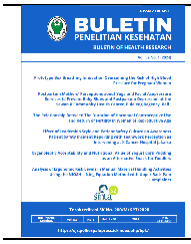

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Community Preparedness in Facing Flood Disasters in Kecamatan Baolan, Kabupaten Tolitoli

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ABSTRACT

Background: Kelurahan Baru RT 01 RW 12 Kecamatan Baolan is one of the areas that often experiences floods and has an impact on property destruction, clean water difficulties and poses a risk of disease, so community preparedness is needed to minimize the impact caused. This study aims to analyze community preparedness in dealing with flood disasters in Baolan District, Tolitoli Regency.
Methods: This study uses a survey method with a correlational approach which was carried out in Baru Village, RT 01 RW 12, Baolan District from June 11 to 13, 2024. The research sample consisted of all heads of families residing in the area, totaling 102 heads of families. The research variable is community preparedness in dealing with flood disasters. The instrument used was in the form of a preparedness questionnaire that included five parameters, namely: knowledge, attitude, emergency response plan, early warning system, and resource mobilization. Data analysis uses the Pearson product moment test, as well as multiple linear regression tests with a 95% confidence interval (CI).
Results: The results of the study showed that community preparedness was in the category of very ready (69.6%). There was a significant relationship between knowledge parameters (p=0.000; r=0.822), attitudes (p=0.000; r=0.609), emergency response plans (p=0.000; r=0.862), early warning systems (p=0.000; r=0.642), and resource mobilization (p=0.000; r=0,623) and disaster preparedness (p<0.05). Of the five parameters, knowledge is the most influential factor on preparedness (p=0.000; beta=0.435).
Conclusion: The community in the research area is classified as very prepared to face flood disasters, with knowledge as the most influential factor. These findings suggest that increased public knowledge about flood disaster risk plays a key role in improving preparedness. This emphasizes the importance of continuous education programs to strengthen public knowledge and awareness.

INTRODUCTION

Indonesia is a country that has a high risk of experiencing geological disasters from the western tip of Sumatra to the south of Papua (Handayani, Sholihatin, Setiawan, & ..., 2022). The territory of Indonesia is also in the tropics with fairly high rainfall and diverse geographical conditions. Because of these conditions, Indonesia always faces the risk of natural disasters

including landslides, floods, tsunamis, and volcanic eruptions (Lapento, 2017). Disasters that often occur are disasters related to hydrological disasters (Priyanti et al., 2019). Hydrological disasters, especially floods, are one of the most frequent types of disasters globally (Jonkman, Curran, & Bouwer, 2024;Problem, Flooding, The, Of, & Solution, 2023). According to the World Meteorological Organization (2021), about 44% of the natural disasters that occurred in the world between 2000-2020 were floods, causing economic losses of more than $651 billion and claiming the lives of nearly 325,000 people in various parts of the world (Duan, 2024; Fernández García, Gan, Cernuda Martínez, & Arcos González, 2024; Zhu et al., 2024).

The National Disaster Management Agency (BNPB) reported that flood disasters in Indonesia since 2014-2023 have occurred 8,067 times and in 2023 there have been 105 floods (BNPB, 2023). In Central Sulawesi, there were 157 flood disasters from 2017 to 2021. The number of flood disasters in Tolitoli City, Tolitoli Regency in 2017 was 3 times with the number of fatalities of as many as 4 people, 1 missing victim, and 280,398 victims. In 2018 as many as 1 time and in 2019 as many as 2 times, there were no casualties but there were 1,524 people who were displaced. In 2020 there were 5 times no casualties, but there were 3,235 victims and as many as 3,310 people and in 2021 there was 1 flood disaster victim that year (BNPB, 2021). This condition shows that flooding is not only a local problem, but also a global phenomenon that requires a planned and systematic preparedness approach.

Tolitoli is one of the regencies in Indonesia, precisely the part of Central Sulawesi that experiences floods more often. The Regional Disaster Management Agency (BPBD) of Tolitoli Regency has determined that as many as 10 sub-districts in Tolitoli Regency have the potential for flood hazards in the medium to high category. Baolan District is one of the districts affected by the flood where there are 200 heads of families (KK) affected by the flood for the October-November 2022 period (BPBD, 2022).

