

## FACTORS RELATED COMMUNITY PREPAREDNESS ON EARTHQUAKE AND TSUNAMI IN COASTAL AREA OF BANDA ACEH, INDONESIA

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### Abstract

Disaster preparedness is an activity on pre disaster which purpose is to develop operational capacities and facilitate effective responses when the disaster occurred. The purpose of the research is to identify factors related community preparedness on Earthquake and Tsunami in Coastal Area of Banda Aceh. The variable of the research is community preparedness with sub variables are knowledge and attitude for disaster risk, policy and guideline, planning for emergency and disaster, early warning system, mobility and resources. Research design used analysis descriptive with cross sectional study approach. Sampling technique was using proportional sampling to 140 respondents who stayed in 4 sub districts of coastal area of Banda Aceh, Indonesia such as Baitussalam, Meuraxa, Syiah Kuala and Kuta Alam. Analysis method used a simple descriptive by using *software computer*. the instruments of the research consisted of 2 parts, which are demographics data consisted of age, sex, long stayed in the risk villages, educational level, attending in emergency training and educational program; 31 items on disaster preparedness questionnaire by using Likert scale, and 6 items open question related community preparedness on disaster. The results showed knowledge and attitude on disaster risk were in well prepare, the policy and guideline were in fair prepare, emergency disaster plans were in fair prepare, disaster warning system was in well prepare, and mobilization of resources was in fair prepare. The conclusion showed that factors related community preparedness on earthquake and tsunami in coastal area of Banda Aceh were in well prepare. It recommended to community who stayed in the coastal area of Banda Aceh, could improve knowledge and attitude for disaster risk by attending training and education on disaster preparedness and for stakeholders to maintain effectiveness of early warning system and guidelines for victim evacuation. It is needed to provide regular training and education on disaster to community, effective policies and guidelines for victim evacuation and early warning system.

**Keywords:** preparedness, disaster, community, coastal area, earthquake, tsunami

### BACKGROUND

Indonesia is one of the most disaster-high risk and prone areas. And many disasters occurred as years passed, but the country itself is not always well-prepared against disasters. A disaster is such calamitous events that seriously endanger and disrupt the functioning of a community or society. Though often caused by natural or unnatural factors, disasters can have human origins. It will have profound human loss, environmental damage, financial and material losses, and can have

tremendous psychological impacts (Clause 1 of Law Number 24/2007 concerning Disaster Management).

Natural disaster is the most common occurring disasters in Indonesia, comprise phenomena such as earthquake, tsunami, flood and etc. And indirect losses affect society but despite many regular disasters happened, we are still able to live our daily lives safely and comfortably as long as we can manage the disaster well. There are indeed many strategies can assist in reducing the

impact of disasters by implementing the Disaster Preparedness (Fanggidae, 2005).

Disaster preparedness is a corrective action before the disaster strikes in effort to ensure the development of operational capacity and an effective coordination during incident response. This action highly beneficial and should be applied for communities located in disaster-prone area such as Aceh Province. The occurrence of natural disasters of the tsunami and earthquake in 13 countries on December 26, 2004, it is estimated that 127.672 people died, while the data on the number of victims in the Aceh Province and North Sumatra, approximately 110.229 people were died, 12.132 people declared were missing, 703.748 people were evacuated and 925 people had been hospitalized (Baghdady, 2005).

The implementation of disaster preparedness involves not only governments, but also the community. As the one of core components of disaster response, community involvement has an important role. The failed roles and responsibilities of government and community that impact disaster victims handling. And the activity of disaster preparedness is to form an integral part of the national system can be responsible for developing the planning and the disaster management programs that include: prevention, mitigation, preparedness, response, rehabilitation or reconstruction (Fauziah, 2006).

According to the Indonesian Institute of Sciences (LIPI) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) (2006) explain that there are five factors affecting preparedness: 1) strengthen the extent of knowledge and attitudes about disaster risk, 2) policies and guidelines: these concrete

efforts are undertaken in disaster preparedness, 3) planning for emergency preparedness, 4) availability and reliability of disaster Early Warning Systems (EWS), 5) the ability to mobilize resources: could be human resources and infrastructure to support disaster preparedness activities. Disaster preparedness activities have been informed and provided to the community or group especially those who are settled in the coastal areas and the surrounding cities of Banda Aceh after the 2004 Tsunami, through an action plan by government or non-governmental organizations (NGOs).

