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Cardiopulmonary Resuscitation Capacity Building Training for High School Students in Martapura, Banjar Regency

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ABSTRAK

Daerah Kabupaten Banjar rawan banjir dan merupakan salah satu daerah bencana yang dapat menimbulkan korban jiwa dan stress yang memicu peningkatan penderita penyakit sistem kardiovaskuler. Kondisi ini menuntut kesiapsiagaan masyarakat terhadap kondisi darurat. Tujuan kegiatan pengabdian masyarakat ini adalah untuk melatih keterampilan mitra dalam keterampilan resusitasi jantung paru untuk dapat membantu korban henti jantung atau henti nafas. Pelaksanaan pengabdian kegiatan masyarakat ini yang pertama adalah dilaksanakannya tes awal pengenalan tanda-tanda darurat pada serangan jantung dan paru, selanjutnya memberikan pengenalan konsep gawat darurat jantung dan paru melalui metode ceramah, diskusi dan sharing terkait kejadian nyata cardiopulmonary arrest di masyarakat, kemudia tahap akhir adalah evaluasi kemampuan siswa. Sasaran dalam kegiatan pengabdian masyarakat ini adalah 40 siswa yang tergabung dalam Palang Merah Remaja SMA di Kota Martapura Kabupaten Banjar. Hasil kegiatan pengabdian masyarakat ini mahasiswa memahami materi terkait resusitasi kardiopulmoner, pemberian penyuluhan bantuan hidup dasar berpengaruh signifikan terhadap pengetahuan mahasiswa. Melalui kegiatan ini diharapkan mahasiswa mampu memberikan simulasi resusitasi kardiopulmoner pra rumah sakit, dan mahasiswa dapat mensosialisasikan informasi kepada orang terdekat.

ABSTRACT

The Banjar Regency area is prone to flooding and is one of the disaster areas that can cause casualties and stress that triggers an increase in cardiovascular disease sufferers. This condition requires community preparedness for emergencies. The purpose of this community service activity is to train partners skills in cardiopulmonary resuscitation skills to be able to help victims of cardiac or respiratory arrest. The first implementation of this community service activity is carrying out an initial test to recognize emergency signs in heart and lung attacks, then providing an introduction to the concept of heart and lung emergency through lecture methods, discussion, and sharing related to real events of cardiopulmonary arrest in the community, then the final stage is evaluation of student abilities. The target of this community service activity was 40 students who are members of the High School Youth Red Cross in Martapura City, Banjar Regency. The results of this community service activity students understand material related to cardiopulmonary resuscitation, and providing basic life support counseling has a significant effect on student knowledge. Through this activity, students are expected to be able to provide a pre-hospital cardiopulmonary resuscitation simulation, and students can disseminate information to those closest to them.

1. INTRODUCTION

Heart attacks are the most common emergency cases outside the hospital. Approximately more than 30,000 people experience heart attacks outside the hospital and only 33% receive treatment by a trained layperson (Lambert et al., 2013; Marshall et al., 2017). Cases of a heart attack need to get treatment as soon as possible from medical personnel or trained first aiders to prevent death (K. Y. Chen et al., 2019; Mao et al., 2021; Nas et al., 2019). The general public is more likely to witness and even the first rescuers who have direct contact with the victim at the time of a heart attack (Ahmed et al., 2022; Cash et al., 2022; Doctor et al., 2017; Fazel et al., 2022). Knowledge of basic life support is very important to be known and carried out by the community to be able to save the lives of cardiac arrest victims before medical personnel arrives (Ali et al., 2021; Scapigliati et al., 2021; Taramarcaz et al., 2022). Layperson cardiopulmonary resuscitation (CPR) is a key aspect in the chain of survival after cardiac arrest. It is therefore essential to create awareness, willingness, and capability of lay- volunteers to perform CPR (Jainurakhma et al., 2020; Munot, Bray, et al., 2022; Perkins et al., 2015). In this context, leading

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authorities have identified research on education as one of the top priorities for cardiac arrest research. Emergency conditions can occur anywhere, and anytime. It is the duty of health workers to deal with these problems, however, it is possible that emergency conditions can occur in areas that are difficult to reach by health workers, so in these conditions, the participation of the community to help victims before they are found by health workers is very important (Byrsell et al., 2021; Cash et al., 2022; Hong et al., 2020; Pulver et al., 2016). Death occurs usually due to the inability of health workers to treat patients in the emergency phase (Golden Period). This inability can be caused by the severity, inadequate equipment, the absence of an integrated system and the lack of knowledge in emergency response (Alm-Kruse et al., 2021; Borkowska et al., 2021; Hong et al., 2020; Khan et al., 2022; Kim et al., 2015; Song et al., 2022).

