Strategies to Increase Family Resilience to Disasters Based on Pentahelix Perspectives: A Qualitative Study

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Abstract: *Disasters affect family dynamics as the smallest social unit in society. Disasters that occur in communities have a considerable impact on the lives and property, and mental health of survivors. In addition, it also affects human health, which risks undermining the well-being of families, due to the health problems that can occur. The family's unpreparedness in these tasks can increase the psychological and physical impacts experienced by its members. Therefore, strategies in disaster preparedness are important to reduce the impact. This study aims to explore strategies to improve family resilience in disaster mitigation. The number of interviews is 21 people, consisting of women and men with an average age of 45 years, who have different backgrounds. Including academians, business, community, government, and journalists. The results showed that the strategy to increase family resilience to disaster is based on 5 family tasks from Maglaya's theory, including that families must have a preparedness plan and knowledge about disaster management through education to families about the steps that must be taken before, during, and after a disaster is very helpful in increasing family resilience. The conclusion is that disaster training and simulation programs involving family members have proven effective in building confidence and necessary skills. This research can be concluded that family disaster preparedness depends on good knowledge and planning. Disaster nurses play an important role in education and training, which helps reduce psychological and physical impacts. Thus, community safety and well-being can be improved by exploring strategies to improve family resilience in disaster mitigation.*

Keywords: adaptation, disaster, Pentahelix, refugee, resilience

Submitted: 12 February 2025, revised: 18 April 2025, accepted: 3 May 2025, published: 23 July 2025

INTRODUCTION

Indonesia ranks third in the world with various hazards having a great risk of disaster (Ayuningtyas et al., 2023). Natural disasters are increasing globally every year, increasing the frequency of disaster events, impacting populations, and resulting in economic losses (Faizatiwahida et al., 2024). East Java is one of the provinces prone to disasters caused by volcanic eruptions. One of the areas included in this province is Lumajang District, which, based on its geographical, climatological, geological, and hydrological conditions, has a high vulnerability to various disasters such as landslides, volcanic eruptions, and earthquakes (Ratnanik et al., 2022). At the end of 2021, a natural disaster occurred, namely the eruption of Mount Semeru, which caused many casualties and damage to property and infrastructure.
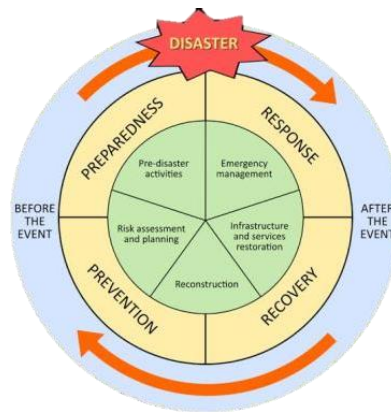
Figure 1. Disaster Management Cycle (Bushnaq et al., 2022)

According to research conducted by Ahmadi & Kulsum (2024), the eruption of Mount Semeru had a multidimensional impact on the community, such as economic problems, damage to homes and agricultural land, and trauma due to volcanic eruptions; even after the disaster, there is still a sense of trauma. This will have an impact on family resilience from both economic, psychological, and social aspects, so in these conditions, it can be ascertained that it is difficult to maintain harmony within the family. A family that plays an optimal role by using all of its potential is also referred to as a family that has high resilience and independence. Families are said to have a high level of resilience if they fulfill several aspects, namely physical resilience, namely the fulfillment of food, clothing, housing, education, and health needs (Andrian et al., 2025).

One of the ways that can be done to maximize resilience is by collaboration between all related sectors, one of which can be applied is the pentahelix disaster collaboration. Pentahelix is a collaboration consisting of government, business/industry, academia, civil society, and media (J. P. Pratama et al., 2024). Through strong cooperation and good synergy, Indonesia can strengthen disaster resilience and minimize the negative impact of the threat of disasters that are always lurking (J. P. Pratama et al., 2024). If each family has independence in carrying out family duties in disaster mitigation, it can be ensured that the implementation of policies in disaster management mitigation will be carried out effectively. In the end, the community can become resilient in the face of disasters and be able to carry out their rights and obligations as citizens (Suhari et al., 2023). Based on this background, the purpose of this research is to formulate a pentahelix collaboration strategy in realizing disaster-resilient family adaptation.

