Journal Of Nursing Practice
https://thejnp.org/
ISSN: 2614-3488 (print); 2614-3496 (online) Vol.9 No.2. January 2026. Page.469-477

The Effect of Training on First Aid for Cardiac Arrest on Knowledge and Readiness of Cadres to Provide Emergency Aid to Cardiac Arrest Victims in the Community

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ABSTRACT

Background: The incidence of cardiac arrest or Sudden Cardiac Arrest (SCA) in the community that cannot be saved increases every year. This is because they do not get the right and fast action due to the community's ignorance and inability to assist.

Objective: This study aimed to evaluate health education on increasing knowledge and readiness of respondents in helping cardiac arrest victims.

Methods: This study used a pre-experimental design with a one-group pre-post test approach to 52 respondents, namely the general public. The research sample was recruited using convenience sampling techniques. The sample was given health education on basic life support (BLS) and cardiac arrest management directly with several interactive sessions using visual aids such as posters and presentation slides. Data collection used a valid and reliable questionnaire (Knowledge and Readiness to Help). Data were analyzed univariately through frequency distribution, central tendency, mean difference, and bivariate tests using paired sample t-tests.

Results: There was an increase in respondents' BLS knowledge from 6.87 to 11 ($p<0.001$) and readiness to help, with an average score increasing from 60.4 to 63.3 ($p=0.002$). These results indicate that health education can increase knowledge about BLS and readiness to help respondents. Research results show that readiness to act in emergencies depends on more than theoretical understanding; it also requires practical training, self-confidence, and direct experience.

Conclusion: Health education significantly improved public knowledge and readiness to provide first aid for cardiac arrest victims. These findings indicate that structured Basic Life Support (BLS) education is effective in strengthening community preparedness and timely emergency response. Integrating regular and practical BLS training into community health programs may further enhance public capacity to respond to cardiac arrest events.

Keywords: cardiac arrest, CPR, health education, knowledge, readiness

Received November 10, 2025; Revised December 12, 2025; Accepted January 3, 2026
DOI: https://doi.org/10.30994/jnp.v9i2.740

ISSN: 2614-3488 (print); 2614-3496 (online) Vol.9 No.2. January 2026. Page.469-477

BACKGROUND

In 2020, 436,852 people died due to Sudden Cardiac Arrest (SCA) in the United States. (American Heart Association [AHA], 2023). According to AHA (2023), in 2021, most (73.4%) SCAs occurred outside hospitals or residences, public (16.3%), and nursing homes (10.3%). Meanwhile, in Indonesia, the 2013 and 2018 Basic Health Research (Riskesdas) data showed an increasing trend in heart disease, namely 0.5% in 2013 to 1.5% in 2018 and the prevalence of heart disease in West Java was ranked ninth out of 35 provinces in Indonesia, which is one of the factors causing Cardiac Arrest (Kementrian Kesehatan RI, 2022).

A person experiencing cardiac arrest requires immediate and appropriate treatment for the victim before receiving primary care from medical personnel. First aid is an immediate assessment and intervention that can be performed by the closest person with minimal or no medical equipment (Kumar et al., 2013). First aid aims to reduce suffering and prevent further injury before reaching an appropriate healthcare facility (Michaels, 2011).

The facts that have developed so far show that laypeople are always present and arrive at the location of a traffic accident faster than the medical team or ambulance (Heidari et al., 2019). Previous reviews have stated that laypeople are important to emergency medical services, especially in developing countries (Dijkink et al., 2017). The public is often the first to discover cardiac arrest events. As well as accidents before being handled by health professionals (Prasetyawan, 2019). People who understand how to handle cardiac arrest victims will be able to provide good initial treatment before being handled by medical personnel. However, when people have knowledge, they will be ready to provide first aid, which is crucial to saving human lives (Anwar & Fadhilah, 2014).

In cases of cardiac arrest emergencies, the current phenomenon shows that the majority of people, including students, still have insufficient knowledge and preparedness regarding Basic Life Support (BLS) (Al Enizi et al., 2016; Alfakey & Alkarani, 2021; Artawan et al., 2021; Asih et al., 2021; Nurhusna, 2022; Pujianto et al., 2022). The community or community cadres need to know first aid for cardiac arrest victims. In this case, there is still a lack of training and socialization related to handling cardiac arrest in the community, causing the death rate due to cardiac arrest in Indonesia to still be high at 12.9% (Riset Kesehatan Dasar (Riskesdas), 2018). According to the National Association of Emergency Medical Technicians (2012), everyone should have BLS skills. Without adequate knowledge and preparedness, emergency response is often delayed or incorrect, substantially reducing survival rates and increasing the risk of permanent neurological impairment and death in cardiac arrest cases (Tad-awan, 2025).

