



# The Effectiveness of First Aid Education on Basic Life Support Knowledge and Skill Among Family Members with Heart Diseases

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**Abstract:** An increasing mortality rate in many places including highways, workplaces, schools, or even in the home mostly occurred because of low knowledge of first aid with the proper and correct procedure. The first aid knowledge for heart diseases patient remains low among family members to prevent the worsening condition of the patients. The purpose of this study was to determine the effect of first aid education on basic life support (BLS) among family members with heart disease in Lingkar Timur Primary Health Care, Bengkulu City. The design of this study was a quasi-experiment with a pre and post-test. Totally 40 respondents who contributed to this study who selected by simple random sampling. The intervention has been done by giving the demonstration, and audio-visual knowledge about basic life survey (BLS). The average age of the respondents was 30.23 years, more than half of the respondents were female by 26 people (65%), and more than half of the respondents graduated from senior high school by 21 people (52.5%). Most of the respondents work as an entrepreneur by 10 people (25%). Most of the respondents' income was <Rp 1,000,000 by 16 people (40%). The results showed that there was an effect of education with audio-visual and BLS demonstration on the skills of doing BLS ( $p$ -value  $0.000 < 0.05$ ). Training effects increasing the knowledge and skills of BLS respondents. Emergency training needs to be given to all people as a form of early awareness of emergency conditions.

**Keywords:** Basic Life Support; Education; First AID; Training

## Introduction

Emergency events can occur anytime and anywhere accidentally, and require immediate treatment. If there are no proper emergency responses, it can be life-threatening or permanent disability caused, among other things, by traffic accidents, disease, fire, or natural disasters. Emergency cases are an important part that needs attention because in terms of the number and impact they have increased from time to time (Zhang et al., 2022). An emergency condition is also might occur among people with heart disease. They might have a heart attack suddenly and need proper and correct first aid immediately. Family members need to be educated

to give first aid to prevent the worsening conditions that might result from morbidity or even mortality.

Many emergency conditions need immediate first aid. The phenomenon of traffic accidents so far has not received public attention as a cause of death even though the proportion is quite large (Liu et al., 2023; Zhou et al., 2023; Zhu et al., 2023). Every year, around the world there are 1.2 million people die due to traffic accidents, and the rest 50 million had injuries (Singh, 2022). According to the WHO report, every year around 1.3 million people die as a result of traffic accidents (World Health Organization, 2022). Meanwhile, according to the Ministry of Information's report of the Republic of Indonesia in Indonesia, every 3 hours, one person dies due to a traffic accident (Risdianto & Widyastuti, 2022).

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Moreover, the situation of Non-communicable diseases in Indonesia showed that the role of the family is very important in terms of emergency treatment and diet management (Purnamasari, 2019). Apart from traffic accident, there are many other non-communicable diseases (NCD's) that need emergency treatment called primary prevention (Estruch et al., 2018). In an emergency situation, people around need to do emergency aid which requires them to do it properly, otherwise the situation might be worse (Elias et al., 2018). In line to this topic, prevention of NCDs is the goal of SDG's point 3.4 which reducing NCD by 2030 (Nugent et al., 2018).

First aid education is not commonly educated to all people in general. Only health personnel who understand and receive training about first emergency aid. Many people already know the importance of first aid but have not reached the learning stage which means they do not understand in detail (Farzan et al., 2023). In addition, people think that first aid is useful in emergencies but they might not experience it so it seems they understand it as a theory but not practice (Tzimpoulas et al., 2020). Everyone must have the right first aid skills because they often panic and don't know what to do when facing an emergency (Crouchman et al., 2022). The skill that must be possessed by ordinary people to perform first aid in an accident is the ability of Basic Life Support (BLS) (González-Salvado et al., 2020). From the training that has been conducted on BLS for nurses and midwives, it has been proven that there has been a significant increase in knowledge and skill to treat emergencies. An emergency might have occurred for a family member with heart disease, so the other family members need to be educated on how to practice Basic Life Support (BLS).

