THE EFFECTIVENESS OF BASIC TRAINING VIA DISASTER MANAGEMENT PILOT PROGRAMS FOR DISASTER PREPAREDNESS IN THE COMMUNITY

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ABSTRACT

Introduction: Professional nurses are expected to prepare for emergency and disaster situations. Therefore, we need to prepare pre-clinical nursing students for basic disaster management. This study aimed to evaluate the effectiveness of disaster management basic training related to improving the student's preparedness to face disaster. **Methods:** This study used an experimental post-test only – the non-equivalent control group design recruited the sample using purposive sampling and the 50 students were divided into 2 groups: students who had basic disaster management training and the students who only received disaster materials through their lectures. **Results:** The average index of disaster preparedness in the treatment group ($\chi = 5.4500$) was higher than in the control group ($\chi = 3.7554$). The result obtained $p = 0,000$ ($\alpha = 0.05$) using the independent t-test. **Conclusion:** This showed that the basic disaster management training method significantly affected the level of disaster preparedness in the students. Therefore, the successful method can be applied for implementation in the 2018 curriculum.

Keywords: disaster, preparedness, training

INTRODUCTION

Indonesia is an archipelagic country where the meeting of three tectonic plates allows for the occurrence of several natural disasters. Other disasters such as forest and land fires, social conflict, transportation accidents and technological failures can also be a threat (Badan Nasional Penanggulangan Bencana, 2013). One of the strategies and efforts that can be undertaken to reduce the impact of the disaster is to prepare (Badan Nasional Penanggulangan Bencana (BNPB), 2008).

Hospitals are at the front line of the health services, and have a great responsibility and role in the handling of emergency patients when disaster strikes (Huriah and Farida, 2010). This is one part of the challenge; to realize the hospital's preparedness to facing disaster. To increase the hospital's resilience to disasters, there are a number of important considerations to note. The hospitals should have simple and flexible written disaster management plans, alternative arrangements, and ensure that the hospital staff are familiar with their training and the testing of any disaster management plans (Timur and Nur, 2013).

Nurses, as health workers that make up the largest percentage in the hospital

service system, are required to participate actively in preparing for when disaster happens (Sudiro and Harnanto, 2014; Duong, 2009). The nurses' knowledge is inadequate, which can be seen by recognizing the major gaps concerning the provision of care during disasters. Moreover, this reveals that knowledge is one critical factor in determining whether hospital-based nurses are willing to provide care in this situation (Pesiridis *et al.*, 2015). Therefore, the institution of nursing education has to prepare for their nursing students to be professionals in a disaster scenario (Peoples, Gebbie and Hutton, 2016). There needs to be preparation conducted for basic disaster management (Jose and Dufrene, 2014).

According to the Asian Disaster Reduction Response Network (2010), disaster preparedness is the knowledge and capacity developed by the government, professional institutions in the field of response and recovery, and communities and individuals involved in responding to and recovering effectively from the effects of events or conditions that threaten possible harm that will soon exist or currently exists. Preparedness is a series of efforts undertaken to anticipate disasters through organization and implanting preventative measures in a useful and effective manner (Badan

Nasional Penanggulangan Bencana, 2015).

Self-preparedness is expected to eventually be able to anticipate the threat of disaster, minimize casualties, injuries, and reduce infrastructure damage. Starting from within ourselves, we can help families and communities to build their level of preparedness, as well to do so in the face of disaster and to recover after the disaster as well (Badan Nasional Penanggulangan Bencana, 2013).

Disaster preparedness efforts are conducted based on the Regulation of the Head of National Disaster Agency No 4, 2008 at the time of the disaster beginning to be identified. The activities undertaken include the activation of disaster prepared positions in society, preparedness training, simulations and technical training for each sector of Disaster Management (Search And Rescue, social, health, infrastructure and public works), the inventory of emergency support resources, the preparation of support, the mobilization of resources or logistics, the preparation of a fast and integrated information and communication system to support disaster tasks, the preparation and installation of instruments in an early warning system, contingency plans, and overall resource mobilization (of both personnel and equipment).

The Indonesian Institute of Sciences (LIPI) is working with the United Nations for Education/International Strategy for Disaster Reduction (UNESCO/ISDR) to develop a community preparedness framework by reviewing the five critical factors that affecting disaster preparedness: knowledge and attitude to disaster, family policies on preparedness, plans for emergency disasters, disaster warning systems and resource mobilization (Peneliti LIPI, 2006).

