

Short Communication

Strengthening the Capacity of Village Communities in Handling Health Crises Due to Disasters Through Participatory Action Research: Results of Community Service in Ngelang

Sunarto*, Heru Santoso Wahito Nugroho, Suparji, Aries Prasetyo and Cantika Puteri Apriliana

Prodi Kebidanan Magetan, Jurusan Kebidanan, Poltekkes Kemenkes Surabaya, Surabaya, Indonesia

Article history

Received: 3 June 2026

Revised: 28 June 2026

Accepted: 28 June 2026

Published Online: 28 July 2026

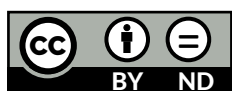
***Correspondence:**

Sunarto

Address: Prodi Kebidanan Magetan, Jurusan Kebidanan, Poltekkes Kemenkes Surabaya, Surabaya, Indonesia.

Email: sunartoyahyamuqaffi@gmail.com

How to cite this article: Sunarto, Nugroho HSW, Suparji, Prasetyo A, Apriliana CP. Strengthening the Capacity of Village Communities in Handling Health Crises Due to Disasters Through Participatory Action Research: Results of Community Service in Ngelang. *Health Dynamics*, 2026, 3(7), 284-294. <https://doi.org/10.33846/hd30703>



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ABSTRACT

Ngelang Village in Kartoharjo District, Magetan Regency, has been designated a Disaster Resilient Village (Destana). However, its capacity to handle health crises remains limited, marked by weak coordination, the absence of an emergency command structure, and minimal training and simulation. The community service activity employed a Participatory Action Research (PAR) approach and involved 34 participants. Needs identification resulted in four priorities: establishing a command structure, developing a contingency plan, updating health vulnerability data, and creating a risk and vulnerability map. Intensive training was conducted over four days, totaling 30 training hours (JPL). The average pre-test score of 77.07 increased to 86.4 in the post-test, but decreased to 81.03 after one month, indicating challenges in knowledge retention. Participation was high, with over 59% of responses in the excellent category. Weaknesses were still evident in discussion engagement and problem-identification skills. Reflection showed that material understanding and practical skills were in the moderate category, while engagement was relatively high. The PAR intervention was effective in increasing knowledge and participation; however, the sustainability of the results requires strengthening retention strategies. Active participant involvement is crucial, but improvements are needed in discussion and problem analysis. The village government is committed to allocating the village budget (APBDes) for evacuation facilities, outreach, and regular simulations. The Destana Forum has agreed to make the training a regular biennial program and establish collaborations with health and disaster management agencies.

Keywords: *Destana*; village capacity; health crisis; participatory action research

1. INTRODUCTION

Natural and non-natural disasters not only cause physical damage but also have the potential to trigger complex and prolonged health crises. This situation is more likely to occur in rural communities with limited resources. The resulting health impacts include physical injuries, increased cases of malnutrition among children, disruptions to maternal and child health services, decreased availability of health workers, adolescent anemia, gender-based violence, infectious diseases, environmental health problems, and mental health issues. In the context of community-based disaster management, Disaster Resilient Villages (Destana) have a strategic role as the vanguard in prevention, mitigation, preparedness, emergency response, and post-disaster recovery.⁽¹⁾

Even though Ngelang Village, Kartoharjo District, Magetan Regency has been designated as a Disaster Resilient Village (*Destana*), the village's capacity to deal with health crises due to disasters is still not optimal. Key issues include

minimal coordination among village stakeholders, the absence of a command structure for emergency health crisis management, the unavailability of food and non-food logistics, and limited training and simulations for emergency health management. These conditions have the potential to cause response delays and increase the risk of health impacts on affected communities.⁽²⁾

The importance of a village capacity building program is even more evident when considering the level of vulnerability of the Ngelang Village population. Of the 1,855 residents, there are significant vulnerable groups: 22.8% are toddlers (1% of whom are malnourished), 23.4% are women of childbearing age (including 2% of pregnant women), 11.9% are elderly (2% of whom have chronic illnesses), and several residents with disabilities. These groups are at higher risk from the impacts of disasters, particularly flooding. Risk distribution at the neighborhood level (RT) shows that the greatest flood threat occurs in RTs 10 to 17, which encompass residential areas and rice fields. With 17 RTs, the uneven distribution of risk requires a disaster health crisis management strategy based on local data that focuses on the most vulnerable areas.⁽³⁾

The urgency of capacity building is increasing with the high risk of annual flooding, particularly in February, when rainfall reached 1,023 mm. Without an adequate preparedness system, disasters have the potential to cause disease outbreaks, disrupt sanitation, and limit access to health services. In line with developments in community empowerment studies, the Participatory Rural Appraisal (PRA) approach has proven effective in increasing community capacity because it positions the community as the primary subject in the process of problem identification, planning, solution implementation, and reflection.⁽⁴⁾ However, the implementation of PRA that specifically integrates training and simulations for disaster health crisis management remains limited. Most previous programs have focused on outreach without structured field practice, thus opening up new opportunities to develop a PRA model integrated with training and simulations for health crisis management at the village level.⁽⁵⁾

Based on these conditions, this community service activity aims to increase the capacity of Ngelang Village towards becoming a resilient village in disaster health crisis management through a PRA approach integrated with training and field practice. This activity involves various village stakeholders, including youth organizations, family welfare women's group (PKK),

community service, health cadres, volunteers, village health workers, and the village government, who are members of the Disaster Risk Reduction Forum (FPRB). Indicators of success include the establishment of an integrated coordination mechanism among village stakeholders, the existence of a command structure for disaster health crisis emergency management, improving community skills through training and simulations, the availability of a flood disaster health crisis contingency plan document, increasing community preparedness, especially in RT 10–17 which are most prone to flooding, the availability of a health vulnerability risk map, and the publication of scientific publications as a contribution to the development of science.