The role of the community, including health cadres as first responders, is important in providing first aid in cases of cardiac arrest (Efendi et al., 2023; Prasetyawan et al., 2019b, 2019a). However, this certainly requires optimal understanding and readiness, so the community needs to be educated on knowledge and skills related to BLS, even though the process requires significant costs and a long time (Kragholm et al., 2017). In addition, Ho et al. (2016) stated that the main obstacles and barriers to the community's providing assistance and carrying out BLS are the community's readiness and inability to carry out early assessments on SCA victims. Therefore, increasing and optimizing community knowledge and readiness is very important with the hope that skills related to BLS can improve and the community can be more confident in assisting (Asih et al., 2021; Gowa, 2022; Ose et al., 2020).

The existence of the community, especially health cadres who are trained in providing first aid to victims of cardiac arrest, has a very crucial role in saving lives. However, the low level of knowledge and readiness of the community to provide first aid for cardiac arrest is still a significant challenge that can result in the victim not being saved. Therefore, training and

socialization on handling cardiac arrest are essential for health cadres and the general public. Based on this situation, health education on first aid for cardiac arrest is a strategic step to improve the knowledge and readiness of community cadres in providing emergency assistance effectively.

METHODS

This study used a pre-experimental design with a one-group pre-post-test approach. In this design, researchers observe one main group and provide interventions to assess changes after the intervention. The population in this study was 70 health cadres and the general public in one of the villages in West Java, Indonesia. The sample was selected using the convenience sampling technique, a sample selection method based on the ease or convenience of access to individuals who are available and willing to participate in the study. In this technique, researchers select respondents who are easy to reach or the most easily accessible without considering random population representation. From this technique, 52 respondents were obtained, including health cadres and community cadres as research participants.

The inclusion criteria in this study include individuals who can read and write and are willing to participate in the entire research series. Meanwhile, the exclusion criteria are individuals with cognitive or physical disorders that can affect their participation in the study. The selected sample is expected to represent a variety of demographic characteristics and experiences so that the study results can provide a more comprehensive picture of knowledge and readiness for the intervention.

In this study, data collection was conducted during two meetings. The data collection process used a questionnaire that included demographic characteristics, knowledge questionnaires, and the readiness of health cadres and community cadres in handling cardiac arrest patients. Demographic data included information on village of origin, gender, age, last education, length of experience as a cadre, main job, experience of socialization about first aid, experience of socialization about BLS, experience of helping cardiac arrest victims, and experience of finding and seeing accident victims. Participants were given interventions in health education that focused on the concept of BLS and BLS practices.

The research team delivered the material offline and directly through an interactive lecture method with visual aids such as posters and presentation slides and then continued with BLS practice. The material presented included an introduction to cardiac arrest patients, which included definitions, clinical signs, and the differences between cardiac arrest and respiratory arrest. In addition, risk factors for cardiac arrest were also explained, both those that occur suddenly and those related to chronic conditions. The practice of first aid for cardiac arrest was the main focus, including steps to check the patient's response, open the airway, and perform chest compressions according to the BLS protocol.

The intervention was carried out in 2 separate sessions for 30 minutes each. Each session was designed to build understanding gradually, starting from basic concepts and direct practice in the field. After the session, participants were allowed to ask questions and discuss to ensure optimal understanding. The evaluation was carried out through a post-test to compare the increase in knowledge and readiness of participants after receiving the intervention, with the results analyzed using statistical methods.

The instruments used in this study were adapted from H. Suhartono (2016) and have been tested for validity and reliability. The knowledge questionnaire consists of 15 statements covering definitions, steps to examine a patient, how to open the airway, and how to perform basic life support. This questionnaire uses the Guttman scale (correct answers are scored 1, and incorrect answers are scored 0). The readiness to help questionnaire consists of 20 statements using a Likert scale (1-5): SS: Strongly Agree, S: Agree, RR: Undecided, TS: Disagree, and

STS: Strongly Disagree. The questionnaire used in this study is valid and reliable. The validity of the knowledge and readiness questionnaire ranges from 0.461 to 0.614, with an r-table value of 0.361. The Cronbach's Alpha reliability values are 0.797 and 0.821, respectively.

Data analysis includes analysis of demographic characteristics and analysis of main variables. Data are presented in the form of a frequency distribution table. The scores from the questionnaire are calculated to obtain a total score, then a normality test is performed. The results of the normality test show that the data on each variable of knowledge and readiness are normally distributed ($p>0.05$) and the Z score by comparing the kurtosis and skewness values with the standard error.

Knowledge is categorized as less (correct score 1-5), sufficient (correct score 6-10), and good (correct score 11-15). The readiness variable is considered less if the total score < average (mean). The average pre-test score was 60.4, and the post-test was 63.31. The intervention's effect on health education was analysed using a paired t-test because the data were normally distributed. Data were analyzed univariately through frequency distribution, central tendency, mean difference, and bivariate tests using paired sample t-tests.

