

Original Research Article

FACTORS RELATED TO SCHOOL'S PREPAREDNESS IN FACING EARTHQUAKE DISASTERS IN DENPASAR CITY

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Article Info:

Received: 27 August 2020

Revised: 25 September 2020

Accepted: 25 September 2020

DOI:

<https://doi.org/10.36720/nhjk.v9i2.192>

Abstract

Background: Earthquake is unpredictable, making it impertinent for all components of society to be prepared to handle, especially elementary school children. During earthquakes, students often experience panic, endangering their lives. It is, therefore, crucial to identify the factors affecting students' preparedness for disasters (LIPI, 2006).

Objectives: This study aimed to determine the factors related to the preparedness of students in disaster prepared schools (DPS) to reduce earthquake risks in Denpasar City, Bali.

Methods: This study used a descriptive correlative analytic design with a cross-sectional approach. The sample in this study were all students of Public Elementary Schools (PES) and private schools (PS) in grades 5 and 6 whose institutions have implemented DPS, and the location of the school is in the city of Denpasar. Students chosen as the research samples received a brief explanation of the research process on the first page of the electronic questionnaire and parents can give consent to be research respondents when they approve their child to be a research sample. The instruments used in this study were 50, where this questionnaire was a standard questionnaire modified by researchers from LIPI (2006), Amri et al.,(2017), Hirano et al., (2011), and Davis & Izadkhah (2008). The univariate analysis identifies each research variable, namely disaster preparedness factors (knowledge, attitudes, infrastructure and CIE) and student preparedness in DPS. The bivariate analysis used is the Gamma test when it meets the requirements. Multivariate analysis in this study used the logistic regression analysis.

Results: The results of this study show that Communication, Information and Education (CIE) has a robust correlation with earthquake preparedness ($r = 0.761$ and $p\text{-value} = 0.000$). CIE of DPS schools that are not good enough will lead to low preparedness of DPS students in earthquake disaster management by nine times.

Conclusion: Knowledge, attitudes, infrastructure and CIE have a relationship with disaster preparedness school preparedness in the city of Denpasar, where low CIE can lead to a greater lack of preparedness for disaster preparedness school students after the variables of knowledge, attitude, facilities and infrastructure are controlled.

Keywords: Preparedness Factors, Students, And Earthquake

INTRODUCTION

Earthquake is one of the focuses of the world in the health sector. More than 500,000 earthquakes are recorded every year in Indonesia, which is considerably large (LIPI, 2006). The Aceh earthquake on December 26, 2004, with a magnitude of 9.3 SR, followed by a tsunami resulted in the death toll of approximately 220,000 people along with severe infrastructure damage (Fathoni, 2018). Another massive earthquake occurred in Jogjakarta on May 26, 2006, with a magnitude of 5.9 SR and was followed by aftershocks that knocked down government buildings, schools, houses, and damaged electrical installations (Yusniawati et al., 2018). On December 7, 2016, Indonesia was again shaken by an earthquake in Pidie Jaya, Aceh measured at 6.5 SR. From this earthquake, at least 104 people died, 857 were injured, and a total of 45,000 residents were displaced (Bencana, 2010)

This condition encouraged the need for continuous preparedness efforts by all levels of society and government in dealing with disaster impacts. Lembaga Ilmu Pengetahuan Indonesia (LIPI) dan UNESCO, (2017) conducted research to identify the level of disaster preparedness in schools, households and communities (LIPI, 2006). The five parameters of school preparedness (knowledge of disasters, policies and guidelines, emergency response plans, disaster warning systems, and resource mobilization) showed that the level of school preparedness was lower than that of the community and officials (Susanti et al., 2014). Thus, school residents and school stakeholders claim its importance to handle disaster preparedness in schools as a joint agenda. Research by Lesmana & Purborini (2015) also stated that the level of DPS is still lacking, in terms of knowledge, attitudes and actions in disaster risk reduction.