## METHODS

### a. Research Design

This research is using descriptive analytical method with a cross-sectional study design, which is the way of collecting data through questionnaire and measuring the variables at a time (Notoatmodjo, 2005).

### b. Sampling Technique

The population in this study are people who live in the coastal areas of Banda Aceh (Kuta Alam (Sub-District), Meuraxa, Baitussalam and Syiah Kuala). The sample size in this study estimated by using power analysis. Sample size is determined by the significance level ( ) 0.05, power test (1- ) 0.08 and the effect size is 0.25 which categorized as a medium effect size of a commonly used in nursing research (Polit & Hungler, 1999). To avoid a low sample response rating, the sample size will be added

10%, so the sample total will be 131 respondents.

**RESULTS**

Data collection was conducted from August 15 to September 22, 2014 at 4 (four) villages in the coastal areas of Banda Aceh, Blang Krueng Village of Baitussalam Sub-District, Lamdingin Village of Syiah Kuala Sub-District, Kp. Keuramat Village of Kuta Alam Sub-District and Lampaseh Kota Village of Meuraxa Sub-District, Banda Aceh City, will be conducted on 131 respondents. Overview of demographic data can be seen in the following frequency of data distribution table.

**1. Demographic Data**

Commonly examined demographics include age, gender, length of residences in villages, education level and the disaster preparedness that ever participated in. For more details, the spread of the respondents demographic data can be seen in the following table:

**Table 6.1**

**Frequency of Respondents Demographic Data Distribution (n=131)**

No	Category	Frequenc y	Percentage
1	<b>Age:</b>		
	<30 years old	57	43,5
	31-40 years old	44	33,5
	41- 50 years old	20	15,2
	>51 years old	10	7,6
2	<b>Gender:</b>		
	Male	47	35,9

No	Category	Frequenc y	Percentage
	Female	84	64,1
3	<b>Village-Length of residences:</b>		
	5 years	44	33,6
	>5 years	87	66,4
4	<b>Address:</b>		
	Lamdingin Village	33	25,2
	Blang Krueng Village	33	25,2
	Kp.Keuramat Village	33	25,2
	Lampaseh Kota Village	32	24,4
5	<b>Education level:</b>		
	Low (Elementary-Middle School)	16	12,2
	Intermediate (High School)	60	45,8
	High (D-III/ Bachelor's Degree)	55	42
6	<b>Disaster preparedness training:</b>		
	Yes	29	22,1
	No	109	77,9
Total		131	100

Based on the table of demographic data, majority of respondents are in the age <30 years old (43.5%), and for gender, the 84 respondents are mostly women (64.1%), length of residences in the village located in the coastal area of >5 years, as 87 respondents (66.4%), secondary education were 60 respondents (45.8%), and a history of never getting disaster preparedness training a total of 109 respondents (77.9%).

**2. Result Of Analysis Univariat**

Research data was analysed by using descriptive statistic test. This is description analyse data result about factors taht influence preparedness of community for disaster of earthquake and tsunami in coastal area of Banda Aceh Town evaluated from five subvariabel they are:

**Tables 6.2**

**Distribution Of Frequency Communitie’s Prpreparedness For Disaster Of Earthquake And Tsunami In Coastal Area Of Banda Aceh Town In 2014 (n=131).**

N o	Knowledg e And Attitude For Risk Of Disaster	Frequenc y	Percentag e
1	Good	84	64,1
2	Less	47	35,9

According to tables 6.2 the conclusion is communitie’s preparedness for disaster of earthquake and tsunami in coastal area of Banda Aceh Town is in good category that they are 88 respondens (67,2%).

