

## The Effect of Cardiopulmonary Resuscitation Training on the Skills of PMR Students in Providing First Aid in Cardiac Arrest Cases

Alfi Ari Fakhrrur Rizal<sup>1</sup>, Milkhatun<sup>2</sup>, Dalya Jemima Maulida Irawan<sup>3</sup>

<sup>1</sup> Bachelor of Nursing Program, University Muhammadiyah Kalimantan Timur, Indonesia

<sup>2</sup> Bachelor of Nursing Program, University Muhammadiyah Kalimantan Timur, Indonesia

<sup>3</sup> Bachelor of Nursing Program, University Muhammadiyah Kalimantan Timur, Indonesia

dalya.jemima98@gmail.com

Phone: +62 817 7904 6973

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**Abstract:** *Cardiac arrest is a condition in which the heart suddenly stops beating, if it is too late to be given help a person can experience death in a short time. The effort to restore the condition of the heart so that it beats again is to do Cardio Pulmonary Resucitation (CPR) however, there are still many people who are not skilled at doing CPR. One way increase the number of skilled people performing CPR is by holding training in special lay groups such as PMR members at SMAN 8 Samarinda. This study aims to see whether there is an influence in the provision of CPR training on the skill level of PMR students at SMAN 8 Samarinda. This study uses a quasi-experimental research design with a quantitative approach to the group teaching method pretest-posttest. The sample in this research is 52 respondents with a total sampling technique. There was an increase in skill level in the intervention group of 26 respondents after being given CPR training, which initially was still in the low skill level category, after being given training it increased to a good level category. With the results of  $Asym.sig = 0.000 < a = 0.05$ , it is stated that there is an influence in the provision of CPR training on the skills of PMR students at SMAN 8 Samarinda.*

**Keywords:** *CPR, Cardiac Arrest, Student of PMR*

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### 1. Introduction

Cardiac arrest is a condition where the heart suddenly stops beating, if it is too late to be given help a person can experience death in a short time. At present cardiac arrest cases are still a major problem in the world, globally the data rate for cardiac arrest cases was around 37% in 2012 and then increased in 2016 to 43%. In 2016 the country of Indonesia was in 13th position from other countries with several cases of 26.4% (Riskseddas, 2018). Cardiac arrest events mostly occur outside the hospital and are generally rare or even too late to be recognized. Cardiac arrest outside the hospital area is known as Out of Hospital Cardiac Arrest (OHCA). The prevalence of OHCA cases in the Asia Pacific region has reached 60,000 in the last three years, one of which is Indonesia. In Indonesia, the prevalence data is still unclear, but it is estimated that there are around 10,000 Indonesians who experience this condition (Nastiti et al., 2021).

According to Vellano, in his study, he found that there were as many as 70% of OHCA cases, most often found in households. Most of the time, the first person to find the victim at the time of the incident could be wrong in recognizing the symptoms of cardiac arrest. The fact is that they immediately contacted the victim's family or closest friends before calling for help at

the hospital. The increasing prevalence of OHCA events in the community requires an action plan to help victims of OHCA quickly and effectively according to procedures. Providing Cardio Pulmonary Resuscitation (CPR) measures is part of an efficient strategy recommended by the American Heart Association (AHA) for victims of OHCA (Rahagi & Anggrasari, 2021).

Efforts that need to be made to restore circulation quickly when a cardiac arrest occurs to prevent death is by administering Cardio Pulmonary Resuscitation (CPR). Providing quality CPR for 1-2 minutes quickly can increase the survival rate to > 60.0% in cardiac arrest patients (AHA, 2020).

Until now the government and several organizations such as PMI have made various efforts so that the incidence of cardiac arrest cases outside the hospital (OHCA) can be reduced, one of which is by holding PMR extracurricular activities where they will teach students in junior high and high school/vocational school how to do CPR properly and correctly.

Quoted from Dewi (2015) in the journal (Yunus & Damanasyah, 2021) states that children aged 13 to 14 years in Germany have been able to perform CPR as well as adults. Teenagers in Indonesia who are classified as high school (SMA) level students would be nice to be able to perform CPR properly and correctly. By providing CPR training to high school students, students can add insight and knowledge about CPR. Providing CPR training is very important and useful for increasing the number of people trained in cardiac arrest first aid so that they can become bystanders in their respective environments. Therefore the researcher believes that knowledge about CPR is fundamental to be taught as early as possible to prevent cases of cardiac arrest outside the hospital that are given too late to help.

Based on the preliminary study results, SMA 8 Samarinda is one of the many schools in East Kalimantan with an extracurricular Youth Red Cross (PMR) under the auspices of the Indonesian Red Cross organization (PMI). When interviewed they said they only received training on handling fainting for material and CPR training had never been taught by PMI.

