



THE EFFECT OF PROVIDING BASIC LIFE SUPPORT MATERIALS USING THE AUDIOVISUAL METHOD ON THE KNOWLEDGE AND SKILLS OF CARDIOPULMONARY RESUSCITATION

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ABSTRACT

Cardiac arrest is a leading cause of death worldwide, including in the United States and Indonesia, with most cases triggered by coronary heart disease. Successful resuscitation largely depends on rapid interventions such as cardiopulmonary resuscitation (CPR) and defibrillation, as survival chances decrease by approximately 10% for every minute without intervention. Basic Life Support (BLS) has been proven to improve resuscitation outcomes; however, knowledge and skills related to BLS remain limited, including among medical students. This study aimed to analyze the effect of providing BLS training using audiovisual methods on the knowledge and skills of students who are members of the Medical Assistance Team (Tim Bantuan Medis/TBM), Faculty of Medicine, Universitas Hang Tuah Surabaya, in performing cardiopulmonary resuscitation (CPR). A cross-sectional study was conducted at the Faculty of Medicine, Universitas Hang Tuah, Surabaya, Indonesia, from June to September 2025. A total of 21 TBM students were selected using a total sampling technique. The dependent variables were knowledge and skills in performing CPR, while the independent variable was BLS training delivered using audiovisual methods. Data were collected using questionnaires that had been tested for validity and reliability. Data analysis was performed using the Wilcoxon signed-rank test for knowledge levels and the McNemar test for CPR skills. The Wilcoxon signed-rank test showed that knowledge levels were significantly improved after the provision of BLS training using audiovisual methods ($p = 0.020$). The McNemar test demonstrated that CPR skills were also significantly improved after the audiovisual BLS training ($p = 0.008$). There is a significant effect of audiovisual-based Basic Life Support (BLS) training on improving both CPR knowledge and skills among TBM students.

Keywords: audiovisual; basic life support; cardiopulmonary resuscitation

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INTRODUCTION

Cardiac arrest is the inability of the heart to pump and circulate blood effectively to vital organs such as the lungs, brain, and others, resulting in loss of consciousness and breathing. Cardiac arrest occurs when the heart stops beating. It is also known as cardiopulmonary arrest (CPA) or circulatory arrest and is a leading cause of death worldwide (Nerkar, 2022). According to information from the American Heart Association (AHA), more than 200,000 cases of in-hospital cardiac arrest (IHCA) occur annually in the United States, with survival rates varying from 0 to 36.2%. Data from the Indonesian Society of Cardiovascular Specialists (PERKI) indicate that cardiac arrest occurs in approximately 10 out of 100,000 individuals under the age of 35 years and accounts for about 300,000 to 350,000 incidents each year. Cardiac arrest is generally caused by underlying structural heart abnormalities. It is estimated that approximately seventy percent of cardiac arrest cases originate from ischemic coronary artery disease, which is the primary cause of this condition. Other structural causes include congestive heart failure, left ventricular hypertrophy,

congenital anomalies of the coronary arteries, arrhythmogenic right ventricular dysplasia, hypertrophic obstructive cardiomyopathy, and cardiac tamponade. In addition, non-structural cardiac causes include Brugada syndrome, Wolff–Parkinson–White syndrome, and congenital long QT syndrome. Various non-cardiac causes may also contribute, such as intracranial hemorrhage, pulmonary embolism, pneumothorax, primary respiratory arrest, poisoning including drug overdose, electrolyte imbalance, severe infections such as sepsis, hypothermia, or trauma (Patel and Hipskind, 2023).

Cardiac arrest can be reversed if prompt actions such as cardiopulmonary resuscitation (CPR) and defibrillation are performed to restore a normal heart rhythm. A patient's chance of survival decreases by approximately 10 percent for every minute that passes without CPR and defibrillation (Effendi, 2023). Based on this information, it can be concluded that the golden time for saving a person experiencing cardiac arrest is 10 minutes. If no assistance is provided within 10 minutes after the event, the patient's chances of survival become very low (Wijaya et al., 2022). Immediate management must be carried out by individuals who are near the victim. However, a common problem is the limited number of community members who have received training in first aid for cardiac arrest or Basic Life Support (BLS). As a result, when witnessing a cardiac arrest, people tend to transport the patient directly to the nearest healthcare facility (Wijaya et al., 2022). BLS is the standard of care for patients with cardiac arrest, with a high chest compression fraction and early defibrillation proven to improve outcomes. BLS courses provided by the American Heart Association (AHA) train participants to perform chest compressions, ventilation, and defibrillation using an Automated External Defibrillator (AED), with a primary focus on single- and two-rescuer cardiopulmonary resuscitation (CPR), while teamwork activities are considered optional (Berger et al., 2024). Rapid action by people around the victim is crucial and can be performed by bystanders. A bystander is an individual who is near the victim and has received training and knowledge in managing cardiac arrest cases. Through this approach, the chances of patient survival can be increased (Wijaya et al., 2022).