METHODS

This research was qualitative research with a grounded theory approach, which aims to explore the pentahelix perspective on family resilience in disasters. This study involved 21 participants from families affected by the Mount Semeru eruption and pentahelix consisting of Lumajang District Government, Lumajang District Health Office, Lumajang's Regional Board for Disaster Management (BPBD), Indonesian National Nurses Association (PPNI), Journalists, Lumajang District Social Office, and academics.

The data collection method through an in-depth interview method aims to find out family resilience in dealing with disasters. The research team carried out this interview procedure, which began with an interview with the health department officer: "What strategies are carried out to increase family resilience to disasters?" The next question developed from the participant's answers and continued the interview with other pentahelix participants. Answers from participants were recorded using a recording device and an interview record sheet. This research was stopped when data saturation occurred, and the data was sufficient to describe the research that had been conducted. This research used a qualitative study with a grounded theory approach. Grounded theory research is a qualitative research design that allows researchers to form constructs and build theories from data directly collected by researchers rather than from existing theories (Ruslan et al., 2023). This study aims to describe the post-disaster family

experience, describe risk communication and community involvement in disaster mitigation, and describe the effectiveness of 5 family health tasks in disaster mitigation. This research uses focus group discussions guided by facilitators to measure the understanding of families and communities in dealing with disasters.

The analysis process was carried out simultaneously with the data collection process by a research team consisting of lecturers in community, family, and disaster nursing who are experienced in the field of research. Spradley's analysis model consists of 12 stages, starting with determining a key authoritative informant who is believed to be able to "open the door" for researchers to enter the research object. After that, the researcher conducts an interview. Furthermore, the researcher's attention was drawn to the research object, and they began asking descriptive questions, followed by an interview analysis. Based on the results of the interview analysis, the researcher then conducted a domain analysis. In the next step, the researcher has determined the focus and conducted a taxonomic analysis; then the researcher asks contrastive questions, followed by a componential analysis. The results of the componential analysis, then researchers found cultural themes. Furthermore, the researcher wrote an ethnographic research report (Wijaya, 2018).

This research was conducted in Bumi Semeru Damai temporary shelter (Huntara) in June-August 2023 and has obtained an ethical certificate from the University of Jember with number 238/UN25.1.14/KEPK/2023.

RESULTS

The demographic data of the research is available in Table 1.

Table 1. Demographic Data of Pentahelix

Characteristic	N=21	Mean Age (in Years)
Age		45.3
Sex		
Female	9	
Male	12	
Professional background		
Academician	2	
Business	1	
Community	9	
Government	7	
Jurnalist	2	

The number of interviews is 21 people, consisting of women and men with an average age of 45 years, who have different backgrounds. Including academic, business, community, government, and journalistic.

The Family can recognize the early signs of disaster

The role of families in dealing with disasters is very important, especially since families must be able to recognize the signs of disasters so that they can increase family preparedness in facing disasters, as expressed as follows:

(Theory Maglaya) *"… According to the family, health service officers conveyed several strategies that can be done to improve the 5 family tasks in disaster, including organizing training and education to increase knowledge about disaster preparedness through counseling activities and developing information systems in collaboration with various parties such as educational institutions." (Health Office 2).*

(Pentahelix) …We conduct socialization to all families so that they know the signs of disaster occurrence by involving students who were doing The Community Service (KKN), then involving the important figures such

as Islamic Scholar (Kyai) or the local trusted figure to give education concerning disaster mitigation." (According to the government, 5).

(Family Resiliency) …Disaster-resilient families can be formed by increasing awareness, knowledge, and skills in dealing with disasters." (Academics 1).

(Disaster mitigation Strategy) "…Building awareness and knowledge about disaster hazards and the importance of preparedness is key to establishing disaster-resilient families." (Academics 2).