The common cause of flood disasters is high rainfall that triggers the overflow of rivers. In addition, due to high settlements in flood-prone areas, residents in this area are more vulnerable to the risk of flood disasters (Fernando, Shrestha, Saurav, & Mohanasundaram, 2022; Nigatu, Abebe, Grum, Kebedew, & Semane, 2023). Floods cause social losses, and physical health and have a significant impact on economic conditions (Lee, Perera, Glickman, & Taing, 2020; Wicaksono & Herdiansyah, 2019; Yin et al., 2021). Community preparedness in dealing with disasters is a crucial aspect in efforts to reduce the negative impacts caused. Although natural disasters are often unpreventable, their impact on communities can be minimized through appropriate preparedness measures. According to the National Disaster Management Agency (BNPB), community preparedness includes the ability of individuals, families, and communities to recognize potential threats, take preventive actions, and respond quickly and effectively when disasters occur. The urgency of this preparedness is even greater considering the high losses caused by disasters, both in the form of economic losses, casualties, and disruptions to social activities. Without adequate preparedness, communities become more vulnerable to the impacts of disasters, which not only affect the well-being of individuals but also hinder the development of the region as a whole. To reduce the impact that arises, community preparedness is needed in dealing with floods (Ao et al., 2020; Elum & Lawal, 2022; Hashim, Ng, Talib, & Tamrin, 2021). Individuals and households are the main stakeholders in community preparedness, as they are the spearhead, subject, and object of disaster preparedness directly against disaster risk (Priyanti et al., 2019).

Based on the results of a preliminary study conducted by the community in Baru Village, Baolan District, they have received education about disasters. However, it is not yet known how the community is prepared to face disasters. Through a descriptive method with a correlational approach, this study aims to analyze community preparedness in dealing with flood disasters in Baru Village, Baolan District, Toltitoli Regency so that information about community preparedness in dealing with disasters is obtained.

METHODS

This type of survey research uses a correlational approach because this study wants to see the relationship between knowledge parameters, attitudes, emergency response plans, disaster warning systems and resource mobilization with community preparedness in dealing with flood disasters with a relatively small sample number (102 families) and using total sampling techniques. This research was conducted in New Village, RT 01 RW 12, Baolan District, Tolitoli Regency on June 11 to 13, 2024. The sample in this study is all heads of families who live in New Village, RT 01 RW 12, Baolan District. The research variable is community preparedness in dealing with flood disasters.

The data collection instrument used the flood disaster preparedness questionnaire adopted from research Rahma, (2022) and then modified by the researcher according to the location and research subject. This questionnaire has been tested for validity and realism with a Cronbach α value of 0.713 greater than the r table (0.60). The preparedness questionnaire consisted of 5 parameters, namely knowledge consisting of 10 statement items, attitude 3 statement items, emergency response response 11 statement items, disaster warning system 4 statement items and resource mobilization 2 statement items. The categories of scoring (weight) of questionnaire answers are strongly agreed = 5, agree = 4, hesitate = 3, disagree = 2, and disagree = 1. The category of ambiguity is very ready if the respondent's answer score is 80% – 100% correct, ready if the score is 65% – 79% correct, almost ready if the score is 55% – 64%, not ready if the score is 40% – 54%, and not ready if the respondent's answer score is <40% (LIPI-UNESCO/ISDR, 2006). Data collection was carried out directly at the research site using a structured survey method. Before the distribution of the questionnaire, the researcher and enumerator conducted socialization to the respondents to explain the purpose of the research, the procedure for filling out the questionnaire, and ensure the confidentiality of the respondents' data. Questionnaires were filled out independently by respondents, but researchers provided guidance if there were questions related to certain items.

To ensure data quality, several steps are taken, including: (1) conducting a questionnaire test (pretest) on a small group of similar respondents to ensure language clarity and understanding of the questionnaire items, (2) directly monitoring the questionnaire filling process to avoid inconsistent answers, (3) conducting an initial check on the questionnaire that has been filled out to ensure data completeness, and (4) conducting double data entry to minimize errors in Data processing.

