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Effective Simulation Methods Improve Student Skills in Performing Basic Life Support

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A B S T R A C T

Almost ten thousand people are affected by cardiac arrest, and the prevalence tends to increase every year in Indonesia. Nursing students need to have skills in performing basic life support (BLS) to increase the survival rate of patients with cardiac arrest inside or outside the hospital. An effective method for facilitating students in gaining such skills is educational simulation. This study aims to identify the effectiveness of the simulation method in improving students' skills in providing BLS. This is a quantitative quasi-experiment with a pre-posttest design. The sample is all fourth-year students in Nursing at Poltekkes Kemenkes Mataram who have had emergency classes in the previous semester. Data were collected using observation sheets and analyzed using the Wilcoxon Signed Rank Test to identify students' skills before and after they were given educational simulations. Before the educational video method was implemented, most respondents had insufficient skills in carrying out BLS, with 11 people (55%) falling into this category. Only two respondents (10%) demonstrated good skills in conducting BLS. After the simulation, all respondents acquired the skills to perform BLS in the "good" category, with 32 people (82%) exhibiting these skills. There were no respondents who had sufficient or poor BLS skills. Educational simulation significantly influenced students' skills in performing BLS (p=0.000). It can be concluded that the simulation method was effective in improving the students' skills in performing BLS. Educational simulation of BLS can be applied as an alternative method in the learning process.

INTRODUCTION

Heart disease and stroke have become the number one cause of death worldwide in the last 15 years (Virani et al., 2020). Cardiovascular disease is the leading cause of death in adults where cardiac arrest related to coronary ischemia is the only major cause (Keto et al., 2016; Virani et al., 2020). In 2014, there were 60,000 cases of cardiac arrest outside in several Asia Pacific regions. In Indonesia estimated around 10 thousand people per year experience cardiac arrest where most events are experienced by coronary heart disease patients whose prevalence tends to increase every year (Kemenkes, 2018).

Victims of cardiac arrest have a survival capacity that will continue to decrease by 7-10% every minute. Therefore, assistance is needed especially assistance from people around them, both outside the hospital and in the hospital (Atmaja et al., 2022; Purwadi et al., 2021). The success of returning spontaneous circulation in less than 20 minutes after a cardiac arrest is associated with an increased survival rate in patients (Virani et al., 2020). This indicates the importance of skills in providing Basic Life Support (BLS) quickly and precisely, especially for nursing students. Nursing students have a very broad opportunity to provide BLS, both in cases of cardiac arrest in their home environment and in cases of cardiac arrest in the

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hospital environment where they practice nursing and or work as nurses later. Therefore, they need to be equipped with the skills to do BLS quickly and precisely (Pranata et al., 2021).

One of the factors that influence the quality of student skills is the method used in the process of learning these skills (Atmaja et al., 2022; Mulianda et al., 2022). The educational simulation method can be used to improve student skills. Simulation is a learning approach that accurately portrays and simplifies real-world situations or phenomena (Pranata et al., 2021; Purwadi et al., 2021). The simulation method can replicate real-life situations, allowing students to react, assess the simulation setting, make decisions about actions to be taken, and reflect on the relationship between their decisions and the ultimate consequences of the skills they are practicing (Atmaja et al., 2022; Purwadi et al., 2021). This supports students in experiencing real-life conditions, preparing them well for situations they may encounter in actual emergencies.

From the brief description above, it can be concluded that both the simulation method and the educational video method have the potential to improve the quality of students' skills, especially in dealing with cardiac arrest cases that require BLS. However, it is uncertain whether educational simulations can effectively enhance students' skills in performing BLS. Based on the provided description, the purpose of this study was to determine the effectiveness of the simulation method in improving students' skills in providing BLS.

METHOD

Design

A quasi-experiment with a pre-post-test design was designed for this study.

Population and samples

The population in this study were students of Poltekkes Kemenkes Mataram. Samples taken from the population using a purposive sampling technique, namely based on inclusion and exclusion criteria, with as many as 40 students.

Inclusion and exclusion criteria

Inclusion criteria included willing to be a respondent, received a lecture on emergencies, and able to take part in a simulation from the beginning to the end of the study process. Exclusion criteria included not present during the data collection process (educational simulation), and never attending a lecture on emergencies.

Research variables

The variables in this study were the educational simulation method as the independent variable and the quality of students' skills in carrying out BLS as the dependent variable. The primary data were the skills of students doing BLS before and after the educational simulation. Secondary data included demographic

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data of respondents including age, gender, and data on whether the respondent attended BLS training before.

