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<u>ORIGINAL RESEARCH</u>

EFFECT OF CARDIAC ARREST MANAGEMENT TRAINING ON THE ABILITY OF ORDINARY PEOPLE TO PERFORM HIGH-QUALITY CARDIO PULMONARY RESUSCITATION

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Abstract

Background: The rate of cardiac arrest outside hospitals remains high in Indonesia. Performing Cardio Pulmonary Resuscitation (CPR) is advised as an emergency procedure to save a person's life. However, lack of ordinary people is able to do CPR. Therefore, cardiac arrest management training is considered important to form a bystander in the community.

Objective: This study aimed to determine if there is an effect of cardiac arrest management training on the ability of ordinary people to perform high-quality CPR.

Methods: This study used one-group pretest-posttest design method with a total sample of 35 participants. Observation sheet based on American Heart Association was used to measure the ability to perform CPR. Paired-t test was used for data analysis.

Results: There was a significant effect of the cardiac arrest management training on the ability to perform high-quality CPR ($p<.001$), with an increase of the mean value from 19.62 (SD=5.50) before intervention to 37.91 (SD=1.29) after intervention.

Conclusion: The cardiac arrest management training at the community level is considered effective in increasing the ability to perform high-quality CPR. The findings of this study can be used as input for community nurses to provide pre-hospital management training specifically on cardiac emergency management training continually for ordinary people in order to help improve good prognosis and reduce mortality risk of out-of-hospital cardiac arrest.

KEYWORDS

cardiac arrest; emergency management training; ability; ordinary people; cardio pulmonary resuscitation

BACKGROUND

Cardiac events are emergency situations that occur in many hospitals and outside the hospital or called Out-of-Hospital Cardiac Arrest (OHCA) (Jainurakhma et al., 2017; Muthmainnah, 2019; Suharsono & Ningsih, 2012). Cardiac arrest is a sudden loss of heart function to supply oxygen to the brain which ultimately causes cell death and heart suddenly stops working (Muthmainnah, 2019). This condition often results in anxiety for families and helpers, especially if it occurs outside the hospital with incomplete pre-hospital management facilities and lack of helpers who are able to perform high-quality Cardio Pulmonary Resusitation (CPR) (Jainurakhma et al., 2020). Data from the American Heart Association (AHA) show that there are 2 million deaths caused by cardiac arrest, with incidence rate of 80% OHCA occurs at home and 20% occurs in public places (Muniarti, 2019).

In Southeast Asian region, the death rate due to cardiac arrest is in the third place of the most common causes of death. In the United States, emergency services assess that each year there are more than 420,000

cases, and in Europe, there are 300,000 cases (Yunanto et al., 2017). In Indonesia, Ministry of Health of the Republic of Indonesia (2007) reported that deaths caused by heart disease resulted in 4.6% of 4,552 deaths in three years. The prevalence in the East Java shows that 1.3% or around 375,127 people suffered from heart disease (World Health Organization, 2011). In Malang, the incidence and death rates in cases of sudden cardiac arrest outside the hospital are estimated to be quite high. Research has been carried out for 6 months in 2016, which showed that there were 57 cases of cardiac arrest, with 44 cases occurred at home and passed away in the way to go to hospitals due to inability of the closest persons to help (Pratama, 2017). In Karangsuko village, in early 2019, there was one death of cardiac arrest due to the residents were late in recognizing symptoms and late in providing CPR assistance before being taken to the hospital.

The main cause of the low survival of the victims of OHCA is due to late administration of CPR (Yunanto et al., 2017), and lack of rescue teams who understand pre-hospital management, especially in the management of OHCA (Jainurakhma et al., 2020). Resuscitation is an

attempt to restore the function of the respiratory system, blood circulation and nerves. CPR performed in the first few minutes when a cardiac arrest occurs will provide a two to three-fold chance of survival (American Heart Association, 2015; Jainurakhma et al., 2017). Our preliminary survey results in Karangsuko Pagelaran Village showed that Karangsuko villagers had never received training on CPR. It is therefore, CPR training is needed. According to Mathis and Jackson (2010), training will provide specific knowledge and skills. The ability of pulmonary resuscitation is very important possessed by all people to increase the chances of life in cardiac arrest victims (Jainurakhma et al., 2020; Pratama, 2017; Putri et al., 2019). The purpose of this study was to analyze the effect of training on ordinary people's ability to perform quality CPR in Karangsuko Village, Pagelaran District, Malang Regency, Indonesia.

METHODS

Study Design
This study uses a pre-experimental research design with one-group pretest-posttest design. The design was chosen to get initial information on effective training for ordinary people to manage the victims of cardiac arrest within the scope of pre-hospital management.