The right help in handling emergency cases is basic life support. All levels of society should be taught about basic life support, especially for workers who are related (Fazel et al., 2022; Khan et al., 2022; Nas et al., 2019; Pietsch et al., 2020). Knowledge and understanding of various ways to handle basic emergencies is very important. However, there are still few people who have this knowledge, understanding and skills. Therefore, many parties, such as the government, independent organizations, activists, and even private companies, are trying to get around this problem. One of them is by utilizing mobile learning technology which is growing rapidly (Ahmed et al., 2022; Baldi et al., 2018; Fazel et al., 2022; Khan et al., 2022; Ko et al., 2021; Munot, Rugel, et al., 2022; Zheng et al., 2022). National association organizations engaged in social and humanitarian fields from various countries have developed many mobile learning applications for first aid such as PMI First Aid, First Aid by America Red Cross, First Aid by Kosova Red Cross, and First Aid by British Red Cross. The learning that has been offered by the application has not provided further first aid training on a mobile learning basis. The app still offers face-to-face training (K. Y. Chen et al., 2019; Fazel et al., 2022; Lau et al., 2022; Walton & Mohr, 2022). Current guidelines state that high level scientific evidence on the optimal CPR training method is scarce. Face- to-face CPR training has long been the gold standard, but new technologies have evolved that may hold potential to reach broader populations and provide quick, easily accessible CPR training that can be performed at home at low costs (Balamba et al., 2017; Gram et al., 2021; Lau et al., 2022; Ringh et al., 2015). Appropriate and rapid cardiopulmonary resuscitation assistance provided using evidence-based guidelines that are internationally agreed is the main indicator so that victims of cardiac arrest outside the hospital receive quality emergency services. Various incidents in the field indicate incompetence and errors in assistance in emergency events in the field. Providing the ability to help with basic life support or cardiopulmonary resuscitation is the right action to prevent this problem from happening. CPR training should always be developed in any situation especially on threatening disaster area. A CPR committee said that many community members from that year had CPR certificates (Ali et al., 2021; Cho & Kim, 2021; Khan et al., 2022; Ko et al., 2021; Mao et al., 2021; Tanaka et al., 2019; Zuhroidah et al., 2022).

The organization says that more certified people are needed and better facilities are needed to achieve this. The CPR training using a technological approach that has been carried out has shown a good response and an increase in people's knowledge and skills. Considering that computer-based learning has been widely implemented into mobile learning, it will be more practical if this training can be applied to high school students in Indonesia, which aims as a first aid application (Baru et al., 2022; Fazel et al., 2022; Han et al., 2021; Munot, Bray, et al., 2022; Tanaka et al., 2019; Taramarcaz et al., 2022; Zheng et al., 2022).

2. METHODS

This community service activity is carried out involving final-semester nursing students who already have a cardiopulmonary resuscitation (CPR) certificate. The intended target is high school students in Martapura City, Banjar Regency. Initially, an approach and coordination were carried out with the leadership of the relevant agency, in this case, the Principal of State Senior High School 1 Martapura, Banjar Regency. Then it was agreed on the time and place for the implementation of the activities in the meeting room of State Senior High School 1 Martapura with the participants of 40 school students who were members of the Youth Red Cross group of State Senior High School 1 Martapura. The service method carried out in the first stage was an initial test of recognition of the signs of an emergency in cardiac and pulmonary arrest. It turns out that 100 percent have forgotten the signs/symptoms of people experiencing cardiopulmonary arrest. Including how to take steps to help by the guidelines for CPR help correctly and accurately.The next stage is to provide an introduction to the basic concepts of cardiac and pulmonary emergencies through lectures, discussions and sharing methods related to real events of cardiopulmonary arrest in the community. Then the high school students were divided into several groups accompanied by two Nursing students as CPR instructors in each group using cardiopulmonary resuscitation mannequins. The final stage is an evaluation of the ability of high school students where

after being given demonstrations and independent practice by students of State Senior High School 1 Martapura.