The issue of nurse preparedness in facing disaster has become a topic not only in Indonesia, but also around the world. Several studies conducted on nurses and nursing students have stated that the nurse's preparedness level to face disaster is still low (Baack & Alfred, 2013; Labrague et al., 2015). International organizations such as the WHO and ICN have identified and criticized undergraduate nursing courses for their failure to adequately prepare their graduates to the eventuality of participating in disaster relief work (Usher and Mayner, 2011). Interprofessional education and

collaborative practices are needed for health professionals to combat natural disasters. This should be started from the beginning of their undergraduate learning (Prihatiningsih *et al.*, 2017). One of the efforts that can be implemented to improve disaster preparedness in nursing students is to conduct basic training on disaster management and disaster simulation (Gardner *et al.*, 2016; Gebbie and Qureshi, 2002).

The Indonesian Nursing Education Core Curriculum 2015, which contains the subject of disaster nursing, has been applied in most nursing schools in Indonesia. Previously, the topic of disaster was contained in the subject of emergency nursing and Advanced Nursing Practice, but it was limited and contained superficial material only. There were no practicals or simulations involved. On the other hand, some studies show that disaster management training with mock drills and simulation methods can produce effective disaster preparedness in nursing students (Burnock, 2014; Ireland *et al.*, 2006).

There are some previous studies related to disaster preparedness and interventions in nursing and nursing students. A pilot disaster preparedness training program conducted on nursing students in the United States indicates the success of the training at improving the responsiveness and willingness of the students to engage in disaster preparedness (Burnock, 2014).

The Long Island University School of Nursing, Brooklyn, New York, is developing a community practice field program for disaster preparedness in its final semester students with materials based on the competence of International Nursing Coalition for Mass Casualty Education recommendations. The students are given the opportunity to apply the learning outcomes and to develop additional skills by following a mock drill (Ireland *et al.*, 2006).

A study comparing the need for preparedness and disaster response learning between nursing students in Istanbul, Turkey with Miyazaki, Japan concluded that nursing students in both cities require disaster preparedness training. The study also demonstrated the need to include disaster management and mass disaster management skills in the nursing curriculum. The existing core curriculum needs to be continued. Outcome competencies should be identified

and validated through further research (Öztekin *et al.*, 2014).

Research conducted on nurses in the Asia Pacific (in 757 hospitals) showed that almost all nurses had a low to moderate level knowledge of disaster skills and disaster preparedness (Usher *et al.*, 2015). A nurse's readiness perception to manage a disaster situation shows that most nurses are not confident at responding to major disasters. Nurses who are confident at dealing with disaster situations are nurses who have had prior experience, where they have been directly involved in disaster or displacement situations. It is therefore necessary for nurses to participate in actual disaster events, mock drills and further specific training for disaster preparedness (Baack and Alfred, 2013).

Research on the perception of nursing students in Australia on disaster nursing and disaster preparedness concluded that nursing students are not ready to respond to disaster situations. The findings resulted in 3 recommendations, namely (1) the need to increase the knowledge of disaster and disaster preparedness in nursing students, (2) the need for a memorandum of understanding and cooperation between nursing education institutions and community organizations that can facilitate the students to respond to disaster, (3) that it is required to open up opportunities for the nurses to act as disaster volunteers to improve the students' understanding of disaster preparedness and plans (Peoples, Gebbie and Hutton, 2016).

The study of the evaluation of disaster preparedness training and disaster drills for nursing students conducted a disaster preparedness training program and disaster simulation, which increased the ability of the nursing students about disaster preparedness, both undergraduate and diploma students. This result means that the participants gained a better understanding of disaster preparedness after completing the training (Alim, Kawabata and Nakazawa, 2015).

Australian undergraduate nursing curricula research showed that in Australia, the preparedness is negligible and that there is a limited interest in addressing the issue. The nursing student had only a little knowledge about disaster, so the registration board suggested that it is required that disaster nursing is included in the future undergraduate nursing curricula (Usher and

Mayner, 2011).

In a study focused on preparing for disaster, all of the participants indicated that the disaster simulation experience was valuable and that it should be continued. The nursing students have expressed that it was a great learning experience, that it was thinking "outside the box" in the clinical practice area, that it was very challenging for them and that they enjoyed participating with so many different entities (Alfred *et al.*, 2015).

