

Manuscript received February 12, 2026; revised February 22, 2026; accepted February 22, 2026; date of publication June 01, 2026

Digital Object Identifier (DOI): <https://doi.org/10.35882/ijahst.v6i3.609>

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**How to cite:** Titani Setyo Anggarnis, Sari Luthfiyah, Nikmatul Fadilah, Endah Suprihatin, "Effectiveness of Video and Lecture Methods on Basic Life Support Knowledge and Skills among Students of Poltekkes Kemenkes Surabaya", International Journal of Advanced Health Science and Technology, Vol. 6 No. 3, pp. 241-249, June 2026.

# Effectiveness of Video and Lecture Methods on Basic Life Support Knowledge and Skills among Students of Poltekkes Kemenkes Surabaya: A Quasi-Experimental Study

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**ABSTRACT** Variations in Basic Life Support (BLS) knowledge and practical competence among students at Poltekkes Kemenkes Surabaya may influence their readiness to respond effectively in emergency situations. Differences in educational background and departmental focus contribute to disparities in students' understanding and performance of BLS procedures, highlighting the importance of implementing appropriate educational strategies. This study aimed to evaluate and compare the effectiveness of lecture-based learning and educational video methods in improving BLS knowledge and practical skills among students. This study employed a quantitative quasi-experimental approach using a two-group pretest–posttest design. A total of 28 members of the Scout Student Activity Unit were selected through simple random sampling and randomly assigned into two intervention groups: lecture-based education and educational video-based learning. Data were collected using validated knowledge questionnaires and skill observation checklists administered before and after the interventions. Statistical analysis was conducted using the Wilcoxon Signed Rank Test to assess within-group differences and the Mann–Whitney U Test to compare outcomes between groups, with a significance level of  $p < 0.05$ . The findings demonstrated a statistically significant improvement in both BLS knowledge and practical skills following the interventions in each group ( $p = 0.001$ ). However, no significant differences were identified between the lecture and educational video methods in improving knowledge ( $p = 0.378$ ) or practical skills ( $p = 0.617$ ), indicating that both approaches were equally effective. Lecture-based learning appeared to enhance conceptual understanding, whereas educational videos provided greater support for procedural and skill-based learning. In conclusion, both lecture and educational video methods are effective educational strategies for improving BLS knowledge and skills among students. The integration of these complementary approaches may optimize learning outcomes and strengthen students' preparedness in emergency response situations.

**INDEX TERMS** Basic Life Support, Educational Video, Lecture Method, Knowledge, Practical Skills.

## I. INTRODUCTION

Basic Life Support (BLS) constitutes a fundamental emergency intervention aimed at maintaining airway patency, breathing, and circulation in individuals experiencing cardiac arrest or respiratory failure. Adequate BLS competence is essential for healthcare students because early and appropriate intervention significantly increases survival rates and minimizes the risk of permanent neurological impairment [1], [2]. As prospective healthcare professionals, students at Poltekkes Kemenkes Surabaya are expected to possess sufficient theoretical understanding and practical proficiency in BLS procedures to ensure readiness in emergency situations. Nevertheless, variations in students' educational backgrounds and departmental learning orientations contribute to disparities in BLS knowledge and skill acquisition [3], [4]. Consequently, emergency preparedness

and resuscitation competency are not uniformly achieved among students.

The inconsistency of BLS knowledge among healthcare students represents a critical educational issue because inadequate preparedness may lead to delayed intervention during life-threatening emergencies. Recent studies have shown that BLS competency among nursing and healthcare students remains below expected standards despite the inclusion of emergency care topics within academic curricula [5]–[7]. Furthermore, limited exposure to repetitive simulation and practical training reduces students' confidence and psychomotor performance when performing cardiopulmonary resuscitation (CPR) and other BLS procedures [8], [9]. Insufficient mastery of BLS principles can negatively affect the quality of emergency response and ultimately influence

patient survival outcomes [10]. Therefore, strengthening BLS education through innovative and engaging learning approaches is essential to ensure that healthcare students acquire adequate knowledge, skills, and confidence to respond effectively in emergency situations. Moreover, identifying effective educational strategies to improve BLS competency has become increasingly important to bridge the gap between theoretical knowledge and practical emergency care performance among healthcare students.

To address this issue, various educational strategies have been implemented to improve students' understanding and practical performance related to BLS. Conventional lecture-based learning remains widely used because it enables educators to systematically deliver conceptual information and theoretical foundations [11], [12]. Lecture methods are considered effective in improving cognitive comprehension, especially regarding algorithms, indications, and procedural sequences in BLS [13]. However, passive learning environments may limit students' engagement and reduce long-term retention of psychomotor skills [14].