2. METHODS

The community service method in Ngelang Village uses a hands-on approach, Participatory Action Research (PRA). The process is carried out sequentially, starting with problem identification through mapping village conditions, vulnerability analysis, and information gathering using participatory tools such as maps, group discussions, and brainwriting. The next stage is joint community planning to develop a health crisis management strategy, emphasizing active participation, empowerment, and respect for the village's socio-cultural uniqueness. The program is then implemented in the form of training and the preparation of a health crisis management plan document involving participants, followed by observations to assess participant engagement, method effectiveness, and the improvement of practical skills. The final stage is a joint reflection as a continuous learning cycle, where the community and facilitators evaluate the results, disseminate good practices, and ensure the program's sustainability through replication in other areas.⁽⁶⁾

To support the success of this method, Ngelang Village partners play a crucial role by providing human resources, local knowledge, communication access to the community, and training locations and facilities. Program evaluation is conducted through the establishment of a command structure for emergency health crisis management, the development of a response plan document, assessment of the training process, improvement of participant knowledge and skills, and assessment of impacts in the form of behavioral changes and increased community resilience (Figure 1). Continuous monitoring is conducted every two months

to ensure the sustainability of the program, with indicators of community preparedness, the effectiveness of institutional coordination, and strengthening local capacity through prevention, mitigation, preparedness,

response, and post-crisis recovery activities. With this sequence, PRA becomes an effective tool for building resilience in Ngelang Village in facing health crises caused by disasters.

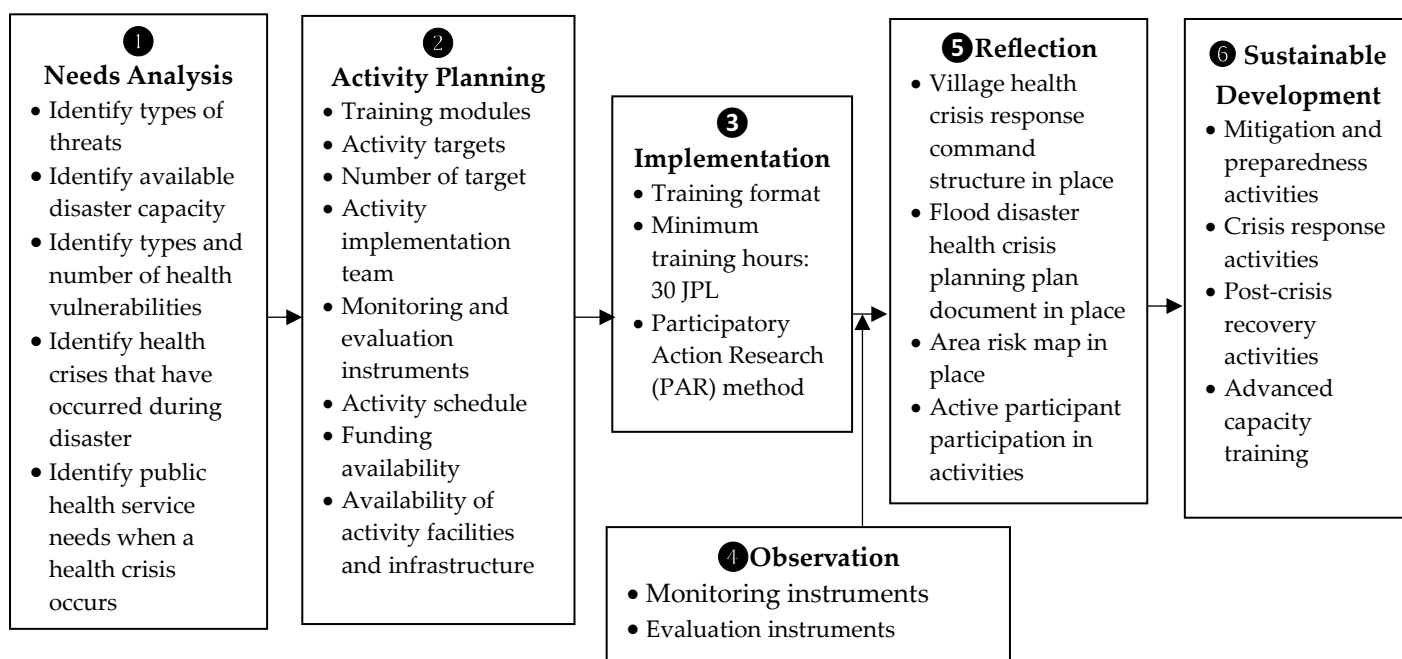


Figure 1. Solution framework for solving partner village problems

3. RESULTS

1. Needs Identification Results

Through group discussions and participatory mapping, followed by a brainwriting method carried out for 3 (three) days with 34 participants (Ngelang Village Disaster Risk Reduction Forum), several urgent needs were identified that must be met immediately to improve preparedness and response to health crises in the village, including:

- The need to establish a command structure for handling emergency health crises and disasters.
- The need to prepare a disaster health crisis contingency plan document as a guideline for dealing with emergencies.
- Disaster management plan document update to suit the latest conditions.
- Strengthening food and non-food logistics to support the basic needs of affected residents.
- Disaster victim handling capacity training for volunteers and health workers.
- Standardization of refugee camps to meet health, safety, and comfort aspects.
- Health vulnerability data update as a basis for intervention planning.
- Preparation of a risk map of health crisis areas and vulnerability maps to clarify vulnerable areas.