## **2. Materials and Methods**

This research method uses quantitative research methods with the Group Teaching Method Pretest-Posttest approach. The sample in this study was 52 respondents using a total sampling technique. The training lasted for 1 day. Before being given treatment, respondents were tested by conducting an observation assessment based on the SOP checklist sheet, after which an observation assessment test was repeated after being given treatment using the SOP checklist sheet. Respondents will be divided into two groups, namely the intervention group that is given treatment and the control group that is not given treatment. The material given to respondents contains signs and symptoms and procedures for CPR (High Quality CPR) (Baldi et al., 2019). The instrument in this study uses SOPs sourced from PPNI. The statistical test used is the Mann-Whitney Test. Considering that the research respondents were humans (adolescents) before the research was carried out, the researcher had requested a research permit from the Health

Research Ethics Commission of the Faculty of Medicine, Mulawarman University with letter number NO. 16/KEPK-FK/I/2023, which states that this research activity has been given a letter of approval for ethical feasibility.

### 3. Results and Discussion

The results are divided into two data. It consists of general data which contains data on the results of the characteristics of the respondents and special data which consists of the results of the pretest and post-test training.

#### 3.1 General data

##### 3.1.1 Characteristics by Age

**Table 1.** Distribution of Age

Number	Intervention Group		Control Group	
	f	%	f	%
14	3	11.5%	1	3.8 %
15	11	42.3%	5	19.2 %
16	6	23.1%	9	34.6 %
17	4	15.4%	9	34.6 %
18	2	7.7%	2	7.7%
Total	26	100.0%	26	100.0%

Based on *Table. 1* above most of the ages in the intervention group old 15 years. Then based on *the table* above, most of the ages in the control group were 16 and 17 years old.

##### 3.1.2 Characteristics by Gender

**Table 2.** Distribution of Gender

Gender	Intervention Group		Control Group	
	F	%	f	%
Women	13	50.0%	16	61.5 %
Men	13	50.0%	10	38.5 %
Total	26	100.0%	26	100.0%

Based on Table 2 above, the sex between men and women in the same intervention group totaled 13 people each. Based on table 4.2 above, most of the sexes in the control group were 16 women and the remaining 10 were men.

### 3.1.3 Characteristics by Class

**Table 3.** Distribution of Class

Class	Intervention Group		Control Group	
	F	%	f	%
X	14	53.8%	6	23.1 %
XI	10	38.5%	11	42.3 %
XII	22	7.7%	9	34.6 %
Total	26	100.0%	26	100.0%

Based on Table 3 above, most of the classes in the intervention group are class X (ten). Meanwhile in the control group, based on the table above, most of them were filled with respondents from class XI (eleven).

### 3.2 Data Khusus

#### 3.2.1 Pre Test

**Table 4.** Characteristics of Skills Before Being Given Training in the Intervention Group and Control Group (Pre Test)

Skills	Pre Test G. Intervention		Pre Test G. Control	
	F	%	F	%
Well	0	0,00%	0	0,00%
Enough	0	0,00%	0	0,00%
Not enough	26	100%	26	100%
Total	26	100%	26	100%

Based on the results of the pretest skills in the intervention group, namely table . 4 and the control group, namely table 4.4, both stated that the skills of the respondents were included in the less skills category.

#### 3.2.1 Post Test

**Table 5.** Skill Characteristics After Being Given Training In The Intervention Group And Without Being Given Training In The Control Group (Post Test)

Skills	Post Test G. Intervention		Post Test G. Control	
	F	%	F	%
Well	18	69.2 %	0	0.00%
Enough	8	30.8 %	0	0.00%
Not enough	0	0.00%	26	100%
Total	26	100%	26	100%

Based on the results from the table . 5 above, stated that in the intervention group after being given training (post test ) there was an increase in the value of the category which was initially categorized as lacking skills after being given training changed to the type of sufficient skills (8 respondents) and good skills (18 respondents ). Then, look at the table. Five above, is the result of the post-test from the control group, which was not given any training or treatment. The results above show no change in the category in the intervention group, i.e., lacking skills.

### 3.2.2 Effect of Training

**Table. 6** Analysis of the Effect of Cardio Pulmonary Resuscitation Training on the Skills of PMR Students in the Intervention and Control Groups at SMAN 8 Samarinda.

<b>Results</b>	<b>Intervention Skills</b>	<b>Control Skills</b>
<b>MeanRanking</b>	39.50	13.50
<b>Sum of Rank</b>	1027.00	351.00
<b>Z</b>	-6,274	-4,472
<b>Asymp. Sig</b>	0.00	0.00

Data analysis to find out whether there is an effect of CPR training on students' skills uses the *Mann-Whitney Test* with an interpretation of *Asymp.Sig.* < 0.05, then the Hypothesis is accepted, and if *Asymp.Sig.* > 0.05, then the Hypothesis is rejected.

