

Original Research Article: Mixed Methods Research

SITUATION AND COMPETENCY OF FIRST RESPONDER IN PREPAREDNESS ON FACING EMERGENCY TO IMPROVE PUBLIC SAFETY IN THE UNIVERSITY

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Article Info:

Received: 15 June 2020

Revised: 21 July 2020

Accepted: 25 July 2020

DOI:

<https://doi.org/10.36720/nhjk.v9i2.155>

Abstract

Background: Cardiovascular disease and trauma caused by accidents remain the leading cause of death. Data by WHO reveals that 17,9 million people die from cardiovascular disease before reaching hospital. The problem is caused by the first aid mistake; hence, a prompt and effective response action of the first responder is important to handle out-of-hospital emergency care. The need for care and human resources is the biggest and most important component to act as the first responders.

Objectives: The research aims to discover evaluation emergency situation in university and the competency level of the first responder taking first aid training in affect the way patients are managed during an emergency.

Methods: The method employed is mixed methods consists of FGD with a four-stage contingency planning approach and quasi-experimental design of one group post-test that was conducted to obtain quantitative data. There were 30 participants in this research. Thematic and descriptive analysis tests were used to analyze the data

Results: The results show that there are four important things in developing an emergency system in the university area which are a distribution of operational area, communication system, Developing emergency system, and sustainable improvement of first responder capacity. The results of the competency assessment show that the average knowledge level of the participants is 79.5, and their psychomotor level is above 80%.

Conclusion: First aid training is important to given for first responder to improve safety in the university.

Keywords: *Public Safety Center, First Responder, Emergency.*

INTRODUCTION

Cardiovascular disease (CVD) remains the major cause of death globally during the last 15 years (WHO, 2018). According to WHO, the mortality rate caused by cardiovascular disease (CVD) reached 17,9 million people in 2016, representing 31% of all global deaths. Of

these deaths, 85% is caused by a heart attack and stroke (WHO, 2017). Based on data in Indonesia in 2014, Coronary Heart Disease (CHD) was the number one cause of death in all age groups after stroke with a total of 12,9%. According to the age group, CHD mostly happens in the age group of 65-74 years (3,6%)

followed by the age group of above 75 years (3,2 %), 55-64 years (2,1 %), and 35-44 years (1,33 %) (Ministry of Health of the Republic of Indonesia, 2013). Besides cardiovascular disease (CVD), the most common cause of death is trauma caused by traffic accidents. Based on the results of Indonesian Basic Health Research, injury prevalences in 2013 is higher than the injury prevalences in 2007. 40,6 percent of them are caused by motorcycle accidents that mostly occurred in men aged 15-24 years (Ministry of Health of the Republic of Indonesia, 2013).

The high mortality rate due to cardiovascular disease (CVD) and physical trauma caused by traffic accidents is affected by the ineffective treatment of Out-of-Hospital-Cardiac-Arrest (OHCA). This is also proven by data released by the American Heart Association (AHA) in 2015 that states almost 90% of victims die or become disabled before reaching a hospital because of the ineffective pre-hospital treatment. (AHA, 2015).

In Indonesia, regulation of pre-hospital care has been made based on the regulation of Ministry of Health of the Republic of Indonesia number 19 in 2016 namely the Integrated Emergency Medical Service System (IEMSS) using call center based system with the access code of 119 and involving public-safety-center-oriented-people (Fikriana & Afik, 2018). The objective of IEMSS is to save life and the indicator of its success is quick response; however, the implementation of IEMSS for almost a decade has not been effective for the launched concept runs without integrating with people as part of the essential element. To make the emergency response in accordance with the golden period, the closest people to the accident place and the victim should have first aid ability. Communities are an important component in the implementation of IEMSS besides information systems, facilities, infrastructure, policy, etc. Communities are the first helper for a victim; thus, they should be educated and even explained about the simple emergency first aid procedures to achieve the planned quick response (Wiratma, 2018;

Arimastuti, 2011). in fact the helper does not yet have concrete and tangible skills that can be used when helping victims (Olchin & Krutz, 2012).

Accordingly, all efforts should be made to improve people's capacity in handling emergency treatment in their environment including in university that has various potential emergencies and limited accesses. That is an effort of the application of Merilee S. Grindle model which states that policy implementation is determined by two main aspects of the content of policy and the context of implementation (Wiratma, 2018). So that this study is important to discover the competency level of the first responder taking first aid training in an emergency in university

METHODS

Study Design

This research adopted Mixed Methods (Creswell, 2014). The researcher employed two methods which were qualitative by data collection techniques of FGD and quantitative by quasi-experimental research of one group post-test design to evaluate the competency level of the first responder and deep understanding the needs and recommendations of first responders.