Recent developments in digital learning technologies have encouraged the integration of educational videos into healthcare education. Video-based learning offers audiovisual stimulation that can improve students' attention, procedural understanding, and practical visualization [15], [16]. Educational videos also provide flexibility for repeated viewing, allowing learners to independently reinforce their understanding of CPR techniques and emergency procedures [17]. Several studies reported that video-assisted learning can significantly improve both cognitive and psychomotor domains in BLS education [18], [19]. Nevertheless, findings regarding the comparative effectiveness of lecture-based and video-based learning methods remain inconsistent. Some studies concluded that educational videos were more effective in enhancing practical skills, while others found no substantial differences between the two methods [20], [21].

Despite the growing body of literature concerning BLS education, several research gaps remain evident. First, most previous studies focused on formal classroom settings or professional healthcare workers rather than student activity organizations such as the Scout Student Activity Unit (UKM Pramuka), whose members frequently participate in community and emergency-related activities [22]. Second, limited studies have directly compared lecture-based and educational video methods simultaneously in improving both BLS knowledge and practical skills among healthcare students with diverse educational backgrounds [23]. Third, evidence regarding the integration of complementary learning approaches to optimize emergency preparedness among students in Indonesian health institutions remains insufficient [24].

Based on these considerations, this study aims to analyze and compare the effectiveness of lecture-based and educational video methods in improving Basic Life Support knowledge and practical skills among members of the Scout Student Activity Unit at Poltekkes Kemenkes Surabaya. This research employed a quasi-experimental two-group pretest-posttest design to evaluate changes in students' cognitive and

psychomotor competencies following educational interventions. The contributions of this study are as follows:

1. Providing empirical evidence regarding the comparative effectiveness of lecture-based and educational video methods in improving BLS knowledge and practical skills among healthcare students.
2. Expanding current literature concerning emergency education strategies within student activity organizations, particularly UKM Pramuka.
3. Offering practical recommendations for integrating complementary educational methods to enhance emergency preparedness and professional competency among healthcare students.

This paper is organized as follows: Section II discusses related literature and theoretical foundations; Section III explains the research methodology; Section IV presents the findings and data analysis; and Section V provides conclusions, implications, limitations, and recommendations for future studies.

## II. METHOD

### A. STUDY DESIGN AND RATIONALE

This study employed a quantitative quasi-experimental design using a two-group pretest–posttest approach to evaluate and compare the effectiveness of lecture-based and educational video methods in improving Basic Life Support (BLS) knowledge and practical skills among students. This design was selected because it enables the assessment of changes in participants' cognitive and psychomotor competencies before and after educational interventions while facilitating comparison between two active intervention groups [25]. The use of a quasi-experimental approach was considered appropriate for educational research settings in which complete randomization and the inclusion of a non-intervention control group may be difficult to implement due to ethical and institutional considerations.

The two-group pretest–posttest design allows researchers to measure baseline equivalence between groups and identify changes attributable to the intervention. In this study, both groups received the same BLS content but through different educational methods, thereby enabling objective comparison of instructional effectiveness. Although the design does not provide strong evidence regarding long-term retention or causal relationships, it offers valuable preliminary evidence concerning the immediate impact of educational strategies on emergency preparedness among healthcare students [26].

### B. STUDY SETTING

The study was conducted at Poltekkes Kemenkes Surabaya, specifically in the Scout Student Activity Unit (UKM Pramuka) room located in the Health Human Resources Development Building (UPK SDM Kesehatan), Jalan Menur No. 118A, Surabaya. Data collection and intervention implementation were carried out on 11–12 November 2025.

The research setting was selected because UKM Pramuka members frequently participate in social, community, and emergency-related activities requiring basic emergency response competencies. Furthermore, the organization

consists of students from various departments and educational backgrounds, making it an appropriate setting for evaluating variations in BLS knowledge and skill acquisition among healthcare students.

### C. PARTICIPANTS AND SAMPLING METHOD

The target population consisted of all new members of the Scout Student Activity Unit (UKM Pramuka) at Poltekkes Kemenkes Surabaya during the 2025 academic year, totaling 30 students. Of these, 28 students met the eligibility criteria and agreed to participate in the study. Participants were equally allocated into two intervention groups: the lecture-based learning group and the educational video group, with 14 participants in each group.