Another study explored the skills, knowledge and attitudes required by registered nurses across China who worked in the aftermath of three large earthquakes. The results showed that almost of them had not received any specific disaster nursing training prior to their post- earthquake nursing. They emphasized the need for knowledge on the psychological care of victims, as well as that of fellow health workers. All believed that there were important gaps in their knowledge and skills, and that they supported the implementation of disaster nursing courses in the future (Yan *et al.*, 2015).

From this background, it is clearly indicated that we need a pilot program to find and evaluate the appropriate and effective learning methods required when preparing for the implementation of teaching disaster nursing. We therefore conducted basic training on disaster management and ran a disaster simulation for nursing students.

The purpose of this study was to determine the level of preparedness of the students when dealing with disasters in groups that only received lecture materials. Furthermore, we need to know the level of preparedness of the students when facing disaster in the group receiving the lecture material and in the group where they followed the basic disaster management training and disaster simulation. This way we can analyze the effectiveness of the basic disaster management and disaster simulation training by learning of the difference in the disaster preparedness level among the students receiving only the lecture material and that of the groups receiving both the lecture materials and the disaster simulation training. The urgency of this research is related to the need for a trial model of learning, including simulation and an evaluation to discover the right method to use to provide disaster nursing lessons according to KIPNI 2015. These will be provided to the students of the class of

2016 in semester 6 (academic year 2018/2019).

MATERIALS AND METHODS

The design of this study used an experimental post-test with a non-equivalent control group. Both of the groups were measured at the end of the intervention. The population consisted of 223 nursing students at STIKES Muhammadiyah Lamongan, who were in their 7th semester who had taken the Advanced Nursing Practice. Sampling course. The recruitment was done through purposive sampling. The technique used to select the sample was focused on setting subjects that were tailored to the research objectives. The students who were doing the unit on the basic training for disaster management were the experimental group, and the control group were made up students taken at random from the same level/semester. Furthermore, after the treatment group received basic training on disaster management and simulation, it will compare disaster preparedness level. The post-test observation was done after the students had completed all of the training materials. This research was ethically approved by the STIKES Muhammadiyah ethical committee.

The independent variables in this research included the implementation of basic training for disaster management and a simulation based on the basic material, subject matter and disaster supporting material. This was ran over 5 days (3 days in the basic training stage and 2 days disaster training). Given the attendance and training attendance parameters, the sample was divided into 2 groups, participating in training (T) and non-training (C) respectively. From the data collected, 28 respondents were obtained for the control group and 22 respondents were obtained for the treatment group. The dependent variable was the individual readiness of the students to serve as nurses in the face of disaster situations, incorporating the following parameters: knowledge and attitude to disaster (KAD), policy (P), Early Warning System (EWS), Emergency Response Plan (ERP) and resource mobilization (RM) which were all measured using the modification of the Individual and Household Preparedness questionnaire used in Anticipation of Natural Disasters by LIPI-UNESCO/ISDR

(2006).

The Disaster Preparedness Index was calculated using the following formula (Peneliti LIPI, 2006):

$$\frac{35(KAD) + 10(P) + 15(ERP) + 25(EWS) + 15(RM)}{100}$$

This research was conducted during five months from April to August 2017 at STIKES Muhammadiyah Lamongan. The processed data was used to analyze the differences in the preparedness index when facing disaster post-test between the treatment group and control group using an Independent t-test with a significance level $\alpha < 0,05$. The data analysis was done with the help of statistical software (SPSS version 16) which was processed through a computer.

RESULTS

Research Analysis

Based on Table 2, it can be seen that the respondents in the control group score with a minimum value of 1.85 and a maximum value of 5.35, and the obtained mean was 3.7554 with a standard deviation of 1.23125. The respondents in the treatment group had a score with a smaller variation, with a minimum value of 5.4 and a maximum value of 5.6, with an obtained mean of 5.4500 with a standard deviation of 0.06726. Based on the data, it can be seen that most of the treatment groups had higher scores than the control group with $\Delta = 1.69464$. This is also evidenced by the statistical analysis conducted using an independent t-test (Appendix 12), and the t value obtained was 7.269 with $p = 0,000$ (2-tailed). The hypothesis of this study was to prove that there were differences in the preparedness index when in the face of disaster during the post-test between the treatment group and the control group. Thus, the statistical hypothesis (H0) was rejected and the research hypothesis (H1) was accepted. This means that the basic training consisting of disaster management and simulation was more effective at improving disaster preparedness compared to the lectures in the control group.