3. RESULT AND DISCUSSION

Results

Cardiopulmonary resuscitation (CPR) is a measure that medical personnel must take when treating emergencies involving the cardiovascular and respiratory systems in order to save life by improving respiratory and circulatory functions with external cardiac massage and/ or be restored simultaneously with artificial ventilation of patients due to the function of the heart and lungs. suffered a total failure due to a sudden cause, so with the help of resuscitation, both the heart and lung function of are expected to function again (Cho & Kim, 2021; Fazel et al., 2022; Khan et al., 2022). CPR is performed and when it occurs, oxygen is delivered to vital organs, particularly the brain and heart. Cardiopulmonary resuscitation in patients with cardiac and pulmonary emergencies is a critical procedure that must be performed by trained and competent nursing staff. Nurses need to be able to make the right decisions in critical and emergency situations. This skill requires mastery of unique nursing knowledge and skills in critical situations and the ability to apply them to meet the needs of critically ill patients (Fazel et al., 2022; Jellestad et al., 2021; Scapigliati et al., 2021). Efficient measures of cardiopulmonary resuscitation consist of the application of external cardiac compression by applying appropriate pressure to the chest and more precise and followed by ventilation artificial respiration with a device or without a device. This action can be performed correctly by a layperson (lay rescuer) if the layperson has received basic life support training on how to properly assist when encountering an unconscious patient experiencing cardiac or pulmonary arrest (Cho & Kim, 2021; Hong et al., 2020; Pietsch et al., 2020). Cardiac arrest is a major health problem with low survival rates. Early cardiopulmonary resuscitation (CPR), including bystander CPR, is significantly associated with better rates of survival to discharge from out-of-hospital cardiac arrest (OHCA). It is also a crucial element in the chain of survival at OHCA (Fazel et al., 2022; Gram et al., 2021; Jellestad et al., 2021; Munot, Rugel, et al., 2022; Plata et al., 2021). Therefore, educating large numbers of people remains a priority for the American Heart Association (AHA) and Red Cross/Crescent organizations around the world cardiac arrest in hospital (OHCA) is a serious public health problem worldwide. Despite efforts to refine treatment strategy, raise public awareness, and develop public health policies, mortality remains high. Rapid responses and early interventions have proven to be critical in the care of patients with OHCA. A key element in the "chain of survival," bystander CPR is one of the first possible treatments an OHCA victim may receive better long-term survival and health-related quality of life (Baldi et al., 2018; Doctor et al., 2017; Fazel et al., 2022; Nas et al., 2019).

However, unlike trained personnel, laypersons may sometimes be reluctant to perform CPR for a variety of reasons, including emotional distress, inability to recognize cardiac arrest, inability to perform CPR, concerns about harming the patient, and fear of sexual accusations from victim misconduct is a woman (Metelmann et al., 2021; Oteir et al., 2019; Scapigliati et al., 2021; Taramarcaz et al., 2022). Quality chest compressions, minimal intervention timing and early external defibrillation is critical for survival with good neurologic outcomes in patients with cardiacarus (CA) as outlined in current resuscitation guidelines. However, maintaining high-quality cardiopulmonary resuscitation (CPR) is often challenging in the prehospital setting, particularly during evacuation and transport. Prompt and competent basic life support (BLS) is essential to increase the chances of survival after an out-of-hospital cardiac arrest. However, it may be a long time before professional rescue workers arrive. To reduce these delays, many countries have set up first aid networks. These networks are made up of BLS-certified professionals or lay rescuers who can be dispatched from EMS centers to care for patients suffering out-of-hospital cardiac arrest (Ahmed et al., 2022; Cash et al., 2022; Fazel et al., 2022; Jellestad et al., 2021; Liu et al., 2022; Munot, Rugel, et al., 2022).

