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ORIGINAL

Challenges and needs in disaster preparedness: A qualitative study

Desafíos y necesidades en la preparación ante desastres: un estudio cualitativo

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ABSTRACT

Introduction: natural disasters that occur suddenly and unpredictably can cause losses for communities. Communities have varied understanding of disasters which influence their perceptions of risks and appropriate anticipatory actions. This study explores stakeholders' perceptions and preferences related to disaster preparedness to design more inclusive and responsive risk mitigation programs.
Method: a qualitative study with a descriptive phenomenological design was conducted from March to June 2024. Forty-eight participants who met the inclusion criteria were involved through purposive sampling. The inclusion criteria were participants who were directly impacted by the Mamuju disaster on January 14 and 15, 2021. Data were collected through six focus group discussions of eight people each until saturation. The FGD guidelines were informed by disaster nursing, management, and crisis health experts. As Graneheim and Lundman proposed, content analysis was used to analyze the data. Ethical approval from the University of Indonesia's Research Ethics Committee
Results: five main themes were found from the emerging data: 1) Holistic response during disasters, 2) Needs for emergency disaster handling, 3) Disaster warning system based on tradition and technology, 4) Challenges in leadership and resource management in disaster situations, 5) Hopes and efforts in future disaster management.
Conclusion: determining the challenges and needs of communities during disasters is crucial for improving disaster response effectiveness. This requires disaster socialization, exercises for victim handling, evacuation drills, exercises for communicating early warning responses, leadership, and resource management training, as well as disaster preparedness simulations. Such efforts are needed to support the sustainability of community-based disaster preparedness.

Keywords: Disasters; Disaster Planning; Needs Assessment; Qualitative Research.

RESUMEN

Introducción: los desastres naturales que ocurren de manera repentina e impredecible pueden causar pérdidas a las comunidades. Las comunidades tienen una comprensión variada de los desastres que influye en sus percepciones de los riesgos y las acciones anticipatorias apropiadas. Este estudio explora las percepciones y preferencias de las partes interesadas relacionadas con la preparación para desastres para diseñar programas de mitigación de riesgos más inclusivos y receptivos.
Método: se realizó un estudio cualitativo con un diseño fenomenológico descriptivo de marzo a junio de 2024. Cuarenta y ocho participantes que cumplieron con los criterios de inclusión participaron a través

de un muestreo intencional. Los criterios de inclusión fueron los participantes que se vieron directamente afectados por el desastre de Mamuju el 14 y 15 de enero de 2021. Los datos se recopilaron a través de seis discusiones de grupos focales de ocho personas cada uno hasta la saturación. Las pautas de los grupos focales fueron informadas por expertos en enfermería de desastres, gestión y salud en crisis. Como propusieron Graneheim y Lundman, se utilizó el análisis de contenido para analizar los datos. Aprobación ética del Comité de Ética de Investigación de la Universidad de Indonesia
Resultados: se encontraron cinco temas principales a partir de los datos emergentes: 1) Respuesta holística durante los desastres, 2) Necesidades de manejo de emergencias ante desastres, 3) Sistema de alerta de desastres basado en la tradición y la tecnología, 4) Desafíos en el liderazgo y la gestión de recursos en situaciones de desastre, 5) Esperanzas y esfuerzos en la gestión de desastres futuros.
Conclusión: determinar los desafíos y las necesidades de las comunidades durante los desastres es crucial para mejorar la eficacia de la respuesta ante desastres. Esto requiere socialización ante desastres, ejercicios para el manejo de víctimas, simulacros de evacuación, ejercicios para comunicar respuestas de alerta temprana, liderazgo y capacitación en gestión de recursos, así como simulacros de preparación para desastres. Tales esfuerzos son necesarios para apoyar la sostenibilidad de la preparación ante desastres basada en la comunidad.

Palabras clave: Desastres; Planificación ante Desastres; Evaluación de Necesidades; Investigación Cualitativa.