Many studies have been done before focused on health professionals and general people to educate the importance of Basic Life Support (BLS). However, this study concerns family members of people with heart diseases in order to prevent fatality and morbidity before the patient is transferred to the hospital for emergency treatment. Importantly, family members are the closest person who can treat immediately and do emergency intervention (Rehr et al., 2018). Therefore, this study aims to examine the effectiveness of first aid knowledge on BLS among family members with heart diseases in Bengkulu City.

## Method

### *Study Design*

This study used intervention to measure the changes in knowledge. A quasi-experimental study was carried out by giving the intervention and seeing the effectiveness before and after (pre and post-test). This

study has been done among family members with heart diseases under the Lingkar Timur Primary Health Care, Singaran Pati Subdistrict, Bengkulu City, Bengkulu Province. This study has been done in July 2021.

### *Target population and sampling technique*

According to data from Lingkar Timur Primary Health Care, the population of the study was 150 households that have members with heart diseases. The sampling method used in this study was simple random sampling and found 40 households that fully participated. The intervention such as demonstration and information about Basic Life Support has been given to representatives of the households which are mostly heads of households. The criteria inclusion to select the sample were those in age more than 18 to 45 years old, have a family member with heart disease, are literate (be able to read and write in Bahasa Indonesia for verbal and non-verbal), never attended the BLS training, willing to be respondent. The exclusion criteria of the sample in this study include those who have participated in BLS training, those who had motivation in level 80-100, got sick during the intervention, had disabilities, and refused to out from the intervention.

### *Intervention*

The intervention in this study consists of some knowledge related to emergency management are; (1) prevent death and disability in emergency patients, so they can live and function again in society, (2) refer emergency patients through the referral system to obtain more adequate treatment, (3) management of disaster victims. It is also important that first aid is at the hospital before transfer to advanced health treatment. The range of emergency conditions in the prehospital can be carried out by special lay people or health workers who are expected to be able to take action in the form of; (1) removing any dangerous objects at the scene, (2) conducting or selecting and determine emergency conditions and provide first aid before more skilled health workers arrive to help, (3) perform temporary fixation or stabilization, (4) evacuate, namely the victim is moved to a safer place or sent to a health service according to the victim's condition, and (5) prepare special lay people and health workers through disaster preparedness training. The respondents are also given a demonstration of Cardiopulmonary resuscitation (CPR) with the phantom.

### *Instruments*

This research was conducted using audiovisuals to provide education to activity participants. The audiovisual was displayed in 2 stages. The first time was giving oral presentations of material from the instructor and the second was participants immediately practice

BLS skills with audio-visual guided by the instructor. All the interventions consumed time about 3-4 hours. To measure the skills of respondents before and after the intervention, the researcher used a questionnaire. Before being given the first activity, all participants were given time to answer a pretest in the form of knowledge questions, steps, and experiences of BLS training. Post-test measurements are given at the end of the activity with the same questions after participants practice BLS skills guided by the audio-visual.

*Data Analysis*

The final data was cleaned to ensure there was no missing data. Then the data analysis was examined by using SPSS software which consists of univariate dan bivariate analysis. The univariate analysis was done to describe the character of independent and dependent variables. The data has presented in percentage, table, mean, median, standard deviation, maximum, minimum, and Confident Intervals of 95%. The bivariate analysis was done using the t-test and Wilcoxon test to find the differences in a mean between the pre and post-test.

*Ethical Consideration*

This study received permission from Lintas Timur Primary Health Care and get a research permit from the Bengkulu Ministry of Health Polytechnic with letter no: DM.01.04/6/347/2021.