Participants
Thirty-five participants were selected in the study using total sampling in Karangsuko village. The inclusion criteria of the participants were village health cadres and physically and mentally healthy. The exclusion criterion was those who had physical disability with their hands and hearing loss.

Instrument
The standard operating procedure for Basic Life Support (BLS) and Advance Cardiac Life Support (ACLS) and observation sheet were used, adopted from American Heart Association (2015). The instruments were validated by two experts and met the requirements to measure the ability of respondents in emergency management in performing high-quality CPR. The observation sheet was based on each step in the standard operating procedure, which consisted of 20 observation items. Three scores were used: score 2 if the participant did the action correctly, score 1 if the participant did the action but in incorrect way, score 0 if the participant did not do the action.

Intervention
In the emergency cardiac emergency training, we divided all participants into nine groups, which one group consisted of four respondents and one observer. The training was conducted in Sumbermaron meeting hall of Karangsuko Village. Before intervention, the ability of each respondent is measured in advance (pretest) conducted for thirty minutes. Then at the first meeting in the first week, it was held for sixty minutes, with the provision of material on the introduction of victims of cardiac arrest and simulations on how to provide first-aid with quality cardio pulmonary resuscitation (CPR) based on American Heart Association (2015), and how to evaluate the success of CPR administration. Furthermore, respondents were divided into nine small groups, which a simulation of first aid on OHCA with quality CPR was conducted. There were three stages of the trainings: the first training was conducted in the first week, and each respondent was given an intervention in the form of a scenario for 30 minutes of simulation, then given the opportunity to practice rescue for victims of cardiac arrest for 30 minutes. The second training was conducted in the second week. Each respondent was given the opportunity to practice first-aid of OHCA for 30 minutes, which initially given a stimulus in the form of reading scenarios for 30 minutes. The third training was conducted in the third week, which all processes were the same in the second training. Posttest was measured after the third training. The intervention was given by qualified trainers with advanced CPR instructor certification, having BLS and ACLS provider license (American Heart Association license), and having experience in providing basic life support training for assessment of patients.

Data Collection
The research process was carried out for six months from September 2019 to February 2020. The research treatment was carried out for three consecutive weeks with repeated treatments. This study was conducted by the researchers assisted by nine observers. The objectives and procedures of data collection were explained to all observers prior to data collection. The criteria of observers were those who attended basic life support training based on American Heart Association.

Data Analysis
In this study, data were normally distributed based on Shapiro Wilk normality test ($p \geq .05$). Paired t-test was used to see the effect of intervention between pretest and posttest.

Ethical Consideration
This study was approved by Ethics Review Committee of Sekolah Tinggi Ilmu Kesehatan Kepanjen, with no.035/S.Ket/KEPK/STIKesKPJ/I/2020. Written permissions were also obtained from Badan Kesatuan Bangsa dan Politik (The National Unity and Politics Agency) of Malang Regency and Head of Karangsuko Village, Pagelaran Sub-District, Malang Regency. Informed consent was signed by the participants as a manifestation of their voluntary involvement in the research. The participants were assured of their confidentiality and anonymity.

RESULTS

Characteristics of Respondents
Table 1 shows the general public who attended cardiac arrest management training, 85.7% had never received training on cardiac arrest and pre-hospital management of victims of OHCA, and 80% of the respondents aged over twenty-five years.

Table 1 Characteristics of Respondents by Age, Gender and Prior Information About Cardiac Arrest Training

Characteristics	Categories	F	%
Gender	Male	14	40.0%
	Female	21	60.0%
	Total	35	100.0%
Prior Information About Cardiac Arrest	Never	30	85.7%
	Ever	5	14.3%
	Total	35	100.0%
Age (years)	21-25 years	7	20.0%
	26-30 years	9	25.7%
	31-35 years	12	34.3%
	36-40 years	4	11.4%
	>40 years	3	8.6%
	Total	35	100.0%

The Ability of the Community to Conduct Quality CPR Before and After given Cardiac Arrest Management Training

Table 2 shows that there was an increase in the average of the ability of the participants to conduct high-quality CPR after given the intervention, which can be seen from the mean value of the posttest of 37.91, with a minimum-maximum value of 35-40, and a standard deviation of 1.29. Paired t-test result shows a significant difference of the average value of the ability of the participants to conduct CPR before and after given intervention with mean difference of 18.29, and a standard deviation of 5.39 (p<.001) (**Table 3**).

