

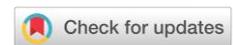
Disaster Resilience Analysis in Vulnerable Groups Through Contingency Planning and Community-Based Emergency Services in the Martubung Region Medan City, North Sumatra Province, 2026

Nurmalina Hutahaean*¹, Merrygrace Simanjuntak¹, Putri Angelina Hutahaean¹, Srilina Br Pinem¹, Elvis Simanjuntak².

¹STIKes Mitra Husada, Medan, Indonesia

²Universitas HKBP Nomensen Medan, Indonesia

*Corresponden Author: Nurmalina Hutahaean (nurmalinaamd@gmail.com)



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ABSTRACT

Background: Vulnerable groups are at high risk of being impacted by disasters and therefore require increased resilience through contingency planning and community-based emergency services. This study aimed to analyze changes in vulnerable groups' knowledge regarding disaster resilience before and after community-based contingency planning and emergency education interventions.

Methods: This study used a quasi-experimental design with analytical research using a pretest–posttest design without a control group. The sample consisted of 32 vulnerable group respondents in the Martubung area. The instrument was a knowledge questionnaire. Data analysis was conducted descriptively and comparatively.

Results: The research also showed that participants experienced an increase in knowledge during the post-test. The pre-test results showed that the majority of respondents had insufficient knowledge (87.5%). After the intervention, there was an increase in knowledge, with 46.9% of respondents categorized as good and sufficient, respectively.

Conclusion: Community-based contingency planning and emergency services effectively increase the knowledge of vulnerable groups in disaster preparedness and resilience.

INTRODUCTION

Disaster resilience is the ability of individuals and communities to effectively anticipate, cope with, respond to, and recover from the impacts of disasters (Whittaker, 2020). The Martubung area, Medan Labuhan District, Medan City, is highly vulnerable to disasters due to its geographic location, population density, and limited access to health information and services. Vulnerable groups such as pregnant women, postpartum mothers, infants, toddlers, and the elderly are at greatest risk of experiencing serious impacts when a disaster strikes (Akbar et al, 2025).

In the context of midwifery, community-based services and emergency preparedness are essential competencies for both the community and healthcare professionals (Koenti, 2016). Contingency planning is a key strategy in disaster risk reduction efforts because it can improve preparedness and coordination in emergency response. Furthermore, community-based emergency services play a crucial role in ensuring that vulnerable groups receive prompt and appropriate treatment during disasters (Lestari et al, 2020).

However, the level of public knowledge, particularly among vulnerable groups, regarding disaster and emergency resilience remains relatively low (Habibullah, 2013). Therefore, this study aims to analyze

changes in the knowledge of vulnerable groups before and after community-based contingency planning and emergency services interventions as part of resilience-building efforts (Koem & Akase, 2022).

To this day, natural disasters remain a global problem and concern, including in Indonesia. Natural disasters can have devastating impacts on humans and the environment because they are unpredictable. However, humans can still predict disasters by recognizing their symptoms and early signs (BNPB, 2021).

According to Adi Maulana, a disaster expert from Hasanuddin University in Makassar, disaster literacy in Indonesia is currently very low. However, natural disasters frequently occur in Indonesia. Of 193 countries, Indonesia has the highest disaster risk (WHO, 2019).

A disaster contingency plan is a plan that encompasses all actions taken to address the threat of a disaster. When a disaster emergency occurs, this plan can be transformed into a Disaster Emergency Operations Plan (ODP) after becoming part of the Disaster Emergency Management Plan (RPKB) (BNPB, 2021).

A flood disaster is a river burst caused by One of the causes of the high impact of damage or loss after a disaster is the lack of community preparedness for disasters. Therefore, to reduce disaster risks, a disaster contingency plan is needed, which can influence community attitudes and concerns to be prepared and alert in anticipating disasters (Ministry of Health of the Republic of Indonesia, 2022). Someone acts or responds to something in a closed manner, a disaster. Linkage to SDGS 3 That is: (Good Health and Well-Being): Improving Preparedness and Emergency Services for Vulnerable Groups in disaster situations, SDG 11 namely: (Sustainable Cities And Communities): Strengthening Community Resilience in facing disasters through Community-based Contingency Planning and SDG 13 namely: (Climate Action): Supporting Adaptation and Reducing Risks of Climate Change Impacts through Disaster Preparedness at the Community Level.

The relationship with Asta Cita is: Asta Cita 1: Strengthening the quality of human resources through increasing community knowledge and preparedness. Asta Cita Ke 3: Equitable and just health development, Especially for Vulnerable Groups. Asta Cita 6: Regional Development and Strengthening Community Social Resilience in Facing Disaster Risks.

METHODS

This study used a pre-experimental design with a one-group pretest–posttest approach. The study was conducted in the Martubung area, Medan Labuhan District, Medan City.

The population in this study comprised vulnerable groups, including pregnant women, postpartum women, and other at-risk populations. A sample of 32 respondents was selected using purposive sampling techniques in accordance with the study's inclusion criteria.

The research instrument was a knowledge questionnaire on community-based disaster and emergency resilience that had been tested for content validity. The intervention provided included education on contingency planning and community-based emergency services. Data were collected through a pre-test before the intervention and a post-test after the intervention. Data analysis was conducted descriptively, displaying the frequency distribution and percentage of respondents' knowledge levels.

RESULTS

Respondents' Knowledge Before Intervention (Pretest)

The pretest results showed that most respondents still had a low level of knowledge before the intervention. Of the 32 respondents who participated in the study, 28 (87.5%) were in the poor knowledge category, indicating that the majority of respondents did not adequately understand the material related to contingency planning and community-based emergency services. Meanwhile, only 4 people (12.5%) were in the adequate knowledge category, and not a single respondent (0%) had a good level of knowledge. These findings indicate that before the implementation of the educational intervention, the level of understanding of the material provided by vulnerable groups was still very limited and requires efforts to improve through a structured educational program.