INTRODUCTION

Natural incidents and disasters often occur suddenly without any prior signs or warnings.[1] The increase in disaster incidence in Indonesia from year to year has caused various problems in several regions.[2,3] During disasters, there is an imbalance between needs and resources that causes damage beyond the capacity of the community.[4] The most critical impact caused by disasters is to cause death and serious injuries that risk permanent disability in victims if not handled quickly and appropriately.[5] The main demand of the community is to get access to responsive and effective emergency health services through appropriate disaster risk management efforts to save victims and minimize further impacts.[6]

Disaster risk management in the health system is an ongoing process to prepare health service institutions for preparedness in dealing with disasters by increasing the organizational, operational, and ability of health workers through training, risk evaluation, and procurement of emergency equipment.[7] Based on these issues, the Disaster Management Master Plan 2020-2044 realizes a disaster-resilient Indonesia for sustainable development that Indonesia can contain, absorb, adapt, and recover from the consequences of disasters and climate change in a timely, effective, and efficient manner.[8] Some of the key factors to improve disaster resilience are community preparedness and the capacity to protect themselves from disaster threats. Disaster education is important to increase understanding of risks through preparedness training. This education is a process of raising awareness to improve the ability to save yourself. This awareness process is useful for all parties to understand risks and develop community resilience. In addition, social cohesion, cooperation, and mutual trust are important social capital that continue to be fostered to improve the ability of individuals and communities to prepare, respond, and recover from difficulties caused by disasters.[9]

West Sulawesi Province is one of the earthquake-prone areas in Indonesia, especially Mamuju which is passed by the Palu Koro fault, is the main fault on the island of Sulawesi and is classified as an active fault.[10,11,12] Based on the 2019 provincial Disaster Risk Index (IRB) table, West Sulawesi Province ranks 2nd highest out of 34 provinces in Indonesia with a score of 166,49 with a high-risk class.[13] Disaster history records that the earthquake disaster that occurred in West Sulawesi on January 14 and 15, 2021 is not the first time it has occurred, the West Sulawesi region has experienced at least 5 destructive earthquakes from 1820 to 2021 with a magnitude of more than 6 SR.[14] Based on field observations of several destructive earthquake events, people in West Sulawesi looked panicked and restless when the earthquake occurred. They are confused about what to do because they have rarely carried out earthquake mitigation activities such as socialization, simulation, and previous exercises. Evacuation places and routes during the earthquake were not found either in the field or in high-rise buildings.[15] This caused people to panic and worry, especially in areas adjacent to the coast so that people were worried about a tsunami.[16]

The main problems faced by EU member states related to disaster risk reduction science and policies are knowledge transfer, disaster expertise, and risk awareness.[17] Increasing community preparedness for disasters is important to consider to reduce the risk of a large number of victims.[18] Improving local community understanding of how to identify disasters is an important first step to building a community-based disaster mitigation system to reduce risks and losses due to disasters.[19] The cultural characteristics that most support community motivation in disaster preparedness are based on the internalization of social values, kinship, and

community cohesion into social norms that strengthen shared responsibility for disaster impact adaptation. [20] As the number of disasters continues to rise, and given the limited research on the challenges and needs needed to improve disaster preparedness, it is important to conduct further studies to address this gap. The purpose of this study is to explore the challenges and needs of community preparedness to reduce risks and losses due to disasters.

METHOD

This study uses a qualitative research method using a descriptive phenomenological design. The research area in this study is in Mamuju district, especially Binangan Village and Bambu Village. The total number of participants in this study is forty-eight participants (16 nurses, 16 health cadres, and 16 families) who meet the inclusion criteria, participants are selected using purposive sampling. The inclusion criteria for the main key informants are community nurses, health cadres and families directly affected by the disaster that occurred on January 14 and 15, 2021.

Data was collected through focus group discussions (FGD) and field notes from March to June 2024. The FGD was carried out in six groups, namely two groups of nurses, two groups of cadres, and two groups of families facilitated by moderators and recorders. Researchers act as moderators by using open-ended questions to encourage discussion and share experiences in disaster preparedness. The FGD lasted for 45-60 minutes and was recorded audio until data saturation was reached. Data saturation is when no new data or information is obtained by continuing data collection.[21] The results of the FGD are then transcribed word for word. The data obtained is then analyzed to obtain a theme that suits the research objectives.

The data was analyzed by content analysis.[22] Transcripts are read repeatedly and categorized based on concepts related to the same phenomenon. The main researcher identifies categories and content. Two co-authors verify the consistency of coding, categories, and supporting statements. Co-authors discuss coding, categories, and findings until a consensus is reached. The results of the study were compared with the results of similar studies to test the transferability of the results of the study. To ensure the consideration of research ethics, research ethics approval was obtained from the Research Ethics Committee of the University of Indonesia (Number: KET-077/UN2. F12. D1.2.1/PPM.00.02/2024). The research applies ethical principles in data collection, maintaining the confidentiality of participant identities, benefits, fairness, and no harm carried out by researchers in the data collection process

RESULTS

Table 1 showing the demographic information of the participants in this study. Of the 48 people who participated in this study, there were 16 nurses, 16 health cadres, and 16 families.