- Implementation of emergency response simulation as a means of community preparedness training.

From the nine identified needs, several priorities were then determined according to the scale of impact and urgency in 4 (four) quadrants, as follows in Figure 2.

Based on the scale of urgency and impact, the priority needs that need to be facilitated immediately are:

- The need to establish a command structure for handling emergency health crises and disasters.
- The need to prepare a disaster health crisis contingency plan document as a guideline for dealing with emergencies.
- Health vulnerability data update as a basis for intervention planning.
- Preparation of a risk map of health crisis areas and vulnerability maps to clarify vulnerable areas.

2. Activity Planning Results

The activity planning was carried out in a participatory manner, involving 20 participants. During the meeting, it was agreed that the empowerment activities would be conducted in the form of intensive training using a Participatory Action Research (PAR) approach over four days. The training structure was designed for 30 training hours (JPL).

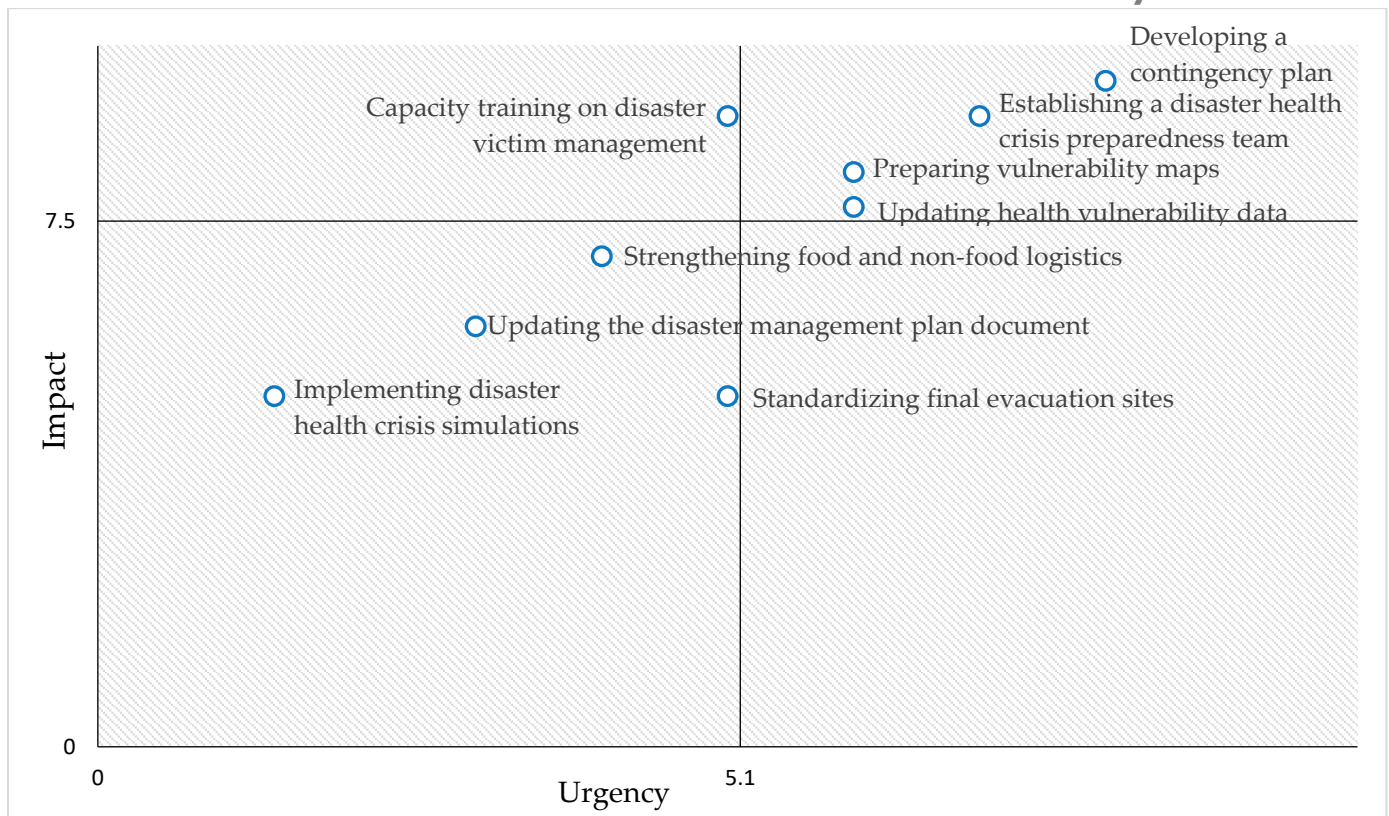


Figure 2. Priority of empowered capacity needs

3. Results of Activity Implementation

The training was conducted over four days for 34 participants from the Ngelang Village Disaster Risk Reduction Forum. The training material was based on a collaboratively developed training module. The training method included a combination of lectures, questions and answers, group discussions, assignments, and map-making practice. Facilitators were academics (the Community Service Team) and the Magetan Regency Disaster Risk Reduction Forum.