Basic Life Support (BLS) is regarded as an essential competency for healthcare professionals in saving lives and improving public health. Therefore, all healthcare workers, especially medical students, are expected to master and be willing to perform BLS anytime and anywhere, both inside and outside the hospital setting (Hanifah, 2019). Understanding BLS procedures and developing practical skills, particularly in performing cardiopulmonary resuscitation (CPR), need to be strengthened during the student years so that they can be more easily applied later in clinical practice after becoming physicians. Based on the background described above, the author aims to understand how BLS training materials influence the knowledge and CPR skills among members of the Medical Assistance Team (Tim Bantuan Medis/TBM) from the Faculty of Medicine, Universitas Hang Tuah Surabaya. In addition, the author also seeks to increase the number of trained bystanders so that, in the event of a cardiac arrest, there will be individuals who are capable of providing first aid through BLS, particularly by performing CPR.

METHOD

This study employs an analytic cross-sectional design. Data will be collected at a single point in time to analyze the relationships between variables. The analytic cross-sectional design is used to examine the effect of delivering BLS material using audiovisual methods on the knowledge and skills of students at the Faculty of Medicine, Universitas Hang Tuah, Surabaya, Indonesia, from June 2025 to September 2025. The study population consists of members of the Medical Assistance Team (Tim Bantuan Medis/TBM) of the Faculty of Medicine, Universitas Hang Tuah Surabaya, who participate in the provision of Basic Life Support (BLS) training materials, particularly cardiopulmonary resuscitation (CPR). A total of 21 students were included as samples using a total sampling technique. Data are collected using a questionnaire containing questions related to CPR, which is distributed online via a form link. The questionnaire consists of 20 items designed to

assess knowledge of CPR. Prior to distribution to respondents, the questionnaire is tested for validity and reliability. The results of the validity test for each item in each variable show a corrected item–total correlation value of ≥ 0.30 . Meanwhile, the reliability test results for each variable indicate a Cronbach’s alpha value of ≥ 0.70 . The equipment used to assess students’ CPR skills is a half-body CPR manikin. In this study, the dependent variables consist of ordinal-scale data (level of knowledge) and nominal-scale data (skills in performing high-quality CPR). Therefore, the Wilcoxon signed-rank test is used to analyze knowledge levels, while the McNemar test is applied to analyze CPR skills. This research has obtained ethical clearance from the Health Research Ethics Commission, Faculty of Medicine, Hang Tuah University Surabaya with No. I/054/UHT.KEPK.03/VIII/2025.

RESULT

Sample Characteristics

Table 1 shows that prior to the provision of BLS training, most participants already had a relatively good level of knowledge, with 57.2% classified in the high knowledge category and 42.8% in the moderate category, while none were categorized as having low knowledge. However, participants’ CPR skills were still very limited; only 9.5% were able to perform High Quality CPR, whereas 90.5% did not yet meet the expected quality standards. These findings indicate that although participants’ theoretical understanding was fairly good, their practical CPR skills were not yet optimal before the training.

Table 1.

Sample Characteristics Based on CPR Knowledge and Skills Before BLS Training

Variable	f	%
Knowledge		
Low	0	0
Middle	9	42,8
High	12	57,2
CPR skills		
High Quality CPR	2	9,5
Low Quality CPR	19	90,5

Table 2, after the provision of BLS training, there was a clear improvement in knowledge, with 90.5% of participants reaching the high knowledge category and only 9.5% remaining in the moderate category. An improvement was also observed in CPR skills, with 47.6% of participants able to perform High Quality CPR compared to only 9.5% prior to training. Although more than half of the participants (52.4%) still did not achieve optimal CPR quality, this improvement indicates that BLS training was effective in enhancing both theoretical knowledge and practical skills. Nevertheless, further training and practice are still required to achieve more optimal outcomes.

Table 2.

Sample Characteristics Based on CPR Knowledge and Skills After BLS Training

Variable	f	%
Knowledge		
Low	0	0
Middle	2	9,5
High	19	90,5
CPR skills		
High Quality CPR	10	47,6
Low Quality CPR	11	52,4

Bivariate Analysis

Based on Table 3, there is a statistically significant difference in the grouping variable after the intervention, as indicated by a significance value of $p = 0.020$, which is smaller than the significance level of 0.05. This result indicates that the provision of Basic Life Support (BLS) training has a statistically significant effect on CPR skills.

Table 3.

McNemar Test Results of CPR Skills Among TBM Students Before and After Basic Life Support (BLS) Training

	High Quality CPR (Pre-test) & High Quality CPR (Post-test)
p-value	0.008

Table 4 shows a statistically significant difference in the level of CPR knowledge among TBM students before and after the provision of BLS training (Exact Sig. (2-tailed) = 0.008). This finding indicates that BLS training has a statistically significant effect on improving the CPR knowledge of TBM students.

Table 4.