Table 1. Demographic data of participants

Demographic Characteristics	Nurses (PR_1-PR_{16})	Health Cadres (KD_1-KD_{16})	Families (KL_1-KL_{16})
	Total (n = 48) n (%) or M ± SD		
Age (years)	40,5 ± 5,65	35,44 ± 8,48	39,56 ± 11,25
Gender			
Male	2 (12,5 %)	-	6 (35,5 %)
Female	14 (87,5 %)	16 (100 %)	10 (62,5 %)
Education			
Elementary school	-	3 (18,8 %)	2 (12,5 %)
Junior high school	-	3 (18,8 %)	1 (6,3 %)
Senior high school	-	6 (37,5 %)	12 (75,0 %)
Diploma degree	1 (6,3 %)	1 (6,3 %)	-
Bachelor degree	15 (93,8 %)	3 (18,8 %)	1 (6,3 %)
Marital status			
Married	16 (100 %)	16 (100 %)	16 (100 %)
Unmarried	-	-	-
Working period (years)	15,75 ± 4,55	7,63 ± 2,50	-

Based on FGD analysis and field observations, this research produced five main themes, namely: 1) Holistic response when disasters occur, 2) The need to handle disaster emergencies, 3) Tradition and technology-based disaster warning systems, 4) Challenges in leadership and resource management in disaster situations, 5) Expectations and efforts in disaster management in the future. The following are elaborated in detail.

Theme 1: Holistic response during disasters

The theme of holistic response when a disaster occurs was obtained from the results of the exploration of categories consisting of 1) Emotional response, 2) Shock due to unpreparedness, 3) Cognitive response, 4) Behavioral response, and 5) Response focused on solutions. When a disaster occurs, humans respond holistically by triggering strong emotional, cognitive, and behavioral negative responses due to neurobiological stress in the brain and hormonal in the body. However, some can suppress these negative responses and focus on rational solutions such as helping victims. A thorough understanding of this multidimensional response is important for comprehensive disaster victim handling.

"When the earthquake occurred, we were very surprised and panicked because we were not prepared to face the disaster that came suddenly. We were overwhelmed by anxiety and trauma from the devastating shock we felt. In a state of extreme panic and fear, we tried to protect ourselves by running away from buildings that were at risk of collapsing while hoping that the disaster would soon pass without casualties." (KD5)

"We were very surprised and confused when the disaster came suddenly. Even though as medical personnel, we don't know for sure what to do because we have never experienced an emergency like this. In a state of panic and confusion, we took the initiative to run to save ourselves and help the injured and displaced victims by sharing food. After the situation calmed down, we joined the post and the health center to help handle the victims as much as we could with a call of conscience, even though it was limited." (PR3)

Theme 2: The need to handle disaster emergencies

The theme of the need to handle disaster emergencies consists of 4 sub-themes, namely 1) Vulnerable groups that need protection, 2) First aid needs of disaster victims, 3) Evacuation needs of disaster victims, and 4) Basic needs of disaster victims. When a disaster occurs, vulnerable groups such as infants, children, pregnant women, and the elderly urgently need special protection. The injured need to be treated with first aid and referred to a health facility. Evacuation and transportation guidance is needed to rescue the victims. Refugees desperately need clothing, food, and other emergency equipment to survive.

"During the earthquake, we are very worried about the condition of infants and young children as well as the elderly and vulnerable pregnant women, so we need special protection to save them from disasters" (KD11).

"When many residents came with injuries due to being hit by the rubble, we tried to provide first aid such as cleaning wounds, suturing minor wounds, and bandaging wounds even though our first aid capabilities were limited. We have serious injuries to regional hospitals even with limited facilities and equipment. We are doing our best with a call of conscience to help the injured citizens" (PR1).

"We need clear evacuation guidelines, such as arranging special evacuation routes and socializing the location of gathering points when a disaster occurs. In addition, we also need the availability of transportation, both ambulances and private vehicles, so that evacuation can run smoothly and quickly when a disaster occurs" (KD9).

"We refugees are severely short of food, drink, and blankets to protect ourselves from the cold weather. Our children also need diapers and milk. We hope to get medical assistance, tents, and emergency toilet facilities soon so that we can survive in the evacuation site" (KL6).

Theme 3: Tradition and technology-based disaster warning system

The theme of tradition-based and technology-based disaster warning systems consists of two sub-themes, namely: 1) Traditional disaster warning system, and 2) Technology-based disaster warning system. Traditionally, people observe natural signs such as sudden receding sea water, birds and animals roaming, and feeling weather changes and vibrations before an earthquake. The community also relies on intuition and estimates from local indigenous leaders. Modern ways use technology such as early warning applications, social media information, and news on radio and TV. However, it is often constrained by communication networks that die during disasters, thus hindering the flow of fast information to the community.