**Result and Discussion**

**Table 1.** General characteristics of respondents

Variable (N=40)	Freq.	%
Age		
Min; Max; Mean (SD)	18; 45; 30.23	(27.21 - 33.24)
Sex		
Male	14	35
Female	26	65
Level of education		
Elementary school	5	12.5
Junior High school	6	15
Senior high school	21	52.5
University	8	20
Occupation		
Housewife	7	17.5
Student	9	22.5
Employee	4	10
Entrepreneur	10	25
Civil servant	2	5
Private sector	8	20
Income		
<Rp 1,000,000 (< 66.93 USD)	16	40
Rp 1,000,000-3,000,000 (66.93 USD - 200.80 USD)	14	35
>Rp 3,000,000 (> 200.80 USD)	10	25

The univariate results of this study revealed that the average age of the respondents was 30 years old with a minimum age of 18 years old and a maximum of 45 years old. Table 1 described the characteristics of respondents based on gender, education, occupation, and income. More than half of the respondents were female 26 people (65%), and about half of the respondents graduated from senior high school education 21 people (52.5%). Most of the respondents work as an entrepreneur 10 people (25%) and the majority of the respondents had an income level <Rp. 1,000,000 16 people (40%).

Table 2 illustrates the skills before and after the intervention. It can be seen that the average respondent's skill in carrying out BLS before being given education was 19.183, with a standard deviation of 8.872. Meanwhile, after being given education was 72.498, with a standard deviation of 13.8768. It can be concluded that there is a significant change in skills and knowledge in giving the intervention which increased from 19.183 to 79.498.

**Table 2.** Description of average BLS knowledge before and after being given intervention

Variable	Mean	SD	SE	CI 95%
Before intervention	19.183	8.872	1.4029	16.345-22.020
After intervention	72.498	13.8768	2.1941	68.059-76.936

Based on Table 3, it can be seen that the mean rank on the positive ranks is 20.50 with a sum of ranks of 820.00 which means the skills to do BLS after being given education > skills to do BLS before being given education. The statistical test results showed a p-value < 0.001 (< 0.05) so it can be concluded that the audio-visual and demonstration of first aid effectively can improve the BLS skills among the respondents.

Overall, from the given data in each table, it can be concluded that the knowledge of respondents has increased pre-and post-intervention. It was also found that the first aid education and demonstration effectively improve the skills of BLS among the family member with heart diseases.

**Table 3.** The Influence of first aid education on BLS Skills

Variables	N	Mean rank	Sum rank	p-value	Z
Skills after given education - skills before given education					
Negative Ranks	0 <sup>a</sup>	0.00	0.00	<0.0001	-5.653 <sup>b</sup>
Positive Ranks	40	20.5	820.0		
Ties	0 <sup>c</sup>				
Total	40				

\*Wilcoxon Test

### Discussion

#### *The differences in skills between before and after BLS training*

The results of the analysis the difference in the average skill of performing BLS to respondents before being given education was 19.183 and the average skill to carry out BLS to respondents after being given education was 72.498. This shows that there is an increase in the skills of conducting BLS among the respondents after being given education with audio-visual and BLS demonstrations. The use of educational films or videos is an effective method for increasing excitability by providing emotional, intellectual, and psychomotor stimuli that are closely related to skills (Ningsih & Atmaja, 2019). The video method combines sound media and image media so that it is easier to reach someone's memory. In addition, learning using video or video-based learning, provides a stimulus to three important parts of learning, namely emotional, intellectual, and psychomotor (Eidenberger & Nowotny, 2022). A person can remember a lot about what he has learned and is stimulated intellectually and psychomotor, so his knowledge and skills will easily increase (Botelho et al., 2019). The use of interesting and fun learning media is one of the factors that make students excited and motivated in learning activities (Arifianto & Izzudin, 2021). Learning media are very diverse, as the researchers explained above learning media in the form of video is one of the learning media that attracts students to learning activities in class. With students' interest in learning activities using video media, it can be expected to increase student learning motivation so that student learning achievement can also increase optimally.