Setting

Study was carried out at Universitas Pendidikan Indonesia for 3 days.

Research Subject

The quantitative dan qualitative research method was involved 30 respondents of university staffs consisted of security, field staff, and academic staff from all faculties in UPI chosen by random sampling.

The inclusion criteria for respondent including adult, no have severe commodity disease.

Data Collection

The research method utilized the contingency planning approach by Inter-Agency Standing Committee (IASC) which

was adjusted to an emergency in the university. The approach consisted of four steps which were preparing and organizing a contingency planning process, analyzing hazards and risks, planning emergency response preparedness, and implementing planned behavior-oriented preparedness (Ajzen, I, 1991).

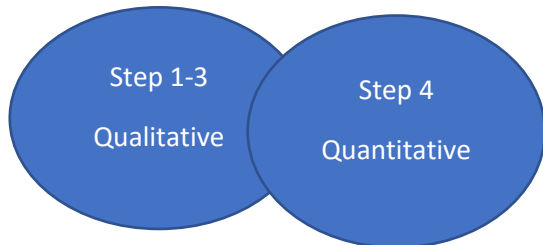


Figure 1 Step of Research Process.

Step 1-3 in contingency planning was conducted by FGD (Focus Group Discussion) involving components of emergency preparedness in university that consisted of the representative of K3 unit, polyclinic, sports facilities unit, and religious unit.

The training was held for 3 days. On the first day, FGD was conducted and the analysis of the university environment in preparedness in facing emergency was obtained.

The questions given during in the FGD including (1) how emergency preparedness planning at the university. (2) What the risk factor of emergency situation at university. (3) What is planning needed in handling emergency at university.

In the second and third days, trainings related to basic emergency prevention using the method of talk, discussion, simulation of Basic Life Support (BLS), prevention of physical trauma, and evacuation were conducted. The evaluation of competency level was conducted to measure knowledge and skills using the method of observation and post-test.

Instruments used to measure knowledge consisted of 30 questions including the handling of basic life support, mobilization and transportation systems and handling of physical trauma.

Evaluation psychometric using the simulation of BLS focused on the quality of CPR by using the phantom series of Laerdal Q CPR Resuscitation Anne. For the training of treatment for physical trauma, a check-list sheet of the accuracy to stop bleeding and immobilization was utilized. In the evacuation training, the researcher utilized a checklist sheet of the accuracy to do logroll and to use evacuation tools.

Data Analysis

The data for the qualitative method was analyzed using thematic review and data for the quantitative method was analyzed using tendency central, which included mean, median, minimum score, and maximum score, and also used deviation standard.

Validity and Reliability/ Trustworthiness

CPR by using the phantom series of Laerdal Q CPR Resusci Anne which has calibrated first. For the qualitative questions have been performed on the face validity of experts

Ethical Consideration

Research had also been declared to have passed the ethical test of Medical Ethical Etic from Universitas Jenderal Ahmad Yani and during the research there was nothing that harmed housewives physically or psychologically. The researcher apply ethical principles consisting of benefit, respect for human dignity, and justice during this study.

RESULTS

The research involved 30 participants in FGD process, which all were the representatives of the K3 unit, polyclinic, sports facilities unit, and religious unit, consisting of 25 men and 5 women of the age 24-46 years. In the first step of FGD, the focuses were the aspect of emergency contingency planning at the university level, emergency risk analysis at the university level, and emergency preparedness planning at the university level.

Contingency Planning (Step 1-3)

1. Preparation of emergency contingency planning at the university level

According to the results of thematic analysis, the university has not planned a complete and coordinated emergency treatment system; hence, there are some suggestions as follow:

- a. Conduct briefing on the emergency first aid.
- b. Socialize the system of emergency system coordination.
- c. Conduct simulation of emergency.

2. Analysis of the emergency risks at the university level

In this step, there are some opinions related to the emergency risks that might happen based on past experience or the calculation of susceptibility level and the university capacity. According to the thematic analysis, there are some emergency risks at the university level as follow:

- a. Cardiac arrest during sports activities.
- b. Physical trauma caused by sports activities.
- c. Great mass clash.

3. Planning of emergency preparedness at the university level

- a. The division of 24 hours quick emergency response zones in several K3 posts.
- b. The need for making call center in the polyclinic.
- c. The delivery message through the K3 radio transmitter access (Handy Talkie).
- d. Polyclinic as the emergency response center during the work hours, and the Bandung Public Safety Centre 119 as the emergency response center outside the work hours.
- e. The need for briefing related to first aid.