The inclusion criteria included active students of Poltekkes Kemenkes Surabaya who were officially registered as UKM Pramuka members, willing to participate voluntarily by signing informed consent forms, and able to attend all stages of the intervention and assessment process. Exclusion criteria included students with physical limitations or health conditions preventing active participation in practical BLS activities.

The sampling technique employed was simple random sampling. Randomization was conducted using a computerized random number generator to ensure equal opportunities for all eligible participants to be selected. Following sample selection, participants were randomly assigned into intervention groups using a lottery method to minimize selection bias and maintain comparability between groups [27]. This procedure was implemented to enhance the internal validity of the study and reduce the influence of confounding variables.

### D. MATERIALS AND EDUCATIONAL INTERVENTION

Two instructional methods were utilized in this study, namely lecture-based learning and educational video-based learning. Both interventions used identical BLS content to ensure comparability of educational outcomes between groups.

The lecture-based group received face-to-face instruction delivered by the research team using PowerPoint presentation slides and a structured teaching script. The lecture sessions included explanations regarding recognition of cardiac arrest, emergency response activation, chest compression techniques, rescue breathing, and cardiopulmonary resuscitation (CPR) procedures. To maintain consistency, all sessions were conducted by the same instructor.

The educational video group received BLS instruction through an audiovisual learning medium in the form of an official educational video developed by HIPGABI East Java. The video contained systematic demonstrations of BLS procedures, CPR techniques, and emergency response algorithms accompanied by narration and visual guidance. Written permission for the use of the video was obtained prior to implementation.

The educational materials used in both groups were adapted from the *Basic Life Support for Trained Laypersons 2025* curriculum developed by Dian Rahmadin Akbar from HIPGABI East Java and aligned with the American Heart

Association (AHA) BLS guidelines [28]. Blinding procedures were not feasible due to the visible differences between instructional methods.

### E. DATA COLLECTION INSTRUMENTS AND PROCEDURE

Data collection instruments consisted of knowledge questionnaires and practical skills observation sheets. The knowledge questionnaire was administered as both pretest and posttest and consisted of multiple-choice questions evaluating participants' understanding of BLS concepts, emergency response procedures, CPR sequences, and victim assessment. The questionnaire underwent validity and reliability testing prior to implementation. Content validity was evaluated by three experts in emergency nursing and nursing education, while reliability testing demonstrated a Cronbach's alpha coefficient of  $\geq 0.70$ , indicating acceptable internal consistency [29].

Practical skills were evaluated using an observational checklist based on the AHA 2020 BLS algorithm and standardized operational procedures for CPR management. The checklist assessed participants' ability to perform critical BLS procedures, including scene safety assessment, victim responsiveness evaluation, chest compressions, airway management, rescue breathing, and activation of emergency services. Observers received prior training and calibration sessions to ensure consistency and inter-rater reliability during assessment.

The study procedure consisted of three phases: preparation, implementation, and completion. During the preparation phase, administrative approvals and ethical clearance were obtained, and all educational materials and research instruments were prepared. The implementation phase was conducted offline over two days. On the first day, the lecture group completed informed consent, pretest assessment, lecture intervention, posttest assessment, discussion session, and practical skills evaluation. On the second day, the educational video group underwent identical procedures, with the intervention delivered through educational video viewing. The completion phase involved verification of participant attendance, data completeness, and coding prior to statistical analysis.

### F. DATA ANALYSIS

The collected data were analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0. Data analysis consisted of univariate and bivariate analyses.

#### 1. UNIVARIATE ANALYSIS

Univariate analysis was performed to describe the characteristics of the respondents and summarize the distribution of variables included in the study. Descriptive statistical measures such as frequency, percentage, mean, and standard deviation were utilized to present demographic characteristics, internal risk factors, environmental conditions, and pretest-posttest TUG scores [30].

#### 2. BIVARIATE ANALYSIS

Data were processed and analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0. Descriptive statistics were used to summarize participant characteristics

and distributions of knowledge and practical skill scores before and after intervention.

Knowledge scores were categorized into three levels: good (76–100%), moderate (56–75%), and poor (<56%). Practical skill performance was categorized as competent when participants correctly performed at least 80% of the required BLS procedures and not competent when performance was below 80% [30].

Bivariate statistical analysis was performed to evaluate differences within and between groups. The Wilcoxon Signed Rank Test was used to assess changes in knowledge and practical skills before and after intervention within each group because the data were non-parametric and paired in nature. Meanwhile, the Mann–Whitney U Test was applied to compare the effectiveness of lecture-based and educational video methods between groups. Statistical significance was determined using a significance level of  $\alpha = 0.05$ . A p-value less than 0.05 indicated statistically significant differences.

