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Implementing Disaster Simulation for Undergraduate Nursing Students

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ABSTRACT

Background: Natural disasters are disasters caused by events or a series of events caused by nature, including earthquakes, tsunamis, volcanic eruptions, floods, droughts, hurricanes, and landslides. Earthquakes are the biggest natural disaster threat in Indonesia because they can occur suddenly and can occur in densely populated areas, such as big cities. The purpose of this study was to determine the effectiveness of the use of the simulation method in increasing the knowledge of nursing students in disaster preparedness.

Method: The respondents were 55 nursing students. This research uses quasi-experimental with a one-group pre-post-test design to measure the level of knowledge of respondents using a questionnaire about disaster emergencies (pre-test). Respondent given intervention with simulation learning method about emergency disaster. They were re-measured using the same questionnaire (post-test).

Result: Statistical test results using the Wilcoxon Signed-Rank Test showed that the value of p = 0.0001 was smaller than 0.05. It can be concluded that learning activities using the simulation method can increase students ' knowledge in disaster emergencies .

Conclusion: The simulation learning method and disaster emergency skills training can improve students' understanding and skills in natural disaster preparedness.

Keywords: *Disaster Simulation; Earthquake; Nursing Student.*

Introduction

Natural disasters are disasters caused by events or a series of events caused by nature, including earthquakes, tsunamis, volcanic eruptions, floods, droughts, hurricanes, and landslides. Natural events occur because of natural order. Natural events cannot be planned, prevented, or engineered by humans. The main factors that can lead to disasters causing heavy casualties and losses are lack of understanding of the characteristics of hazards, attitudes, or behaviors that result in the decline of natural resources, lack of early warning information resulting in powerlessness or incompetence and unpreparedness in dealing with disasters (BNPB, 2017; Ferianto and Hidayati, 2019) .

One of the disasters that can hit Indonesia is an earthquake. Earthquakes are probably the biggest natural disaster threat in Indonesia because they occur suddenly and can strike densely populated areas, such as big cities. Earthquakes with a magnitude of about 5 on the Richter scale occur almost daily in Indonesia but usually cause little or no damage. If the strength of the earthquake exceeds 6 on the Richter scale, an earthquake can cause a lot of damage. On average, every year there is an earthquake with 6 on the Richter scale (or more) in Indonesia and causes damage to infrastructure, the environment, as well as casualties and (APEPI, 2021) .

Earthquakes in Indonesia occur 2 times and tsunamis 1 time every year. Large-scale earthquakes can cause serious casualties and material losses. One of them was the Padang earthquake on September 30, 2009 with a magnitude of 7.9 on the Richter Scale (SR), which caused a loss of Rp. 4.8 trillion and 1,195 people died, and a total of 271,540 houses were damaged. The 2004 earthquake and tsunami in Aceh killed nearly 300,000 people in Indonesia, Thailand, India, Sri Lanka, the Maldives and Africa. Not only that, the 2006 Yogyakarta earthquake with a magnitude of only 6.3 on the Richter Scale caused quite a number of victims. It was recorded that in Yogyakarta City, 4,772 people died, 17,772 were injured, and were damaged. In the 2018 earthquake in Lombok, 105 people (Atmojo and Muhandis, 2019).

The phenomenon of earthquakes can be caused by artificial / due to human activities or due to natural events. As a result of these two the ground vibrates as an effect of the propagation of energy waves radiating from the epicenter / focus. The energy that radiates from the focus is the result of mechanical events (collisions,

friction, attraction) or chemical events (explosion due to chemical reaction events), the energy that occurs as a result of these events spreads in all directions on the soil medium (Sulistiawaty, Tiwow and Saleh, 2020) .

To reduce the number of casualties when a disaster occurs, preparedness in dealing with disasters is needed. Preparedness is one part of the disaster management process and in the current concept of disaster, the importance of preparedness is one of the important elements of pro-active disaster risk reduction prevention activities, before a disaster occurs. Increased knowledge, understanding, and adequate preparedness can be done through disaster simulations (Ferianto and Hidayati, 2019; Kanita and Wulandari, 2019) .

Students, especially in the field of nursing, must be equipped with the knowledge and skills of disaster nursing that are obtained through education and training. Disaster simulation was developed as a learning method for nursing students to have the competencies needed during a disaster. (Kanita and Wulandari, 2019) . The purpose of learning earthquake disaster management simulation is to increase knowledge and skills, effective simulation design for nursing student learning practices. Most students need a lot of time to understand disaster management. Simulation as a proven teaching strategy and an effective approach to improve teamwork and active learning (Andika and Sundari, 2019) .