Table 1 Thematic Analysis Result

Questions	Statement participant	Theme
How emergency preparedness planning at the university	<p>“the university has not planned a complete and coordinated emergency treatment system” (P3, P6, P10)</p> <p>"There must be a plan for the preparation of the handling beforehand, we are worried that there will be an incident like tennis again when we died tennis don't know what to do" (P14)</p> <p>"It is better to have a structured KGD handling system in campus, for example when there is an incident, what should we do" (P23, P9)</p>	Developing emergency system
What the risk factor of emergency situation at university	<p>"You can send it to the clinic in the morning and evening, but fear that if it happens outside working hours, we must know what to do, because it can increase the risk of the victim if he is wrong, he may even die" (P12)</p> <p>"There is a risk like in tennis when someone died, suddenly fainted and finally was not helped. It's because we don't know how to handling" (P1)</p>	Sustainable improvement of first responder capacity.
What is planning needed in handling emergency at university.	<p>"There are times when only a few security personnel have handy talkies, so there must also be socialization, such as what method of conveying that information" (P7)</p> <p>"Is the information sufficient to be conveyed to the coordinator of a particular area or center because it is related to the speed of handling" (P11)</p> <p>"It seems like a call center should be made that everyone can call, so if there is anything the team in charge can move, so far only security has connections to the respective K3 office, moreover it involves several units" (P 27)</p> <p>"It could also be at the clinic that there is a call center specifically for handling universities, but it hasn't been 24 hours yet" (P20)</p>	a distribution of operational area and communication system

The Competency Achievement Results of First Responder in Handling Emergency (Step 4)

The competency achievement results show in the table 2.

Table 2 The Competency of The First Responder in Handling Emergency After the Training.

Competency	Mean	Min-max	SD
Knowledge	79,5	45-95	14,16
Psychomotor of CPR Quality			
• Correct compression depth	83.6	78.6 - 92.5	8.78
• Average compression rate	113.5	100 - 120	6.77
• Compression with complete release >60%	92	72.3 - 100	8.0
Psychomotor of Trauma Treatment	81,93	73-90	4,41
Psychomotor of Evacuation	86,2	78-90	2,65

The results above show that the competency standard of the first responder after the training is good, even though the knowledge, which scores 45, is cognitively below the standard.

DISCUSSION

The high death rate among out-of-hospital victims is a big problem in the implementation of out-of-hospital emergency care. The Integrated Emergency Medical Service System is generally secure-and-safe-oriented. It is necessary to adopt a multisectoral approach and involve the community in the implementation of the system (Fikriana & Afik, 2018; Wiratma, 2018; Arimastuti, 2011). Various people's community characteristics such as university communities that have various dynamic activities and restricted communities of students and academicians evoke different problems.

The Effort of Emergency Preparedness in University

Some emergency situations in the university have happened and are potentially reoccurred in the future. The results of FGD lead to several potential emergency problems which are cardiac arrest during sports activities, physical trauma caused by sports activities, and great mass clash. Those problems need structured-coordinated-planning and the active role of all community aspects in university. To establish an emergency preparedness system in university, all communities should be aware

that the emergency preparedness system is the responsibility of all community aspects so that it becomes a new culture in the university (McGuire, 2015). The conducted approach referred to the contingency planning approach by Inter-Agency Standing Committee (IASC) in Vidiarina (2010) that has four steps in which during the first until the third steps the participants were stimulated to examine the plan to organize the expected contingency planning program.

Based on the first step, the emergency preparedness briefing program, socialization of coordination system and communication, and emergency simulation are important to be conducted. The aim of this phase is to stimulate participants to think of the planning to improve their capacity in emergency prevention at the university level. This is in line with Raharjo, W (2010) that states that someone's perception can affect the action done in everything included an emergency in both daily life and a disaster. This phase shows that the participants have the same perception toward the need for emergency skills as well as communication and coordination system. Mohaupt's research (2016) knowledge and skills are considered equally important; and all individuals work

towards a common goal and are willing to sacrifice some professional supervision.

In the second step, there were narrow results related to emergency risks at the university level which are cardiac arrest during sports activities, physical trauma during sports activities, and potential risks caused by a great mass clash. This stimulated participants to decide the substances needed to be improved in supporting the establishment of an emergency prevention system at the university level. This is in line with Preparedness Model adapted from Patton (2007) and other basis researches that state that the important elementary factors in improving individual capacity in emergency prevention in daily life or disasters are risks perception or recognizing the potential risks. From the risks internalization results, participants were able to construct things needed and could be applied to establish effective emergency prevention at the university level. This is in line with Gill et al., (2019) and Olchin & Krutz, (2012) If a victim is known to have cardiovascular problems and trauma, he is categorized as a priority and cardiopulmonary resuscitation will begin. This is perhaps the most difficult triage management for the community that acts as the first responders.

