

## Original Research Article

# Effectiveness of first-aid training in school among high school students in Kulon Progo, Indonesia

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## ABSTRACT

**Background:** The cardiovascular disease was the main cause of death throughout the world. The first aid that should be taken by the first responder or witness was an important part in the chain of survival out of the hospital that could improve the prognosis and avoid the rest of the symptoms. Hence, it is important for common people to know and possess the skill, especially the cardiopulmonary resuscitation, to handle the emergency situation. Schools became the appropriate place to organize the first-aid training because the students were more conditioned in emotional, social and cultural terms.

**Methods:** This study utilized the quasi-experiment method. The total number of subjects was 124 students who studied in Kalibawang 1<sup>st</sup> State Senior High School, and in Samigaluh 1<sup>st</sup> State Senior High School, both of them school is located in Kulon Progo district, Indonesia. The subjects were divided into three groups using three different methods, namely lecturing-discussion, poster demonstration, and audio-visual media.

**Results:** The pre-test and post-test results showed that there was a knowledge improvement after the training using the lecturing ( $p=0.000$ ), poster ( $p=0.000$ ) and audio-visual methods ( $p=0.000$ ). The cardiopulmonary resuscitation skills in the lecturing ( $p=0.000$ ), poster ( $p=0.000$ ) and audio-visual methods ( $p=0.000$ ) groups showed the improvement after the first-aid training in school.

**Conclusions:** This study proved that the first-aid training in the school gave effect on the improvement of the knowledge and skill in handling the emergency situation, particularly the cardiac arrest through cardiopulmonary resuscitation.

**Keywords:** Cardiopulmonary resuscitation, First aid, High school, Student, Training

## INTRODUCTION

Cardiac arrest was one of the causes of main death throughout the world. American Heart Association stated that more than 1000 persons experienced non-traumatic cardiac arrest that happened out of the hospital, including 26 children in the United States.<sup>1</sup>

The first-aid training which was done by the first responder or witness was the important part in the chain of survival out of the hospital. Cardiopulmonary

Resuscitation (CPR) that was performed by the first responder enhanced the life possibility and avoided the rest of the symptoms. On the contrary, the delay in handling the cardiopulmonary resuscitation decreased the life possibility 5-10% every minute.<sup>2</sup> Therefore, it is important for ordinary people to be given the training in relation to the emergency situation, especially the CPR. Someone who has received the first-aid training would perform first-aid better and more confident in doing the CPR compared to those who have not participated in the training.<sup>3</sup>

## Background and significance

The cardiovascular disease, particularly the sudden cardiac arrest was the main cause of the death and disability in the whole universe. Around 17.7 million people per year died of cardiovascular disease within which the incidence of cardiac arrest always increased.<sup>2</sup> The 70% events of the cardiac arrest happened out of the hospital (Out-of-Hospital Cardiac Arrest/OHCA) whom the first responder was the common people such as the family members, friends, neighbors, and other people close to them.<sup>4</sup> The life possibility of the people who experienced the cardiac arrest could increase significantly, two to three times, using the cardiopulmonary resuscitation by the people who first found them. This would reduce the brain damage and improve the return of the circulation. However, not all people knew the CPR technique. The individual competence level in performing the CPR had connection with the knowledge and the skills.<sup>5</sup> Therefore, the education and training for the first responder became an important matter.<sup>6</sup>

The training and education about CPR will be more optimum if it is given to students in the level of senior high school. The students in the age of more or less 17 years are able to understand the materials of the first aid and handling the emergency situation. This is in accordance with the consensus stating that in general the student in the age of 15-16 years or above have possessed the maturity to participate in the training, proper skill in performing the cardiopulmonary resuscitation, the willing to give assistance to the family, friends, or other people.<sup>7</sup> Schools in general are the environments that support the learning of emergency measures, particularly CPR, to identify the skills and knowledge to save lives. For the students individually, the training of CPR will enhance the knowledge and skills to save lives, increase mental awareness and preparedness in case of emergency, improve confidence and contribute to the community.<sup>1</sup>

In Indonesia, the research on first-aid trainings in school have not been conducted much. The researcher noted one similar study, that is "Pelatihan First-aid untuk Meningkatkan Sikap dan Pengetahuan Guru di Sekolah Dasar" (The first-aid training to Improve Teacher's Attitude and Knowledge in the Elementary School).<sup>8</sup>

There were some innovations, such as the method of the training which lecturing, poster demonstration, audio-visual media, and simulation. In addition, the subjects of the training were senior high school students, while in the previous research the subjects were elementary school teachers. This motivated the researcher to conduct research on the effectiveness of first-aid training in schools, particularly CPR for senior high school students in the level of knowledge and skills.