Because of this, trained professionals or students can perform early CPR, initiate resuscitation attempts, and speed access to prehospital and definitive care (Han et al., 2021; Mao et al., 2021; Oteir et al., 2019; Taramarcaz et al., 2022). This can lead to higher survival rates and improve treatment outcomes. In addition, the studies concluded that basic and advanced life support skills deteriorate after just 6 months of exercise. Therefore, it is imperative to regularly update students' knowledge and skills. Also, a study of students reported that students with BLS training had greater knowledge compared to those without training. Additionally, students' CPR knowledge was assessed, who indicated that 27% of participants had received BLS training. The study also reported similar results where CPR knowledge was associated with prior CPR training, despite their low overall level of knowledge (Mao et al., 2021; Oteir et al., 2019; Scapigliati et al., 2021; Teng et al., 2020). Other international studies also reported that trained individuals were more willing and confident in performing bystander CPR. This may reflect that greater

knowledge of CPR is associated with prior training. Our results at are consistent with other studies reporting that BLS skills deteriorate over time after education and training. Therefore, continuing education can increase knowledge levels and optimize CPR performance. In addition, low knowledge levels prompt the design of mandatory and regular training programs/courses or certification requirements. This is arguably particularly important for physicians and health professionals, who are supported by recommendations in numerous reports. Such a program can only teach handheld/compression CPR, which is highly recommended by the AHA and reportedly associated with participants demonstrating greater willingness to perform CPR and higher survival rates (Ali et al., 2021; Cho & Kim, 2021; Han et al., 2021; Nas et al., 2019; Zheng et al., 2022). Martapura high school students previously did not have cardiopulmonary resuscitation skills. They are layman both in terms of knowledge and skills in cardiopulmonary resuscitation so that if cardiac arrest is found by these students, they will not be able to help. This will certainly be very detrimental if the victim of cardiac arrest is the student's family, for example the student's parents, relatives or loved ones. Student preparedness in providing resuscitation assistance is very important because students are in the productive age range and can be relied on to provide cardiopulmonary resuscitation assistance (Han et al., 2021; Mao et al., 2021; Oteir et al., 2019; Taramarcaz et al., 2022).

At the beginning of the training, our students did a pre-test to determine their level of knowledge about the condition of cardiac and pulmonary arrest and their knowledge of cardiopulmonary resuscitation. After that we also evaluate the cardiopulmonary resuscitation skills according to the correct AHA guidelines. The results of our evaluation found that their level of knowledge regarding cardiopulmonary resuscitation was low and so were their cardiopulmonary resuscitation skills. After that, we presented videos of real incidents of some victims who had cardiac arrest outside the hospital so that students could get an idea of what the situation would be in the event of cardiac arrest or respiratory arrest. It is important that they can feel the atmosphere of real events. Then our students show the correct way of help starting from the assessment of cardiac arrest and pulmonary arrest then the steps that must be taken. Final evaluation of the ability of high school students where after being given demonstrations and independent practice by State Senior High School 1 Martapura students, it was found that State Senior High School 1 Martapura students had been able to provide artificial respiration and proper heart massage skills so it was concluded that State Senior High School 1 Martapura students who were members of the group The Youth Red Cross (PMR) are categorized as capable of providing cardiopulmonary resuscitation if it finds a victim of cardiac arrest or respiratory arrest for various reasons.

Discussion

Emergency conditions are conditions where there is a condition in which cardiac arrest and/or respiratory arrest will occur which will result in the death of the brain stem so that the victim/patient experiences permanent death if basic life support is not immediately provided (Hong et al., 2020; Pietsch et al., 2020). Emergency care is a professional nursing service provided to patients with urgent and critical needs. However, often the actions given are inappropriate and not following standard guidelines in helping cardiac and pulmonary arrest. This of course will result in losses where the victim of cardiac or pulmonary arrest or both will die without prior assistance given proper help (Lott, C. et al., 2021; Rzońca et al., 2019).

