

Research article

The Impact of Disaster Knowledge and Attitudes on Community Preparedness in Facing Earthquakes

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In 2016, a catastrophic earthquake with a magnitude of 6.5 devastated Pidie Jaya Regency. This shallow earthquake, centered on the land, killed 104 people and displaced tens of thousands. This study aimed to measure the relationship between disaster knowledge and attitudes of the community, and their disaster preparedness in Bandar Dua District, Pidie Jaya Regency. 250 villagers of Gampong Ulee Glee, Pelakan Cibrek, Peulakan Tunong, Paya Tunong, and Keude Ulee Glee participated. The data were collected using a questionnaire. The results showed that the level of community disaster was categorized as 'well' (59.2%), the attitudes towards disasters were categorized as prepared (60.4%), and preparedness was categorized as well-prepared (54.8%). The bivariate analysis showed that people's knowledge was categorized as very well prepared (76.8%) and the people's attitudes were categorized as well and ready in coping with disasters (71.7%). We concluded that there was a relationship ($p = 0.005$) between disaster knowledge and preparedness. There was also a relationship between the attitudes towards disasters and community preparedness.

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1. Introduction

Sunday, December 7, 2016, an earthquake with a moment magnitude 6.5 SR devastated the province of Aceh and its surroundings. The earthquake, which was centered in Pidie Jaya, caused damage along the northern coast of the Pidie Jaya district, including the districts adjacent to Pidie Jaya, namely the Pidie district and also Bireuen [1]. Based on a press release issued by the Indonesian Meteorological, Climatological, and Geophysical Agency (BMKG) [2], the earthquake occurred at 05.03 WIB with the epicenter located at 5.25 North Latitude and 96.24 East Longitude at a depth of 15 Km. Based on data reported by the Indonesian National Disaster Management Agency (BNPB) in 2016 [3], the earthquake caused 11,730 houses damaged, 105 shop-house units to collapsed, 14 mosques were seriously damaged, 1 hospital was badly damaged and 1 school unit

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collapsed. Not only that, at least 104 people died and 43,529 people were displaced. Losses caused by this earthquake were estimated at \$139 million [4]. To speed up the process of handling the earthquake, the Acting Governor of Aceh at that time declared the level of the provincial emergency response.

The earthquake caused tens of thousands of people to panic and try to save themselves. The earthquake that occurred early in the dawn caused panic, many residents tried to evacuate themselves and their families to higher ground for fear of a tsunami. Learning from the earthquake and tsunami that occurred in 2004, the community became more prepared and alert in dealing with earthquakes. Quoted from BNPB [5], based on the results of a survey conducted on the Kobe earthquake (Great Hanshin Earthquake 1995), the percentage of survivors was caused by oneself (35%), family members (31.9%), friends or neighbors (28, 1%), passers-by (2.60%), SAR Team (1.70%), others (0.90%). This shows how important the attitude of preparedness in dealing with the earthquake.

Preparedness is one of the efforts to reduce property damaged and even casualties when a disaster occurs. Strategies in preparedness can be used to develop knowledge, beliefs, attitudes, and actions that can increase a person's capacity to adapt, cope with and recover from the threat of a sudden earthquake disaster [6]. Preparedness is influenced by many factors, especially those related to knowledge and attitudes towards disasters. Knowledge is the main factor and the key to preparedness. The knowledge possessed can usually influence attitudes and concerns to be prepared in anticipating disasters. Preparedness is part of the disaster management process In the current concept of disaster, the importance of preparedness is one of the important elements of proactive disaster risk reduction prevention activities, before a disaster occurs [7].

Lack of understanding of the characteristics of hazards, and the ability to deal with disasters cause helplessness and inability to save themselves when disasters occur. This is the main factor that can cause huge casualties and losses when a disaster occurs. Quoted from LIPI-UNESCO [7], preparedness is grouped into four parameters, the first is basic knowledge about disasters, especially disasters that occur in their area. The second, preparedness plans within the family. The third is the existence of a disaster early warning system, and the last is the mobilization of household resources.

Therefore, it is important to know the level of knowledge, attitudes, and preparedness of the people who experience disasters. This study wanted to determine the level of knowledge, attitudes, and preparedness of the people in Pidie Jaya who had experienced a devastating earthquake in 2016. The sample used in this study was the Bandar Dua sub-district. Furthermore, this study also aims to determine the relationship

between knowledge and attitudes of disaster on community preparedness in dealing with the earthquake.

2. Method

This study used a descriptive approach with quantitative data analysis. Quantitative data analysis in this study used a frequency table, which with this table a descriptive picture is produced about the influence and attitude of community preparedness in Bandar Dua in dealing with the earthquake. The location of this study is shown in Figure 1 below.