This is the background of the community service research activity with the theme "Implementing Disaster Simulation for Undergraduate Nursing Students." With this activity, we hope that students have knowledge and preparedness when a disaster occurs and understand the actions taken when a disaster strikes.

Method

This research was conducted in November 2021 in Gucialit Village, Gucialit District, Lumajang Regency. This study uses a one-group pre-post-test design where researchers measure the respondents' knowledge level using a questionnaire about disaster management during the disaster impact phase (pre-test), then they are given an intervention in the form of learning media using a simulation method on disaster management in the impact phase for personnel. Health. Respondents were re-measured using the same questionnaire (post-test). Research subjects consist of 5 5 students

nursing. The learning media used is the simulation method. The data analysis used consisted of 2 stages, namely univariate and bivariate. Univariate analysis technique using descriptive is presented in the form of a distribution table. Meanwhile, bivariate analysis to measure farmers' knowledge about injuries caused by sharp objects and ability to manage sharp object trauma both before and after health education using interactive video media was tested using the Wilcoxon test with a significance level of 5%.

Result

Total, 55 respondents have been educated with simulation methods in disaster emergencies consisting of triage, evacuation and transportation, primary survey actions, emergency management of airway, breathing, and circulation.

Table 1. Description of respondents characteristics

Category	Frequency (n)	Percentage (%)
Gender		
Male	13	24
Female	42	76
Age		
19 years	14	25
20 years	23	42
21 years	18	33

Female respondent population is more than that of the male respondents with a percentage of 76 % female and 24 % male. The average age of the respondents involved in this study was 19 years old with a percentage of 25 %, while the age of 20 years old respondents was 42 % and 21 years old was 33 %.

Table 2. Normality test

Tests of Normality

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
Value_Pre_Post	.163	110	.000	.927	110	.000
Group	.340	110	.000	.636	110	.000

a. Lilliefors Significance Correction

Based on table 2 above, it shows that the knowledge level of respondents in Gucialit is not normally distributed due to the significance value of the Kolmogorov-Smirnov or Shapiro Wilk test results $\rho = 0.0001$. So the statistical test to prove whether there is an effect using the Wilcoxon Signed Rank Test is as follows.

Table 3. Wilcoxon signed rank test

Test Statistics

	Post_Test - Pre_Test
Z	-6.462
asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

The test results show that the Asymp value. Sig. (2-tailed) 0.0001 which is smaller than 0.05, which means that there is a difference between the learning outcomes for the pre-test and post-test so that it can be concluded that there is an effect during the use of the disaster simulation learning method on increasing respondents' knowledge regarding preparedness in dealing with disasters.

Table 4. Results of measuring respondents' level of understanding

Level of understanding	**Frequency (n)**	**Percentage (%)**
Before intervention		
Low	28	50.9
Currently	27	49.1
Tall	0	0
After intervention		
Low	0	0
Currently	26	47.3
Tall	29	52.7

Based on table 4 shows that the level of understanding of respondents before and after the intervention has increased understanding. Before the intervention was given, the average respondent showed that the level of understanding was still low as many as 28 people (50.9%) and the level of understanding was moderate as many as 27 respondents (49.1%). The level of understanding increased after the intervention was given with a moderate level of understanding as many as 26 people (47.3%) and a high level of understanding as many as 29 people (52.7%).

Table 5. Wilcoxon signed rank test results

	N	Mean±Sd	Kolmogorov-Smirnov	Shapiro-Wilk	Wilcoxon Signed Rank Test
Pre_Intervention	55	36.36±14.81	ρ = 0.0001	ρ = 0.0001	ρ = 0.0001
Post_Intervention	55	77.16±9.19			

Based on the results from table 5, it shows that the statistical test results obtained a p value of 0.0001 which indicates that there is a significant difference before (pre-test) and after (post-test) given the disaster simulation learning method. So that the disaster

simulation learning method is effective to increase students' knowledge of Emergency Nursing lessons.

