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Online Basic Life Support Course to Increase Knowledge and Skill of Nursing Students

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ABSTRACT
This study aimed to describe the learning outcomes of undergraduate nursing students who attended online basic life support course. The research method was online Basic Life Support course which was developed as a form of adaptation during the Covid-19 pandemic and was given to 102 nursing students. Pre and post tests were conducted to measure cognitive learning outcomes. Simulations are carried out in person to determine basic life support skills. This result with paired t-test showed a significant increase in learning [pre-test (6,3±1.62), post-test (9.2±0.84), p <0.001). the increase in mean scores after attending online course was significant (p <0.001). there was no difference in learning (p = 0.482) after observation. The simulation results were carried out after course: check response (90.2%), exposed chest (93.1%), checked for pulse (93.1%), checked for breathing (87.2%), called emergency services (72.5%), use a defibrillator (86.2%), correct hand position (82.4%), perform chest compressions (92.4%), perform compressions of at least 2 inch (82.4%), full recoil (89.2%), provide ventilation (94.1%), use AED (84.3%), and positioned the pads (89.2%). BLS course conducted online is an alternative course and effective method to provide knowledge and skills, where students continue to accurately implement BLS actions.

Keywords: Basic Life Support, Knowledge, Nursing, Online Course, Skill

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BACKGROUND

Cardiac arrest cases are increasing by the year, and become a major public health problem and cause of death worldwide. The survival rate increase when a person has a cardiac arrest and must be given immediate help (Bukiran et al. 2014). Not all patients or victims of cardiac arrest receive prompt and precise treatment. This needs to be started early on by providing a course to health workers and lay person so they can assist victims of cardiac arrest (Ahmad et al. 2018). Basic life support techniques need to be provided in comprehensively. Increased ability of health care professionals to recognize an unconscious victim earlier and to respond or provide assistance immediately (Aksoy et al. 2019). In addition, a proper technique improves the basic life support measures quality so that the patient's survival improves (Hunt et al. 2017; Kwiecień-Jaguś et al. 2020). The American Heart Association (AHA), which facilitates high-fidelity phantom use, simulations, feedback instruments, more prevalent course, and online course, is a resource for providing information and learning resuscitation skills. The Covid-19 pandemic is one of the reasons for course methods changing to online or without face to face. In addition, the online method is claimed able to provide skills development facilities, autonomy, cost-effectiveness, reducing the burden on facilitators, while maintaining positive learning outcomes (Kwiecień-Jaguś et al. 2020; Requena-Mullor et al. 2021).

The online course requires careful planning and organization where educational objectives must be defined and the content must be relevant. In addition, the need for combining technological resources to improve resuscitation education. The purpose of this study was to explain the learning outcomes of nursing students who attended online basic life support course (Harvey et al. 2012; Hunt et al. 2017).

METHODS

This study used a quasi-experimental study. Online BLS course was developed and given to 7th-semester nursing students at STIKes Muhammadiyah Gombong. Samples were taken using consecutive sampling, namely 122 students who have registered as students.

A total of 102 students participated the online course such as pre-tests, theory, online classes, theoretical tests and practical tests, and post-tests. Data were collected from November to December 2020 electronically. The pre-test, theoretical learning and post-test were conducted online, while the practical test was carried out offline.

The validity and reliability tests were carried out first to the nurse. The questions for the theory test consisted of 30 question items. The evaluation was carried out using an observation sheet containing basic life support procedures. Cardiac Resuscitation Scores were categorized into basic CPR (0-49%), intermediate CPR (50-74%) and advanced CPR (75-100%). The final value is determined based on a simulation containing the depth of compression, compression frequency, full recoil, minimal interruptions, hand position, and ventilation. Online course was carried out using face-to-face online through zoom meetings, cognitive evaluation using google quizzes and moodles. Students were given guidance on using the media and there were no significant obstacles. Simulations were carried out in pairs for 2 minutes using an automatic external defibrillator (AED) and phantom CPR, then they alternated. The evaluation was assessed by the facilitator using an observation sheet which consisted of assessment, technique and used a defibrillator.