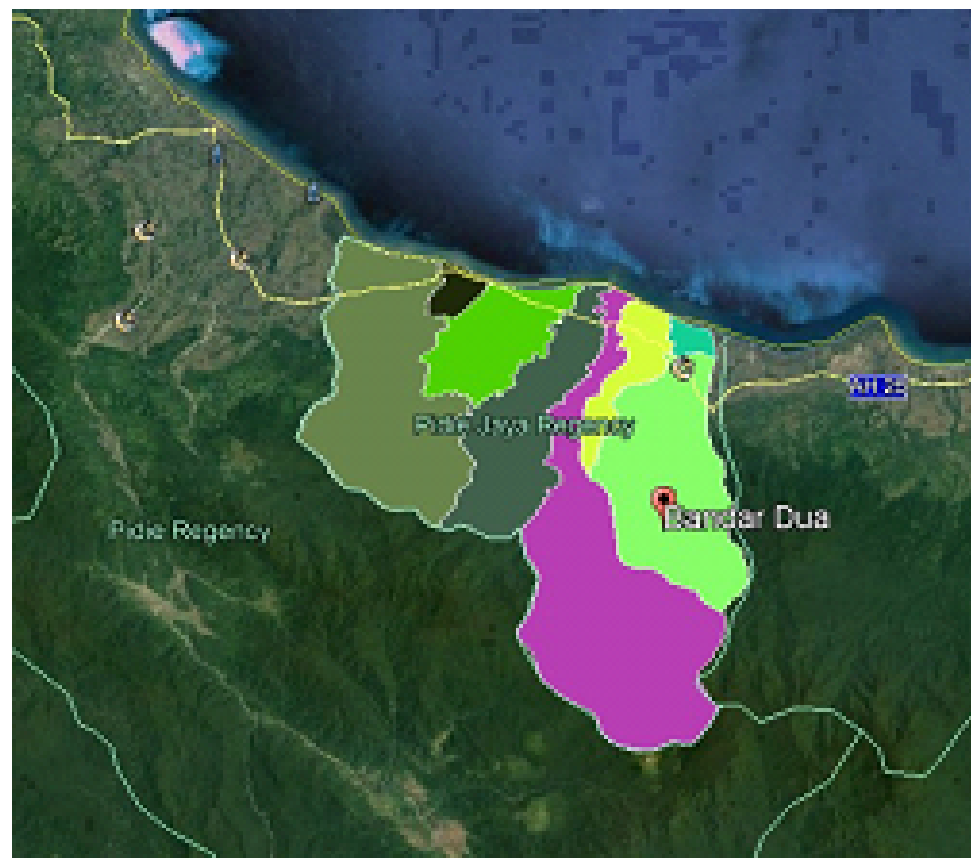


Figure 1: The Map of Location of This Study.

The subjects in this study are the community who live in the Bandar Dua sub-district. Bandar Dua sub-district is chosen because this sub-district was one of the most severely affected because of the earthquake. The sample used in this study was determined using a probability sampling technique that is random sampling. Probability sampling is a sampling technique that provides equal opportunities for each member of the selected population [8]. The number of samples was determined using the following Slovin formula:

$$n = \frac{N}{1 + N \cdot e^2}$$

From the total population of 715 households, the number of samples taken was 250 samples. The process of collecting data is done through documentation, questionnaires, and observations. It aims to measure the level of community preparedness in the Bandar Dua sub-district, Pidie Jaya district against earthquake disasters.

The variables used in this study are the independent variable (X) and the dependent variable (Y). Variable X_1 is public knowledge about the risk of earthquakes. The aspects that are assessed on the variable X_1 are knowledge, understanding, and application. The variable X_2 is the attitude of the community in dealing with the earthquake. There are four aspects assessed in the X_2 variable, which are aspects of attitude, namely acceptance, response, respect, and responsibility. The variable of Y used in this study is the preparedness carried out by the community in dealing with the earthquake. The indicators used in determining community preparedness are preparation, family policies, and emergency response plans. The measurement scale used in this study is the Likert scale. The Likert scale is used to measure attitudes, opinions, and perceptions of a person or group of people about social phenomena.

The data analysis process includes several stages, namely univariate analysis, and bivariate analysis. Univariate analysis was conducted to obtain the value of knowledge, attitudes, and community preparedness in dealing with earthquake disasters in their area. The analysis process was carried out using the *Statistical Package for the social science* (SPSS) version 25.0.

