

Simulation of Bystander Cardiopulmonary Resuscitation and Butterfly Hug Therapy Towards the ability to Perform Emergency Assistance for Cardiac Arrest

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ABSTRACT

Background: Patients who experience cardiac arrest outside the hospital are very unlikely to survive; survival decreases by 7-10% if patients are not given proper treatment. Immediate handling by people around the victim, called bystanders, can be carried out. **Objective:** The purpose of this study was to identify the effect of bystander CPR simulation and butterfly hug therapy on improving the ability of Muhammadiyah high school students, Gorontalo, to provide emergency assistance for cardiac arrest due to disasters. **Methods:** The method used was a Quasi-Experiment with One Group Pre-test and Post-Test approach with a sample of 24 respondents. **Results:** The results showed an increase in scores from the median value of 14 to 29. Some of the increases were in a good category, namely four respondents (16.7%), and a very good category with one respondent (4.2%). The results of further analysis obtained a significance value of 0.000 ($p < 0.05$). **Conclusion:** All in all, the simulation of bystander CPR and butterfly hug therapy positively and significantly improves the ability of Muhammadiyah high school students to provide emergency assistance for cardiac arrest due to disasters.

Keywords: *Butterfly Hug Therapy; Bystander CPR Simulation; Cardiac Arrest*

A significant number of deaths are attributed to sudden and unforeseen cardiac arrests. The majority of these take place outside of hospitals.

INTRODUCTION

As many as 359,400 cardiac arrest cases occurred outside the hospital. Patients with out-of-hospital cardiac arrest have a very low survival rate of 7–10% (AHA, 2020). Cardiac emergency cases due to disasters become a dangerous threat to the victim's condition due to rapid cell and tissue damage if one does not get help immediately.

On this basis, it is essential to perform immediate treatment for emergency cases of cardiac arrest. Such treatment must be carried out by the victim's surrounding people, called bystanders. Basic life support that a bystander can perform as an untrained rescuer is mandatory Cardiopulmonary Resuscitation (CPR) with compressions only (hands only) with or without guidance from a trained rescuer. If a trained rescuer arrives, basic life support is continued by the trained rescuer by adding artificial respiration at a ratio of 30 compressions to two breaths. As ordinary people and untrained helpers in providing basic life support, bystanders only need CPR as an easy performance that can be guided more effectively by a trained operator or rescuer. Butterfly hug therapy is an alternative solution to provide self-reinforcement in helping others. Therapeutic measures include crossing the arms across the chest and then flapping the arms like a butterfly flapping its wings. This is done while inhaling deeply and exhaling slowly (Artigas, & Jarero, 2014; Jarero, & Artigas, 2020).

The butterfly hug is among the methods used to reduce fear during the rescue of cardiac arrest victims. Lucina Artigas and Ignacio Jarero developed this method while working with survivors of Hurricane Pauline. Many therapists use the butterfly hug method to reduce anxiety and increase self-reinforcement, especially when a person is experiencing excessive worry (Girianto *et al.*, 2021).

The above idea motivated the researchers to conduct a study to solve the aforementioned problems by empowering the community, specifically students, in the disaster mitigation stage so that they are prepared to give

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first aid during a cardiac emergency. The present work is also proposed to support the achievement of strategic plans and leading fields of higher education for basic research in disasters.

METHODOLOGY

This study relied on a quasi-experimental design with a one-group pre-test and Post-Test approach. The interventions included simulation of bystander CPR and butterfly hug therapy to improve the ability to provide emergency assistance for cardiac arrest. The population involved Muhammadiyah high school students from Gorontalo. The sampling technique applied was accidental sampling, in which, based on the inclusion criteria, there were 24 respondents in total. An instrument was used for assessing students' knowledge and abilities through observation sheets for emergency cardiac care with a significance value of <0.05. Furthermore, the statistical test with Fisher's exact test with a significance value of 5% was performed.

Ethical Consideration

This study was approved by the State University of Gorontalo , Indonesia on January 13, 2023 with reference number 22/UN47.B7/KE/2023.

RESULTS

Table 1: Performance of Bystander CPR in Emergency Assistance for Cardiac Arrest before Simulation of Bystander CPR and Butterfly Hug Therapy

No	Performing Bystander CPR	n	%
1.	Poor	20	83.3
2.	Fair	4	16.7
3.	Good	0	0
Total		24	100

It is illustrated from the table that the majority of respondents related to the ability to provide emergency assistance are in the poor category, with 20 respondents (83.3%). As many as four respondents (16.7%) reach the fair category.