The data was analyzed using an univariate test to determine the level of preparedness and characteristics of respondents. The Pearson product-moment test was used to determine the relationship between knowledge parameters, emergency response plan attitudes, early warning systems, and resource mobilization with randomness, and multiple linear regression tests were conducted to determine the parameters most related to the level of preparedness of 0.05%. The product moment correlation test was conducted due to the findings of the data normality test using the Kolmogorov-Smirnov test, revealing a p-value greater than 0.05, indicating that the data follows a normal distribution.

RESULTS

This research was carried out from April to June 2024 and as many as 102 heads of families participated in this study.

Descriptive Statistics

Table 1 shows that based on age characteristics, more than half of the respondents in the adult category (26-45 years) were obtained, namely 57 respondents (55.8%), while the elderly. The gender of the respondents was almost entirely male, namely 86 respondents (84.3%), while a small part of the respondents were female, namely 16 respondents (15.7%). The job category showed that almost half of the respondents were self-employed, namely 47 respondents (46.1%), while a small part of the respondents were honorary, namely 2 respondents (2.0%). Almost half of the respondent's education level was high school, namely 34 respondents (33.3%), while a

small part of the respondents were S2, namely 1 respondent (1.0%). The marital status of the respondents was almost entirely married, namely, 81 respondents (79.4%), while a small part of the respondents were not married, namely 2 respondents (2.0%).

Table 1. Characteristics of respondents (n=102)

Characteristic	n	%
Age		
17-25 years old	8	7.8
26-45 years	57	55.8
46-65 years old	33	32.3
> 65 years	4	3.9
Gender		
Man	86	84.3
Woman	16	15.7
Work		
Housewife	9	8.8
Honorary	2	2.0
Self-employed	47	46.1
Farmer	11	10.8
Planters	4	3.9
Fishermen	4	3.9
Government employees	14	13.7
Retired	10	9.8
Education		
SD	15	14.7
SMP	21	20.6
SMA	34	33.3
D3	5	4.9
S1	26	25.5
S2	1	1.0
Marital status		
Unmarried	2	2.0
Marry	81	79.4
Divorce	19	18.6

Table 2. Distribution of respondents based on research variables (n=102)

Variables	n	(%)	Mean	Median	Min	Max
Knowledge						
Enough	46	45.1	41.93	43.00	30	48
Good	56	54.9				
Attitude						
Negative	41	40.2	12.83	13.00	9	15
Positive	61	59.8				
Emergency response plan						
Low	44	43.1	44.62	45.00	33	55
Tall	58	56.9				
Disaster warning system						
Low	51	50.0	17.35	17.50	12	20
Tall	51	50.0				
Resource mobilization						
Low	49	48.0	8.49	9.00	6	10
Tall	53	52.0				
Community preparedness in dealing with flood disasters						
Almost ready	1	1.0				
Ready	30	29.4				
Very ready	71	69.6				

Table 2 shows that the characteristics of knowledge have a mean value of 41.93; attitude has a mean value of 12.83; the emergency response plan has a mean value of 44.62; The disaster warning system has a mean value of 17.35 and resource mobilization has a mean value of 8.49. The variable of community preparedness in dealing with flood disasters showed that most of the respondents had a very ready category, namely 71 respondents (69.6%), while no respondents were included in the category of unprepared and unprepared.

Primary Outcome Measures

Table 3 explains the knowledge, attitudes, emergency response plans, disaster warning systems, and resource mobilization with preparedness in dealing with flood disasters, analyzed using the Pearson product-moment test. The results showed that there was a significant relationship between knowledge Parameters in dealing with flood disasters show a p-value of < 0.05, which was 0.000. The r-value of the calculation is 0.822, indicating a very strong relationship. There was a relationship between attitude parameters and preparedness in dealing with flood disasters, which showed a p-value of < 0.05, which was 0.000. The r-value of the calculation is 0.609 indicating a very strong relationship. There is a relationship between the parameters of the emergency response plan and preparedness in dealing with flood disasters, shown by a p-value of 0.05 <, which is 0.000. The calculated r value is 0.862, indicating a very strong relationship. There is a relationship between the parameters of the disaster warning system and preparedness in dealing with flood disasters, which is shown with a p-value of < 0.05, which is 0.000. The r-count value of 0.642 indicates a very strong relationship. There is a relationship between resource mobilization parameters and preparedness in dealing with flood disasters, shown by a p-value of 0.05 <, which is 0.000. The calculated r value is 0.623, indicating a very strong relationship.