"I heard from residents that the seawater has receded. Some saw many birds flying and strong winds blowing towards the beach. Before the earthquake, I heard rumbling and explosions. When the earthquake happened, I felt a very strong vibration and the electricity went out suddenly. So before the catastrophic earthquake and tsunami disaster occurred, there were natural signs such as low sea water, flying birds, strong winds, rumbling sounds, and explosions that were heard and seen by residents" (KD6).

"After the earthquake that afternoon, there were smart parents who warned of aftershocks at 3 am. I also felt a strong feeling in the form of a pounding heart, like there would be another earthquake. So intuition through the words of smart people and also a premonition in me, hinted that there would be aftershocks." (KL1).

"After the first earthquake, I saw a warning from the BMKG application that there would be aftershocks. When the telecommunication network was still active, we contacted the family via phone, SMS, FB, and WA group to coordinate their respective conditions, and evacuation locations, ask for help, and share information

about the damage caused by the earthquake" (PR7).

Theme 4: Challenges in leadership and resource management in disaster situations

The theme of challenges in leadership and resource management in disaster situations is formed from four categories, namely: 1) Personnel direction function 2) Staffing function 3) Functional conflicts in the family and profession 4) Advocacy, coordination, and communication functions. The limitations in mobilizing personnel can be seen from the lack of instructions and initiatives to open posts and organize members. The lack of manpower to help victims can be seen from the small number of health workers who can come and join. Conflicts of responsibility in the family and profession, especially for women related to domestic roles. Coordination and communication across sectors are not smooth, as can be seen from the lack of involvement of related sectors, lack of communication and still waiting for government instructions and recommendations.

"On the instruction of the Head of the Health Center, we nurses immediately opened a post-earthquake medical post and service with limited personnel, only 20% of the staff could attend. We are overwhelmed with many victims coming with minimal manpower and there are no additions." (PR11)

"As a medical worker, I want to help at the disaster post, but I have to ask for permission from my family because I am also responsible for taking care of young children and sick parents" (PR2).

"We have difficulty coordinating with the local government regarding logistics and the location of the aid post. Cross-sectoral communication is also not smooth, resulting in slow response and confusion. We had to make many reports and letters to the relevant agencies to ask for help even though the emergency was very clear. Information from the government and BMKG is also not fluent so the public receives a lot of unclear news"(PR5).

Theme 5: Hopes and efforts in disaster management in the future

The theme of hopes and efforts in disaster management in the future consists of two sub-themes, namely: 1) The need to respond to disaster emergencies, and 2) Improving disaster preparedness. The need for disaster management knowledge, life-saving skills, and psychosocial support shows the importance of increasing the capacity of human resources. Meanwhile, the need for simulation training, rapid reaction team activation, and regular periodic exercises encourage better disaster emergency response system preparedness. Meeting this need will strengthen capacity and preparedness in disaster management in the future.

"This first disaster reminds us of the importance of providing knowledge and skills training to health workers in responding to disaster emergencies. We need specialized training related to disaster management, victim evacuation, first aid, and last but not least the skills of providing psychosocial support to victims and survivors who have experienced post-disaster trauma" (PR16).

"We need to be trained in first aid skills to rescue victims before health workers arrive, such as wound management, fainting treatment, and stabilization of trauma victims" (KD1).

"Disaster emergency response simulations that are carried out routinely and scheduled through field practice are very important to improve the preparedness of health workers because it will make it easier for them to remember and apply victim handling during real disasters" (PR6).

DISCUSSION

In the face of disasters, preparedness is the key to safety.[23] Preparedness is a series of activities carried out to anticipate disasters through organizing and using appropriate and effective strategies or steps.[24] Five main themes were identified in this study, namely 1) Holistic response when disasters occur, 2) The need to handle disaster emergencies, 3) Tradition and technology-based disaster warning systems, 4) Challenges in leadership and resource management in disaster situations, 5) Expectations and efforts in disaster management in the future.