Table 2: Performance of Bystander CPR in Emergency Assistance for Cardiac Arrest after Simulation of Bystander CPR and Butterfly Hug Therapy

No	Performing Bystander CPR	n	%
1.	Poor	0	0
2.	Fair	19	79.2
3.	Good	4	16.7
4.	Very Good	1	4.2
Total		24	100

Table 2 shows that the majority of respondents (19 respondents, 79.2%) have a fairly good ability to provide emergency assistance. Some of the increases were in the good category, with four respondents (16.7%) and the very good category, with one respondent (4.2%).

Table 3: Improved Performance of Bystander CPR in Emergency Assistance for Cardiac Arrest before and after Simulation of Bystander CPR and Butterfly Hug Therapy

Performing Bystander CPR	Median	Min-Max	P Value
Before Simulation of Bystander CPR and Butterfly Hug Therapy	14	13-30	0.000
After Simulation of Bystander CPR and Butterfly Hug Therapy	29	26-48	
Wilcoxon Test, 27 respondents with Good Performance			

It can be seen from the above table that the ability to provide emergency assistance for cardiac arrest due to disasters in Muhammadiyah high school students, Gorontalo, has increased scores from the median value of 14 to 29. The results obtained were further analysed with Fisher's exact test at significance value of 0.000 ($p < 0.05$).

DISCUSSION

Efforts have been made to use butterfly hug in overcoming stress. Nurses can perform butterfly hugs. Butterfly hug therapy is an effective therapy to reduce anxiety among nursing students. This therapy is expected to be applied and used as an intervention to reduce anxiety (Caturini, Safitri, & Sugi, (2023).

Performance of Bystander CPR in Emergency Assistance for Cardiac Arrest Before Simulation of Bystander CPR and Butterfly Hug Therapy

The results of the study found that the majority of respondents (20 respondents, 83.3%) were in the less category in terms of their ability to provide emergency assistance before being given a simulation of bystander CPR and butterfly hug therapy. A few were in the fair category (four respondents, 16.7%). If a person suffers from a heart attack, 68.2% of the students are not willing to perform cardiac massage and artificial respiration on the victim who has a cardiac arrest. Next, 15.1% are not willing to call an ambulance or provide help. Such issues are, first, due to the lack of information they get about emergency assistance, both from schools and health agencies. In line with a study by Natalansyah, Sari, & Kasuma, (2020), students who had not received emergency information and training had a low level of knowledge (85.19% of respondents).

First aid knowledge is the basis of methods and techniques for carrying out practices related to prevention and immediate response to an emergency. Education about first aid is a crucial thing to give to all people, particularly students in schools. Apart from health issues, first aid knowledge also enhances social responsibility and strengthen the value of solidarity, among other things. The importance of CPR needs to be introduced to early childhood education (De Buck *et al.*, 2015) because CPR training improves safety culture in schools and shifts responsibility from adults to children, which can result in long-term health changes. It provides an understanding that, apart from adults, children are able to help victims of cardiac arrest (Calicchia *et al.*, 2016). Another study shows that educational program can be enhanced to sustain the theoretical and practical foundation while performing the basic life support in nursing expertise.

Second, students are afraid they will be prosecuted legally if their help does not make the victim survive. Therefore, they do not have the courage to help the victims. Research conducted by Chen *et al.* (2017) discovered that some were worried about legal issues (53.2%). The number of laypeople who refuse to perform CPR drops from 23.7% to 2.4% if the law protects the person providing assistance. Laws that regulate and protect ordinary people who provide assistance to victims experiencing cardiac emergencies are required.

Third, the lack of self-confidence due to their concern over their knowledge and skills in performing CPR (38.0%) This is strengthened by Quraishi *et al.* (2018) finding that 23.5% of students lacked confidence in dealing with cardiac arrest victims, and 96% of students reported that they wanted the components of basic life support to be integrated into the school curriculum, thus providing them with the knowledge and skills to be able to help victims who experience heart emergencies.

Performance of Bystander CPR in Emergency Assistance for Cardiac Arrest After Simulation of Bystander CPR and Butterfly Hug Therapy

The results of the study found that the majority of respondents (19 respondents, 79.2%) were in the less category regarding their ability to provide emergency assistance. Some of the increases were in the good category, with four respondents (16.7%), and the very good category, with one respondent (4.2%). If there is a heart attack victim, 85.9% of students are willing to perform cardiac massage and artificial respiration. Most of them are willing to call an ambulance and provide help. There is a change in attitude toward helping after being given a simulation of bystander CPR and butterfly hug therapy. This is consistent with the finding (Kose *et al.*, 2020) that students' self-confidence improved after participating in the training program. There is a desire and willingness to help.