4. Observation Results

a. Increasing the empowerment of partners in understanding the material

Figure 3. The pre-test results show an average participant score of 77.07, with a score range of 55 to 100. This illustrates that participants' initial knowledge was relatively good, but there was still considerable variation, with some participants having low levels of understanding. After the intervention, post-test scores increased to an average of 86.4, with a minimum score of 75 and a maximum score of 100. This increase indicates a positive impact of the intervention, as evidenced by the increase in both the average and the lowest score, which was higher than the pre-test. This indicates that almost all participants had improved understanding, with no

participants remaining in the very low category. However, one month after the post-test, the average score decreased to 81.03, with a minimum score of 60 and a maximum score of 100. This decrease indicates a decline in knowledge retention over time. Although the average remained higher than the pre-test, some participants experienced a significant decline, resulting in a decrease in the minimum score. Overall, these data demonstrate that the intervention significantly improved participants' knowledge, but the sustainability of understanding remains an issue challenge.

b. Participation of participants in the community service activity process

Participant participation in activities was generally high, where more than 59% of the 13 question items were in the category very good, around 34% including good, and the rest Enough. This shows that the majority of participants were actively involved, although there were still weaknesses in the aspects of involvement in group discussions, active questioning, and the ability to identify problems. Of the total 34 participants, these results reflect that participation has been positive, but it is still necessary to strengthen the components that are still weak so that participant involvement is more even and in-depth, as shown in Figure 4 below.

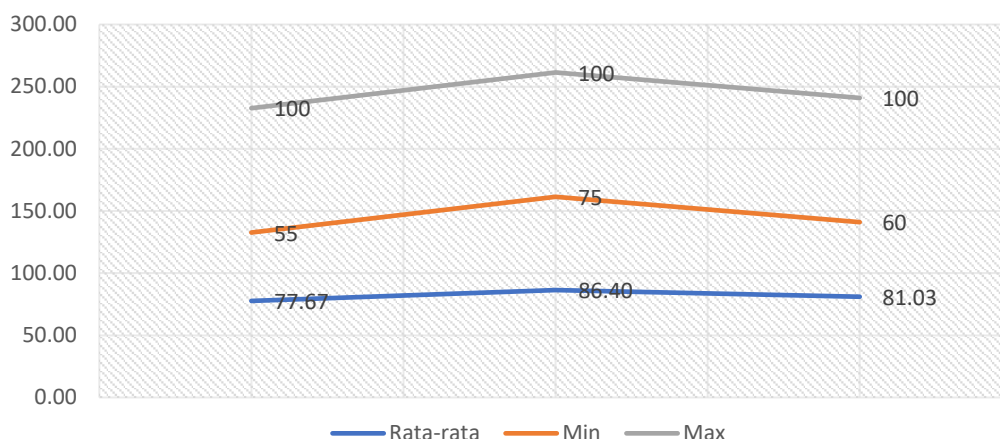


Figure 3. Results of observations of the understanding of the material by training participants