Guidelines in cardiopulmonary resuscitation, in this case, are important because CPR is a comprehensive and systemic approach using a critical flow of thought followed by appropriate and rapid action in providing assistance to patients; starting with a rapid assessment of the patient's condition (awareness, airway, pulse, respiration of the patient), accompanied by activating the emergency response to get assistance in dealing with patients so that help can be maximized and well organized. Cardiopulmonary resuscitation is very useful for saving life because by giving chest and lung compressions, the patient's circulation can return to the patient's vital organs, especially to the brain and heart itself, accompanied by simple artificial respiration so that ventilation and oxygen exchange occurs in the lungs (H. A. Chen et al., 2022; Jung et al., 2022; Munot, Rugel, et al., 2022). The existence of cardiopulmonary resuscitation provides oxygen intake and blood circulation to body systems, especially organs that are very vital and sensitive to lack of oxygen such as the brain and heart. Cessation of circulation (either a few seconds or even a few minutes) is an emergency condition because the supply of oxygen to the brain stops, and brain hypoxia can occur which results in the ability of the brain's coordination to move autonomic organs to be disturbed, such as heart rate and breathing movements (Borkowska et al., 2021; H. A. Chen et al., 2022; Jung et al., 2022; Kuo et al., 2022; Munot, Rugel, et al., 2022). This rescue will be very useful if it is done as well as possible. It is better to be helped, even if imperfect than to be left without help. At the time of stopping breathing, the oxygen content in the blood is still low, the heart is still able to circulate it to important organs, especially the brain, if breathing is given,

the heart's need for oxygen for metabolism is available and cardiac arrest can be prevented. Cardiopulmonary resuscitation is effective by using compression and followed by ventilation. This action can be carried out by ordinary people as well as people trained in the health sector (H. A. Chen et al., 2022; Munot, Rugel, et al., 2022; Zuhroidah et al., 2022). Cardiopulmonary resuscitation (CPR) is an action that needs to be done by everyone, including the layman, in handling emergency cases in the cardiovascular and respiratory systems. This effort is carried out to normalize the ability to breathe, circulation, and the nervous system that were previously abnormal by providing heart and lung compression (Cash et al., 2022; Zuhroidah et al., 2022). Various incidents in the field indicate incompetence and errors in assistance in emergency events in the field. Giving the ability to help with cardiopulmonary resuscitation is the right action to prevent this problem from occurring (Cash et al., 2022; H. A. Chen et al., 2022; Kuo et al., 2022; Munot, Rugel, et al., 2022; Rzońca et al., 2019; Zuhroidah et al., 2022).

The existence of the problem of the low ability of the Lay, including in this case the general public is very low and needs to be empowered (Jellestad et al., 2021; Jung et al., 2022; Munot, Rugel, et al., 2022; Wang et al., 2022). This of course has an impact if an emergency case is encountered or occurs in the community, it is possible that ordinary people in the case of Riverside Communities cannot provide cardiopulmonary resuscitation assistance. Tutorials for ordinary people can increase their ability from 8.3% to 94.4% where which can help with cardiac arrest problems that occur outside the hospital or out of the hospital cardiac arrest. (OHCA) which is the leading cause of death in adults of which 92% of people who experience OHCA are not saved. and happens outside the hospital (Borkowska et al., 2021; H. A. Chen et al., 2022; Jung et al., 2022; Schluep et al., 2021). Giving the ability to help with cardiopulmonary resuscitation is the right action to prevent this problem from happening. Community Service Activities for Students of State Senior High School 1 Martapura, Banjar Regency are in line with the above. The involvement of students who are trained in basic life support skills is very appropriate because students can provide good tutorials on how to use basic life support. The results of this activity are that students understand the material related to cardiopulmonary resuscitation, providing basic life support counseling has a significant effect on student knowledge, students can practice cardiopulmonary resuscitation well, students can provide pre-hospital cardiopulmonary resuscitation simulations, and students can disseminate information to other people closest.

4. CONCLUSION

When meeting an adult sudden cardiac arrest victim, bystander or layperson must first be aware that the victim has had a cardiac arrest, based on an unresponsiveness and lack of normal breathing. After identification, bystander rescuers must immediately activate the emergency response system, including if school students who find victims must be able to provide resuscitation assistance. This unexpected emergency incident became the basis for our team to provide cardiopulmonary resuscitation training to the community, including high school students. Evaluation of resuscitation knowledge and skill after training show that the students of State Senior High School 1 Martapura, Banjar Regency have been able to provide cardiac resuscitation and respiratory assistance in cardiopulmonary resuscitation measures. The bystander CPR training program not only improved participants' knowledge and skills, but also had a reasonable retention rate. This study could be a stepping stone to strengthening the chain of survival for out-of-hospital cardiac arrest patients.

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