Data collection

Data on the characteristics of the respondents collected using the respondent data sheet which was filled in by the researcher according to the data provided by the respondent. Primary data collected using an observation checklist. The researcher filled the checklist of student skills observation before and after the educational simulation carried out.

Data collection carried out after obtaining permission from the relevant institutions and the ethics committee of the Poltekkes Kemenkes Mataram. Data collected by socializing about the research to be conducted to prospective respondents and registering students who are willing to become respondents. Next, give the consent sheet to become a respondent to the students and explain the procedure. Fill out the form sheet regarding the demographic data of the respondent. Conducting a pre-test by asking respondents to demonstrate their skills in conducting BLS and assessed/evaluated using a checklist before being given an educational simulation. After the pre-test, the simulation was played 2 times. Doing a post-test by asking respondents to practice how to do BLS after the simulation, then assessed/evaluated using a checklist.

Data management: the researcher re-checked all the respondent's data entry sheets and the respondent's skills evaluation checklist to avoid mistakes or the possibility of filling out incomplete questionnaires. Furthermore, the researcher calculated the results of the evaluation of the skills of the respondents in carrying out the BLS, determined the category of the ability of the respondents and calculated the research data then collected them into the master table according to the variable category.

Statistical analysis

After collecting and managing data, data analysis is carried out to obtain research results. Data on students' skills in carrying out BLS before (pre-test) and after (post-test) given the education simulation method were analyzed using the Wilcoxon Signed Rank Test non-parametric statistical test. This test was conducted to determine the effect of educational methods on the quality of students' skills in carrying out BLS.

Ethical consideration

The informed consent. Participant has the right to withdraw. The researcher got approved to conduct the study from the committee ethic of Poltekkes Kemenkes Mataram (IRB Number: 001/EC/I/2022), further, the data about the level of stress among students were collected.

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RESULT

The results of collecting secondary data and primary data on respondents can be described as follows:

Respondent characteristics

Distribution of Respondents based on Age, Gender and Experience Participating in BLS Training presented in Table 1.

Table 1. Distribution of Respondents based on Age, Gender and Experience Participating in BLS Training

Characteristic	Amount	Percentage
Age		
20 years old	5	12.5%
21 years old	26	65%
22 years old	7	17.5%
23 years old	2	5%
Gender		
Male	11	27,5%
Female	29	72,5%
Experience Participating in BLS Training		
1 time	0	0%
≥ 2x times	40	100%
None	0	0%
Total	40	100%

The age of the respondents was in the age range of 20 - 23 years. Most of the respondents were 21 years old (65%) and only 2 respondents were 23 years old (5%). Most of the respondents were female, namely 29 people (71.8%). All respondents had attended BLS training 2 times (100%). There were no respondents who had never participated in BLS training or who had attended training only once.

Respondents' skills in carrying out BLS before being given educational simulation methods.

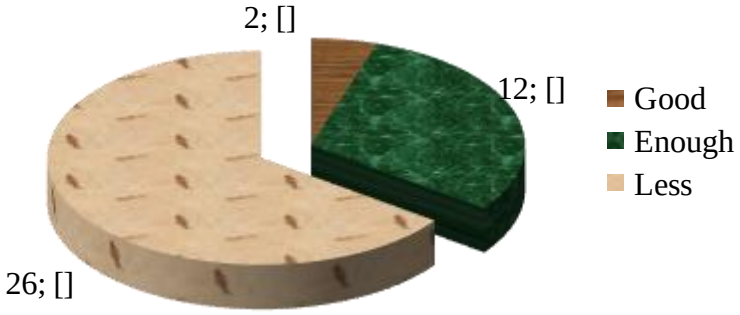

Figure 1. Skills Diagram for Carrying Out BLS After being given a Simulation.

Before given the educational video method, most of the respondents had insufficient skills in carrying out BLS, namely as many as 11 people (55%). Only two respondents (10%) have good skills in conducting BLS.

Respondents' skills in carrying out BLS after being given the simulation method.