**Tables 6.3**

**Distribution Of Frequency About Knowledge And Attitude For Risk Of Disaster Earthquake And Tsunami In Coastal Area Of Banda Aceh Town In 2014 (N=131).**

N o	Knowledg e And Attitude For Risk	Frequenc y	Percentag e
1	Good	84	64,1
2	Less	47	35,9

	Of Disaster		
1	Good	84	64,1
2	Less	47	35,9

According to tables 6.3 the conclusion is communitie’s Knowledge and attitude for disaster of earthquake and tsunami in coastal area of Banda Aceh Town is in good category that they are 84 respondens (64,1%).

**Tables 6.4**

**Distribution Of Frequency About Regulation And Guidance For Earthquake And Tsunami In Coastal Area Of Banda Aceh Town In 2014 (N=131).**

N o	Regulati on And Guidanc e	Frequen cy	Percenta ge
1	Good	64	48,9
2	Less	67	51,1

According to tables 6.4 the conclusion is communitie’s regulation and guidance for earthquake and tsunami in coastal area of Banda Aceh Town is in less category they are 67 respondens (51,1%).

**Tables 6.5**

**Distribution Of Frequency About Emergency Plan Of Disaster For Earthquake And Tsunami In Coastal Area Of Banda Aceh Town In 2014 (N=131).**

N o	Emergen cy Plan	Frequen cy	Percenta ge
1	Good	64	48,9
2	Less	67	51,1

	Of Disaster		
1	Good	48	36,6
2	Less	83	63,4

According to tables 6.5 the conclusion is community's Emergency plan of disaster for earthquake and tsunami in coastal area of Banda Aceh Town is in less category they are 83 respondents (63,4%).

**Tables 6.6**  
**Distribution Of Frequency About Early Warning System Of Disaster For Earthquake And Tsunami In Coastal Area Of Banda Aceh Town In 2014 (N=131).**

No	Early Warning System Of Disaster	Frequency	Percentage
1	Good	76	58
2	Less	54	41,2

According to tables 6.6 the conclusion is community's early warning system of disaster for earthquake and tsunami in coastal area of Banda Aceh Town is in good category they are 76 respondents (58%).

**Tables 6.7**  
**Distribution Of Frequency About Resource Mobilization For Earthquake And Tsunami In**

**Coastal Area Of Banda Aceh Town In 2014 (N=131).**

N	Resource Mobilization	Frequency	Percentage
1	Good	62	47,3
2	Less	69	52,7

According to tables 6.7 the conclusion is community's Resource Mobilization for earthquake and tsunami in coastal area of Banda Aceh Town is in less category they are 69 respondents (52,7%).

**DISCUSSION**

According to result univariate analyse test by using descriptive statistic, so preparedness of community for earthquake in coastal area of Banda Aceh Town is in good category they are 88 respondents (67,2%).

Preparedness of disaster is every activity before disaster happen which aim to develop capacities of operational and an effective facility respon when disaster happened. Preparedness of disaster have to applied especially in a risk disaster area as Provinsi Aceh. The tsunami and earthquake was happened in 13 state at December 26<sup>th</sup> 2004 has made 127.672 people pass away, the data of Aceh and North Sumatra showed about 110.229 people pass away, 12.132 people lost, 703.748 people evacuated and 925 people were taking care in hospital ( Baghdady, 2005). Doing preparedness of disaster not only responsibility of government, but also a responsibility of community. One of components that really important in respon for

disaster is community involvement (Fauziah, 2006).

*Lembaga Ilmu Pengetahuan Indonesia (LIPI)* and *United Nations Educational, Scientific and Cultural Organization (UNESCO)* (2006) explained that there are 5 factor which influence disaster preparedness: 1) knowledge and attitude toward the risk of disaster, 2) wisdom and pilot: disaster preparedness wisdom is a concrete effort to implement the alert disaster activity, 3) program to disaster emergency situation, 4) disaster early warning system, 5) ability to resource mobilization: both human resource or medium and infrastructure that was provide having potential that can support disaster preparedness.

According to research result, it was find that in whole the preparedness of society present in good category (67,2%). This situation can be explain that from five subvariable which was observe there are only two subvariable present in good category; knowledge and attitude toward the risk of disaster, and disaster early warning system. While the other subvariable category was present in minus category; wisdom and pilot: disaster preparedness wisdom is a concrete effort to implement the alert disaster activity, program to disaster emergency situation, and ability to resource mobilization toward disaster management.