The earthquake-disaster knowledge variable consisted of 10 questions, with the lowest score is 10 and the highest score is 50. Variables of Attitude and preparedness also received a similar valuation. Scoring values and parameter intervals are divided into five sections which are shown in Table 1 below.

TABLE 1: Scoring Values and Intervals for Knowledge Parameters.

Category	Value	Parameter	Value
Very Knowledgeable (ST)	5	Excellent	41 – 50
Knowledgeable (T)	4	Good	31 – 40
Doubtful (R)	3	Average	21 – 30
Not Knowledgeable (TT)	2	Poor	11 – 20
Very Not-Knowledgeable (STT)	1	Very Poor	1 - 10

Bivariate analysis was used to see the relationship between the two independent and dependent variables. To see the relationship between the two variables, the Chi-Square test used with the following hypothesis:

1. If the p-value ≤ 0.05 then H_0 is rejected and H_1 is accepted. It means that there is a significant relationship between knowledge and attitudes towards preparedness.
2. If the p-value > 0.05 then H_0 is accepted and H_1 is rejected. It means that there is no significant relationship between knowledge and attitude towards preparedness.

3. Result and Discussion

3.1. Characteristics of the Community of Bandar Dua Sub-District

The sample used in this study is the people who live in the village of Gampong Ulee Glee, Pelakan Cibrek, Peulakan Tunong, Paya Tunong, and Keude Ulee Glee. The total sample is 250 people. Based on the results obtained through the questionnaire, the characteristics of the respondents are shown in table 2 below.

TABLE 2: The Characteristics of Respondents in Bandar Dua Sub-District.

No.	Characteristics	The Number of Respondents	Percentage
1.	Gender: Male	221	88,4
	Female	29	11,6
	Total	250	100,0
2.	Age of Respondents: 20 – 29 Years Old	57	22,8
	30 – 39 Years Old	67	26,8
	40 – 49 Years Old	51	20,4
	50 – 59 Years Old	58	23,2
	> 60 Years Old	17	6,8
	Total	250	100,0
3.	Marital Status: Married	202	80,8
	Single	48	19,2
	Total	250	100,0
4.	Education Level: No Education	8	3,2
	Elementary School	15	6,0
	Junior High School	59	23,6
	Senior High School	106	42,4
	University	62	24,8
	Total	250	100,0

Source: Researcher Primary Data (2020)

The distribution of the frequency of the community knowledge about earthquake disasters can be seen in Table 3 below. Respondents were classified as very knowledgeable (total score range from 41 – 50), knowledgeable (total score range from 31

– 40), doubtful (total score range from 21 – 30), not knowledgeable (total score range from 11 – 20), and very not-knowledgeable (total score range from 1 – 10).

3.2. The Knowledge of the Community about Earthquake Disaster

As previously explained, the analysis of the knowledge of the community about earthquakes uses univariate analysis. The result of the univariate analysis can be seen below:

TABLE 3: Distribution of Frequency of Community Knowledge to Earthquake Disaster (n = 250).

No.	Level of Knowledge	Frequency	Percentage
1	Very Unwell	0	0
2	Not Very Well	0	0
3	Average	3	1,2
4	Well	148	59,2
5	Very Well	99	39,6
	Total	250	100,0

Source: Researcher Primary Data (2020)

Table 3 above shows that the level of knowledge about earthquake disasters in the community in Bandar Dua Sub-District, Pidie Jaya Regency. Table 3 showed that the knowledge of the community is mostly in the Well category (59.2%) or as many as 148 respondents and the Very Well category is 39.6% or as many as 99 respondents.

Based on the results of the analysis above, it can be seen that the level of knowledge about earthquake disasters of the people of Bandar Dua sub-district, is mostly in the Well or fourth category. This is caused by most people already know alternative communication tools that can be used when a disaster occurs. This tool can be used by the community to contact relatives during an earthquake, and can also be used to ask for help if needed. In addition, the community also already knows the impact caused by an earthquake so that they can know what actions to take if an earthquake occurs in their area.

3.3. The Attitude of the Community to Earthquake Disaster

The frequency distribution of attitudes of the community towards the earthquake disaster can be seen in Table 4. Respondents were classified as Well Prepared (total score range from 41 – 50), Prepared (total score range from 31 – 40), Less Prepared (total score range from 21 – 30), Unprepared (total score range from 11 – 20), ill-Prepared (total score range from 1 – 10).

TABLE 4: Distribution of Frequency of Community Attitudes toward Earthquake Disaster (n = 250).

