opportunities to participate in structured simulation training. This condition aligns with realities in the field, where healthcare personnel in primary care facilities rarely have access to regular disaster training programs. As a result, although some nurses possess theoretical knowledge of disaster management procedures, their practical skills are not yet optimally developed for application in crisis situations that demand rapid, accurate, and coordinated responses.

Furthermore, Umar & Yunus (2024) emphasized that simulation-based emergency response training significantly improves nurses' preparedness skills. Through simulation, nurses not only learn technical aspects such as first aid procedures and evacuation but also enhance their ability to coordinate within teams, develop psychological composure under pressure, and increase decision-making speed. Therefore, continuous training that prioritizes hands-on practice can be considered a key strategy for strengthening nurses' skills in disaster preparedness, particularly in flood-prone areas.

Overall, the low skill levels demonstrated in this study indicate a gap between the expected competency standards and the actual conditions in the field. This gap must be addressed through strategic interventions, including the implementation of regular training programs, the integration of disaster preparedness modules into nursing education curricula, and supportive policies from healthcare institutions and local governments. The implementation of such measures will ensure that nurses are not only equipped with conceptual knowledge and positive attitudes but also with adequate practical skills. Consequently, they will be able to deliver rapid, accurate, and effective responses when confronted with flood-related disasters that frequently occur in vulnerable regions.

Conclusion

Based on the findings of this study, it can be concluded that the level of community-based nurses' preparedness at Limboto Barat Public Health Center, Gorontalo Regency, in facing potential flood disasters remains low and does not yet meet adequate standards. Deficiencies were identified in three main aspects: knowledge, attitude, and skills. Most nurses still face difficulties in understanding emergency response procedures, tend to demonstrate less proactive attitudes in critical situations, and lack mastery of technical skills that should serve as essential competencies in disaster management. These shortcomings are closely linked to the limited implementation of continuous training, weak institutional support, and insufficient opportunities to participate in field simulations that are ideally required to strengthen nurses' practical capacities in real emergency settings.

Nevertheless, the findings also indicate considerable potential that can be optimized. This is reflected in the fact that most nurses are within the productive age range, possess adequate

formal nursing education, and have more than five years of work experience. This combination represents a valuable asset for developing stronger preparedness, provided it is accompanied by appropriately designed capacity-building strategies that are well-targeted and contextually relevant to the needs of disaster-prone areas.

Suggestion

In light of these conditions, the primary recommendation is the need for structured interventions through regular training programs based on the national disaster preparedness curriculum. Such programs should be enriched with periodic simulations and continuous evaluations to ensure their effectiveness. In addition, strengthening cross-sectoral collaboration between public health centers, local governments, the National Disaster Management Agency (BNPB), and local communities is essential to ensure that emergency response concepts move beyond theory and are effectively implemented in practice.

Furthermore, the development of training modules tailored to the characteristics of flood-prone areas in Gorontalo represents a strategic step to equip nurses with a balanced set of competencies in knowledge, attitudes, and skills. Through these measures, nurses are expected to play a more significant role in strengthening the healthcare system and contributing concretely to flood disaster mitigation and management at the community level.

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