DISCUSSION

Knowledge and Attitudes about Disaster

In general, the students in the

intervention group had a high knowledge and attitude score (87.5%). Students in the intervention group were mostly informed about natural disasters, mitigation, and the signs and risks of natural disasters. The knowledge in the control group also showed a fairly high rate (75%). The intervention and control group have the same information about disasters due to the learning process conducted in the classroom.

This enables the students to obtain important information about the basic concepts of disaster. The information obtained by the students is what also affects their attitude when dealing with disaster conditions. The intervention group had higher scores due to the information they obtained on the basic principles of disaster being re-delivered when they followed the basic training on disaster management.

Table 1. Characteristics of the Respondents

Characteristics	Control Group	Treatment Group	Frequency (f)	Percentage (%)
Age				
19 years old	0	1	1	2
20 years old	4	3	7	14
21 years old	15	12	27	54
22 years old	8	1	9	18
23 years old	1	5	6	12
Total	28	22	50	100
Gender				
Male	5	9	14	28
Female	23	13	36	72
Total	28	22	50	100
Organizational activity				
Active	1	22	23	46
Not active	27	0	27	54
Total	28	22	50	100

Table 2. Test Results Analysis; the Independent t-test on the Disaster Preparedness Index

Score	N	Mean	SD	Min	Max	t-test
Control Group	28	3.7554	1.23125	1.85	5.35	t = 7.269 p = 0.000 (2-tailed)
Treatment Group	22	5.4500	0.06726	5.4	5.6	
Δ		1.69464				

According to Peoples, Gebbie and Hutton (2016), they explained that in order to improve the student perception of disaster preparedness, it is necessary to increase the student's knowledge of disaster and disaster preparedness. From the data in this study, there was the indication that the students' knowledge was high enough on the basis of disaster and disaster mitigation. On the other hand, the value was still high in the intervention group. Cadorin et al (2014) found that the knowledge of the nurses can improve if there is "meaningful learning". This means that they must be active in study process, especially when they are directly involved in an event. This indicates that the students who adhere to the extracurricular basic training on disaster management can improve their knowledge on the basis of disasters. Therefore, the students can be

advised to follow similar training to improve their disaster knowledge (Cadorin *et al.*, 2014).

The attitude measured in the instrument of this study also describes the attitude that is owned by the family. This is based on the fact that all attitudes and activities of the students are still involved with and influenced by the attitude of their family during the disaster. Students still have the role of being a child in the eyes of their family, whose actions are not only determined by themselves, but by their respective parents. The parents' attitude is also strongly influenced by the experiences that they have of the natural disasters occurring in the surrounding environment. Thus, indirectly, the individual student's attitude is also influenced by the experience of their family in the face of the disasters that they have experienced.

The individual's attitude and response to a condition may be affected by his or her confidence. Their confidence will grow if they have had prior experience. Cant and Cooper (2010) also said that students involved in simulation learning have more confident and critical thinking skills than those who have engaged in non-simulation learning. The experience is derived from a direct jump into certain situations or by performing simulations that resemble a particular condition (Cant and Cooper, 2010). This is consistent with the research conducted by Baack & Alfred (2013), which explains that the attitude of disaster preparedness in the nurses can be influenced by their experience of confronting and participating in disasters or disaster simulations. Changes in the nurses attitude can be mediated by simulation experience, which allows for deep and meaningful learning (Cadorin *et al.*, 2014).

Disaster simulation is a method that creates a situation similar to the real conditions of disaster. Therefore, disaster simulation is a very appropriate method to use so then the students can grow in self-confidence. The participants' self-esteem and confidence increases because they have experience in dealing with disaster situations, even though they have not faced the actual conditions. The simulation also serves as an application of the learning outcomes and the development of individual and group skills when facing emergency disaster conditions. Thus, disaster simulations need to be conducted in the disaster learning curriculum. This opinion is supported by the research conducted by Ireland *et al* (2006) which suggests that community-based disaster preparedness practice programs need to be undertaken by students in order to develop their skills.

Government Policy on Disaster

The student's perceptions of government involvement are minimal because they are not exposed to the socialization of local government policies, as described in the evaluation of regional disaster management. The policy objectives achieved are not in accordance with the targets set, and communication with the community has not gone well in the past (Kiswanto and Rosdiana, 2016). Secondly, they do not understand that

some activities related to disaster mitigation carried out by NGOs or other institutions are also translations and the application of government policies. Therefore, the socialization and active involvement of the local government in disaster mitigation is necessary for their perception of local government to be improved (Connolly and Fedoruk, 2014).