## Purpose

This study aimed at investigating the effectiveness of first-aid training in improving the first-aid skills of school students in Kulon Progo, Indonesia.

## METHODS

This study was a quasi-experimental study with one group pre and post-test

design using quantitative approach. The period of the intervention in 15th August 2018 - 14<sup>th</sup> November 2018. The location was in senior high schools SMAN 1 Kalibawang and SMAN 1 Samigaluh in Kulonprogo Regency, Province of Yogyakarta, Indonesia. The subjects were 124 students who were divided into three group with different methods of intervention. This study used purposive sampling technique.

## Inclusion criteria

- The eleventh-grade students in SMAN 1 Kalibawang and SMAN 1 Samigaluh.
- Never involved in the first-aid training.

This criterion of inclusion did not include the absent students when the data gathering was implemented. The intervention was first-aid training in the schools that were conducted using three different methods, namely, lecturing-discussion, poster demonstration, and audio-visual media. First, the subjects were divided into three groups that received the materials of First aid in School about the CPR using three different methods. The subjects in three groups worked on the pre-test in 20 minutes. The topics, subtopics and duration are explained in Table 1.

**Table 1: Topics of training.**

Topic	Sub Topic	Duration
Integrated emergency management system	The concept of Integrated emergency management system	20 minutes
	Telephone numbers for emergency	
Introduction to emergency	Introduction to cardiac arrest indicator out of the hospital	20 minutes
	Introduction to the chain of survival	
CPR based on the guideline of the American Heart association 2015	CPR technique	60 minutes
	High quality CPR	

Second, three groups took part in the simulation training to perform the CPR in accordance to the guideline of the American Heart Association (2015). Before doing so, the subjects had worked on the CPR practice pre-test corresponding to their prior knowledge, each took 2 minutes (5 cycles of the CPR). The delivery of CPR skill materials with the methods of simulation was implemented using mannequin. The CPR materials were delivered within 100 minutes and the subjects tried to perform the CPR one by one, each spent 2 minutes to finish 5 cycles of the CPR. The pre-test and post-test aimed at assessing the subject skills in performing the CPR.

The instrument was the items of pre-test and post-test to measure the knowledge, and the other instrument was the skill checklist of the CPR skill laboratory of Department of Basic and Emergency Nursing, University Gadjah Mada to measure the CPR skills. The materials were composed by the researcher team based on the AHA Guideline 2015. The pre-test and the post-test were developed based on the delivered materials, in the form of 10 items of multiple-choice test with five options of answer.

The data were analyzed using SPSS version 22. The data gathering was implemented by means of observation which was conducted before the experiment (T0) called pre-test and after the experiment (T1) called post-test. The difference between T0 and T1 (T1-T0) was assumed as the effect of intervention. The variable data of knowledge and skill were the numerical data with the pair samples, so the measurement of comparison between T1 and T2 utilized the Wilcoxon test because the data were not normally distributed.

The ethical approval was issued by the Ethic Committee of the Faculty of Medicine, Public Health, and Nursing, Gadjah Mada University in registration number KE/FK/0016/EC/2019. The student participation was voluntary and without any compensations.

## RESULTS

### *Characteristics of the respondents*

The respondents were 124 individuals. The respondents were the grade XI in two senior high schools, namely SMA N 1 Kalibawang numbering 96 individuals (77.42%) and SMA N 1 Samigaluh numbering 28 individuals (22.58%). Most of the respondents were female in the range of age 0-17 years. The selected respondents were never involved in the First-aid Training in School before. The characteristic of the respondents could be seen in Table 2.

### *The level of knowledge and skill before and after the first-aid training in school*

The respondents were divided into three groups and received the material of the First-aid Training in School in three different methods, namely, lecturing-discussion,

poster, and audio-visual media. The level of knowledge before and after the First-aid Training in School were measured using pre-test and post-test (Table 3).

**Table 2: The characteristics of the respondents (n=124).**

Characteristic (n= 124)		F	%
Gender	Male	53	42.74
	Female	71	57.26
Age	14-17 years	113	91.13
	18-20 years	11	8.87
School origin	SMA N 1 kalibawang	96	77.42
	SMA N 1 samigaluh	28	22.58

**Table 3: The difference of the level of knowledge before and after the training with the methods of lecturing, poster, and audio-visual media (n=124).**

	Pretest		Posttest		P
	Mean	Sd	Mean	Sd	
Knowledge					
Lecturing (n=42)	43.57	13.58	87.38	11.70	0.000
Poster (n=36)	38.06	12.61	81.39	12.22	0.000
Audiovisual (n=46)	36.09	12.20	88.26	12.87	0.000

The result indicated that the three methods of delivering the materials performed the significant improvement statistically ( $p=0.000$ ) in the result of the pre-test and post-test. It could be identified that the highest score difference between the pre-test and the post-test was in the method of audio-visual media (mean difference was 52.17). Furthermore, the smallest score difference between the pre-test and the post-test was in the method of poster media (mean difference is 43,33) (Table 3).