### G. ETHICAL CONSIDERATIONS

This study received ethical approval from the Health Research Ethics Committee of Poltekkes Kemenkes Surabaya with approval number EA/4010/KEPK-Poltekkes\_Sby/V/2025. All procedures were conducted in accordance with ethical principles governing nursing and health research involving human participants [31].

Participants were informed regarding the objectives, procedures, benefits, and potential risks of the study before participation. Written informed consent was obtained from all respondents, and participation was entirely voluntary. Participants were also informed of their right to withdraw from the study at any stage without academic or personal consequences.

Confidentiality and anonymity were maintained by coding participant identities and presenting findings in aggregate form only. The educational interventions provided basic emergency education and did not replace formal certified BLS training programs. All practical sessions were supervised by trained instructors to ensure participant safety and adherence to standard operating procedures.

### III. RESULTS

This study was conducted at UKM Pramuka, Poltekkes Kemenkes Surabaya, on November 11–12, 2025, involving students who were active members of UKM Pramuka in the 2025–2026 academic year. UKM Pramuka actively supports the development of students' emergency preparedness through routine first aid, emergency response, and Basic Life Support (BLS) training, as well as participation in medical and disaster response activities.

According to the information in TABLE 1, In the video education group, most respondents were from the Midwifery Department (29%), with the most common ages being 19 and 20 years (43% each). Most respondents had never attended BLS training or seminars (64%), had not participated in any training within the past year (64%), and had no direct involvement in BLS actions (64%). Social media was the most common source of BLS information (36%), and half of the

**TABLE 1**  
Distribution by Characteristics Students at Poltekkes Kemenkes Surabaya

No	Characteristic	Criteria	Educational Video Method		Lecture Method	
			f	%	f	%
1.	Departement	Nursing	2	15	4	29
		Midwifery	4	29	1	7
		Environmental Health	3	21	2	15
		Medical Laboratory	1	7	2	15
		Technonologi Electromedical Engineering	3	21	3	21
		Dental and Oral Therapy	0	0	1	7
		Nutrition	1	7	1	7
		Total	14	100	14	100
		2.	Age	18 years	1	7
19 years	6			43	10	71
20 years	6			43	3	21
21 years	1			7	0	0
Total	14			100	14	100
3.	Experience of BLS Training or Seminar	Yes	5	36	8	57
		No	9	64	6	43
		Total	14	100	14	100
4.	Last Participation in training/seminar	Never	9	64	6	43
		<1 Year	4	29	5	36
		1-3 Years	1	7	2	15
		>3 Years	0	0	1	7
Total	14	100	14	100		
5.	Involvement in BLS	Yes	5	36	4	29
		No	9	64	10	71
		Total	14	100	14	100
6.	Source of information	Social Media	5	36	6	43
		Discussion with friends/family	4	29	2	14
		Books	2	14	1	7
		Newsa	3	21	3	21
		Television/Radio	0	0	1	7
		Others	0	0	1	7
Total	14	100	14	100		
7.	Exposure to BLS material	Never	7	50	2	14
		Rarely	5	36	10	71
		Often	2	14	2	14
Total	14	100	14	100		
8.	Family member or close friend working in health sector	Yes	8	57	8	57
		No	6	43	6	43
		Total	14	100	14	100
9.	Discussion of BLD Topics	Never	5	36	3	21
		Rarely	4	29	4	29
		Occasionally	2	14	5	36
		Often	3	21	2	14
Total	14	100	14	100		

respondents had never been exposed to BLS material (50%). More than half had family members or close friends working in the health sector (57%), and the largest proportion had never discussed BLS-related topics (36%).

In the lecture method group, most respondents were from the Nursing Department (29%) and were 19 years old (71%). The majority had never attended BLS training or seminars (43%), had not participated in training within the past year (43%), and were not directly involved in BLS actions (71%). Social media was the main source of BLS information (43%), with most respondents reporting rare exposure to BLS material (71%). More than half had family members or close friends working in the health sector (57%), and discussions about BLS most frequently occurred occasionally (36%).

**TABLE 2**

Knowledge	Before		After	
	f	%	f	%
Good	3	21	9	64
Moderate	7	50	4	29
Poor	4	29	1	7
<b>Total</b>	<b>14</b>	<b>100</b>	<b>14</b>	<b>100</b>
<i>Wilcoxon Signed Rank Test</i>	p = 0,001, (p < α = 0,05) Z = -3,305			

According to the information presented in **TABLE 2**, before receiving BLS education, half of the students were in the moderate category (50%). After the BLS educational intervention, a shift in the distribution of knowledge levels was observed, with the majority of students classified in the good category (64%).