Interviews with teachers and students at a school in Denpasar City on August 21, 2018, showed that DPS programs had been implemented. Several disaster managements plans had been carried out in increasing preparedness in schools, such as the application of local content related to disasters and material about disasters conveyed in extracurricular activities. However, the implementation has not been optimal due to the lack of teachers and students trained for disasters, the lack of knowledge of teachers regarding disaster material, the lack of facilities and infrastructure to conduct disaster activities, the attitudes and awareness of students have also not been formed due to the lack of training and simulations and funding for training and simulations (Thornley et al., 2015) (Pathirage et al., 2012). Observations showed that when an earthquake occurred, students still experienced panic and confusion in saving themselves, causing trauma (Haifani, 2008). Lembaga Ilmu Pengetahuan Indonesia dan United Nation-International Strategy Disaster Reduction (LIPI-UN/ISDR), five critical factors influence school preparedness in anticipating natural disasters, especially earthquakes, namely knowledge, attitudes, infrastructure and CIE (Suprajitno, 2017).

Based on the above background, it is vital to know the factors related to the preparedness of DPS students in reducing the risk of earthquake disasters in Denpasar City, Bali.

METHODS

Study Design

This study used descriptive correlative analytic with a cross-sectional approach.

Setting

This research was conducted for nine months, starting from January to September 2020. The research was carried out by public

elementary schools and private elementary schools in Denpasar.

Research Subject

The population in this study were all students of PES and PS in grades 5 and 6 whose institutions have implemented DPS and the location of the school is in Denpasar City, namely PS Muhammadiyah 1, PS Harapan Denpasar, PES 1 Renon, PES 2 Sanur, PES 5 Sanur, PES 11 Sumerta, PES 29 Daging Puri, and PES 1 Sanur, PS Kuncup Bunga.

The sample in this study used a purposive sampling approach, determined using the Slovin formula. The sample obtained 350 students.

The inclusion criteria in this study were elementary school students in grades 5 and 6 and were willing to become research respondents. The exclusion criteria were respondents who refused to be research subjects and did not complete the questionnaire.

Instruments

The instruments used in this study were 50 which were divided into 10 knowledge questions, 10 attitude questions, 10 infrastructure questions, 10 CIE questions and 10 preparedness questions, where this questionnaire was a standard questionnaire modified by researchers from (LIPI, 2006)(Amri et al., 2017)(Hirano et al., 2011)(Davis & Izadkhah, 2008).

The validity test was performed using the Pearson bivariate correlation technique (Pearson product-moment) with a 95% confidence level (5% significance = 0.05). In the validity test, data obtained from r count (0.533) > r table (0.312), which means that the questionnaire is valid to use.

The reliability test in this study used SPSS with alpha technique (Cronbach's). The instrument is said to be reliable if " r alpha" > 0.6. From the results of the reliability test, the result

is 0.745, so the research questionnaire is reable to use.

Data Analysis

The univariate analysis identifies each research variable, namely disaster preparedness factors (knowledge, attitudes, infrastructure and CIE) and student preparedness in DPS. The bivariate analysis aims to determine the factors associated with the preparedness of the variables studied (knowledge, attitudes, infrastructure and CIE). The statistical test used is the Gamma test when it meets the requirements. The test used SPSS is for windows version 20, with a 95% confidence interval or a p-value smaller than 5% alpha (<0.05) so H_0 would be rejected with a 95% CI value. The multivariate analysis aims to determine the most significant factors of the preparedness of DPS students in disaster risk reduction. Multivariate analysis in this study using logistic regression analysis. The use of logistic regression was chosen because the independent and dependent variables have a categorical data scale, where the requirements of the logistic regression are P value <0.025, from the research results obtained knowledge of P value = 0.000, attitude P value = 0.020, infrastructure p value = 0.006 and CIE P value = 0.000 so that all variables can follow multivariate modeling with logistic regression.

Ethical Consideration

This research has received ethical approval from the ethics committee of the Bali Institute of Technology and Health (ITEKES BALI) with an ethical number of 04.0050 / KEPITEKES-BALI / VII / 2020, where this research has been ethical and approved to continue research and data collection.

RESULTS

The results of the study were divided into three parts, namely univariate, bivariate and multivariate.

Characteristics of Respondents by Age, Gender, Experiences, Knowledge, Attitude, Infrastructure, and CIE.

Table 1 Distribution of Frequency of Respondents by Age, Gender, Experiences, Knowledge, Attitude, Infrastructure, and CIE at the Public Elementary Schools and Private Elementary Schools in Denpasar from January to September 2020.