(Education) …Academician role is required so that the family knows about the signs of disaster; also, to apply the tri dharma of college, academicians give education through socialization for the community about the signs of disaster occurrence." (Reveal The Community 5).

Families Can Decide on the Right Course of Action

According to the participants' statements, families need preparedness in the face of disasters, as mentioned:

"...During the eruption of Semeru in 2021, there was a lot of attention from various parties to the victims of the eruption of Semeru. This attention should not only be on the events after the eruption, but it is also necessary to pay attention to the preparedness of the community, especially families, in facing disasters, especially the eruption of Semeru, because so far it turns out that the community still does not recognize the signs of an eruption or how or what to do when an eruption occurs, which ones take precedence to save, even though some people still return to their home villages even though they are included in disaster-prone areas. Therefore, the strategies that need to be applied in developing the 5 tasks of disaster-resilient families are to collaborate with cross-sectors such as Lumajang's Regional Board for Disaster Management (BPBD), PMI, Indonesian National Armed Force (TNI), Health Office, and academics to form disaster preparedness village teams or cadres and conduct socialization or education about disaster preparedness not only for families but also for all age groups." (Participant 2).

"...Need to increase community awareness that it is important to become a disaster-resilient family through socialization and training activities on disaster preparedness and disseminating information about disasters either through social media or making a kind of information corner as a forum for increasing community knowledge about disaster preparedness." (Participant 4).

"...Family also needs a decision maker beside the father to decide the evaluation of the family. For example, if the father is not working, it means there is someone beside the father that can decide, so not waiting for each other." (Participant 6).

"... As a professional organization, we need to face the disaster. The professional organization presents to give education to the community on the importance of disaster mitigation as early as possible, and the family who lives in disaster-prone areas needs to be given education." (Participant 17).

Families Can Care for Family Members

The participants stated that disasters could cause anxiety, so there is a need for care after a disaster so that they can form a resilient family in a disaster, which is by the following statement:

"... Disasters are events that are not expected and always come unexpectedly, so that as a believing community, we need to also get closer to Allah SWT to ask for safety, but in addition to prayer, it is also important to make efforts in the form of integration of life values such as teaching families mutual cooperation, solidarity, and care for others when disaster situations occur both pre- and post-disaster." (Participant 3).

''...It is also important to improve community and family skills on first aid and the use of safety equipment.'' (Participant 5)

''... The community has been trained regarding disaster mitigation; however, it is only suitable with the disaster potency, such as at the coast, only given training of tsunami mitigation. The community also sometimes negligence and never notice the sign of disaster warning.'' (Participant 12)

"... Building a strong social network with neighbors and the surrounding community is important to form a disaster-resilient family. We need to provide easy access to information that is user-friendly to families there, for example, by providing QR codes that are posted at the puskesmas or distributed on the village website." (Participant 13)

"... The family also needs a decision-maker beside the father to decide the evaluation of the family. For example, if the father is not working, it means there is someone beside the father that can decide, so not waiting for each other." (Participant 14)

Families Can Modify the Environment

According to participants' expressions, creating a safe and comfortable environment is an important factor after a disaster because it can reduce the psychological impact and risk of disaster for participants, according to the following statements:

"…Conditioning a disaster-safe environment such as available evacuation routes and rallying points that are already known and understood by the family." (Participant 9).

"…Lumajang's Regional Board for Disaster Management (BPBD) actually has a program for community preparedness in the face of disasters through the Destana (Disaster Resilient Village) program, where later in each destana there will be disaster preparedness groups and cadres who can help prepare disaster-resilient families. In addition, it is necessary to develop a family contingency plan to help families develop contingency plans that include information on evacuation routes, gathering points, and available survival kits and disaster folders that contain important documents so that if at any time a disaster occurs, they can be saved." (Participant 10).

"… making contingency plans and evacuation plans are important tasks of disaster-resilient families. In addition, building a strong social network with neighbors and the surrounding community is an important task of disaster-resilient families." (Participant 19).

