

Analysis of Disaster Awareness and Community Disaster Risk Reduction in Indonesia Through Disaster Education

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ABSTRACT

A comprehensive approach is essential to understand disaster risk better and take the necessary preventive measures. The purpose of the study is to analyze disaster awareness and disaster risk reduction in the community. The methods used were descriptive, quantitative, and qualitative, with data collection techniques using questionnaires and 234 respondents. The results of the study show that some people have experienced disasters and are not prepared to deal with disasters. Most people (62%) still feel less or unprepared for disaster situations, indicating the need for increased preparedness education and training. Even though they are not prepared, the community already has a basic understanding of the right actions when a disaster occurs. Although the majority have experienced disasters, the level of physical and mental readiness to deal with emergencies is still low. Knowledge of the surrounding environment through mapping is very important in disaster preparedness, but its implementation has not been evenly distributed. Through Kamishibai, disaster education and understanding of the surrounding environment can become educational programs in disaster mitigation.

Keywords: disaster awareness; disaster education; disaster risk reduction; Indonesia.

INTRODUCTION

Indonesia is a country that is passed by the Ring of Fire and is located in the area where the Indo-Australian plate, the Eurasian plate, and the Pacific meet. This makes Indonesia unable to avoid disasters. One of the challenges in sustainable development that is currently receiving serious attention is related to disaster management. Almost every region, especially in Indonesia, has the potential for disasters (Triastari et al., 2021).

The three types of disasters identified include natural, non-natural, and social disasters. Various types of natural disasters that occur in Indonesia include earthquakes, tsunamis, volcanic eruptions, soil movements, floods, droughts, erosion, and abrasion, as well as extreme weather and waves (Baldah et al., 2023). Meanwhile, non-natural disasters include technological failures, epidemics, and disease outbreaks. Social disasters include social conflicts and acts of terrorism.

Disasters can directly shake and weaken the resilience of a region, which is the dynamic condition of an area that covers all aspects of people's lives in an integrated manner, including the ability to develop the potential of the region in facing and overcoming various challenges, threats, obstacles, and disturbances, both from within and outside, directly or indirectly (Juhadi et al., 2021). Several Indonesian waters have the potential to be affected by the tsunami, such as the west coast of Sumatra, the south of Java, the west coast of Sulawesi, Gorontalo Bay, the northern part of North Sulawesi, the west coast of the Sangihe-Talaud Islands, as well as the western, northern, and eastern coasts of Halmahera, as well as the northern region of Papua (Fuady et al., 2021).

Disaster mitigation can be interpreted as an effort to review the condition of disaster-prone areas so that disaster potential and vulnerability can be evaluated. A comprehensive approach is essential to better understand the risks and take the necessary preventive measures. Integrating disaster mitigation into sustainable development policies helps reduce vulnerability to natural hazards while promoting economic growth and environmental protection (Rahman et al., 2023). Therefore, mitigation efforts must be carried out through the agreement of various parties to address risk reduction. Local governments, stakeholders, and property owners need to work together to find viable solutions through informed decision-making (Demiray et al., 2025).

Studies on disaster education are still relatively minimal in the context of education and community development. In fact, this education has a crucial role,

not only as a preventive measure but also to minimize the impact felt by disaster victims. Well-designed disaster education is able to provide knowledge and skills to individuals and communities to be better prepared to face and recover from disaster situations effectively (Pradipta et al., 2024). In order for disaster education to be more optimal, the direct involvement of the community in identifying and solving problems related to disasters based on real experience is very important. For this reason, this study was conducted to analyze disaster awareness and disaster risk reduction in the community.

METHOD

This research uses quantitative and qualitative descriptive methods. The data collection technique used a questionnaire distributed using Google Forms. Questions are divided into 3 parts, namely a closed question model with several questions suggesting several reasons and open questions with free answers. Respondents totaled 234 people, consisting of lecturers, teachers, and students spread throughout Indonesia. This research uses quantitative descriptive analysis to process the data from the questionnaire results expressed in the form of scores, using Correlation Analysis Between Questions. Meanwhile, qualitative descriptive analysis is used to classify information from qualitative data in the form of answers in the questionnaire, in the form of Most Frequently Appearing Words.