Based on the test data above, it states that the *Asymp—sig results.* = 0.000 <  $\alpha$  = 0.05, it can be concluded that the *Alternative Hypothesis (Ha) is accepted*. Thus, it can be said that there is a significant difference in results between skills before and after being given CPR training. The conclusion from the statistical test above is "There is an influence from the provision of training on CPR at SMAN 8 Samarinda".

### Characteristics of Respondents

According to (Lase, 2021), cases of cardiac arrest often occur suddenly, anywhere and anytime without any visible initial symptoms. Cardiac arrests mostly occur outside the hospital and are generally late for help due to a lack of skilled people in handling cardiac arrest cases. Efforts that need to be made to restore circulation quickly during cardiac arrest to prevent death by administering Cardio Pulmonary Resuscitation (CPR). Providing high-quality CPR for 1-2 minutes quickly can increase the survival rate to > 60.0 % in cardiac arrest patients (Downing et al., 2022). In the past, CPR could only be performed by medical professionals. However, lately, many cardiac arrests have occurred outside the hospital, and CPR initiation must be given immediately by those who saw the event. Therefore, CPR is said to be everyone's skill (Nastiti et al., 2021). To increase the number of people skilled in handling cardiac arrest cases, the government and several health organizations such as PMI hold PMR extracurricular activities

where they go to schools such as junior and senior high schools/vocational schools to train them on how to do CPR properly. Dewi (2015), the journal (Yunus & Damanasyah, 2021) states that children with characteristics aged 13 to 14 years in Germany are able to perform CPR correctly and adequately as well as adults do.

The results of the characteristic data of PMR students at SMAN 8 Samarinda are, on average, 14 to 18 years old according to WHO recommendations in the journal Leo Rulino (2021), children aged 12 and over can be trained to become CPR bystanders. High school students are teenagers with an age range of 15 to 18 years, where they have a high curiosity and can remember well what is being taught. There are 52 active students members of the PMR extracurricular at SMAN 8 Samarinda, consisting of grades X, XI, and XII. The age range for PMR members at SMAN 8 Samarinda ranges from 14 to 18 years old.

### **Respondent Skills**

In a journal written by Priosusilo (2019), it is stated that the provision of BHD training, especially regarding CPR to high school students, is urgently needed to be able to increase students' knowledge and skills so that students become skilled in helping victims of cardiac arrest cases in the school and community environment. In his research, it was also proven that there was an influence from the provision of training on BHD knowledge and skills to students of SMKN 1 Geger Madiun, with the initial category of students' knowledge and skill levels being in the low category. However, after being given training, the knowledge level of 23 students increased by 71.9% and the skills of 15 students by 46.9%. Whereas in the control group, which was not given treatment, the level of knowledge of 10 students was 31.2%, and the skills of 15 students was 46.9%. And based on the results of the statistical tests carried out, the results obtained were a *p-value* of  $0.000 < ( 0.05 )$  which was interpreted as an influence of the provision of BHD training on the level of knowledge and skills of students.

In a research journal written by Oktafiani & Fitriana (2022) , it was stated that the provision of knowledge using the audiovisual method also proved that there was an influence in the learning process about BHD which PMR Bharaku members carried out at SMKN 1 Kutasari. The researcher also mentioned ~~in his research~~ that one of the efforts to increase knowledge about BHD is through education and training. The researcher uses an audiovisual method that is not monotonous by displaying video case illustrations and BHD action steps so students don't feel bored, this can increase students' interest in following the lesson until it's finished.

Nastiti et al. (2021) stated that knowledge of CPR and self-efficacy also have a significant relationship. The researcher concluded that self-efficacy requires knowledge as the cognitive basis of each individual, for that knowledge is the most important and basic thing so that a bystander has high self-confidence and does not hesitate to provide quality CPR cardiac arrest victims (Garcia et al., 2022).

Based on the research that has been done, the researcher does the same thing that the previous researcher did. The learning method used before entering the training session is the lecture method in which there is material about CPR in written form and several video illustrations that are useful for increasing students' interest in learning so they don't feel bored. After the material session was finished, the researcher continued with a training session that began with an initial simulation from the researcher, after which the researcher conducted simulations and trained the respondents directly so that respondents could more easily understand and practice them correctly.

From the data on the results of the skills measurement above, it can be seen that initially when the pretest assessment was carried out in the intervention group and the control group, it could be seen that the results of the skill levels of the two groups were both in the less category. The limited sources of knowledge of the respondents also influence this. During the interview, the respondents said that previously, no one had ever taught them about how to handle cardiac arrest and the proper and correct CPR steps. They also said that so far, they had only received material on how to handle fainting.