Families Can Utilize Disaster-Related Facilities

The participants revealed that families with access to disaster-related facilities are the main pillars in efforts to protect themselves and the community from disaster threats. This is implied by the participants' statements as follows:

"… As the head of a health center in a disaster-prone area, I realize that it is important to prepare my human resources, who are also proficient and skilled in providing services quickly to post-disaster victims. In addition to minimizing the number of casualties, it is also important to build family skills in providing first aid to post-disaster victims through training programs on disaster preparedness and health." (Participant 18).

"… That allocating sufficient resources for disaster preparedness, such as safety equipment and basic necessities, is an important task of disaster-resilient families.   " (Participant 20).

"… We actively participate together with existing medical and nursing staff in utilizing disaster-related facilities. The staff provides training, information, and resources that each family may need in order to optimally cope with disasters." (Participant 21).

DISCUSSION

The Family can recognize the early signs of disaster

These results support the research objectives by showing that family preparedness starts with knowledge. Understanding the signs of a disaster is critical to mitigating risk. This is in line with research conducted by Rahman & Pradido (2020), which states that the role of knowledge in disaster preparedness is very important because increased awareness leads to better decision-making and reduces risk. Families who understand the signs of a disaster are more likely to act quickly, thereby reducing its impact (Dewi et al., 2023). This finding is in line with research showing that knowledge

and education are key factors in disaster preparedness (Kim et al., 2022). Other research highlights how family cooperation and resource pooling before and after disasters improve risk management (Anitasari et al., 2022). Improving family preparedness in the face of disasters requires a comprehensive approach involving various parties. Education and training are the main strategies, while community leaders and university students play a role in community-based counseling. Awareness, knowledge, and skills are considered key to disaster-resilient families. Academics also have an important role in education through the Tri Dharma of Higher Education. Therefore, cross-sector collaboration between the government, academics, and communities is needed to create families that are better prepared to face disasters.

Families can decide on the right course of action

Families can make the right decisions. The ability to take appropriate action during a disaster demonstrates the effectiveness of the five tasks of family health and family preparedness. Having specific preparedness measures in place—such as emergency bags containing important documents and prioritizing vulnerable family members—can significantly reduce the impact of disasters (Setianingsih et al., 2020). Empowering some family members to make decisions can increase flexibility during emergencies. This result is consistent with research emphasizing the role of proper planning and decision-making in disaster mitigation (Okon et al., 2023). These findings underscore the importance of family preparedness in minimizing loss of life and damage (Harianto & Nuntaboot, 2023). Besides that, the family stated that mitigation is very important. Disaster mitigation is very important because it plays a role in reducing the risks and impacts caused by natural and human-caused disasters (Harianto & Nuntaboot, 2023). Some reasons why disaster mitigation is important include:

a. mitigation efforts can significantly reduce the number of victims during a disaster that can affect knowledge of behavior and attitudes towards disaster preparedness, which can reduce the number of victims during a disaster.
b. Mitigation efforts play a significant role in reducing property and infrastructure damage from disasters.
c. Environmental Impact Reduction: Disaster mitigation can help protect the natural environment from damage caused by disasters such as environmental pollution or ecosystem damage.
d. Social and Economic Stability: By reducing economic and social losses caused by disasters, mitigation can help maintain the economic and social stability of the community.
e. Faster Recovery: Mitigation efforts can prepare communities to respond more quickly after a disaster, accelerating the recovery process.
f. Resource Maintenance: Through mitigation, natural and human resources can be maintained, thus supporting long-term sustainability.
g. Disaster mitigation that includes community education and awareness significantly improves community preparedness and quality of life.

Overall, disaster mitigation is the steps needed to reduce vulnerability and increase the resilience of communities to disaster threats. to create a safer and more sustainable community (Sutini et al., 2021). Disaster mitigation can make communities not only better prepared for disasters but also able to take quick and appropriate action and form resilient communities.