#### *The influence of audiovisual instructors on the skills of performing BLS*

The results of statistical tests using the Wilcoxon test showed that all respondents who after being given education had a value greater than before being given education with an average of 20.50 and no respondents who were given education had a value lower than before being given education. The results of statistical tests using the Wilcoxon test on the effect of audio-visual education and BLS demonstrations on the skills of performing BLS in families who have heart disease in the working area of the Lingkar Timur Primary Health Care in 2021 obtained a p-value of 0.000 which less than 0.05, which means that there is an effect of education with audio-visual and BLS demonstrations on the skills of performing BLS.

The demonstration audio-visual instructor method is easier to understand something, and more interesting, and respondents are influenced to observe and can do it themselves (re-demonstration) (Septiani et al., 2020). Good educational media is media that can provide

health information that is by the target's level of acceptance so that the target is willing and able to change behavior according to expectations (González-Salvado et al., 2020). Visual aids can help target students receive lessons by using their five senses. The more senses used in receiving lessons, the better the acceptance of lessons.

Apart from the non-medical person, some studies have been conducted to examine the effect of BLS skills. A previous study in Pakistan found that work experience was the most important factor for BLS knowledge among health personnel, especially the findings that revealed that doctors had a higher score for BLS knowledge compared to other health personnel (Irfan et al., 2019). The other study has different findings which found doctor has lower score compared to nurse for CPR practices. The study in India found that dentists and postgraduate students had only average scores about BLS. The medical students in Thailand were also found the good performance after training (Suwanpairoj et al., 2020). One study revealed that the training needs to be repeated once a year because it was found a decreased score of BLS one year after training (Castanha et al., 2021). Some studies above that conducted among health personnel even found average to high improvement in BLS so that why the training for non-medical persons is needs to do in detail because they may have different understandings about first aid. It was emphasized by some studies in the United States (US) that adults aged more than 18 years old need to be educated in first aid and BLS at least for emergencies in the family.

#### *The role of the family in an emergency situation*

Emergency situations could not be expected in terms of the time. However, people can prevent the worst impact of that. In this study patients with heart diseases were the concerns. The primary prevention and emergency treatment need to be done by family members, friends, and colleagues, who are close to the patients (Geiderman et al., 2019). Once the conditions become better, patients need to transfer to get services from primary health care or hospital (Østervang et al., 2022).

The findings of this study answered the needs of family members who requested the proper ways to treat emergency situations for their family members with heart disease (Demirtaş et al., 2020). Younger family members might be the most appropriate person who take care of older with NCDs because the data shows old people have the highest risk of NCDs (Mikkelsen et al., 2019). For instance, people with hypertension, heart disease, and diabetes mellitus need to have diet management that can be cared for by other family members (Budreviciute et al., 2020; Gupta & Xavier,

2018; Thow et al., 2018). In conclusion, the role of family members for emergency treatment is very important.

## Conclusion

First aid education is an effective way to improve Basic Life Support (BLS) skills, especially for a family member with heart disease. Support from primary health care to implement training in Basic Life Assistance (BLS) is required, especially for those who live in potential areas of natural diseases and family members with heart diseases. Furthermore, all citizens need to be trained in first aid for any possibility of emergency conditions. The way to train would be better to use audio-visual with direct demonstration. The future study could add more participants to ensure the wider effect of first aid training on BLS skills.

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## Author Contributions

Conceptualization, P.E. and E.B.; methodology, E.B.; software, I.N.I.; validation, P.E., and E.B.; formal analysis, E.B.; investigation, P.E.; resources, I.N.I.; data curation, E.B.; writing—original draft preparation, P.E.; writing—review and editing, E.B.; visualization, I.N.I.; supervision, P.E.; project administration, E.B.; funding acquisition, P.E. All authors have read and agreed to the published version of the manuscript.

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## Conflicts of Interest

The authors declare no conflict of interest.

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