This study was conducted in accordance with established ethical principles, including respect for persons, beneficence, and justice. Respect for persons was ensured by providing clear information regarding the study objectives, procedures, potential risks, and benefits, and by obtaining informed consent from all participants prior to data collection. Beneficence was upheld by minimizing potential risks and ensuring that the study posed no harm to participants, while maximizing potential benefits through the contribution of knowledge to emergency health preparedness. The principle of justice was applied by ensuring fair and equal selection of participants without discrimination and by providing equal opportunities for participation. This study received official research permission from Universitas Padjadjaran with approval number 3548/UN6.L./TU.00/2023, and all data were collected and managed confidentially to protect participants' privacy and anonymity..

RESULTS

Demographic Characteristics

Table 1. Demographic Characteristics of Respondents (n=52)

Karakteristik Demografi	Frequency(f)	Percentage (%)
Gender		
Female	44	84.6
Male	8	15.4
Age		
<18 years old	11	21.2
18-30 years old	10	19.2
31-40 years old	14	26.9
>41 Tah years old un	17	32.7
Educational Background		
Elementary School	6	11.5
Junior High School	16	30.8
Senior High School	27	51.9
Bachelor	3	5.8
Employment		
Housewife	42	80.8
Entrepreneur	6	11.5
Student	4	7.7

Karakteristik Demografi	Frequency(f)	Percentage (%)
Cadre Experience		
Not a Health Cadre	17	32.7
1-5 years old	16	30.8
6-10 years old	15	28.8
>10 years old	4	7.7
Helping Experience		
Ever	8	15.4
Never	44	84.6

Table 1 shows that most respondents were female (84.6%), and the majority were aged >41 years (32.7%) and had a high school/vocational school education (51.9%). Then, the respondents in this study were housewives (80.8%) and not health cadres (32.7%), and most had never had experience helping cardiac arrest victims.

Respondent's Knowledge and Readiness

Table 2. Level of Knowledge and Readiness (n=52)

Variable	Pre-test		Post-test	
	f	%	f	%
Knowledge of BLS				
Low	19	36.5	3	5.8
Enough	29	55.8	19	36.5
Good	4	7.7	30	57.7
Readiness to Help				
Not Ready	31	59.6	30	57.7
Ready	21	40.4	22	42.3

The study results in Table 2 show that respondents' knowledge and readiness levels changed after the intervention. In the pre-test, most respondents had enough BLS knowledge (55.8%), and a small number had good knowledge (7.7%). After the intervention, there was a significant increase in the good knowledge category, 57.7%, while the low category was only 5.8%. Then, readiness to help also showed changes, although more moderate. In the pre-test, most respondents were in the not ready category (59.6%), and only 40.4% were ready. After the intervention, ready respondents increased to 42.3%, although the unprepared category remained dominant (57.7%).

Tabel 3. Descriptive Statistics of Knowledge and Readiness (n=52)

Variable	Pre-test		Post-test	
	Mean ± SD	Min-Max	Mean ± SD	Min-Max
Knowledge of BLS	6.87 ± 2.78	2-15	11 ± 2.17	5-15
Readiness to Help	60.4 ± 4.77	52-76	63.3 ± 6.49	50-78

Based on the descriptive statistics of Table 3, the average score of BLS knowledge increased from 6.87 ± 2.78 to 10.6 ± 2.17, while the score of readiness to help increased from 60.4 ± 4.77 to 63.3 ± 6.49. These results indicate that the intervention significantly influenced the increase in knowledge and readiness of respondents to conduct BLS.

Influence of Health Education on Knowledge and Readiness

Table 4. Influence of Health Education on Knowledge and Readiness (n=52)

Variable	Mean Difference	p-value

Knowledge of BLS	-3,73 ± 0.406	<0.001
Readiness to Help	-2,90 ± 0.888	0.002

Based on Table 4, health education intervention significantly affects BLS knowledge and readiness to help participants. In the BLS knowledge variable, the average difference value was obtained at -3.73 ± 0.406 with a p<0.001, which indicates a statistically significant increase in knowledge after the intervention. Meanwhile, the average difference in the readiness to help variable was -2.90 ± 0.888 with a p-value = 0.002, indicating a significant increase in participants' readiness to help. These results prove that health education intervention effectively increases BLS knowledge and participants' readiness to assist.

DISCUSSION

Based on the study results showed that differences in the level of BLS knowledge and the readiness of respondents to help cardiac arrest victims before and after health education (p <0.05). This can be proven in Table 4.3, which shows an increase in the score of each knowledge and readiness variable after health education is given. In the knowledge aspect, the increase in the average score from 6.87 to 11 reflects a fairly significant change. This shows that the material delivered through health education has improved participants' understanding of BLS. The high average difference (-3.73 ± 0.406), which is statistically significant (p <0.001), also indicates that the intervention is not only practical but also able to improve understanding in most participants consistently.