Families Can Care for Family Members

Disasters can cause anxiety, so there is a need for care after a disaster occurs. Disasters can cause anxiety. Anxiety is experienced when thinking about the potential chaotic situation at the disaster site (Hindriyastuti et al., 2019). In family participation, both before and after a disaster, the role of the family in caring for facilities and situations that occur is very important (Sunarti et al., 2023). These findings are in line with the research objectives, which show how families are critical in providing care during and after disasters. Care for vulnerable family members is essential for post-disaster recovery and adaptation. Families that ensure ongoing health care and attention to special needs can reduce the long-

term impact of disasters (Sriyono et al., 2020). These results are in line with Istiana & Ema's (2017), which found that families with preparedness for chronic diseases performed better during disasters (Anam & Abiddin, 2022).

Families Can Modify the Environment

Environmental modification by families contributes to disaster resilience and recovery, which is in line with the goal to improve family preparedness. Families play a key role in maintaining environmental safety, sanitation, and health after a disaster. These modifications are critical to creating a safe living space that supports mental and physical recovery (Gumelar et al., 2020). This finding supports Koesnadi's (2023) research on the importance of environmental adjustments to mitigate disaster risk (Valter et al., 2019). Post-disaster environmental modification for refugees with an emphasis on factors that can restore the condition of refugees and the environment affected by the disaster by refunctioning the role of families, institutions, and facilities through good, coordinated, integrated, and comprehensive planning after the disaster. The above statement is in line with the statement conveyed by Koesnadi (2023) that the disaster prevention and mitigation stage is carried out to reduce and manage disaster risk (Valter et al., 2019). The series of efforts made can be in the form of improvements and modifications to the physical environment as well as increasing awareness and ability to deal with disaster threats. The stage of disaster prevention and mitigation can be carried out structurally and culturally (non-structurally). (Liu & Wu, 2017). Structurally, efforts are made to reduce vulnerability to disasters through buildings that can survive through technical engineering. While culturally it is to reduce vulnerability to disasters by changing paradigms, increasing knowledge, and attitudes to form resilient communities (H. Pratama & Hattarina, 2023). Cultural mitigation includes making people care about their environment so as to minimize the occurrence of disasters. Family efforts also play an important role in environmental modification to empower the internal potential that exists in the home environment to maintain health. Environmental modification actions have a wide scope according to the family's knowledge of environmental conditions.

Families Can Utilize Disaster-Related Facilities

Families who have access to disaster-related facilities become the main pillar in efforts to protect themselves and protect the community from disaster threats. Utilizing disaster-related facilities is in line with the goal to integrate the roles of families, institutions, and facilities in disaster preparedness. Access to disaster-related facilities, including communication tools and health services, is critical to reducing disaster risk. Well-prepared families are more likely to use these resources effectively (Matsukawa et al., 2024). Families have a full understanding of how to use health facilities and follow instructions from authorities. There are several factors that can help families to be successful in using disaster health facilities, namely getting training related to disaster preparedness and management, actions taken during disaster events such as evacuation sites or disaster facilities, ownership of emergency equipment, and coordinating with the authorities (Wakhid et al., 2020). Prepared families with access to facilities have better outcomes during disaster recovery.

CONCLUSION

Strategies that can be done to increase family resilience to disasters are through the application of 5 family tasks based on Maglaya's theory, which includes each family member knowing the signs of a natural disaster by increasing the knowledge of each family member in responding to disasters so that later they can minimize disaster risk. Families can work together to know and gather the resources needed to deal with disasters both before and after disasters. Most likely, they will be able to manage the risks of disasters that befall their families. To minimize the impact caused by disasters. Disaster nursing also plays an important role in guiding families to respond effectively to disasters. In addition, after a disaster, families need to be involved in environmental recovery with the support of related institutions and facilities. This approach is in line with the pentahelix perspective, which emphasizes the importance of collaboration between government, community, academia, and media to build resilient and sustainable family resilience.

AUTHOR CONTRIBUTION:

S and RES contributed to the research design, data collection, and initial data analysis. PMR and DOP provided methodological guidance and assisted with data interpretation. All authors contributed to the critical revision of the manuscript and ensured the overall academic quality.

ETHICAL STATEMENT

This study was approved by the University of Jember with number 238/UN25.1.14/KEPK/2023.

DATA AVAILABILITY STATEMENT

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

CONFLICT OF INTEREST STATEMENT:

The authors declare no conflict of interest.

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