Table 2 The Ability of the Community to Conduct CPR Before and After given Cardiac Arrest Management Training

Group	F	Mean	SD	Min-Max
Pretest	35	19.62	5.50	10-32
Posttest	35	37.91	1.29	35-40

Table 3 Difference in the Ability of the Community to Conduct CPR Before and After given Cardiac Arrest Management Training

	Mean Difference	SD	CI 95%		p-value
			Lower	Upper	
Pretest-Posttest	18.29	5.39	20.14	16.43	<.001

DISCUSSION

In this study, most respondents aged less than 36 years as much as 80%. This is very influential on the ability to receive information about pre-hospital management of cardiac arrest, which is in accordance with Fadiah et al. (2019) stated that someone who is in the early adult category or younger is very capable of receiving or learn new things and better ability to remember. In addition, according to Putri et al. (2019), the implementation of a person's skills is based on their prior knowledge either in the form of information or training. Our study showed that 85.7% of the participants had never been exposed to information about the management of CPR, but after given training, their skills increased with the average ability of 37.91. This shows that the training on pre-hospital management of cardiac arrest provided to ordinary people effectively and can be used as a reference for improving the quality of CPR delivery skills. Good knowledge from the helper about the introduction of victims and how to manage pre-hospital management of cardiac arrest patients, greatly affect the quality of helpers in the alacrity of relief and performance when performing quality CPR compression (Berger et al., 2019; Putri et al., 2019; Tanna et al., 2019).

The training in this study aimed in increasing the ability and understanding of the participants to recognize early signs and symptoms of cardiac arrest, ability to seek help, high-quality CPR compression and accuracy of the placement of the hands, the speed of compression, and assessment of the success of the first aid. According to Unoki et al. (2019), Suharsono and Ningsih (2012), and American Heart Association (2015), the recognition of early signs of cardiac arrest is very important to be realized by every individual because cardiac arrest is a life threatening event. This is in line with Yasin et al. (2017) and Metrikayanto et al. (2018) stated that the late introduction of victims of cardiac arrest is the cause of the failure of relief efforts for victims. Setiaka (2018) and Suratmi and Juanita reported that during resuscitation of cardiac arrest cases, the quality of helper

compression is one of the successes of high-quality CPR, with the right speed of 100-120x / minute, not too fast or slow to be able to improve a good prognosis.

Additionally, according to Suharsono and Fikriana (2016), the correct placement of hand positions during cardiac pulmonary resuscitation is also very important. The respondent's lack of confidence in providing the mouth blowing mannequins has also contributed to the ability to provide effective ventilation. This is also in line with guidelines issued by the American Heart Association (2015), recommended for ordinary people when meeting someone with cardiac arrest is to immediately carry out hands-only CPR. This technique has been found to be an effective interventions in the management of cardiac arrest and overcome many of the barriers to bystander CPR (Witt, 2019). Hands-only CPR is an act of cardiac pulmonary resuscitation by only providing compressive measures without providing breathing assistance or ventilation (American Heart Association, 2015; Liu et al., 2018). Widyarani (2018) said that the ability of respondents must often be sharpened, if the respondents are less exposed to cases of cardiac arrest, they will quickly forget the procedure of CPR action. According to Muniarti (2019), the simulation and observational method is very effective to improve skills. The simulation process also makes it easy to build confidence in carrying out an action (Sahu & Lata, 2010; Yasin et al., 2017), and to learn the technical procedures of action in detail (Sahu & Lata, 2010).

This study provided the knowledge that the training related to the ability to provide the right blow, proper placement of hand positions, the pressure needed to produce maximum depth, the adequate speed and the provision of effective breathing assistance are effective to increase the ability of ordinary people to perform high-quality CPR. The use of simulation and obervational methods is considered to be a good method during the training. Overall, the ability score of quality CPR to help cardiac arrest victims had been improved after given the interventions based on American Heart Association (2015) guideliness.

The limitations of the study include the inability of the researchers to observe or measure the decline in the ability of the participants after given training, which can be an input for further research. Also, the use of the pre-experimental design without a control group might limit the results of this study. True experiment or quasy experiment is needed for further research.

CONCLUSION

The results showed that there is a cardiac arrest emergency training influence on the society's ability to perform high-quality CPR. The findings are expected to be the basis of evidence of practice to help cardiac arrest victims. This study can be used for community nurses to understand the importance of CPR given to the ordinary people in fast, precise and safe way. It is therefore necessary to pay attention to the continuity of this training in an ongoing basis. The more often the public is given knowledge and training on appropriate management of cardiac arrest victims, the more the cardiac arrest events will be handled. The trainings of the management of cardiac arrest victims in the ordinary people in terms of recognizing cardiac arrest victims, finding and communicating the health conditions of the victims, and

performing high-quality CPR are very important to decrease the death rate of people with cardiac arrest.

Declaration of Conflicting Interest

None declared.

Authorship Contribution

All authors have contributed equally from conception to the finalization of this study. Most of the significant intellectual content of this publishable copy of the article was done by the corresponding author.

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