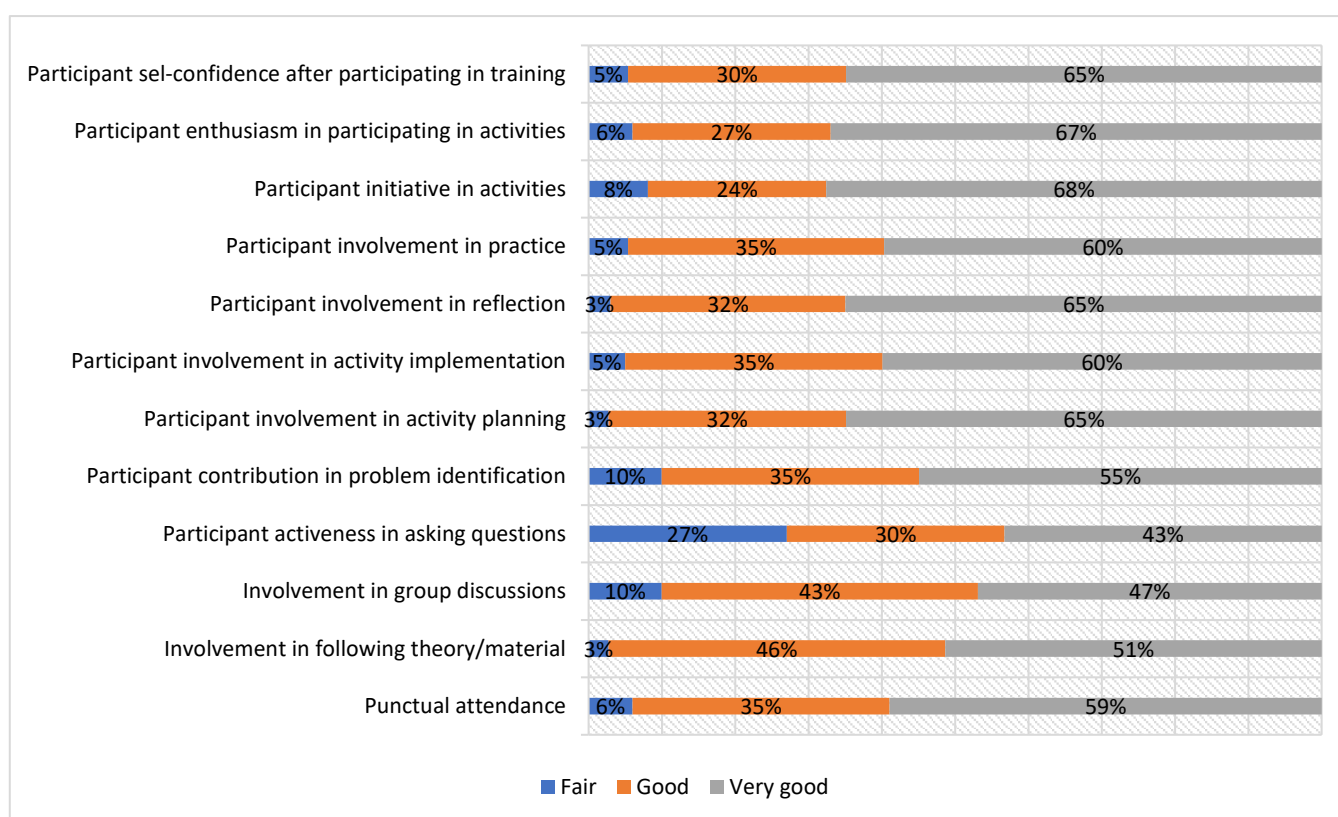


Figure 4. Results of observations of participant participation in all Community Service activities

c. Availability of the disaster health crisis risk map in Ngelang village

Figure 5. Shows a map of social and economic vulnerability to flooding in Ngelang Village, Kartoharjo District. The mapping results indicate that several neighborhood units (RT) are at high risk of flooding, namely RT 2, 4, 11, 13, 14, 16, and 17. The high vulnerability in these areas is not only caused by geographic factors, but also influenced by the community's socio-economic conditions, such as low income levels, limited access to health services, and inadequate housing quality. This situation makes residents in these neighborhood units more vulnerable to

disasters, both in terms of mitigation capabilities and post-flood recovery. Therefore, special attention and targeted management strategies are needed to reduce the impact of flooding on the most vulnerable community groups.

d. Availability of a command structure for handling emergency health crises in villages

The command structure for handling emergency health crisis disasters in Ngelang village was established by Decree of the Head of Ngelang Village number: 188/37/Kept./403.415.6/2026 dated April 30, 2026, with the structure as shown in Figure 6.