After the pretest was conducted on the respondents, the researcher divided the respondents into two groups, namely the intervention group, which would be given treatment in the form of CPR training, and the control group, which was not given any treatment at all. Furthermore, the intervention group began to be given CPR training in which, the respondents were first given an understanding of material about cardiac arrest and how to handle it, namely CPR (Cardio Pulmonary Resuscitation). After understanding the material, the researcher then provides simulations and training on how to do high quality CPR, namely compression speed 100-120 x/minute, compression depth 5-6 cm, perfect recoil, minimize interruptions and avoid ventilation. Excess, will then be followed by respondents who are members of the intervention group. After the simulation and training, the respondents who are members of the intervention group will have their skills assessed again. Likewise, with the control group not given treatment, the post test assessment will still be carried out.

After the two groups were assessed, the results showed a significant difference. In the intervention group, there was an increase in the skill value of each respondent from the less skills category to the sufficient skills category, totaling 8 respondents and 18 respondents with good skills. However, in the control group, which was not treated at all, the results of the pretest and post-test did not change at all, the skill category of the control group was still lacking.

Training is a process for acquiring knowledge, attitudes, and skills as a result of one's experience so that it can produce a behavior change (Fabriana et al., 2018) . Notoadmodjo S in 2012 stated that skill is the ability of a person to take action after receiving a learning experience that involves the learning process using limbs and the help of other tools that can support this process. Skills result from the process of understanding cognitive learning (understanding

knowledge) and affective (attitude towards something). This means that a person will be said to be skilled if he has experience (knowledge) about something.

From the research above, the researchers saw differences between the group that was trained and the group that was not trained. Then, the researchers also concluded that there was an influence on a person's skills when a person was given training or not given training. This was proven by previous researchers, namely (Oktafiani & Fitriana, 2022) with the title "The Influence of Audiovisual Learning on the Knowledge of PMR Bharaku Members of SMK Negeri 1 Kutasari About BHD". In his research there was a very significant difference in results between before and after knowledge with the audiovisual method. There was an increase of 52 respondents from 32 respondents, who having good expertise after being given audiovisual learning. Obtained p-value Pretest (0.000) and Post-Test (0.000) so it can be concluded that the data obtained is not normally distributed, because the p-value  $< 0.05$ . So the test used is the Wilcoxon Signed Rank test, which obtained a p-value of 0.000 ( $< 0.05$ ) which means that  $H_a$  is accepted. It was finally concluded that learning about Basic Life Support with audiovisual methods had an effect of the the knowledge of members of PMR Bharaku SMK Negeri 1 Kutasari.

The same evidence was found in research conducted by (Priokusilo, 2019) with the research title "The Effect of Providing Basic Life Support Training on Increasing Knowledge and Skills in Students of SMKN 1 Geger Madiun". In his research it was also stated that there were differences before being given treatment and after being given knowledge and skills about BHD. Based on the Wilcoxon statistical test analysis conducted by the researcher, the p-value was  $0.000 < 0.05$ . This means that providing basic life support training has an effect on increasing knowledge and skills in students of SMKN 1 Geger Madiun. This study concludes that basic life support training can affect students' knowledge and skills.

Based on the description above, the researcher can conclude that cardiopulmonary resuscitation training using lecture and simulation methods can be more easily accepted in learning by students, because they get the material directly and they can also see and try to practice it alternately so that this can improve resuscitation skills. Pulmonary heart disease in PMR students at SMAN 8 Samarinda. And based on the statistical tests performed, the results were  $Asymp.sig = 0.000 < ( 0.05 )$ , which is interpreted as the influence of the provision of CPR training on the skills of PMR students at SMA Negeri 8 Samarinda.

#### **4. Conclusion**

Based on the results of research conducted on PMR students at SMAN 8 Samarinda about the effect of CPR training on the skills of PMR students in assissting in cases of cardiac arrest, it can be concluded that the average age of PMR students ranges from 14 to 18 years with the majority being female and most of them are male. Came from 179lasses X and XII, all of whom stated that they had never received CPR training by PMI (100%). Before the training, the skill level in the intervention and control groups was still the same at the low skill level. After



being given training, there was a change in skill level from the intervention group which was initially at a lower skill level, rising to a good skill level. However, the skill level was still in the low skill level category in the control group that was not trained. From the research results, the *Asymp.Sig* results were obtained.  $= 0.000 < \alpha = 0.05$ , it can be concluded that the *Alternative Hypothesis (Ha) is Accepted* "There is an influence from the provision of CPR training on the skills of PMR students in providing first aid in cases of cardiac arrest at SMAN 8 Samarinda".

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