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The Effectiveness of Basic Life Support Training on Disaster Preparedness Among Students

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ABSTRACT: This study analyzed the effectiveness of Basic Life Support (BLS) training on disaster preparedness among health students. A quasi-experimental pretest–posttest control group design involved 60 students. The results showed significant differences between intervention and control groups in knowledge, skills, and attitudes (p=0.000). These findings indicate that BLS training effectively improves students' disaster preparedness in cognitive, psychomotor, and affective domains and should be implemented continuously in higher education institutions.

KEYWORDS*:* Attitudes, disaster preparedness, Health Students, knowledge, Skills

INTRODUCTION

Disasters are events that occur either naturally or as a result of human activities, happen suddenly, and cause significant material and non-material losses. Earthquakes may occur due to the movement of tectonic plates, known as tectonic earthquakes, which are among the most common causes of seismic events. Generally, earthquakes are caused by the release of energy generated by pressure from moving plates. The greater the pressure, the more difficult it is for the plate boundaries to withstand it, leading to the occurrence of an earthquake (Salmawati et al., 2024).

Higher education institutions, through the Tri Dharma of higher education, play a strategic role in disaster management through education, research, and community service. This role can be carried out through the active participation of lecturers and students in various internal and external programs and activities, including mitigation efforts such as spatial planning, development regulation, infrastructure development, building management, as well as education, outreach, and training conducted both conventionally and through modern approaches. These efforts can be integrated into a disaster-resilient campus program (Kamaludin, 2025).

The concept of a disaster-resilient campus emphasizes the preparedness of higher education institutions in facing potential disasters through various mitigation and preparedness strategies. A disaster-resilient campus not only focuses on strengthening disaster-resistant physical infrastructure but also includes capacity building for the entire academic community in responding to and adapting to emergency situations (Ambarukmi P., 2021). With thousands of students, lecturers, and educational staff carrying out daily activities on campus, universities represent communities with a high level of vulnerability to disaster impacts.

According to the United Nations International Strategy for Disaster Reduction (UNISDR), Indonesia is among the most disaster-prone regions in the world due to its geographical conditions. Many cities are located along the world's seismically active zones. Indonesia has 127 active volcanoes and 317 districts at high risk of flooding. Consequently, the country experiences not only earthquakes but also volcanic eruptions, storms, landslides, and floods. It was recorded that approximately 2,000 disasters affected Indonesia, resulting in at least 4,000 fatalities and displacing around 3 million people (UNISDR, 2019).

The success of disaster preparedness education programs requires strong collaboration between universities, government, and non-governmental organizations. Tadulako University needs governmental support in the form of regulations and funding, while non-governmental organizations can contribute by providing training and additional resources. Through synergistic collaboration, the ultimate goal of disaster preparedness education—creating a safe and resilient learning environment can be achieved (Rahmi Fadiah Nasution et al., 2024).

Recommendations from the World Health Organization (WHO), the American Heart Association (AHA), and Indonesia's Ministry of Health Regulation No. 66 of 2016 support the integration of Basic Life Support (BLS) training into educational institutions. However, studies examining the effectiveness of BLS training in university settings remain limited. Therefore, it is important to conduct research on the effectiveness of Basic Life Support training in improving disaster preparedness among undergraduate students of the Faculty of Public Health at Tadulako University.

MATERIALS AND METHODS

This study employed a quantitative research approach, emphasizing objective measurement of phenomena and the collection of numerical data for statistical analysis. A quasi-experimental design with a pretest–posttest control group was used. This method involved two groups: an experimental group that received the intervention and a control group that did not. Data were collected through pretests and posttests.

The sample consisted of 30 third-semester undergraduate students of the Faculty of Public Health, Universitas Tadulako, in the 2025/2026 academic year. Participants were selected using purposive sampling, as they had received basic public health courses and had never participated in Basic Life Support (BLS) training.

The variables in this study included Basic Life Support (BLS) training, defined as a systematic learning process aimed at improving basic life-saving skills in emergency situations. Knowledge of BLS refers to participants' cognitive ability to understand information and basic concepts related to the management of cardiac arrest or respiratory arrest. Attitudes toward BLS describe individuals' affective tendencies to support, value, and be willing to engage in BLS training and implementation, reflecting mental and emotional readiness to provide assistance to victims of cardiac or respiratory arrest. BLS skills refer to an individual's motor and procedural ability to perform initial life-saving actions accurately and effectively for victims of respiratory and/or cardiac arrest.