Meanwhile, in the aspect of readiness to help, although the average score increased from 60.4 to 63.3, the difference was smaller compared to knowledge (-2.90 ± 0.888; p = 0.002). This shows that readiness to help requires more than just theoretical understanding. Other factors such as practical skills, self-confidence, and direct experience in dealing with emergencies often influence readiness to act. Although the increase in this variable was significant, the percentage of participants who were ready after the intervention was still relatively low, at only 42.3%. This shows that readiness to act in an emergency depends on theoretical understanding and requires strengthening practical skills and mental readiness. Factors such as repeated practice, action simulation, and direct experience can increase this readiness. Thus, although health education effectively increases knowledge, additional approaches are needed in the form of periodic practice or simulation to ensure participants' readiness to assist in real situations.

Health education is one of the main strategies for increasing a person's knowledge regarding basic life support (Ambohamsah et al., 2021). Health education is a learning method involving the process of growth, development, change, and improvement at the individual, group, and community levels (Artawan et al., 2021). In addition, according to Notoatmojo (2012), health education or health promotion is an effort to advertise, disseminate, introduce, or trade health so that the public accepts or buys it.

The findings in this study are in line with Ose and Pujianto (2021), who reported that the level of knowledge of participants increased after being given an intervention, whereas before it was given only 8% had good knowledge, while after being given an intervention, participants who had a good knowledge category increased to 64%. This is also supported by previous research by Milindasari dan Juniah (2022), where the results show an increase in cadres' knowledge before and after being given counselling and training, with an average percentage increase of 41.9%. In addition, Pujianto et al. (2022) said that after participating in health education activities, participants' knowledge and skills related to BLS and emergency response increased by at least 60%.

On the other hand, increasing readiness to help is also in line with Afni et al. (2021), who reported an increase in community independence in practising BLS steps during the

pandemic from 0% to 58%. Basri and Istiroha (2019) also found that health education can significantly increase community readiness ($p<0.001$). However, challenges such as legal fears, lack of self-confidence, and lack of motivation to learn BLS can affect community readiness.

Several factors that cause lay people to be unprepared to provide BLS are fear when performing BLS, lack of knowledge about BLS, fear of hurting and harming the victim, fear of contracting a disease, and the belief that the victim has died (Afni & Irdianty, 2019). Not being interested in learning, having no time, fear of making mistakes, fear of being sued, and other reasons are obstacles for the general public to learn and master BLS, thus influencing the low level of community readiness (Aji, 2017). The experience of conducting BLS directly, both in simulation programs and directly with victims, also influences the community's readiness to help cardiac arrest victims. Gede and Putra (2019) added that someone will only be ready to assist just by being given reading materials if they are given the opportunity to try. This supports the idea that training is a method that can be used to improve the helper's knowledge. If the helper has a good level of knowledge, the motivation to help the victim will also increase, so self-readiness will also increase (Nirmalasari & Winarti, 2020).

Although health education or counselling can significantly improve community knowledge and readiness to provide BLS, additional strategies are needed to maximize its impact. These include equalizing health education, strengthening practice simulations, and providing ongoing training to build community confidence and readiness in dealing with emergency situations. Governments and health organizations need to pay attention to these needs so that the number of deaths due to cardiac arrest can be significantly reduced.

CONCLUSION

Health education has been proven effective in increasing knowledge about BLS and readiness to help respondents. This study showed a significant increase in respondents' knowledge. This indicates that the health education material provided consistently increased respondents' understanding. However, the increase in readiness to help, although significant, was more moderate. The readiness to act in an emergency depends on more than theoretical understanding; it also requires practical training, self-confidence, and direct experience. Health education in nursing services should be integrated with simulation-based training programs emphasizing improving the community's practical skills and mental readiness to deal with emergencies. Health services in facilities such as community health centres or integrated health posts need to provide structured ongoing education so that community understanding and readiness can continue to develop. Future research is recommended to explore alternative educational methods, such as digital technology, interactive videos, or educational apps, to reach a wider audience. In addition, longitudinal research is needed to measure the effectiveness of health education in the long term and explore the psychological, social, and cultural barriers that influence community readiness to act. Research can also focus on community-based education models involving health cadres as agents of change, which can increase community readiness and independence in providing BLS.

Acknowledgements

All authors would like to thank the participants who were willing to participate in the health education activities and Padjadjaran University, Bandung, West Java, Indonesia, which facilitated the provision of a database for this study.

Disclosure

The authors had no conflicts of interest in this research.

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