### *The skill before and after the first-aid training in school*

The three groups of respondents (lecturing, poster, and audio-visual media) joined the same training to increase the skill of cardiopulmonary resuscitation. The skill training to the three groups was conducted in the same method, namely pre-test, the material of the cardiopulmonary resuscitation skill, and post-test. The respondents performed the pulmonary cardio resuscitation as a form of pre-test and post-test.

The result showed that there was a significant improvement statistically ( $p=0.000$ ) in pre-test and post-test first aid, particularly the cardiopulmonary resuscitation in the three groups. It could be identified that the biggest score difference between the pre-test and the post-test was in the method of Lecturing (mean difference was 60,24). Furthermore, the smallest score difference between the pre-test and the post-test was in the method of poster media (mean difference is 40,42) (Table 4).

**Table 4: The difference of the level of skill before and after the training with the methods of lecturing, poster, and audiovisual media (n=124).**

	Pretest		Posttest		p
	Mean	Sd	Mean	Sd	
Skills					
Lecturing (n=42)	24.52	11.16	84.76	11.84	0.000
Poster (n=36)	37.00	6.63	84.97	13.20	0.000
Audiovisual (n=46)	42.89	19.14	83.13	10.44	0.000

## DISCUSSION

Many kinds of accident and emergency cases often happen in the school surrounding and can cause the risk of disability up to death. The accident and emergency need quick and proper rescue.<sup>8</sup> The cases of emergency often occur in the communities, one of them is related to the cardiovascular disease. This matter became the foundation for the American Heart Organization (AHA) to campaign the training for the students in junior high schools and senior high school to conduct the cardiopulmonary resuscitation training. Cardiopulmonary resuscitation training for the senior high school students gives benefits to reduce death due to the out of the hospital cardiac arrest.<sup>9</sup> Even though the incidence of cardiac arrest occurs in school is only 2.6 % of all sites in general, the training delivered to students in school can increase the CPR skill needed in any locations. Based on the study mentioning that the teen spent more time in public places, such as malls, most cardiac arrest incidences occurred in that kind of places. Hence, the introduction to CPR to the senior high school teenagers would yield significant effect to the cardiac arrest handling in the communities.<sup>7</sup>

The prior knowledge on the First aid in three groups, based on the pre-test scores, indicated the low result. However, after the material delivery, the result of the post-test indicated significant differences in the three groups. The highest difference between the pre-test and post-test scores could be found in the audio-visual group. It indicated that the audio-visual method was the highest method in increasing the knowledge on the first aid. This was supported by the study reporting that the audio-visual method was considered to be more easily adapted and applied.<sup>10</sup> The leaning by the audio-visual media, through video show, increased the retention of the knowledge and skill after the training had finished.<sup>1</sup>

Based on the result, it was found that the skill to perform the CPR increased statistically from the period before and after the first-aid training in school. This study utilized the method of hands-on experience so that all subjects who participated in the training would try to perform the CPR to the mannequin. The use of the method of practice

while watching and hands-on experience would increase the psycho-motoric skill in CPR.<sup>6</sup>

The first-aid training to the senior high school students decreased the fear in giving the rescue in the cases of emergency. The senior high school students possessed enough cognitive and physical skill as the first responder of the emergency case, especially cardiac arrest.<sup>7</sup> The First-aid Training in Schools, particularly to the senior high school students, exhibited the effective result. The study recommended the schools to conduct the first-aid training periodically. This is important to introduce to the students about how to handle emergency in a practical manner.<sup>11</sup>

The limitation of this study is that the training was focused only on the cardiopulmonary resuscitation technique for ordinary people, hence it can be added with the material of using Automatic External Defibrillation (AED) for ordinary people to increase the life chances in the case of cardiac arrest. This study can be developed to conduct further study to evaluate the retention of knowledge and skill after several months the first-aid training in school had been accomplished.

## CONCLUSION

The implementation of first-aid training in schools gives benefits in handling emergency situations, especially out of the hospital cardiac arrests. This study has proved that the implementation of First-aid Training in schools affects the improvement of knowledge and skill in handling emergency, particularly cardiac arrests through the CPR. There was an increase of knowledge from before to after the training with the methods of lecturing, poster, and audio-visual media. The highest difference of pre-test and the post test scores was in the audio-visual group. The skill of cardiopulmonary resuscitation in the three groups indicated the improvement from before to after the first-aid training in schools.

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