No.	Attitudes	Frequency	Percentage
1	Very Not Ready	0	0
2	Not Ready	0	0
3	Less Ready	7	2,8
4	Ready	151	60,4
5	Well-Ready	92	36,8
	Total	250	100,0

Source: Researcher Primary Data (2020)

Table 4 shows that the level of attitude of the community towards the earthquake disaster in Bandar Dua sub-district, Pidie Jaya Regency. Table 4 showed that the attitude of the community is mostly in the Prepared category (60.4%), with as many as 151 respondents and the Well Prepared category is 36,8% or as many as 92 respondents.

Based on the results of the analysis above, it can be seen that the level of attitude of the community towards the earthquake disaster in the Bandar Dua sub-district, Pidie Jaya Regency, is in the Prepared category. This is due to the anticipation of disaster preparedness from the head of the family. So that people in disaster-prone areas know what actions to take for their families when an earthquake occurs. Furthermore, in general, the community knows the negative impacts caused by the earthquake, so they know what steps to take to deal with the adverse effects of the earthquake. For example, by saving the telephone number of the nearest PLN (State Electricity Company), PDAM (Local Water Company), or Health Officer who can be contacted at any time when an earthquake occurs.

3.4. The Preparedness of the Community to Earthquake Disaster

The frequency distribution of the preparedness of the community to earthquake can be seen in Table 5. Respondents were classified as Well Prepared (total score range from 41 – 50), Prepared (total score range from 31 – 40), Less Prepared (total score range from 21 – 30), Unprepared (total score range from 11 – 20), and Ill-Prepared (total score range from 1 – 10).

Table 5 above shows that the level of preparedness of the community in the Bandar Dua sub-district, for earthquake disasters. Table 5 showed that the preparedness of the community is Well Prepared (54,8%) or as many as 137 respondents and the Prepared category is 43,2% or as many as 108 respondents.

TABLE 5: Distribution of Frequency of the Community Preparedness to Earthquakes (n = 250).

No.	Preparedness	Frequency	Percentage
1	Ill-Prepared	0	0
2	Unprepared	0	0
3	Less Prepared	5	2.0
4	Prepared	108	43.2
5	Well Prepared	137	54.8
	Total	250	100.0

Source: Researcher Primary Data (2020)

Based on table 5 above, it can be seen that the level of preparedness of the community living in the Bandar Dua sub-district, Pidie Jaya, for earthquake disasters is in the very ready category. The community already has a destination or a plan for self-evacuation if an earthquake disaster occurs in their area. This provides a greater opportunity for the people who live in the earthquake-prone area to immediately escape to a safer place. Furthermore, the availability of backup lighting devices such as rechargeable lamps, flashlight, or generators that can be used as a backup of electrical energy if an earthquake occurs at night. So that it will be easier for the community to deal with earthquake disasters that occur in their area.

3.5. The Relation between Knowledge and Preparedness in Coping Earthquake Disaster

The relationship between knowledge and community preparedness for earthquake disasters was measured using bivariate analysis as described previously. The results of the analysis of the relationship between knowledge and preparedness for earthquake disasters can be seen in Table 6 below.

TABLE 6: The Relation between Knowledge and Community Preparedness in Coping Earthquake Disaster (n = 250).

Preparedness									
No	Knowledge	Less Prepared		Prepared		Well Prepared		Total	P-Value
		f	%	f	%	f	%		
1	Enough	1	33,3	2	66,7	0	0,0	3	0,001
2	Good	4	2,7	83	56,1	61	41,2	148	
3	Very Well	0	0	23	23,2	76	76,8	99	
	Total	5	2,0	108	43,2	137	54,8	250	

Source: Researcher Primary Data (2020)

Table 6 above showed that out of 250 respondents, there are 3 respondents (1,2%) who have 'Enough' knowledge to face the earthquake disaster, which is 1 (one) respondent is less prepared and 2 (two) respondents are prepared. There are 148 respondents (59.2%) who have Good knowledge to face the disaster (4 respondents are less prepared and 83 respondents are prepared). 99 respondents have very good knowledge (39.6%) who are Well Prepared to face the earthquake disaster (23 respondents are prepared and 76 respondents are well prepared). Based on the results of the Chi-Square test with a significant level of 5% (0.05) it was found that there was a significant relationship between knowledge and preparedness in coping with the earthquake disaster in the community of Bandar Dua sub-district, Pidie Jaya Regency. The significant level used in the Chi-Square test was 5% (0.05) while the p-value is 0.001 which means $p\text{-value} < 0.05$. Therefore, this study indicates that there is a significant relationship between disaster knowledge and preparedness in coping with the earthquake disaster within the community.