RESULTS AND DISCUSSION

Demographics Profile

The demographic profile of the study is presented in Table 1 below.

TABLE 1: Demographics Profile.

Demographics	Number of Respondent	%	Total
Gender			
Male	66	28	234
Female	168	72	
No answer	0	0	
Background			
Lecturer	6	3	234
Science teacher	159	68	
Non-science teacher	64	27	
Student	5	2	
Education			
Senior High School	5	2	234
Diploma	0	0	
Bachelor	150	64	
Magister	44	19	
Doctor	0	0	
No answer	35	15	

Based on Table 1, respondents are dominated by women, with a proportion of more than two-thirds. The vast majority of respondents were science teachers, about two-thirds of the total respondents, followed by non-science teachers and a few lecturers

and students. Most of the respondents have a bachelor's or master's degree, with the majority at the undergraduate level. A significant number do not provide answers related to education.

Result

Disaster awareness and disaster risk reduction are very important for the community, too. Preparing before a disaster occurs is a way to reduce the impact of damage (Castro & Aranguren, 2023). Damage and loss of homes, food crops, and livestock, loss of sources of income, food and water crises, sanitation disorders, and communication disruptions are the

main problems reported during disasters (Parvin et al., 2023). Disasters caused by intensive and extensive disaster risks have a great impact on people's lives. Indirect losses and chain effects can cause more serious damage to the social and economic development of a region or society (Wen et al., 2023). The results of disaster awareness and disaster risk reduction are presented in Table 2.

TABLE 2: Results of Disaster Awareness and Disaster Risk Reduction.

No	Question	Responds	Percentage (%)	Total (%)
1	Have you ever experienced a disaster?	Yes	65	100
		No	35	
2	How prepared are you to face the situation in the event of a disaster?	Not ready	9	100
		Less prepared	53	
		Ready	33	
		Highly prepared	5	
3	What percentage of your confidence level is that you will be safe in the event of a disaster?	0-20%	7	100
		21-40%	12	
		41-60%	41	
		61-80%	30	
		81-100%	9	
4	What will you do when a disaster suddenly occurs?	Finding a safe place	58	100
		Don't know what to do	0	
		Stay calm	35	
		Saving yourself	7	
5	Do you think disaster education is necessary? Include the reason!	Necessary	100	100
		No need	0	
6	In your opinion, how important is it for us to know the environment around home and school?	Not important	0	100
		Less important	0	
		Important	17	
		Very important	83	
7	Have you ever done environmental mapping around your teaching?	Yes	65	100
		No	35	
8	Have you ever heard of the word "Kamishibai" in Japanese theater paper?	Yes	43	100
		No	57	
9	Do you know the function of Kamishibai in disaster education? If the answer is yes, explain what it does!	Yes	42	100
		No	58	

Based on Table 2, most of the respondents have experienced a disaster and are not prepared to deal with situations when a disaster occurs. This can affect the perception and preparedness of respondents for emergencies. Most people (62%) still feel less or unprepared for disaster situations, indicating the need for increased preparedness education and training. Most (71%) are in the moderate to high confidence range (41%-80%), but few are truly fully confident in their safety.

This indicates uncertainty and concerns related to security in the event of a disaster. Public awareness directly contributes to reducing the impact of disasters by encouraging proactive behaviors such as hazard identification and participation in mitigation activities (Bali, 2022). The results obtained on question number three, especially the responses from 159 science teachers, are presented in the following Table 3.

TABLE 3: Science Teacher's Response Results.

Question	Responds	Percentage (%)	Total (%)
What percentage of your confidence level is that you will be safe in the event of a disaster?	0-20%	7	100
	21-40%	12	
	41-60%	41	
	61-80%	30	
	81-100%	9	

Most science teachers (71%) have moderate to high levels of confidence (41%-80%) that they will be safe in the event of a disaster, indicating optimism about preparedness or self-protection. However, around 19% of teachers feel unsure (0%-40%), and this could be an indication of concern or uncertainty among some teachers regarding safety during disasters.

There is a need to increase education and preparedness training so that more teachers feel confident and safe to face potential disasters. The response to the fifth question about how necessary disaster education shows that all science teachers feel the need for it. The most frequently cited word for the reason for the need for disaster education is presented in the following Table 4.