Wilcoxon Signed-Rank Test Results of CPR Knowledge Among TBM Students Before and After Basic Life Support (BLS) Training

	Level of Knowledge (Pre-test) – Level of Knowledge (Post-test)
p-value	0.020

DISCUSSION

The provision of Basic Life Support (BLS) training to TBM students was conducted once. The session began with the delivery of BLS material, particularly focusing on cardiopulmonary resuscitation (CPR), using an audiovisual approach. In this study, the instructor presented the material using PowerPoint slides accompanied by verbal explanations (audio). This was followed by a CPR practice session, which was directly demonstrated by the instructor (dr. Sp.EM) and subsequently practiced by all training participants under direct supervision.

Analysis of the Effect of Audiovisual-Based Basic Life Support (BLS) Training on CPR Knowledge Among TBM Students Before and After the Intervention

The results of the Wilcoxon signed-rank test (Table 3) showed a significance value of $p < 0.05$ ($p < 0.01$), with an asymptotic significance (2-tailed) value of 0.020. These findings indicate that there is a significant effect of audiovisual-based Basic Life Support (BLS) training on CPR knowledge among TBM students. This outcome may be attributed to the strong motivation and high level of enthusiasm demonstrated by TBM students toward emergency care, particularly in relation to CPR. The findings of this study are consistent with research conducted by Stanly et al., which reported a significant difference in CPR knowledge scores before and after BLS training ($p < 0.001$). The mean knowledge score before training was 2.6 (± 1.9), while the post-training and one-week retention scores were 12.44 (± 0.89) and 12 (± 1.05), respectively (Stanly et al., 2022). Another study by Pujianto et al. reported that after participating in Basic Life Support (BLS) training, participants' knowledge and skills related to BLS and emergency management increased by at least 60%. This improvement was evidenced by higher post-test scores and the ability of all participants to perform CPR skills and airway obstruction management for choking victims, including adults, children, and infants (Pujianto et al., 2022). Furthermore, research conducted by Permata Sari et al. demonstrated that, from a learning perspective, the use of instructional videos functions effectively and efficiently as a learning medium to achieve improvements in nursing students' knowledge and clinical skills compared with conventional or lecture-based methods (Sari et al., 2021).

Audiovisual media are capable of delivering information simultaneously in the form of images and sound. One of the main advantages of audiovisual media is its ability to provide more realistic representations and enhance memory retention, as the content is more engaging and easier to remember (Putu et al., 2023). Knowledge plays a crucial role in shaping behavior, as it forms beliefs in perceiving reality, provides a basis for decision-making, and ultimately determines behavior (Gama et al., 2022). Knowledge acquired by healthcare personnel through experience is proportional to the knowledge gained by the individual. The more CPR training an individual receives, the greater their knowledge and ability to manage emergency situations (Kedokteran

Nanggroe Medika et al., 2020). An individual's knowledge can develop and increase through continuous learning processes, both in formal and informal educational settings. One of the most effective ways to enhance knowledge and skills is through participation in training programs (Ramadia et al., 2021).

Analysis of the Effect of Basic Life Support (BLS) Training on CPR Skills Among TBM Students Before and After the Intervention

The results of the McNemar test (Table 4) showed a significance value of $p = 0.008$ ($p < 0.05$). Therefore, it can be concluded that there is a significant effect of audiovisual-based Basic Life Support (BLS) training on the CPR skills of TBM students. This finding is consistent with the study conducted by Kanita et al., in which the Wilcoxon statistical test showed p -values of 0.000 (< 0.05) for skills, 0.000 (< 0.05) for readiness, and 0.000 (< 0.05) for motivation. These results indicate that Basic Life Support training had a significant effect on skills, readiness, and motivation in managing CPR among students at Universitas Kusuma Husada Surakarta (Kanita et al., 2024). Another study by Atmaja et al. reported that prior to the implementation of an educational video method, most respondents demonstrated inadequate skills in performing BLS, with 11 respondents (55%) categorized as having poor skills. Only two respondents (10%) showed good BLS skills. After the provision of simulation-based education, all respondents achieved a "good" category for BLS skills, with 32 respondents (82%) demonstrating good performance. No respondents were categorized as having moderate or poor BLS skills. Thus, it was concluded that educational simulation significantly influenced students' BLS skills ($p = 0.000$) (Atmaja et al., 2023). Skills training is an essential component of medical education. One important example is Basic Life Support (BLS) skills training, which plays a key role in improving patient outcomes in life-threatening situations (Thommes et al., 2023). Knowledge and skills can be improved through direct training, as skills require repeated practice; insufficient training or practice is not adequate to produce good skill performance (Nirmalasari and Winarti, 2020). BLS skills are intended to support emergency oxygenation by maintaining cardiopulmonary function through artificial ventilation and circulation. Over time, it is expected that both ventilation and circulation can be restored spontaneously, enabling patients to function independently. Improved prognosis may be achieved, potentially enhancing the quality of life of affected individuals (Rahmania and Triwijayanti, 2023).

Research Limitations

The cross-sectional design resulted in the assessment of CPR knowledge and skills being conducted only in the short term before and after the intervention, thereby preventing the evaluation of long-term retention.

CONCLUSION

This study concludes that there is a significant influence of audiovisual-based Basic Life Support (BLS) training on increasing CPR knowledge and skills among TBM students.

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