Based on the research result, it can be explain that there are many younger respondent under 30 years old. It was approved by their higher amount, 57 people, which is find in demography data. This age have the important role to support and help the society to be more active, perceptive

and responsive in facing the disaster. Also in this age, it may be appear involvement and responsibility to always realize and wary toward disaster that will be occur. So that, in anticipate the disaster they also have the higher willingness to find out the information and knowledge about disaster preparedness.

Then, if refer to how long they live and stay in a village that have risk for earthquake and tsunami occur, it was find that 87 people (66,4%) have lived up to 5 years in the village, moreover there are respondent have lived there soon after tsunami occur in 2004. The villages those are purpose; Blang Krueng village, Sub districk of Baitussalam, Kampung Keuramat, Sub districk of Kuta Alam, Lamdingin, Sub districk of Syiah Kuala, and Lampaseh Kota, Sub districk of Meuraxa Banda Aceh city. Based on this data, it is very enable for respondent or society have been had experience and enough knowledge related to disaster preparedness that is get through involvement in training activity and disaster simulation both conducted by region government or institute of society self-supporting local, national, and international.

Another data supported are education level of respondent where many of them present in senior high school category, it is about 45,8% and for degree about 42%. It can be show that the respondent have receive many information both formal or informal and also they have better comprehension about disaster preparedness, expecially for earthquake and tsunami.

In addition, according to the result that is find from subvariable, it can be explain that

disaster early warning system appear in good category (58%). It means, in general disaster early warning system at the society that live near the beach in Banda Aceh city has been better. It was proof with some disaster early warning system which is available in good condition in six location along beach line Banda Aceh city and some of Aceh Besar area that can be functional directly if the disaster signs appear. The disaster early warning system alarm every years together with the moments of tsunami disaster on 26 Desember 2006 is always activated to certainly readiness the tools and also to increase the society preparedness and awareness to realize the important of disaster early warning system.

This research is supporting by Husna's and Afrita research (2012) that conducted to some nurses in emergency department of a general hospital area dr. Zainoel Abidin Banda Aceh it was found that preparation of preparedness health workers specially nurses in good category in generally (83,3%). While another research that conducted by Seniwati (2012) about community preparedness in anticipating flood disaster at Panakkukang village, Gowa Regency, south Sulawesi in very good category by means of as follows: knowledge about risk disaster (52,9%), plan to emergency response (60,7%), and early sign disaster system (80,5%).

Furthermore if related with training of disaster preparedness for community that lives at fourth villages, the result shows that 109 respondent (77,9%) never take training of disaster preparedness. This conditions show that, even though generally in good category (67,2%), but there are 33,8% respondents said that disaster

preparedness in poorly category. So that, it is necessary education and training disaster preparedness continuous based community can be done in the community that domiciled along coastline. Remember the important training disaster preparedness for community because it can be increase knowledge and change manner to be better for risk disaster to the relief effort, so it's needed concern from local and central government to bring off continuous trains disaster preparedness particularly for community that lives at high risk area.

Based on the guided interview result found that most part of the community said that it's needed to increase make sign and direction of evacuation better, knowledge and continuous trains disaster preparedness, and effectiveness early sign disaster system better.

## CONCLUSION

Based on research result, it can be conclude that community preparedness about earthquake and tsunami disaster in coast area Banda Aceh in good category. The result are: 1) knowledge and demeanor about risk disaster in good preparedness that is 84 respondents (64,1%), 2) Wisdom and guide about earthquake and tsunami disaster in poor preparedness, 67 respondents (51,1%), 3) Disaster emergency plan to earthquake and tsunami disaster in poor category, 83 respondents (63,4%), 4) early sign toward earthquake and tsunami disaster in good category, 76 respondents (58%), and 5) Mobilization of resources toward earthquake and tsunami disaster in poor preparedness, 69 respondents (52,7%).

Recommended a needed to increase the provision of guidance signs and evacuation of disaster victims better, education and continuous training of community-based disaster preparedness, and the effectiveness of disaster early warning system better.

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