Category	N	%
Age		
10 years old	214	61.1
11 years old	132	37.7
12 years old	4	1.1
Gender		
Male	156	44.6
Female	194	55.4
Experiences		
None	205	58.6
1x	96	27.4
>1x	49	14.0
Knowledge		
Good	127	36.3
Bad	223	63.7
Attitude		
Positive	126	36
Negative	224	64
Infrastructure		
Good	135	38.6
Bad	215	61.4
CIE		
Ready	50	14.3
Not Ready	300	85.7

Sources: Primary Data of Questionnaire, 2020.

The data above showed that the dominant age is ten years old, with females being the dominant gender and the majority of students have no previous earthquake disaster training experience. The results of the knowledge variable from the students showed that they did not understand earthquake well, so the dominant attitude they had was negative, it was also supported by the lack of infrastructure and the majority was not ready in terms of the CIE.

*Bivariate Test between Student Preparedness and Characteristics of Respondents***Table 2** The Results of Bivariate Test between Student Preparedness and Characteristics of Respondents at the Public Elementary Schools and Private Elementary Schools in Denpasar from January to September 2020.

	Student Preparedness				r	p-value
	Not Ready		Ready			
	N	%	N	%		
Knowledge						
Bad	209	59.7	14	4	0.617	0.000
Good	99	28.3	28	8		
Attitude						
Negative	204	58.3	20	5.7	0.367	0.020
Positive	104	29.7	22	6.3		
Infrastructure						
Bad	198	56.6	17	4.9	0.452	0.006
Good	110	31.4	25	7.1		
CIE						
Ready	277	79.1	23	6.6	0.761	0.000
Not Ready	31	8.9	19	5.4		

Sources: Primary Data of Questionnaire, 2020.

The bivariate data above showed that knowledge has a strong correlation with preparedness, attitude has a sufficient correlation with preparedness, infrastructure has a sufficient correlation with preparedness, and CIE has a very strong correlation with preparedness

Determine the Factors Related to the Preparedness of Students in Disaster Prepared Schools (DPS) to Reduce Earthquake Risks in Denpasar City, Bali using Logistic Regression Analysis

The results of the multivariate analysis (table 3) showed the independent variables that had the biggest to the smallest effect on the dependent variable which can be seen from the value of the Odd Ratio (Exp.B), where the data of knowledge (OR = 5.311) and CIE (OR = 9.306).

CIE is the most significant variable to affect student preparedness (OR = 9.306), which means that a poor CIE in DPS school will cause DPS students' low preparedness in earthquake disaster management by nine times compared to DPS schools that have good CIE after being controlled by variables of knowledge, attitudes, and infrastructure.

Table 3 Analysis of the Factors Related to the Preparedness of Students in Disaster Prepared Schools (DPS) to Reduce Earthquake Risks in Denpasar City, Bali using Logistic Regression Analysis on January to September 2020.

		Sig	Exp (B)	95%	
				Lower	Upper
Step 1	Knowledge	0.000	5.433	2.393	12.337
	Attitude	0.774	1.214	0.323	4.567
	Infrastructure	0.794	1.112	0.501	2.469
	KIE	0.004	7.679	1.926	30.611
	Constant	0.000	0.001		
Step 2	Knowledge	0.000	5.495	2.432	12.416
	Attitude	0.819	1.161	0.324	4.163
	KIE	0.001	8.290	2.359	29.136
	Constant	0.000	0.001		
Step 3	Knowledge	0.000	5.311	2.491	11.323
	KIE	0.000	9.306	4.243	20.413
	Constant	0.000	0.001		

Sources: Primary Data of Questionnaire, 2020.

DISCUSSION

This study highlighted that CIE had a substantial correlation with earthquake disaster preparedness ($r = 0.761$ and $p\text{-value} = 0.000$). Bad CIE of disaster prepared schools would lead to low preparedness of DPS students in earthquake disaster management by nine times.