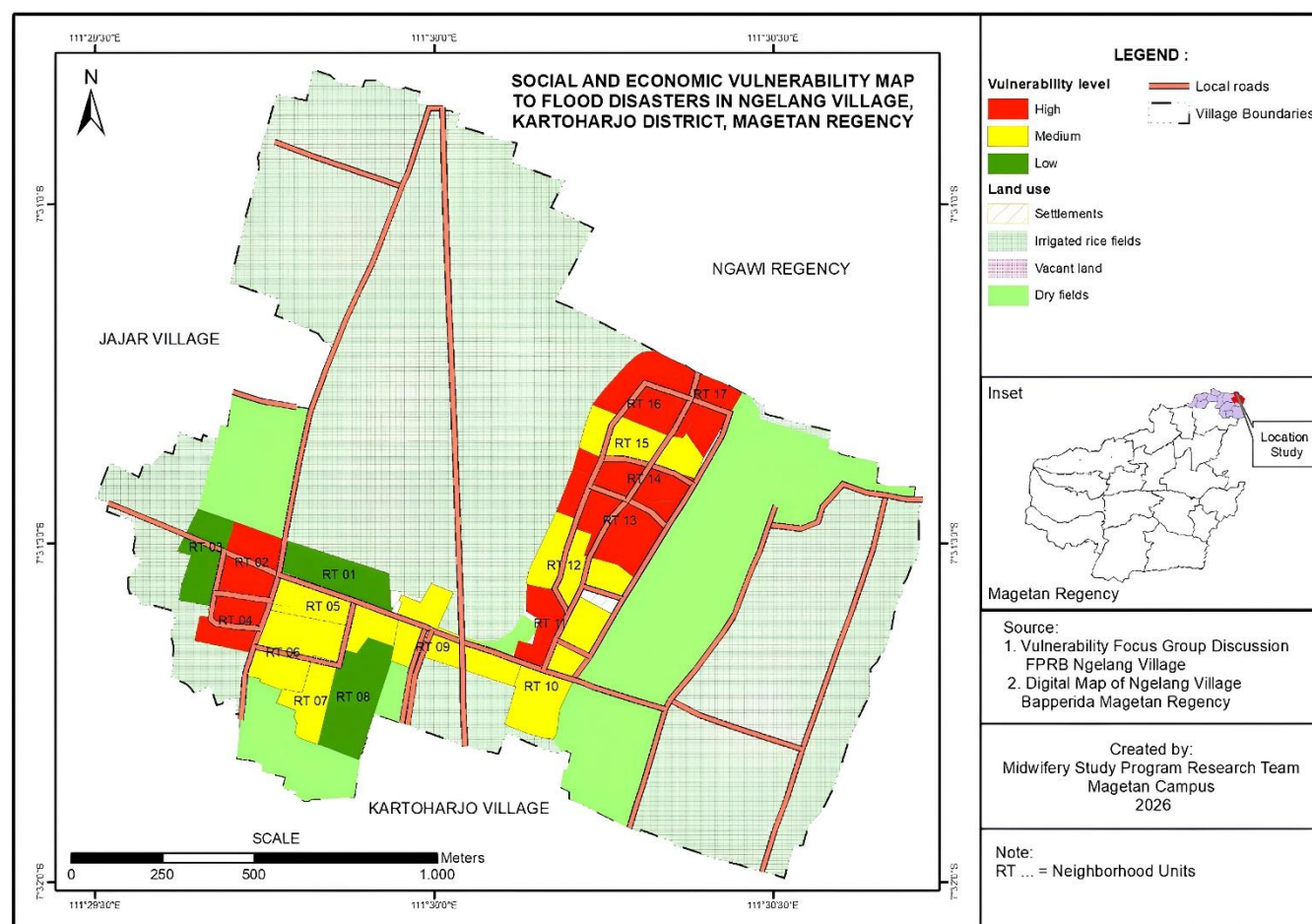


Figure 5. Health vulnerability map of Ngelang Kartoharjo village, Magetan

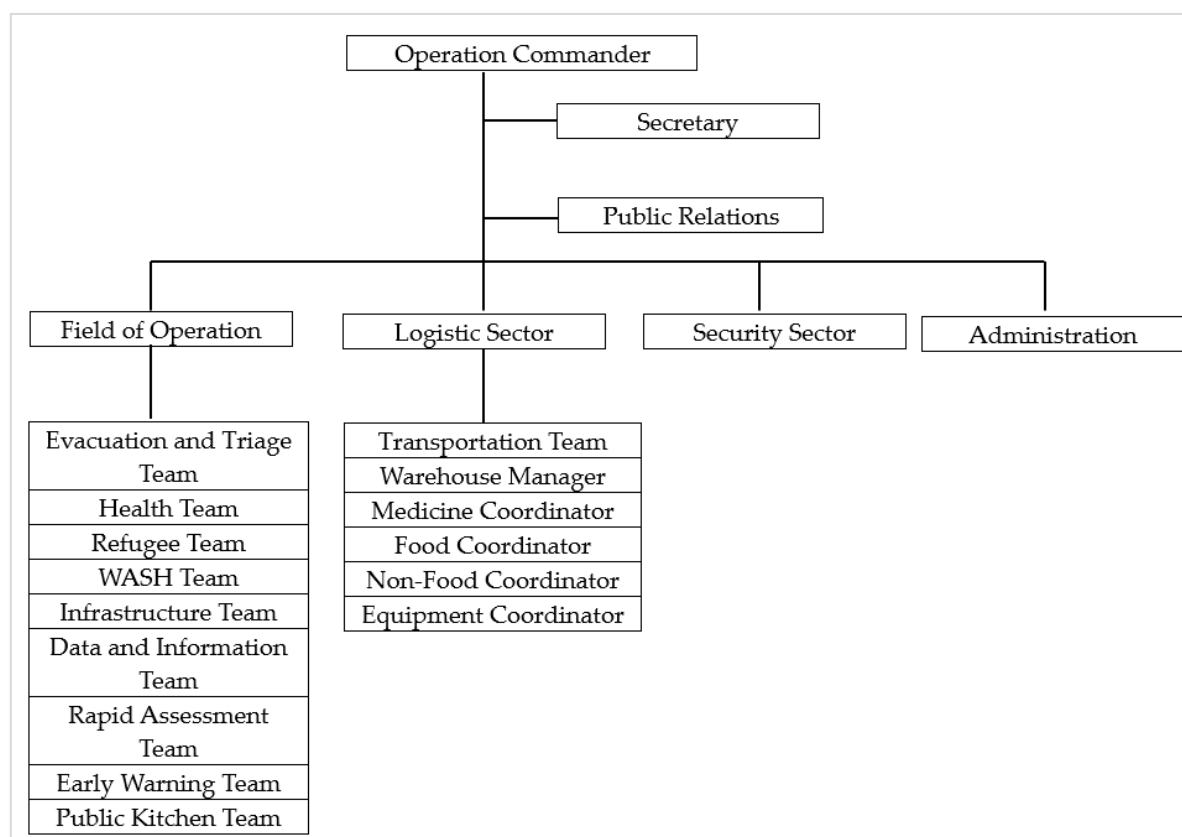


Figure 6. Ngelang village disaster health crisis emergency command structure

e. Photos of the results of the activities



Figure 7. Shows photos of community participation activities in participatory-based community service activities.

5. Reflection Results

Figure 8. In terms of understanding the material from 12 questions, participants' scores ranged from 12 to 60, with an average of 43. This indicates that most have understood the material well but are still in the moderate understanding category, so there are still some who need further in-depth understanding. For practical skills, from a score range of 8 to 40, the average participant score was 27. This means that participants' practical abilities are categorized as moderate, but there are some participants whose skills are already good, so they still need guidance. Meanwhile, in the reflection of participant participation in the activity, the score ranged from 5 to 25, with an average participant score of 19. These results indicate that the level of participant involvement is quite high, although some are still passive.