The questionnaire used to assess the effectiveness of BLS training was adapted from an instrument developed by Rahmawati Syam (2022). The original questionnaire adopted by the researchers consisted of ten statements.

Univariate analysis was used to describe respondent characteristics and data distribution (frequency, percentage, and mean). Bivariate analysis was conducted to compare pretest and posttest scores (significance level $p < 0.05$) to determine the effect of BLS training on disaster preparedness between the intervention and control groups. An independent t-test was used when the data were normally distributed, while the Mann–Whitney test was applied when the data were not normally distributed.

RESULTS AND DISCUSSION

The analysis of differences in knowledge between students who participated in Basic Life Support (BLS) training (Class A) and those who did not participate in the training (Class D) using the Mann–Whitney test showed a significance value of $p = 0.000$ ($p < 0.05$). This result indicates a statistically highly significant difference between the two groups (Table 1).

Table 1. Knowledge Scores of Class A (Intervention) and Class D (Control) Before and After BLS Training

No	Knowledge Score (Mean ± SD)	Before training	After training	change
1	Class A	48,13±6,361	91,97±5,792	43,84↑
2	Class D	41,53±12,128	39,83±11.055	-1,7 ↓
	P-value		0.000*	

Source: Primary Data, 2025

Note: *Mann–Whitney Test

Effectiveness is defined as the extent to which an activity, program, or organization successfully achieves its predetermined objectives through optimal use of available resources. This concept emphasizes the alignment between input, process, and output as indicators of goal attainment (Kusumawati, 2023).

According to Dewi et al. (2024), training is an effort to develop human resources, particularly in enhancing intellectual capacity and personality development. The World Health Organization (WHO, 2020) states that knowledge is a crucial domain within the cognitive sphere, encompassing the abilities to remember, understand, and apply information in specific situations.

Basic Life Support includes several skills that can be taught to anyone, such as recognizing sudden cardiac arrest, activating the emergency response system, performing early cardiopulmonary resuscitation (CPR), and using an automated external defibrillator (AED). Ideally, everyone worldwide should be familiar with basic first aid techniques and undertake regular training to ensure sustained knowledge (Merchant et al., 2024).

This study is consistent with research by Guruh Suprayitno and Jeni R. Tasik (2021), which found that BLS training significantly improved nursing students' knowledge and skills in providing first aid. Improvements in skills indicate that hands-on practical training provides applicative experience that strengthens students' preparedness for emergency situations.

These findings also support the study by Sari et al. (2020), which reported that participants' attitudes toward BLS became more positive after training, as reflected by increased confidence and willingness to assist victims in emergency situations. However, Lestari (2020) found that although knowledge increased after training, students' attitudes did not change significantly. This may be influenced by external factors such as limited direct experience in handling emergencies, fear of making mistakes, and insufficient exposure to real-life situations.

Theoretically, the increase in knowledge supports Notoatmodjo's (2014) view that health education is effective when learning encourages conceptual understanding and meaningful information transfer. In addition, these results reinforce Kirkpatrick's assertion that high-quality training leads to improved cognitive abilities as a foundation for subsequent behavioral change. Thus,

within the Learning dimension, BLS training has been proven effective in enhancing students' cognitive readiness to face emergency conditions.

These findings are in line with the study by Suprayitno and Tasik (2021), which demonstrated a significant increase in students' knowledge from 65.16 to 86.09 following simulation-based BLS training. Nirmalasari and Winarti (2020) also supported these results, stating that BLS training significantly improved public health students' knowledge ($p = 0.000$). Furthermore, Mufimah and Kamaludin (2025), through a systematic review, concluded that disaster training interventions in various forms effectively strengthen participants' cognitive preparedness. Therefore, the results of this study reinforce the argument that BLS training is an effective learning method for improving disaster preparedness knowledge among students.

The Independent t-test results for the attitude variable showed a significance value of $p = 0.000$ ($p < 0.05$), indicating a statistically highly significant difference in disaster preparedness attitudes between students who received BLS training and those who did not. The mean difference between the two groups was 2.130 (3.26 − 1.113) with a 95% confidence interval. The higher mean attitude score in the intervention group reflects an improvement in positive disaster preparedness attitudes after receiving BLS training (Table 2).