Table 3. Cross-tabulation of knowledge, attitudes, emergency response plans, disaster warning systems and resource mobilization with preparedness in dealing with flood disasters

Variables	P value	Assumption	R value	Assumption
Knowledge	0.000	Significant	0.822	Near-perfect relationship
Attitude	0.000	Significant	0.609	Relationships are very strong
Emergency response plan	0.000	Significant	0.862	Near-perfect relationship
Disaster warning system	0.000	Significant	0.642	Relationships are very strong
Resource mobilization	0.000	Significant	0.623	Relationships are very strong

Table 4. Multivariate Analysis of Linear Regression Multiple Variable Model Candidate Variables/ Full Model

Variables	Beta	Sig.	Adjusted R Square
Knowledge	0.435	0.000	
Attitude	0.156	0.000	
Emergency response plan	0.432	0.000	0.998
Disaster warning system	0.159	0.000	
Resource mobilization	0.113	0.000	

Table 4 shows that the most related parameter related to preparedness in dealing with flood disasters is the level of knowledge (p=0.000 and beta=0.435). The results of the last modeling have an Adjusted R Square value, which shows that the parameters in this study, namely knowledge, attitude, emergency response plan, disaster warning system, and resource mobilization are related to preparedness in dealing with flood disasters by 99.8%.

DISCUSSION

The results of the study showed that the preparedness of the community in Baru Village, RT 01 RW 12, Baolan District, Tolitoli Regency in dealing with flood disasters was mostly in the very ready category (69.6). Although from the results of filling out the questionnaire, the results

obtained were that the community was very prepared, however, community preparedness was not followed by their actions. This is evidenced by the observation that there are still many people who throw garbage carelessly, there is no evacuation route in the event of a flood disaster, there is no early warning system and the results of interviews most people do not have P3K boxes or important medicines for family first aid (such as betadine, diarrhea medicine, flu medicine, etc.) and most people have never participated in skills training for first aid. Therefore, cooperation is needed between the community, the Kelurahan Baru, the Baolan Health Center and BNPBD Kabupaten Tolitoli to educate about flood disaster preparedness, first aid training for disaster victims, flood disaster simulation, procurement of evacuation routes and early rescue systems.

The results of this study are in line with the research conducted by Rahma, (2022) in Bogor which stated that community preparedness in dealing with flood disasters is in the category of very ready (Rahma, 2022). However, the results of this study are inversely proportional to the research conducted in Bali by Mas'Ula, Siartha, & Citra, (2019) and the research conducted in Malaysia by Dapun et al., (2024) which stated that community preparedness in dealing with flood disasters is in the moderate category. The difference in these findings is due to the location of the research and the experience in dealing with different flood disasters.

The results of the study also showed that more people had good knowledge and positive attitudes and there was a meaningful relationship between knowledge and attitudes and community preparedness in facing disasters (p-value < 0.05 and r count was 0.822 for knowledge and r count attitude 0.609). This finding is in line with research conducted in Malaysia stating that people's knowledge and attitudes in dealing with flood disasters are in the high category, where knowledge (M= 4.51, SD= 0.40) and attitude (M= 4.62, SD= 0.35) (Dapun et al., 2024). This good knowledge is influenced by the education of more respondents who are in high school and bachelor's. In addition, the experience of facing floods also affected the knowledge of respondents. Where almost every rain with high intensity this area must experience flooding. This is in line with research conducted by Selvyana & Fitriani, (2021) who said that the experience of facing floods can increase public knowledge about flood disaster. In addition, based on interviews, the community said that they had received education about floods carried out by the Tolitoli Regency BPBD but it had been a long time. The results of this study are inversely proportional to the research conducted in Grobogan by Widayati & Husain, (2023) which states that public knowledge about preparedness in dealing with disasters is still low (Widayati & Husain, 2023). Meanwhile, research conducted by Hidayanto, (2020) stated that the attitude of the community in dealing with the flood disaster (Hidayanto, 2020). The difference in these findings is due to the experience of dealing with flood disasters and the information received.