The results of this study are following research by Finnis, et al. [9] which states that participation in disaster education can increase respondents' understanding of self-protection behavior during disasters. Most disaster education will only be carried out if a disaster has occurred and will gradually decrease when a disaster has not occurred for a long time. This allows the preparedness behavior of disaster-prone communities to decrease. It is recommended that training and education be carried out regularly so that the community's preparedness, especially students, is always at the optimal level.

According to LIPI-UNESCO/ISDR [7], knowledge is a key factor for preparedness. The knowledge that individuals and households must have regarding earthquake disaster is an understanding of earthquake disaster and understanding of disaster preparedness. Including an understanding of appropriate self-rescue actions when an earthquake disaster occurs as well as actions and equipment that need to be prepared before the disaster occurs. Another study showed a similar result done by Rusiyah [10]. This study showed that there was a positive and significant relationship between students' knowledge and earthquake preparedness conducted in Taman Pendidikan Alqur'an Al-Khair (Al-Khair Qur'an Learning Center), Bone Bolango District. The correlation between variable result of 0.850 with sig. or $p=0,000$ ($0.000 < 0.05$). Those studies show that, generally, knowledge is the key factor for preparedness. People with good knowledge will know what to do when a disaster occurs and what to prepare in the normal condition. So that, the people who live in earthquake-prone areas will become a resilient community.

3.6. The Relation between Attitude and Preparedness in Coping Earthquake Disaster

The relationship between attitude and preparedness in coping with earthquake disaster was obtained from the Chi-Square test. The results of the analysis can be seen in table 7.

TABLE 7: Relationship between Attitudes and Community Preparedness to Earthquakes (n = 250).

Preparedness									
No	Attitude	Less Prepared		Prepared		Well Prepared		Total	P-Value
		f	%	f	%	f	%		
1	Less Ready	1	14,3	5	71,4	1	14,3	7	0,001
2	Ready	3	2,0	78	51,7	70	46,4	151	
3	Well-Ready	1	1,1	25	27,2	66	71,7	92	
	Total	5	2,0	108	43,2	137	54,8	250	

Source: Researcher Primary Data (2020)

Table 7 above showed that out of 250 respondents, there are 7 (2.8%) respondents who have a Less Ready attitude to face the earthquake disaster, which 1 (one) respondent Less Prepared, 5 (five) respondents are Prepared and 1 (one) respondent is Well Prepared. Of the 151 respondents (60.4%) that are 'Ready' to face the disaster, there are 3 respondents who are in the Less Prepared-level category, 78 respondents are in the Prepared-level category, and 70 respondents are Well Prepared to face the disaster. In the last category, Well-Ready, there are 92 respondents (36.8%) who fill this category, which is 1 respondent is Less Prepared, 25 respondents are Prepared, and 66 respondents are Well Prepared to face the disaster. Based on the results of the Chi-Square test with a significant level of 5% (0.05) it was found that there is a significant relationship between attitude and preparedness in coping with the earthquake disaster within the community. The significant level used in the Chi-Square test was 5% (0.05) while the p-value is 0.001 which means p-value < 0.05. Therefore, this study indicates that there is a significant relationship between disaster attitudes and preparedness in coping with the earthquake disaster within the community.

Based on the description above, preparedness in dealing with disasters can be influenced by attitudes that are prepared for disasters. This is proven by the results of the study showing that the level of preparedness of respondents who have a Well-Ready attitude towards earthquake are higher than respondents with a Less Ready attitude. Theoretically, it is explained that the attitude possessed can usually affect individual

awareness to be ready and alert in anticipating earthquake disasters, especially for those who live in disaster-prone areas.

4. Conclusion

Based on the results of the analysis that has been carried out in this study, it can be concluded that the majority of the people of Bandar Dua sub-district, Pidie Jaya, already a good preparedness to face the disaster. This can be seen from the level of knowledge they have about the earthquake. 59.2% (148 respondents) are in the Well-level category and 39.6% (99 respondents) are in the Very Well-level category. Furthermore, to see from the attitude variable, the community has already had a good attitude toward the disaster. 60.4% (151 respondents) are in Ready-level category and 36.8% (92 respondents) are in Well Ready-level category. To see from the level of preparedness, the people of Bandar Dua sub-district are well prepared to face the earthquake disaster with 54.8% (137 respondents) are in Well Prepared-level category and 43.2% (108 respondents) are in the Prepared-level category to face the disaster.

Furthermore, there is a significant relationship between knowledge and community preparedness to deal with earthquakes. There is also a significant relationship between the attitudes of disaster to the preparedness of the people who live in the sub-district of Bandar Dua. It shows that the community already has knowledge and preparedness in dealing with the earthquake, but the capacity of the community still needs to be improved so that if a similar disaster occurs in the future, the number of victims and losses can be minimized.

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