Table 2. Attitude Scores of Class A and Class D Before and After BLS Training

No	Attitude Score (Mean ± SD)	Before training	After training	change
1	Class A	29,77±3,421	33,03±2,266	3,26↑
2	Class D	28,20±2,140	29,33±1,348	1,13↑
	P-value		0,000*	

Source: Primary Data, 2025

Note: *Independent t-test

Attitude is an individual's response or tendency to act, feel, and behave toward an object based on knowledge, experience, and emotions. According to Azwar (2021), attitude is an evaluative reaction that reflects supportive (positive) or unsupportive (negative) feelings toward something.

BLS training not only improves knowledge and skills but also influences students' attitudes in facing emergency situations. The results showed a positive change in attitudes within the intervention group, reflected by increased confidence, readiness to help, and willingness to provide initial assistance to victims of sudden cardiac arrest.

This finding is consistent with the study by Triana D. (2024), which reported that BLS training significantly improved students' readiness-to-act attitudes in emergency situations.

This attitude change reflects the success of training in influencing the affective domain, as explained in Green's behavior change theory, which states that attitude improvement is a crucial stage preceding actual behavior. However, Putra et al. (2022) noted that limited training duration and insufficient real-condition simulations resulted in participants lacking full confidence to perform BLS in real settings. These differing results suggest that the effectiveness of training on attitudes is strongly influenced by teaching methods, simulation intensity, instructor quality, and the learning environment.

The Independent t-test results confirmed a significant difference in preparedness attitudes between the intervention and control groups ($p = 0.000$). The positive attitude improvement in the intervention group indicates that BLS training effectively influences the affective aspect and participants' internal readiness to act. Attitude serves as a bridge between knowledge improvement and behavioral capability; thus, in the Kirkpatrick model, this variable represents the transition between Level 2 (Learning) and Level 3 (Behavior).

These findings align with Green's (1980) theory, which states that behavioral change is strongly influenced by predisposing factors, including positive attitudes toward health actions. As preparedness attitudes improve, students become more confident in making life-saving decisions during emergency situations. The results demonstrate that BLS training is successful not only in the cognitive and psychomotor domains but also in strengthening motivational and self-efficacy aspects of preparedness behavior.

These results are further supported by Rahmi Fadiah et al. (2025), who found that disaster preparedness education increases adolescents' awareness, concern, and active responses to disaster risks. In addition, Mufimah and Kamaludin (2025) showed that disaster training positively impacts participants' preparedness attitudes across various interventions. Therefore, this study provides evidence that BLS training shapes students' preparedness not only cognitively and psychomotorically but also affectively.

The analysis of differences in students' skills between the two groups using the Mann–Whitney test showed a significance value of $p = 0.000$ ($p < 0.05$), indicating a statistically highly significant difference in skills between students who received training and those who did not.

Skills are not innate traits but constructs developed through the synergistic integration of declarative and procedural knowledge, practical competence, and supportive attitudes and dispositions (Ravindran et al., 2023; Susanty et al., 2024). Dewi N. (2024) found a significant improvement in students' skills after BLS training using demonstration methods ($p < 0.05$). Similar findings were reported by Al-Mubarak et al. (2020), who stated that 92% of participants achieved appropriate compression depth after simulation-

based training. Suprayitno and Tasik (2021) also concluded that students' skills increased dramatically following training due to repeated independent practice.

Table 3. Skill Scores of Class A and Class D Before and After BLS Training

No	Skill Score (Mean ± SD)	Before training	After training	change
1	Class A	3,40±1.037	84,60±7,337	81,2↑
2	Class D	3,30±0,915	3,30±0,195	0↓
	P-value		0,000*	

Source: Primary Data, 2025

Note: *Mann–Whitney Test

These findings are consistent with the study by Suprayitno and Tasik (2021), which demonstrated significant improvement in BLS skills following training using hands-on practice and simulation methods. They are also supported by Tanaka, Tulus, Didik et al. (2025), who reported that technology-based disaster education and simulation activities improved evacuation skills and emergency response. Thus, the results of this study validate the importance of practical components in BLS training to produce competent first responders

V. CONCLUSIONS

This study concludes that Basic Life Support (BLS) training is effective in significantly improving disaster preparedness among public health students. The training led to meaningful increases in knowledge, skills, and attitudes across cognitive, psychomotor, and affective domains compared to the control group. These findings indicate that structured and practice-based BLS training plays a crucial role in strengthening students' readiness to respond to emergency situations and should be implemented sustainably within higher education institutions.

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