Data were analyzed using SPSS 25 with paired t-test. The value of pre, post-test and practice was calculated as the standard deviation. The characteristics of the research subjects were analyzed using the correlation coefficient. Furthermore, the t-test was used to determine the

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mean difference between the pre-test and post-test values which were used as parameters to evaluate the course.

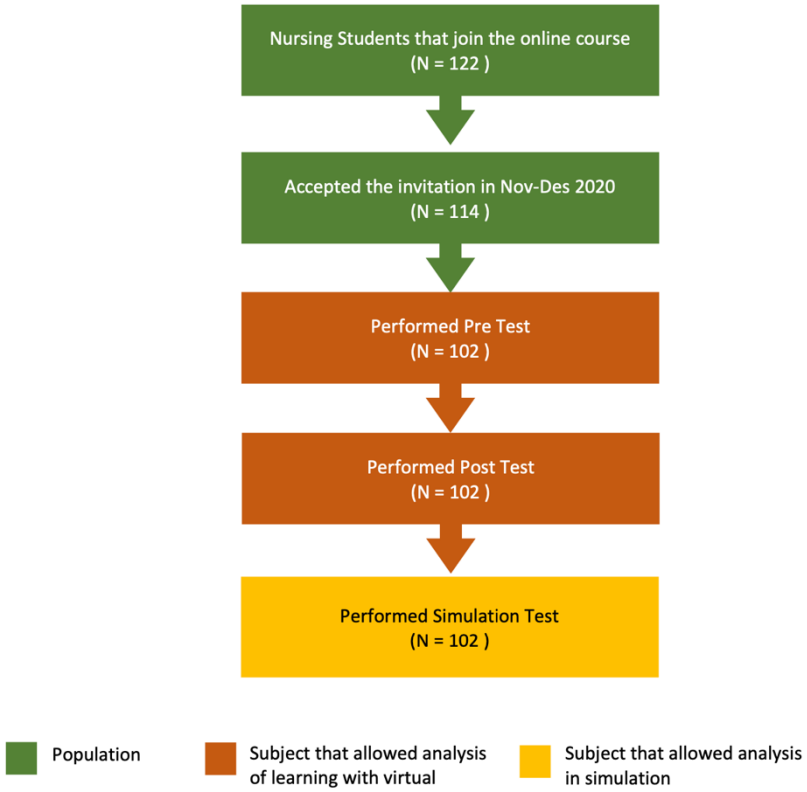

Figure 1. Flowchart of Research Subjects

RESULTS

The research subjects consisted of 102 students who had completed the online course, of whom 86% were women with an average age of 20.42 ± 2.41, and male 14% average age 21.22 ± 2.13. The course participants had never attended BLS course before, were already familiar with the zoom meeting platform, google quiz and moodle, as many as 95.6% were motivated to take online course and apply course practices.

Table 1. The Results of the Pre and Post-Test

Test	Mean	SD	CI	Phase	Interaction
				p-value	
Pre test	6.30	1.62	5.72, 6.71	<0.001	0.482
Post test	9.20	0.84	8.81, 9.48		

The pre and post-test mean difference scores of the written test were used for the course evaluation. The written test used 30 multiple choice questions. Paired t-test to compare mean pre-test scores (6.3 ± 1.62), and post-test (9.2 ± 0.84), p <0.001 indicated a significant increase

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Table 2. CPR Simulation Test (N=102)

Phase	Test	N	%
Assessment	Response	92	90.2
	Exposed the chest	95	93.1
	Checked for pulse	95	93.1
	Checked for breathing	89	87.2
	Called emergency services	74	72.5
	Request for a defibrillator	88	86.2
Technique	Positioned their hand properly	84	82.4
	Performed compression at least 2 inch	84	82.4
	Full recoil	91	89.2
	Minimal interruption	89	87.2
	Give two breaths	96	94.1
Defibrillator	Use AED	86	84.3
	Positioned the pads	91	89.2