Respondents' Knowledge After Intervention (Posttest)

After being given an intervention in the form of education regarding contingency planning and community-based emergency services, there was a significant increase in the level of knowledge of respondents. Of the 32 respondents, 15 people (46.9%) had achieved the good knowledge category, indicating an increase in optimal understanding of the material presented. In addition, 15 respondents (46.9%) were in the sufficient knowledge category, so that overall almost all respondents had experienced an increase in their level of knowledge to a higher category. Only 2 respondents (6.2%) were still in the poor knowledge category. These results clearly indicate a substantial improvement in the level of knowledge of vulnerable groups after the educational intervention, so it can be concluded that the program provided was effective in increasing respondents' understanding regarding contingency planning and community-based emergency services

DISCUSSION

The results of this study indicate a significant increase in knowledge among vulnerable groups after interventions in the form of contingency planning and community-based emergency services. At the pretest, the majority of respondents were in the poor knowledge category, at 87.5%. This figure indicates that before the intervention, the majority of respondents did not have an adequate understanding of disaster preparedness, the steps to take in an emergency, and the emergency service mechanisms available in their environment. This low level of knowledge indirectly indicates that community preparedness, especially among vulnerable groups, remains at a concerning level and has the potential to increase the risk of more severe impacts if a disaster actually occurs.

Vulnerable groups, which in the context of disasters include pregnant women, breastfeeding mothers, infants, toddlers, the elderly, and individuals with certain health conditions, are at higher risk during emergencies (Linnenluecke, & McKnight, 2017). Their physical limitations, health conditions, and dependence on others make them particularly in need of support and a robust protection system. Therefore, the low level of knowledge in the pretest phase is a crucial finding that underscores the urgency of structured and sustainable educational interventions (McKnight, & Linnenluecke, 2016).

After the intervention, posttest results showed significant changes, with the majority of respondents in the good and sufficient knowledge categories. This improvement indicates that the intervention effectively addressed information needs and improved respondents' understanding. Not only did the proportion of respondents with poor knowledge decrease, but there was also a significant shift toward higher knowledge categories. This demonstrates that the educational methods used in contingency planning and community-based emergency services are well-received by the community and improve their cognitive capacity to understand disaster risks and mitigation measures.

Contingency planning, as part of disaster management, is a systematic process aimed at preparing response measures before a disaster occurs (Putra et al, 2025). Through a community-based approach, the public is not merely the recipient of information but is also actively involved in the risk identification process, action planning, and emergency response simulations. This active involvement plays a crucial role in improving respondents' memory, conceptual understanding, and application skills. Thus, the resulting knowledge gain is not merely theoretical but also oriented towards real-world practice.

Community-based emergency services also have a positive impact on improving preparedness. This service model emphasizes empowering local resources, strengthening social networks, and optimizing the role of community-level health workers and cadres (Putri et al, 2025). When the public understands the service flow, the signs of an emergency, and how to access assistance quickly and appropriately, the potential for delays in response can be minimized. Good knowledge will foster responsive attitudes and behaviors in crisis situations.

The increased knowledge gained in this study also demonstrates that disaster education delivered in a participatory manner is more effective than a one-way approach. Methods involving discussions, questions and answers, simulations, and case studies enable respondents to more easily understand the material because they can relate it to real-world experiences and conditions in their surroundings. Active learning encourages deeper internalization of information, resulting in more lasting knowledge.

Furthermore, increasing knowledge among vulnerable groups has broad implications for disaster risk reduction efforts (Whittaker, 2020). Knowledge is a key determinant of attitudes and behavior. Individuals with good knowledge tend to have higher risk awareness and better decision-making skills in emergency situations. Therefore, increased knowledge not only impacts individuals but also contributes to overall community resilience (Ardila Sánchez et al, 2019).

The findings of this study align with the concept of community midwifery, which emphasizes the importance of community empowerment as a primary strategy for improving health and preventing risks. In the community midwifery approach, health workers act as facilitators, helping communities identify problems, explore potential, and develop solutions tailored to local conditions (Setiawan, 2025). Promotive and preventive efforts are the primary focus, including in the context of disaster preparedness. Improving community knowledge and skills is seen as a long-term investment in creating independent and resilient communities (Salsabila, 2025).

Community empowerment in this study was reflected in the respondents' active involvement in each stage of the intervention. This process not only increased knowledge but also fostered a sense of ownership in the program. When people feel involved and valued, they tend to be more motivated to apply the knowledge they have gained in their daily lives. This is a crucial factor in maintaining the sustainability of disaster preparedness programs at the community level.

Overall, the results of this study confirm that interventions in the form of contingency planning and community-based emergency services are effective in increasing the knowledge of vulnerable groups regarding disaster preparedness (Wardhono, 2022). The initial low level of knowledge was successfully improved through a participatory and contextual educational approach. This improvement is expected to impact not only cognitive aspects but also changes in attitudes and behaviors in dealing with emergency situations. Therefore, strengthening community-based disaster education needs to be continuously developed as an integral part of efforts to increase community resilience, particularly for vulnerable groups who are at greatest risk in disaster situations (Ardila Sánchez et al, 2019).

CONCLUSION

Community-based Contingency Planning and Emergency Services have proven effective in increasing the knowledge of vulnerable groups regarding disaster resilience in the Martubung area of Medan City. Educational interventions can reduce the proportion of insufficient knowledge and increase the categories of good and sufficient knowledge.

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CONFLICTS OF INTEREST

No conflict of interest was found during the research.

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