TABLE 4: Most Frequently Appearing Words.

No	Term	Count	%	No	Term	Count	%
1	Disaster	49	27	14	Potential	4	2
2	To	14	8	15	Knowledge	4	2
3	Happen	14	8	16	People	4	2
4	Ready	12	7	17	Victim	4	2
5	Face	9	5	18	Disasters	4	2
6	Community	9	5	19	Know	3	2
7	Indonesia	6	3	20	Increase	3	2
8	Risk	5	3	21	Subtract	3	2
9	Necessary	5	3	22	Help	3	2
10	Education	5	3	23	Understand	3	2
11	Done	5	3	24	Awareness	3	2
12	Ready	4	2	25	Impact	3	2
13	Prone	4	2				

Disaster education is very necessary to equip teachers to be mentally and practically ready to face emergencies. The keyword disaster is the central topic of discussion. The dominant keyword, namely disaster, reflects the focus on risk understanding, action readiness, and the social impact of disasters.

Data on the frequency of word occurrence supports the argument that disaster education is a crucial aspect of risk mitigation at both the school and general public levels. The results of the open-ended questions totaling 6 questions are presented in the following Table 5.

TABLE 5: Disaster Preparedness.

No	Question	Conclusion Answer
1	In your opinion, what should be prepared in the event of a disaster?	Prepare a standby bag containing food, medicine, clothing, important documents, and communication tools. Stay calm, and find a safe place in times of disaster. Learn disaster mitigation and evacuation knowledge. Protect yourself with safety gear. Always be mentally and physically ready to face emergency situations.
2	According to you, who is responsible for saving residents in the event of a disaster?	The person in charge of rescuing residents during disasters involves the government, the community, and the SAR/BASARNAS team. All parties must play an active role, including individuals and local organizations. Cooperation between the central government, regions, and residents is essential for safety and effective disaster management.

No	Question	Conclusion Answer
3	What should you bring when evacuating after a disaster?	Prepare a standby bag containing a change of clothes, food, medicines, essential documents, communication tools, and personal supplies. Bring valuables and basic necessities for evacuation. Ensure mental and physical readiness and complete equipment to be safe in the face of disasters or emergency evacuations.
4	What will you do in the event of an earthquake disaster?	During an earthquake, stay calm and find a safe place such as under a table or corner of the room. Protect the head and body from falling objects. Avoid glass doors and dangerous items. After an earthquake, evacuate carefully to an open area away from buildings at risk of collapse.
5	What will you do in the event of a landslide?	When a landslide occurs, immediately evacuate to a safe place and stay away from dangerous areas. Stay calm, help your family and neighbors. Avoid landslide-prone areas and unstable soils. Seek help if needed. Prioritize the safety of yourself and those around you quickly and organized.
6	What will you do if a flood disaster occurs?	When flooded, immediately search and evacuate to a higher place. Protect yourself and your valuables. Stay calm, help your family and neighbors. Avoid areas prone to flooding and strong currents. Use communication tools to ask for help and prepare for emergencies well.

Overall responses emphasized the importance of physical preparation (complete standby bags), mental calm, risk mitigation knowledge, and the collaborative role between the government and the community in dealing with various types of disasters effectively for mutual safety. Disaster preparedness is very important to protect yourself and those around you. One of the main steps is to prepare a standby bag containing a change of clothes, food, medicines, important documents, communication tools, as well as personal and safety equipment. Mentally and physically, I must also be prepared to remain calm and alert in emergencies. Rescuing residents during disasters is a shared responsibility between the government, the community, and the SAR/BASARNAS team, with the active role of local individuals and organizations. Cooperation between the central government, local governments, and residents is indispensable for effective disaster management.

When an earthquake occurs, it is important to stay calm, find a safe place such as under a table, protect your head and body, and avoid dangerous areas. After the earthquake, evacuate carefully to an open area away from buildings at risk of collapsing. In the event of a landslide, immediately evacuate to a safe place, stay away from vulnerable areas, and help those around you. During floods, look for higher ground, protect valuables, and avoid rush currents. Use communication tools to call for help and make sure emergency needs are available. Readiness, calmness, and cooperation are the main keys to dealing with various disasters.