After the written test, students simulated a BLS by performing CPR, with an average SD score of 9.2 $\pm$ 0.84 (scores from 0 to 10). The results of observations from the facilitators found that participants were able to checked response (90.2%), exposed chest (93.1%), checked for pulse (93.1%), checked for breathing (87.2%), called emergency services (72.5%), used a defibrillator (86.2%), corrected hand position (82.4%), performed chest compressions (92.4%), performed compressions of at least 2 inch (82.4%), full recoil (89.2%), provided ventilation (94.1%), used AED (84.3%), and positioned the pads (89.2%). In addition, when participants were asked about the self-confident they felt during the online BLS course, they stated that 92.5% were confident in their ability to provide BLS actions, 4.6% were not confident and 2.9% were hesitant.

DISCUSSION

The ability to conduct BLS through CPR measures is very important. According to the AHA, preparation and qualifications for assistance to unconscious victims because cardiac arrest significantly affects resuscitation success and improves survival (Yoon 2011). The sooner the course is given to students, the greater the chance to apply it when finding an unconscious victim. Gradual and continuous course needs to be done because knowledge tends to decrease over time (Jarrah, Judeh, and AbuRuz 2018).

The results of a study on health care providers explained that the performance differences during online learning allowed participants to evaluate their performance. This study emphasized that knowledge about actions and skills were quite distinct, and must be carried out actions effectively. In addition, feedback instruments can help monitor procedures, given their accuracy and objectivity in evaluating student performance (Bielec, Klajman, and Pęczak-Graczyk 2014; Requena-Mullor et al. 2021). During the online course implementation, break for rest and ice breaking were given, so they able to focus on learning and practice. Lectures and discussions were also conducted in an effective time, participants were given free time to ask questions and try again directly during practice.

The AHA guidelines stated that it was reasonable to use simulators and high-fidelity feedback devices, which underpinned quality in providing better CPR Measures. During the course, students used phantom CPR and can see and increase the compression rate, depth level and compression frequency. Another supporting tool used for monitoring was the

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metronome (a musical instrument used to adjust the compression frequency), which was used to guide the speed in performing CPR. The study results showed that compression rates were better when using a metronome or auditory guide, because participants can focus more on the strength and depth of compression (Iserbyt 2016). These recommendations were based on balancing the potential benefits of better CPR performance with minimal device costs during course. In addition, short and frequent course is highly recommended as higher frequency will increase retention and safety during the implementation of the BLS Measures (Pehlivan et al. 2019; Wang et al. 2021).

Although satisfactory levels of online learning or course can be achieved, skills retention over time tends to decline. The resuscitation guide provides recommendations for using online course as a resource in education (Bylow et al. 2021; Harvey et al. 2012). In addition, they also showed that a short and regular study period would have a positive effect on learning without a significant correlation with course time. Therefore, online course is a resource that can be used to train students and continue their pre-professional education (Pande et al. 2014; Takamura et al. 2017). The conventional and traditional learning methods that have been used for a long time are no longer accepted as the best way to provide or teach students. It is important to encourage students or professionals to be more confident in their abilities, and to focus more on the patient's needs than their own needs are important qualities of a competent healthcare professional (Aaberg et al. 2014; Boet et al. 2017).

The limitation in this study was the use of convenience samples and some of the course participants experienced health problems so that they could not follow through to completion.

CONCLUSION

Online courses were an effective teaching and learning method, where students can apply BLS correctly during practical simulations. In addition, online courses can be used for continuing education because they often use videos in the learning process, increasing variation in learning and self-improvement during heart attack treatment. Future research should assess prospects beyond direct learning using a larger sample and ongoing evaluation to determine the effects of learning and the ability to conduct BLS.

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