This research highlights the response when a disaster occurs such as fear, anxiety, sadness, and shock response because of unpreparedness, confusion, running to save themselves, and helping victims and refugees. The response is a holistic reaction that reflects the perceptual process, including emotional, cognitive, physiological, and behavioral responses.[25] The community response that occurs when a disaster occurs is an emotional reaction, cognitive reaction, and physiological reaction.[26,27] Fear comes from the cognitive process of a stimulus that is perceived to be threatening, while anxiety is an emotional response to a threatening stimulus.[28] The psychological symptoms included in anxiety are uncontrollable worry, sleep disturbances, restlessness, and difficulty concentrating.[28,29,30]

This study found that the needs for handling disaster emergencies are needed, including protection for vulnerable groups, first aid for disaster victims, evacuation of disaster victims, and basic needs of disaster victims. Disaster-prone groups that are prioritized for immediate assistance are infants, toddlers, and children, pregnant or lactating mothers, people with disabilities, and the elderly.[31,32,33] The parameters of the plan for emergencies consist of eight variables, namely: disaster management organization, evacuation plan, disaster

post and implementation of permanent procedures (protap), first aid plan, plan to meet basic needs, evacuation equipment and supplies, essential facilities for emergencies and evacuation drills and simulations.[34]

This study identifies traditional and technology-based disaster warning systems. Disaster early warning often called a warning system is the main component of disaster risk reduction.[9] Increasing the availability of multi-hazard warning systems and disaster risk information is one of the seven global targets set by the Framework for Disaster Risk Reduction 2015–2030.[35] Early warning is carried out through several stages, namely 1) observation of disaster signs, (2) analysis of the results of observation of disaster signs, 3) decision-making by the authorities, 4) dissemination of disaster warning information, and 5) action by the community. This stage is then called the disaster early warning system.[36,37]

Study participants reported experiencing many challenges in leadership and resource management in disaster situations. These findings are in line with previous research that shows the main challenges of leadership in disaster management include providing clear direction to personnel and organizing human resources.[38,39] The dilemma between personal safety and professional obligations amid limited resources during their disaster.[40,41] Cross-sectoral advocacy, coordination, and effective communication are needed to respond quickly and appropriately.[41,42,43,44,45]

An important note from this study is that the hope and efforts in disaster management in the future are emphasizing the need to pay attention to individual and household preparedness in dealing with disasters.[46] Families must ensure the performance of preparedness measures in the household by increasing knowledge and understanding of disasters, as well as the ability to provide protection a harmonious social life, and a sense of security.[47,48] There are 3 key stages in a disaster-resilient family:[49], namely: 1) disaster risk awareness, which is knowing and being aware of the risks and threats of disasters in their environment, 2) knowledge, where the family knows and can strengthen the structure of the building, understands disaster management, disaster education and 3) empowerment, which is the ability to save themselves, their families and neighbors.

While this study provides insight into the various challenges and needs of communities in improving disaster preparedness, it is important to note that the results may not be generalizable for all cultures and contexts. The experience of managing disaster risk is influenced by cultural, economic, social, and educational factors that are specific to each society. Therefore, it is recommended to conduct similar studies in other communities to gain a more comprehensive understanding of the specific challenges and needs of each community in improving disaster preparedness. Thus, best practices can be identified to improve community resilience by the local context.

In the research experience, an important strength of note is that FGD and using field notes allow us to gain in-depth insights into the experiences and perspectives of communities directly affected by disasters. The main findings of this study can provide valuable insights for the development of more responsive and inclusive disaster preparedness programs. The results of this research can help understand the specific needs and challenges of the community when disasters occur. As a limitation, the geographical scope is limited, so the findings of the study may need to be fully generalizable for other regions. Therefore, the next research needs to be broader in scope and involve more locations to get a more comprehensive picture. Data collection using focus group discussions (FGDs) can reduce the depth of individual experience disclosure, where group dynamics can affect participants' openness, so combining FGD methods with individual in-depth interviews is important. The final focus on one type of earthquake disaster can limit a comprehensive understanding of disaster management, and it is necessary to consider research that covers different types of disasters to gain a more comprehensive and in-depth understanding of disaster preparedness.

CONCLUSIONS

Community preparedness in dealing with disasters requires close cooperation between various related sectors. Although communities have adapted to their environment, it is still important to continue to raise awareness regarding the potential hazards and risks of existing disasters. Orderly and well-planned coordination among disaster management agencies is needed to realize sustainable disaster preparedness. Adequate funding support, especially from the government, is also necessary. The widespread impact of the disaster that cut off accessibility and the lack of medical personnel, caused the number of victims to increase sharply. Efforts to assist by NGOs, both local and international, were also hampered by transportation difficulties at that time. All assistance efforts, including from NGOs, are well coordinated by the local BPBD for operational effectiveness. With close cross-sectoral cooperation and careful planning, it is hoped that community preparedness in dealing with disasters can continue to be improved.

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