6. Follow-up Activities

As a follow-up, the village government committed to allocating funds from the Village Budget (APBDes) to complete facilities and infrastructure at the evacuation site and to disseminate training results to the community, especially in high-risk neighborhood units (RTs). The Destana Forum, along with all relevant agencies, agreed to hold regular emergency response simulations for health crises and make this training a biennial program. Furthermore, this activity opens up opportunities for broader collaboration with health and disaster agencies to strengthen the village's resilience system on a sustainable basis.

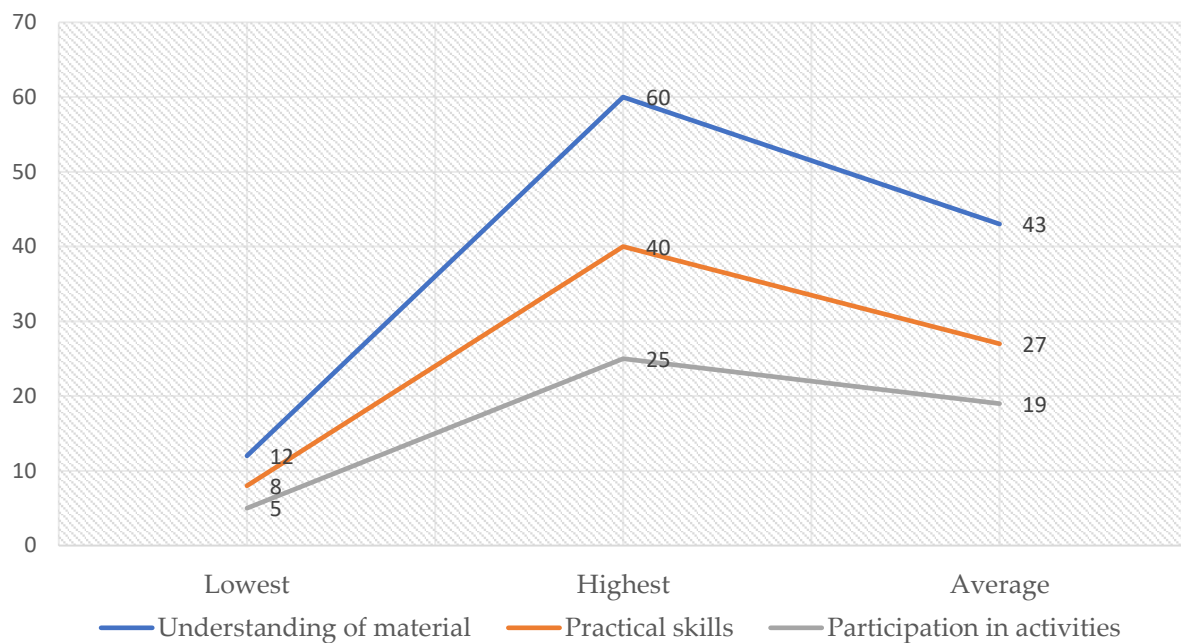


Figure 8. Results of participant reflections on a series of community service activities

4. DISCUSSION

Community Service (*Pengabmas*) activities in Ngelang Village demonstrated that 30 hours of flood disaster health crisis preparedness training were quite effective in increasing the capacity of the village community. The training was conducted using a Participatory Action Research (PAR) approach through lectures, group discussions, practice, simulations, and collective reflection. This approach provided participants with the opportunity to not only understand the concept of preparedness theoretically but also to apply skills directly in the context of a health emergency situation resulting from a disaster. The effectiveness of the training was evident in the participants' ability to compile a health vulnerability map, develop a flood disaster health crisis Contingency Plan (*Renkon*), and establish a community-based emergency response command structure. These findings align with recent research by Sofyana and Tabche, which states that intensive, practice-based training can increase community capacity in developing a community-based emergency preparedness and response management system.⁽⁷⁾ The results of the pre-test and post-test evaluations showed an increase in participants' knowledge levels after participating in the training. This increase indicates that the training material was well understood by the participants, especially regarding health crisis preparedness, disaster victim

triage mechanisms, identification of vulnerable groups, preparation of vulnerability maps, and the formation of emergency command structures. These findings indicate that training with a combination of theory and practice is quite effective in improving participants' understanding of the basic concepts of disaster preparedness. These results are in line with recent research by Fazeli and Sulley, which stated that community-based training can significantly improve community knowledge in the initial evaluation stage after training.⁽⁸⁾

However, the evaluation results one month after the training showed a slight decline in participants' knowledge levels. This decline indicates that disaster knowledge retention requires ongoing reinforcement through routine simulations, repeated field practice, and periodic community mentoring. This condition is common in community-based training because most participants are not yet accustomed to continuously applying preparedness skills in their daily lives. The results of this activity align with previous research, which also shows that post-training knowledge gains tend to decline in mid-term evaluations if they are not accompanied by regular practice and ongoing material reinforcement.⁽⁹⁾

Despite a slight decline in follow-up evaluations, observations indicated that participants were still able to apply the practical skills they had learned during the training. Participants successfully conducted disaster

victim triage exercises, simulated victim evacuations, identified pregnant women with Chronic Energy Deficiency (CED), screened adolescent girls and pregnant women for anemia, and independently developed an emergency response command structure. Furthermore, participants were able to develop health vulnerability maps and village contingency planning documents, although they still required assistance from a facilitator, particularly during the risk analysis, identification of vulnerable groups, and integration of socio-geographic data. This demonstrates that participants' practical skills were considered quite good, but further technical capacity building is needed to enable communities to carry out preparedness functions more independently. These findings align with research published in several journals, which found that village communities were generally able to understand basic preparedness practices after training, but still required assistance in developing technical documents and community-based risk mapping.^(2,10)