Some points according to the results of risks assessments are the division of 24 hours quick emergency response zones in several K3 posts, the urgency of call centre in polyclinic, the delivery message through the K3 radio transmitter access (Handy Talkie), polyclinic as the emergency response center during the work hours, and the Bandung Public Safety Centre 119 as the emergency response center outside the work hours. This is in line with the main objective of the Integrated Emergency Medical Service System which is a prompt and effective first response (Wiratma B. 2018).

First Responders Competency in Handling Emergency

The first through the third steps of the training focused on developing self-awareness that emergency prevention is the responsibility

of all so that the planned and implemented efforts were the results of observation and perception established during the discussion. Meanwhile, the fourth step which is the emergency preparedness effort was conducted by improving the first responder capacity related to the potential risks such as basic life support, physical trauma care, and evacuation transportation. CPR quality is the main core of BLS learning in this training. According to AHA 2015, besides quick response, the success of cardiac arrest rescue is determined by the CPR quality done (Meaney, et al. 2013).

CPR quality should be maintained with the right strategy. Three stages to maintain the CPR quality are pre, intra, and post attempt. The strategies to improve CPR quality in pre-attempt are teaching and showing the right technique (Jamil, 2016). CPR quality consists of three assessed aspects which are correct compression depth, the chest compression rate of 100-120 compressions per minute, and compression with a complete release of >60% (Van Dawen et.al, 2018). The training shows that CPR quality performed by the participants was very great so that the pre-attempt effort was done very well. According to the observation results of three assessed aspects, the two aspects have positive results, while the correct compression depth with an average of 83,6% becomes the lowest one among them. Hence, a strategy to maintain the CPR quality of the first responder is important to improve that aspect. This is in line with the AHA campaign that encourages all people to understand CPR by organizing the Hands-Only CPR program in which the training conducted continuously every 6 months (O'Keeffe, C, 2011).

The aspect of physical trauma treatment became the second substance provided in improving the capacity of the first responder. The results show that participants have an average ability of above 80% in physical trauma care. Two points emphasized during the training were how to stop hemorrhage as well as immobilization technique or applying bandage splint. This is in line with the aim of handling an emergency. Besides saving a life,

handling an emergency aims at preventing disability (ATLS, 2018). In the third aspect which is the evacuation process and transportation, the average skills of participants are very positive which is 86,2. This supports the implementation of the evacuation process to the nearest healthcare service from where the accident occurs. This is important considering the increasing of the out-of-hospital death rate due to suspected multiple trauma or cervical fracture caused by the wrong evacuation process.

The whole training shows that a special approach is necessary to establish the system properly. The comprehensive contingency planning approach can stimulate self-awareness towards the nearby risks or threats. It can be utilized to adapt well to reduce those risks or threats. From this study, it was obtained that some aspects should be simultaneously established based on the efforts of building a Public Safety Centre in the university from the first until the fourth step. Those aspects are a university call center, healthcare service facilities, and an active role of all academicians in handling emergency first response based on their capacities. Those aspects can help realizing quick emergency response, and prompt treatment and transportation (Wiratma B. 2018; Fikriana & Afik, 2018).

CONCLUSION

The results show that it is important to adopt a system that stimulates contingency planning of emergency preparedness, analyze risks, plan emergency scenarios at the university level, and conduct emergency preparedness effort, development of standard information exchange models and protocols for use by first responders. The results also show that the competency level of the first responder in the BLS training, which shows a mean of 79,5% in knowledge aspect, 83,4% in correct compression depth, 81,93% in trauma treatment, and 86,2% in evacuation, is perceived as good.

SUGGESTIONS

This study suggests to all community in the University to prepare a team which have capability in the handle emergency situation and have a system support.

ACKNOWLEDGMENT

Thank you to the Institute of Research and Community Empowerment (LPPM) at the Indonesia University of Education for providing grants of Research and Community Empowerment program in 2019.

DECLARATION OF CONFLICTING INTEREST

All authors state no conflict of interest that arise when conducting research.

FUNDING

This research was funded by the Institute of Research and Community Empowerment (LPPM) at the Indonesia University of Education for providing grants of Research and Community Empowerment program in 2019.

AUTHOR CONTRIBUTION

Suci Tuty Putri: Drafter, Final manuscript.

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Cite this article as: Putri, S. T., Salasa, S., Sumartini, S. (2020). Situation dan competency of first responder in preparedness on facing emergency to improve public safety in the university. *Nurse and Health: Jurnal Keperawatan*, 9(2), 102-110. <https://doi.org/10.36720/nhjk.v9i2.155>