The findings in this study also stated that the emergency response plan was higher (56.9) and there was a significant relationship between emergency response plans and community preparedness in dealing with flood disasters with a p-value of < 0.05 and r count of 0.862. In line with research conducted by Rahma, (2022) in her research stated that most people in the emergency response plan parameters are in the very ready category (Rahma, 2022). Although the community's emergency response plan is high, there are still many people with low emergency response (44%). This can be seen from the answers of respondents who received low scores on the statement "make evacuation maps, evacuation routes, temporary places in case of disasters and the family there must be someone who has skills for first aid". Thus, education is needed on the creation of evacuation routes and flood disaster management training for the general public to improve community knowledge and skills so that they are ready to face disasters so that the impact of disasters can be minimized.

Another finding in this study is that in the parameters of the disaster warning system, some of the respondents are in the high category (50%) and some are in the low category (50%). The results of this study show that some people know about the importance of the disaster warning system. This finding is in line with research conducted by Rahma, (2022) which stated that most respondents have a disaster warning system with a category of being very prepared to face flood disaster (Rahma, 2022). Some people also consider the disaster warning system unnecessary because this area is often flooded, so if it rains with high intensity, the community is

already preparing for flooding. In addition, the community considers that disaster warnings are rarely carried out because when floods occur, it is easier for people to get information from word of mouth about disaster warnings compared to the disaster warning system that follows procedure (Angriani, Rahman, & Hastuti, 2021; Saifullah, Arisanty, Angriani, Farista, & Rahman, 2023).

The fifth parameter is resource mobilization. This study shows that there are more people with a high category of resource mobilization (52%) and there is a significant relationship between resource mobilization and community preparedness to face disasters. In line with research conducted by Mulyati & Rohmansyach, (2021) which states that a large number of people have a high mobilization for preparedness to face flood disaster. However, some communities also have low resource mobilization (48%). This is in line with research conducted by Saifullah et al., (2023) in their research stating that community mobilization in dealing with flood disasters is still low.

The results of the multiple linear regression test showed that the knowledge parameters had the strongest drag with disaster preparedness (p=0.000 and beta=0.435). In line with the findings presented by Mulyati & Rohmansyach, (2021) that knowledge has a significant simultaneous influence on preparedness. Knowledge and a good attitude will have a risk of 1,163 times having flood preparedness with good criteria (Mulyati & Rohmansyach, 2021). Another study conducted in Samarinda also stated that there was a significant relationship between knowledge and community preparedness for flood disasters (p-value <0.05) (Dede, Nekada, Herawati, Rahil, & Yogyakarta, 2023). The knowledge that a person possesses is necessary to determine the management action taken against a disaster (Dede et al., 2023; Mahon & Rifino, 2024).

CONCLUSION

Community preparedness in New Village RT 01 RW 12 Baolan District, Tolitoli Regency in dealing with flood disasters is classified as very ready based on the assessment of five parameters: knowledge, attitude, emergency response plan, disaster warning system, and resource mobilization. The dimensions of knowledge, attitudes, emergency response plans, disaster warning systems, resource mobilization, and community readiness for flood catastrophes were significantly correlated, with calculations demonstrating a very strong correlation. However, there are still weaknesses that need to be overcome. The habit of people who still throw garbage carelessly, there is no clear evacuation route, and first aid training is still minimal. This shows that high preparedness in theory has not been fully implemented in practice. Therefore, the Kelurahan Baru in collaboration with the Baolan Health Center and the BNPBD Kabupaten Tolitoli need to take concrete steps to improve community preparedness, such as education on sustainable flood disaster preparedness, first aid training for disaster victims, and the provision of adequate infrastructure such as evacuation routes and early warning systems.

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