Analysis Results of Correlation

The questions analyzed for correlation amounted to 9. The results of the correlation analysis between the questions are presented in the following Table 6.

TABLE 6: Results of Correlation Analysis Between Questions.

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	
Spearman's rho	Q1	Correlation Coefficient	1.000	0.017	-0.144*	-0.118	.	-0.064	0.118	0.073	0.049
		Sig. (2-tailed)	.	0.793	0.027	0.072	.	0.329	0.073	0.265	0.457
		N	234	234	234	234	234	234	234	234	234
	Q2	Correlation Coefficient	0.017	1.000	0.432**	-0.014	.	0.027	0.252**	0.150*	0.210**
		Sig. (2-tailed)	0.793	.	<0.001	0.830	.	0.679	<0.001	0.022	0.001
		N	234	234	234	234	234	234	234	234	234
	Q3	Correlation Coefficient	-0.144*	0.432**	1.000	0.057	.	0.038	0.102	0.112	0.123
		Sig. (2-tailed)	0.027	<0.001	.	0.383	.	0.561	0.120	0.088	0.059
		N	234	234	234	234	234	234	234	234	234
	Q4	Correlation Coefficient	-0.118	-0.014	0.057	1.000	.	0.157*	-0.028	-0.049	-0.024
		Sig. (2-tailed)	0.072	0.830	0.383	.	.	0.016	0.670	0.458	0.712
		N	234	234	234	234	234	234	234	234	234

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Spearman's rho	Q5	Correlation Coefficient	.	.	.	.	.	.	.	.
		Sig. (2-tailed)	.	.	.	.	.	.	.	.
		N	234	234	234	234	234	234	234	234
	Q6	Correlation Coefficient	-0.064	0.027	0.038	0.157*	1.000	0.056	-0.170**	-0.174**
		Sig. (2-tailed)	0.329	0.679	0.561	0.016	.	0.393	0.009	0.008
		N	234	234	234	234	234	234	234	234
	Q7	Correlation Coefficient	0.118	0.252**	0.102	-0.028	.	0.056	1.000	0.236**
		Sig. (2-tailed)	0.073	<0.001	0.120	0.670	.	0.393	.	<0.001
		N	234	234	234	234	234	234	234	234
	Q8	Correlation Coefficient	0.073	0.150*	0.112	-0.049	.	-0.170**	0.236**	1.000
		Sig. (2-tailed)	0.265	0.022	0.088	0.458	.	0.009	<0.001	.
		N	234	234	234	234	234	234	234	234
	Q9	Correlation Coefficient	0.049	0.210**	0.123	-0.024	.	-0.174**	0.194**	0.851**
		Sig. (2-tailed)	0.457	0.001	0.059	0.712	.	0.008	0.003	<0.001
		N	234	234	234	234	234	234	234	234

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

The second question regarding preparedness for situations in the event of a disaster has a positive and significant relationship with many other variables (third question, seventh question, eighth question, ninth question), showing a central role in the pattern of relationships between variables. A significant negative association was found between the first and third questions, although small (-0.144). Other correlations did not reach the level of significance at $p < 0.05$ and were not analyzed further.

A moderate positive correlation between the second question regarding disaster preparedness and the third question regarding the level of confidence in being safe in the event of a disaster (+0.432) showed a fairly strong relationship. An increase in the score on one question tends to be followed by an increase in the score on another question. The very strong correlation between the eighth question on kamishibai and the ninth question on the function of kamishibai in disaster education (+0.851) indicates that these two variables are very closely related monotonically.

Analysis

Although the majority have experienced disasters, the level of physical and mental readiness to deal with emergencies is still low. The things that must be prepared in the event of a disaster are emergency bags containing important items. In addition, confidence in personal safety during the incident was also not optimal. This indicates the importance of awareness-raising programs, risk mitigation training, and the provision of supporting facilities so that the community is more confident and ready to face potential disasters in the future. Factors such as participants' education levels, socioeconomic status, lack of access to disaster education, and lack of awareness-raising activities can affect disaster preparedness (Steel, 2023). Knowledgeable communities can better participate

in risk assessments, early warning systems, and sustainable development planning, which are essential to reducing the impact of disasters at the local level (Mead, 2022).