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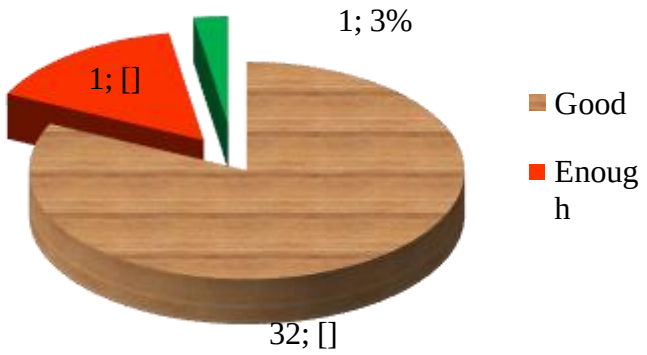

Figure 2. Skills Diagram for Carrying Out BLS After Being Given a Simulation

After given a simulation, all respondents had the skills to do BLS in a good category, namely 32 people (82%). There were no respondents who had sufficient and poor BLS skills.

Analysis of Respondents' skill data before and after being given the simulation method

Respondents' skill data in carrying out BLS before and after given the simulation method analyzed using the Wilcoxon Signed Rank Test non-parametric statistical test to measure the difference between the two data groups. The average scores of students' skills before and after given a simulation and the results of statistical tests on the data are presented in Table 2.

Table 2. The mean value of the skills of the respondents in the simulation group (mean)

	Pre-Test Simulation	Post-Test Simulation	Z	Pretest-Post test simulation
N	40	40	-3.874b	.000
Mean	44.7368	96.5789		
Median	40.0000	100.0000		
Mode	40.00	100.00		
Std. Deviation	21.56860	5.28431		

Table 2, there is a difference in the average score of the respondents' skills before and after the educational video is carried out, where the average value after the simulation (post-test) is greater than the average value before the educational video (Pre-test). The results of the Wilcoxon Signed Ranks Test statistical test showed that there was a significant difference between the skills of the respondents before and after being given the educational video (p = 0.000). This shows that the simulation influences increasing the skills of respondents doing BLS.

DISCUSSION

There was a significant difference between the skills of the respondents before and after given a simulation. This shows that the simulation influences increasing the skills of respondents doing BLS. The results of this study are in accordance with research on the application of the simulation method to improve student learning outcomes (Priester, 2016; Steurer, 2011). With the simulation method, students can participate actively, and students who are active observers can develop imagination, and form group

cohesiveness, students are not embarrassed and hesitate, resulting in an increase in student's knowledge and skills (Sari, 2019; Steurer, 2011).

Other studies also show the effectiveness of the simulation method in increasing student activity in the learning process. There was an increase in learning activities from cycle I to cycle II and from cycle II to cycle III so as to optimize student achievement (Pranata et al., 2021; Sari, 2019; Steurer, 2011). The simulation method not only increases student knowledge but can also improve students' ability to respond to an object and practice an object skill shown (Priester, 2016; Purwadi et al., 2021). Simulation methods that involve a lot of sense will shape knowledge and understanding more perfectly, thus helping someone to respond positively to an object that is manifested in real actions (Steurer, 2011).

In addition to involving almost all the senses and aspects of one's intelligence, the simulation method also allows one to practice making the right action decisions or appropriate skills in response to an object or situation that is made like in a real situation (Brewer et al., 2020; Liao, 2021; Veenerma, 2015). This can explain why the simulation method is more effective in improving student skills than the educational video method (Veenerma, 2015). However, this does not mean that one of the two methods must be chosen, if possible, the two methods can be combined so that the learning process can obtain maximum results.

Based on the data, all respondents in this study had attended BLS training twice. In training, they certainly have practiced or simulated BLS skills. However, the pre-test scores in the educational video group and the simulation group showed unsatisfactory scores, where there were still many respondents who were not skilled at doing BLS even though they had been trained. This shows the need for a continuous learning process to improve and maintain student skills. The learning process to maintain students' skills in carrying out BLS can use the educational video method because with this method the knowledge and skills learned can settle in memory (Ahayalimudin & Osman, 2016; Hammad et al., 2012).

The audiovisual method through simulation is indeed a method that has often been used, especially for the learning process and health education activities. Simulation can affect the increase in the value of student knowledge (Arbon et al., 2013; Whetzel et al., 2013).

CONCLUSION

The simulation method is effective in increasing students' skills in carrying out BLS. To maintain students' abilities and skills, it is necessary to make continuous learning efforts or recall lessons ever learned. This effort can be carried out by applying the simulation method either jointly with the teaching lecturers in the class or independently by each student. As previously mentioned, even though it is effective, the simulation method still has drawbacks, so future research is expected to be able to identify other methods that can be used to complement the simulation method or used as an alternative method to improve the quality of student skills.

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