Disaster Warning System

Disaster warning systems are a critical component in the success of disaster mitigation. Accurate, structured, informative and targeted disaster warnings are an absolute requirement to better the effectiveness of disaster warning systems. The government's role in disaster, mass media, and social media becomes the actor who will be directly involved in disseminating disaster warning information. Thus, good coordination is necessary to avoid errors being present in the disaster warnings. If there are any errors in the information, then this will lead to panic and further problems in the community.

The disaster warning system can be traditional in villages such as *kentongan*, such as delivering important information through places of worship or it can be information obtained through media electronic and social. Electronic and social media is an information system that can reach broader society in a relatively short time. Therefore, to avoid media misuse and hoaxes, the information deployment must be anticipated by all officers involved in the disaster warning system. Socialization in the use and dissemination of information is also needed because those involved are individuals who are close to the virtual world and who are very vulnerable to being a hoax spreader. In this study, the nursing students were novices with core competencies after completing the simulation. They must have a basic knowledge and ability to appropriately respond to mass casualty incidents (Dennis and Lin, 2005). This means that the disaster warning system in the real environment can be improved after they get knowledge and refined abilities from the simulation learning. The nursing students can be a change agent in the real population and make the disaster warning system better.

Disaster Emergency Response Plan

The emergency response plans measured by our instruments cover the readiness of the students in making special preparations before a disaster occurs. Some of the important things that we reviewed related to the disaster emergency response plan included the division of tasks in a disaster rescue, the availability of tools, paths and evacuation sites, the availability of First Aid, the storage of important documents, supplies, important numbers and tools for disaster preparation, and follow-up plans prepared to deal with emergency conditions.

If the students are actively involved in disaster simulations and mitigation, then they will make preparations related to the gravity of the disaster. Thus, it becomes important to include disaster simulations in the implementation of their learning curriculum. According to Öztekin *et al.* (2014), he explained that nursing students still need skill enhancement in the context of mass disaster management. Improvements in the learning curriculum is the key to enabling the student's skills. A relevant curriculum with the provision of academic support is a very important component of simulation (Cant and Cooper, 2010). Skills upgrades through applications and engaging directly will raise the students' awareness of disasters. Without being instructed, individually, they will prepare if similar conditions are experienced. The core curriculum that has been implemented does not have to be changed, but the addition of competencies related to hard skills and the direct involvement of students in real disaster conditions needs to be an added portion.

Resource Mobilization

The mobilization of resources studied by relevant researchers on the efforts and involvement of students in obtaining information and training on disaster is important. In addition, this sub-domain also reviewed preparation, the ownership of assets, and the involvement of people closest to the disaster. Their involvement in the simulation or disaster evacuation was also studied. Some of the above mentioned are part of an effort to optimize the quality of human resources and the benefits of the assets used to prepare if natural disasters

occur. It can be seen that the mobilization of resources in nursing students can begin to be implemented during the learning process at universities by optimizing their knowledge and skills. Optimizing the knowledge and skills of the students, is expected to be applicable in the community when disaster strikes. Students need to be involved in volunteering in order to improve their understanding of real-life conditions in the field. So, in the future, as a direct response to disaster, emergency nurses can improve the comprehensive ability of disaster nursing by systematic disaster nursing education and professional training (Xu and Zeng, 2016). In addition, good cooperation between the government and disaster mitigation agencies with nursing education institutions is needed to create synergy and understanding in response to any emergency conditions that may occur. Thus, in the event of disaster, the disaster relief service team already has resources ready to be involved. This is consistent with the research conducted by Baack& Alfred (2013), which explains that the attitude of disaster preparedness can be influenced by the experience of confronting and participating in disaster events or disaster simulation. The limitations of this study includes the limited number of samples taken without randomization and the basic training on disaster management being too short.

CONCLUSIONS

From the results, we can conclude that the level of preparedness of the students when dealing with disasters in the control group who only accepted the lecture material had a score that was lower than the level of preparedness of the students in the treatment group receiving the lecture materials and basic disaster management and disaster simulation training.

Therefore, basic training on disaster management and disaster simulation has been proven to be effective at improving the students' preparedness in facing disaster. Regarding the recommendations for educational institutions, we recommend for them to consider the results of this research as a method available in the application of the disaster nursing curriculum according to KIPNI 2015. They should develop operational standards for disaster simulation in each respective agency. For

research and development, we recommend for future researchers to conduct research on other learning methods that allow for the increased effectiveness of the learning objectives. Subsequent research is expected to use a better research method with randomization in a larger population so then the results of the research are better.

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