The majority of respondents already have a basic understanding of the right actions during a disaster, namely finding a safe place and maintaining calm. This shows a good early awareness in dealing with emergencies. The growing focus on disaster risk reduction rather than just response and recovery suggests that risk reduction can reduce the impact of losses both humanly and economically (Albris et al., 2020). The collective awareness of the importance of disaster education is very high, signaling strong support for disaster risk mitigation education programs in communities and schools. Respondents understand that knowledge of the surrounding environment is crucial in disaster preparedness, for example, knowing evacuation routes or safe gathering points. Most have implemented mapping in the surrounding environment as part of disaster education, but there is still room for improvement so that all educators can practice it regularly.

When a disaster occurs, most respondents argue that all parties have their responsibilities. Local governments and decision-makers should adopt integrated risk management strategies, which can be much more effective if they involve the participation of local communities (Genovese & Thaler, 2020). The success of Disaster Risk Reduction (DRR) depends on an inclusive approach, where responsibilities are shared equitably between government agencies, NGOs, or community groups, as well as citizens themselves (Elkady et al., 2024).

Only 43% have heard the word Kamishibai, while the majority (57%) are not familiar with the term. 'Kami' is a Japanese word that means paper, and 'shibai' refers to a drama show.

So, Kamishibai is a multimodal show that combines picture cards with narration from the narrator (Ishiguro, 2022). Preschoolers in Japan are very familiar with Kamishibai. Of the respondents who knew about Kamishibai, only a small percentage (42%) knew about its function in disaster education. Knowledge of creative learning methods such as Kamishibai is still limited among respondents despite its great potential as an interactive educational medium for disaster mitigation.

The community shows high awareness of the need for disaster education and understanding of the surrounding environment as part of disaster preparedness. However, its implementation, such as environmental mapping, has not been fully evenly distributed among educators or respondents related to teaching. Disaster education can be carried out through two paths, namely formal education and informal education. Formal disaster education is usually carried out in schools, while informal disaster education is applied in the family environment and in the community (Sari et al., 2022). The results of the research conducted by Asih et al. (2023) emphasize that public education is a core component of Disaster Risk Reduction (DRR), in addition to risk assessment and early warning systems. Educating the public improves their ability to identify hazards, develop preparedness plans, respond quickly to emergencies, and play an active role in recovery efforts. In addition, learning media innovations such as Kamishibai are still poorly known, so further socialization is needed so that they can be optimally utilized in future disaster risk mitigation educational programs.

Disaster mitigation education plays an important role in equipping communities with the knowledge, skills, and attitudes needed to face and minimize disaster risk. Through this education, people not only learn how to act when a disaster occurs but can also recognize potential hazards in the environment around where they live, study, and work. Thus, people can be more vigilant and able to make the right decisions to protect themselves and others.

One of the most effective mediums for teaching disaster mitigation education is Kamishibai, a Japanese visual storytelling method that uses compelling images and simple narratives. Kamishibai conveys messages and information about disaster mitigation in a way that is easily understood by various groups, both children and adults. The use of Kamishibai has been proven to increase public awareness and understanding of the steps to be taken before, during, and after a disaster occurs.

However, in Indonesia, the use of Kamishibai as an educational medium for disaster mitigation is still not widely known and used by the world of education and the general public. In fact, Kamishibai is very easy to apply and can be an effective alternative to delivering disaster materials, especially in schools and local communities.

Improving people's literacy and preparedness for disasters is essential to reduce the negative impacts that may arise. Disaster mitigation education should be a priority, and the use of media such as Kamishibai can strengthen these educational efforts. Thus, people no longer feel anxious or do not know what to do but become more prepared, vigilant, and resilient in facing future disasters.

CONCLUSIONS

The results of the study show that some people have experienced disasters and are not prepared to deal with disasters. Most people (62%) still feel less or unprepared for disaster situations, indicating the need for increased preparedness education and training. Even though they are not prepared, the community already has a basic understanding of the right actions when a disaster occurs. Although the majority have experienced disasters, the level of physical and mental readiness to deal with emergencies is still low. Knowledge of the surrounding environment through mapping is very important in disaster preparedness, but its implementation has not been evenly distributed. Through Kamishibai, disaster education and understanding of the surrounding environment can become educational programs in disaster mitigation.

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