During the implementation phase, observations showed that the level of participant participation during the training was very good. Participants from various community groups who are members of the Disaster Resilient Village Forum (Destana) were actively involved in all activities, from providing materials, group discussions, compiling documents, practicing triage and evacuation, practicing anemia screening for pregnant women, screening for malnutrition in toddlers, to joint reflection. This high level of participation demonstrates that the Participatory Action Research (PAR) approach is able to create a collaborative learning atmosphere and encourage active community involvement in the process of increasing capacity for disaster health crisis preparedness. Recent research by Counto, Karunarathne, and Margayaningsih reported that a participatory approach can increase community involvement and strengthen social cohesion in community-based preparedness programs.⁽¹¹⁾

Although participant participation was considered very good, observations showed limitations in group discussions and participant engagement in asking questions and expressing opinions. Some participants tended to be passive during in-depth discussion sessions, particularly on technical topics such as developing health vulnerability maps, risk analysis, and developing contingency planning documents. This condition is likely influenced by differences in educational background, organizational experience, and level of understanding of

disaster issues among participants.⁽¹²⁾ From an experiential learning perspective, critical reflection and active participation in discussions are essential components of the community learning process. Therefore, more interactive facilitation methods and more intensive mentoring are needed to empower all participants to develop the courage and ability to express their ideas and conduct independent analysis.⁽¹³⁾

The presence of participants from among volunteers, health workers, and cadres has been proven to positively contribute to the dynamics of group learning through peer learning mechanisms. Participants with broader experience in disaster management were able to assist other participants in understanding health vulnerability mapping, establishing emergency command structures, anemia screening practices for pregnant women, malnutrition screening for toddlers, and developing contingency plans for village flood disaster health crises. Based on the perspective of social learning theory, interactions between members with different levels of experience accelerate the process of skill transfer while increasing participants' confidence in participating in the training.⁽¹⁴⁾ The findings of this activity confirm that collaboration across community elements is a key factor in supporting the success of community-based preparedness capacity-building programs.

From the Community-Based Disaster Risk Assessment (CBDRM) perspective, participants' success in developing health vulnerability maps, contingency planning documents, and emergency command structures demonstrates that communities are beginning to integrate local knowledge with disaster preparedness principles. This process serves as an early indicator of the success of a participatory approach to building a community-based emergency response system. In addition to strengthening community technical capacity, the process also raises collective awareness of the importance of village-based disaster risk reduction. The results of this community service align with recent research conducted by Cvetkovi, which shows that CBDRM-based training can improve communities' ability to develop risk maps, strengthen local coordination, and build more adaptive emergency response systems tailored to the conditions of their respective regions.⁽¹⁵⁾

Overall, the results of this Community Service Program indicate that the 30 JPL training sessions with a participatory approach were quite effective in improving understanding, practical skills, and community

participation in health crisis preparedness due to flood disasters. The level of participant understanding of the training material was categorized as good, while practical skills were in the fairly good category because most participants were able to apply basic preparedness skills, although they still needed further assistance. High community participation is an important asset in building a sustainable preparedness system at the village level. Therefore, follow-up is needed in the form of routine simulations, repeated training, technical assistance, and integration of preparedness programs into village development policies so that community resilience can develop operationally and sustainably in facing real disaster situations.

Limitations of this Community Service activity include the relatively short implementation time, which meant that not all material could be optimally explored, particularly in the development of health vulnerability maps and village flood disaster health crisis contingency plans. Furthermore, limited resources and time for mentoring meant that the post-training capacity building process could not be carried out intensively and sustainably. Evaluation of the activity was also limited to short-term measurements, thus not being able to reflect long-term changes in community preparedness behavior. Furthermore, there were still limitations in the activeness of group discussions, the ability to analyze technical disasters, and the courage of participants to ask questions and express opinions. Therefore, a more structured mentoring model, regular follow-up training, and strengthened cross-sector collaboration are needed so that the results of community capacity building can be maintained and developed sustainably.

5. CONCLUSION

The Participatory Action Research (PAR) approach has strengthened Ngelang Village's capacity to face disaster-related health crises by improving knowledge, skills, and community involvement. Continued training and mentoring remain important to sustain preparedness. To support this, the Destana Forum should conduct simple, low-cost response simulations every 3–6 months using local scenarios and community participation. In addition, small volunteer-based coordination teams with clear roles and communication channels—such as WhatsApp groups—can be formed with village governments to ensure quick and efficient emergency response.

Ethical Approval

This community service activity has obtained permission from the National and Political Unity Agency of Magetan Regency number: 072/147/403.205/2026.

Acknowledgement

This research article, compiled in the form of a research brief, received support from the Disaster Risk Reduction Forum of Magetan District, East Java, Indonesia.

Competing Interests

Although there is funding support from the Magetan Regency Disaster Risk Reduction Forum, East Java, Indonesia, there is no conflict of interest between the author and the forum, in fact the research results can be used by the forum to provide assistance to other disaster-resilient villages.

Funding Information

This research received funding support from the Magetan Regency Disaster Risk Reduction Forum, East Java, Indonesia.

Underlying Data

The author has nothing to report.

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