The bivariate and multivariate data identified that the CIE of elementary school students in Denpasar City was still very low, causing students to no be prepared for earthquakes (Bencana, 2010). The reason being, the majority of students, said they had never received training from the school or the Badan Penanggulangan Bencana Daerah (BPBD) regularly. The simulation that students have ever received is when the BPBD carries out simulations to the public; however, the number of participants is also limited and is not carried out regularly (Bencana, 2010) (Yulaelawati, 2008).

The CIE of students at school is only limited to disaster-related school subjects from teachers in the lecture method; the school has made no innovation in providing CIE, such as workshops, visits from competent parties specializing in disasters to schools, disaster training and laboratory (Amri et al., 2017) (Fathoni, 2018).

These may affect the preparedness of DPS students in disaster risk reduction (Thornley et al., 2015). Various methods can be used to improve student preparedness, such as counselling. (Hatthakit & Chaowalit, 2011) stated that counselling given to students had a significant effect on student preparedness (Taghizadeh et al., 2012).

Lack of information from the media also plays a role in student preparedness. Information media can stimulate students to be prepared in the face of disasters. According to (Haifani, 2008) Information media has a significant influence on students' preparedness in disaster risk reduction. Integrating information media such as the internet, tv and radio into learning in schools may help alter attitude (Wedawatta et al., 2016) (Lebe et al., 2014). Radio, tv and the internet are propaganda media with wide and inexpensive dissemination of information that will potentially influence students to conduct discussions (Suprajitno, 2017).

The Hyogo Framework for Action (HFA) 2005-2015 has identified on five priority actions to reduce disaster risk globally, namely using knowledge, innovation and education to build a culture of safety and resilience at all levels. Integration of disaster risk reduction education in

school curricula is one of four key indicators of progress towards HFA priorities (Davis & Izadkhan, 2008)(Voutsas et al., 2014). Sustainable development is an impetus to focus on implementing sustainable policies regarding the introduction of school-based disaster education (Paramesti, 2011)(Nur, 2010)

CIE related to disasters must be integrated with curriculum development, and relevant information delivery mechanisms, and be carried out based on the student's vulnerability development inside and outside of school, through the three main things of HFA, namely safe learning infrastructure, school disaster management, a series of school disaster management curricula and tasks established based on correct knowledge, attitude, communication, and coordination (PRABOWO, 2017)(Benis et al., 2018).

Through education, the concept of disaster management can be developed in school students, as it will enable them to build a correct understanding of disaster-related topics. Therefore, disaster management capabilities and overall disaster management capabilities can be improved. Education management has become a global trend. Schools also need to build resilience to emergencies and manage the consequences as effectively and efficiently as possible (Khan et al., 2007) (Susanti et al., 2014).

CONCLUSION

There is a significant correlation between knowledge, attitudes, facilities and infrastructure and CIE with the preparedness of DPS students in handling earthquakes in Denpasar City where CIE is the most significant variable that influences students' preparedness for earthquake disasters.

SUGGESTIONS

DPS must become the foundation for school-based disaster risk reduction efforts. DPS will not be successful if there is no collaboration between stakeholders. DPS students are expected to further improve their knowledge skills in increasing self-commitment in dealing with disasters. Cooperation between the government

through the Denpasar City BPBD, school teachers and also health workers must exist to provide continuous training so students can be better prepared for disasters.

ACKNOWLEDGMENT

The author would like to thank all those who helped in making this manuscript. The author would also like to show her appreciation to all the public and private elementary schools in Denpasar City that consented to become the research locations.

DECLARATION OF CONFLICTING INTEREST

None.

FUNDING

The research fund came from the Director General of Strengthening Research and Development of the Ministry of Science, Research, and Technology- National Research and Innovation Agency of Indonesia (KEMENRISTEK-BRIN RI).

AUTHOR CONTRIBUTION

Yustina Ni Putu Yusniawati: Have the main idea, make a proposal, arrange permission and research ethics, data collection, and data analysis

Putu Inge Ruth Suantika: Conduct data analysis and make research manuscripts

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Cite this article as Yusniawati, Y. N. P., Suantika, P. I. R. (2020). Factors related to school's preparedness in facing earthquake disasters in Denpasar city. *Nurse and Health: Jurnal Keperawatan*, 9 (2), 160-168. <https://doi.org/10.36720/nhjk.v9i2.192>