Discussion

Natural disasters are extraordinary events that can cause suffering for those who experience them, including injuries, injuries, and psychological or psychological impacts. Therefore, a strategic step is needed, namely preparedness. Preparedness is an important factor that becomes the focus of attention considering that preparedness is a determining factor in disaster risk reduction. In dealing with disasters, increasing the resilience of community systems to reduce hazard risks can be achieved through mitigation and adaptation efforts. Communities need to be prepared from the start in dealing with disasters, starting to recognize the potential for disasters that will occur in the areas they live in, to how or what to do when a disaster occurs so that the community is safe both life and property (Yustisia, Aprilatutini, & Utama, 2019 ; Barus & Aminah, 2021) .

One of the disasters that can occur is an earthquake. Earthquake (earthquake) is an event that vibrates or shakes the earth due to the sudden movement of rock layers in the earth's crust due to the movement of tectonic plates. The nature of earthquakes always comes suddenly and surprising, causing extraordinary general panic because it is completely unexpected so that no one has time to prepare themselves (Atmojo and Muhandis, 2019).

Simulation is a form of preparedness in dealing with disasters. Simulation is a way of presenting a learning experience by imitating a disaster situation to understand a principle, concept, or skill. Emergency simulation using the role play method. Simulations are directed at creating actual events, or events that may appear in the future (Indriasari, 2018) . The disaster simulation activities carried out included health education, initial management of disaster victims, and the establishment of a field hospital.

Health education was conducted before the emergency rescue simulation event. Counseling contains effective communication in the management of earthquake emergency events. Communication in a disaster is not only needed during a disaster emergency, but is also important during and pre-disaster. This communication is the

best way for successful disaster mitigation, preparation, response, and recovery in disaster situations. The function of this communication can communicate messages to the public, government, media, and can reduce risk, even save someone's life. In disaster management, accurate information is needed by the community and private institutions that care about disaster victims (Haddow and Haddow, 2008 in Rudianto, 2015) .

Effective disaster communication includes 4 main basic points including, *customer focus* , namely understanding the information needed by the community and volunteers. *Leadership commitment* , leaders who play a role in disaster emergency response must have a commitment to carry out effective communication and be actively involved in the communication process. *Situational awareness*, effective communication is based on the controlled collection, analysis and dissemination of information related to disasters. *Media partnership* is an important medium in conveying information appropriately to the public (newspapers, radio, television, etc.) (Haddow, 2018 in Sikumbang, Zainun and Zubaidi Zakaria, 2018) .

Disaster simulation is carried out in post-disaster situations. The activities carried out include searching and labeling disaster victims according to the TRIASE team using the START method. Initial management is carried out by the evacuation team while taking the victim to the field hospital which can be seen in Figures 1 and 2. The initial management given to earthquake victims includes airway control, respiratory and heart functions, monitoring the victim's position, bleeding control, fracture immobilization, dressings and attempts to make the victim feel more comfortable. It should always be remembered that, if the victim is still in the location, the most important thing is to move the victim as soon as possible, bring the emergency victim to the advanced medical post while carrying out major first aid efforts, such as maintaining the airway, and controlling bleeding. Cardiopulmonary resuscitation should not be carried out at the accident site in a mass disaster because it requires time and effort (Ose, 2019).

Figure 1. Victim labeling by triase team

Figure 2**.** Primary survey

Figure 3. Sirculation

Figure 4. Transportation

Figure 5. Evacuation

Field hospitals can provide victims with further assistance regarding their clinical condition. A field hospital (field hospital) is a service unit created to assist the function of referral health services (outpatient, inpatient, emergency room, operating room, laboratory, etc.) In organizing, the service unit consists of parts that work together in

providing basic and specialist medical services for both individuals and groups of disaster victims (Pakarya *et al.* , 2011) .

Pakarya *et al.* (2011) states that in establishing a field hospital in a disaster location, there are several things that must be considered, namely security, the location of the establishment of a field hospital must be in an area that is safe from disasters, access, determining the location of the establishment of a field hospital, must take into account the ease of access for officers and patients, as well as for logistics mobilization. Infrastructure, Is there a building or land with a flat and hard surface that can be used for the establishment of a field hospital. and available infrastructure such as clean water and adequate electricity to meet the operational needs of field hospitals or use of generators. Communication system, Is there a communication system available at the location of the field hospital or is an independent communication system needed for the field hospital? The communication factor plays an important role both for internal hospital needs and for external relations related to reporting, coordination and mobilization of personnel and logistics, etc.

Conclusion

In an effort to increase student preparedness in dealing with earthquake disasters, it can be done by providing counseling and simulations as well as emergency skills training. This simulation activity is able to improve students' understanding and skills in performing first aid during the disaster impact phase.

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