Teaching CPR in schools is one of the most sustainable ways to increase the number of trained laypeople and the rate of rescuers in cardiac emergencies. (Colquhoun, 2012; Pasquier *et al.*, 2023). CPR training is best done annually in all schools worldwide (Böttiger & Van Aken, 2015). In 2011, the American Heart Association (AHA) published an advisory statement recommending mandatory CPR training for rescuing survivors of cardiac arrest in schoolchildren. In 2018, a law was passed that ensured more than two million students were trained annually in 39 states and Washington. Schools require students to have these competencies before they graduate from high school (Cave *et al.*, 2011).

In addition to live simulations, educational methods can be offered through technology that provides an automatic feedback feature that can be used in CPR training and has been proven to increase participants' knowledge and competence. The International Liaison Committee on Resuscitation recently recommended using devices that provide effective feedback when the rescuer performs an action and can assess the degree of compression, depth, release, and hand position during CPR training, thereby effectively providing understanding to participants. For instance, live simulations give participants the convenience of receiving feedback while helping victims (Cortegiani *et al.*, 2017). Several studies have examined the role of these devices in training schoolchildren under current CPR guidelines (Baldi *et al.*, 2017).

Improved Performance of Bystander CPR in Emergency Assistance for Cardiac Arrest Before and After Simulation of Bystander CPR and Butterfly Hug Therapy

Heart disease is among the main causes of death. It is estimated that 31% of deaths are caused by cardiovascular disease (CVD), 80% of which are heart attacks and strokes. Concerning this, students need to be able to perform CPR on patients with respiratory or cardiac arrest. Students as laypersons are likely to be the first to find patients with cardiac and respiratory arrest by looking at youth data from 20% of the world's population and most (85%) in schools and communities, with the age group of 11–14 years old (Shahhosseini *et al.*, 2013). For this reason, the long-term benefits will be very useful for students to have appropriate knowledge and high self-efficacy about CPR to strengthen their skills in helping victims of cardiac arrest.

The results of the study showed that there was an increase in score and ability from the median value of 14 to 29 regarding the ability to provide emergency assistance for cardiac arrest due to disasters before and after being given a simulation of bystander CPR and butterfly hug therapy. The results of further analysis obtained a significance value of 0.000 ($p < 0.05$). These results can be used as an evaluation of whether students can handle cardiac emergencies if they are equipped with knowledge, training, and reinforcement so that they dare to do so. This is in line with the World Health Organization's recommendation regarding introducing CPR training in schools (Böttiger & Van Aken, 2015). In Scandinavia, the ability of laypeople to perform CPR is improved once schoolchildren understand CPR, resulting in higher survival rates after OHCA. Students pass on the information they get to the community about how to help victims of cardiac arrest. The results are that health services' costs decrease and community productivity increases (Wissenberg *et al.*, 2013).

Teaching schoolchildren early on the importance of OHCA and CPR skills is essential since they have greater motivation, learn faster than adults, and maintain learning abilities (Banfai *et al.*, 2017). In some countries, schoolchildren are required to participate in CPR training. Meanwhile, other countries also provide a gradual introduction to CPR for schoolchildren. This has even been included in the learning curriculum, in which students are given training on CPR for two hours every year. In addition, children can serve as transmitters of information on how to perform CPR and help victims of cardiac arrest because they can pass on awareness and CPR skills to family members and friends. The benefits of teaching CPR from an early age can improve positive confidence, foster an

attitude of helping others, and motivate oneself to help if a victim is experiencing cardiac arrest (Plant & Taylor, 2013).

Besides age, education, and gender variables that can lead to behavioral changes, some variables can change the intentions and behavior of CPR providers. A model that focuses on intentions can be a motivation that influences behavior, the desire to try, and how much effort is planned to be made. Such things can shape a person's behavior (Panchal *et al.*, 2015).

Through this research, there are two methods applied during emergency: simulation, which affects the willingness to help others—in this case, victims who experience cardiac emergencies due to disasters—and butterfly hug therapy to increase self-confidence to perform CPR, motivation to help others who are in need, and the development of empathy. By using the combined methods, it is expected that CPR training will have an effect on the willingness, attitude, and intention to help others.

CONCLUSION

The study revealed that the performance of bystander CPR in a given situation for cardiac arrest before and after simulation of bystander CPR and butterfly hug therapy have improved. There is an increase in the score from the median value and results were further analysed which obtained a significance value of 0.000 ($p < 0.05$).

Conflict of Interest

The authors declare that they have no conflict of interests.

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