The outcomes of the Wilcoxon Signed Rank Test indicated a p-value of 0.001 (p < 0.05) with a Z value of -3.305, indicating a statistically significant difference in students' knowledge levels before and after the BLS educational intervention using the video education method.

**TABLE 3**

Skill	Before		After	
	f	%	f	%
Competent	0	0	10	71
Incompetent	14	100	4	29
<b>Total</b>	<b>14</b>	<b>100</b>	<b>14</b>	<b>100</b>
<i>Wilcoxon Signed Rank Test</i>	p = 0,001, (p < α = 0,05) Z = -3,325			

According to the information presented in **TABLE 3**, showed a change in skills in Group Two before and after receiving health education through the educational video method at Poltekkes Kemenkes Surabaya. Before the education, all students (100%) were not competent in performing Basic Life Support (BLS) actions. After the education, most students (71%) reached the competent category.

The Wilcoxon Signed-Rank Test outcomes indicated a p-value of 0.001 (p < 0.05) with a Z-value of -3.325, showing a significant difference in students' skills before and after the BLS education intervention using the educational video method.

According to the information presented in **TABLE 4**, showed a shift in the understanding of Group One prior to and following health education delivered through lectures at Poltekkes Kemenkes Surabaya. Before the education, most

students (57%) had an adequate level of knowledge. After the education, almost all students (78.6%) reached the good knowledge category.

The Wilcoxon Signed-Rank Test results showed a p-value of 0.001 (p < α = 0.05) with a Z-value of -3.306, indicating a statistically significant difference in students' knowledge before and after the BLS education.

**TABLE 4**

Knowledge	Before		After	
	f	%	f	%
Good	2	15	11	78,6
Moderate	4	29	3	21
Poor	8	57	0	0
<b>Total</b>	<b>14</b>	<b>100</b>	<b>14</b>	<b>100</b>
<i>Wilcoxon Signed Rank Test</i>	p = 0,001, (p < α = 0,05) Z = -3,306			

**TABLE 5**

Skill	Before		After	
	f	%	f	%
Competent	0	0	9	64
Incompetent	14	100	5	36
<b>Total</b>	<b>14</b>	<b>100</b>	<b>14</b>	<b>100</b>
<i>Wilcoxon Signed Rank Test</i>	p = 0,001, (p < α = 0,05) Z = -3,334			

According to the findings presented in **TABLE 5**, showed a change in skills in Group One before and after receiving health education utilizing the lecture method at Poltekkes Kemenkes Surabaya. Before the education, all students (100%) were not competent in performing Basic Life Support (BLS) actions. After the education, most students (64%) reached the competent category.

The Wilcoxon Signed-Rank Test results indicated a p-value of 0.001 (p < α = 0.05) with a Z-value of -3.334, indicating a statistically significant difference in students' skills before and after the BLS education.

**TABLE 6**

Groups	N	Mean Rank	Sum of Rank	Z	Asymp. Sig. (2-tailed)
Educational Video Method	14	13,14	184	-0,881	0,378
Lecture Method	14	15,86	222		

**TABLE 7**

Groups	N	Mean Rank	Sum of Rank	Z	Asymp. Sig. (2-tailed)
Educational Video Method	14	15,14	212	-0,501	0,617
Lecture Method	14	13,86	194		

According to the information presented in **TABLE 6**, based on the Mann-Whitney U Test outcomes on students' knowledge regarding the BLS education intervention, there was no significant difference in knowledge between the group

that received education via the educational video method and the group that received education via the lecture method. The statistical test outcomes showed a Z-value of  $-0.881$  with an Asymp. Sig. (2-tailed) =  $0.378$ . Given that this p-value exceeds  $0.05$ , we accept the null hypothesis ( $H_0$ ). This shows no meaningful statistical difference in students' knowledge among the groups receiving BLS education using the educational video method and the lecture method.

According to the information offered in TABLE 7, based on the Mann-Whitney U Test outcomes on students' skills regarding the BLS education intervention, there was no real difference in talents among the group that received education via the educational video method and the group that received education via the lecture method. The statistical test outcomes showed a Z-value of  $-0.501$  with an Asymp. Sig. (2-tailed) =  $0.617$ . Since this significance value is greater than  $0.05$ , the null hypothesis ( $H_0$ ) is accepted. Therefore, there is no statistically significant difference in students' skills between the groups receiving BLS education using the educational video method and the lecture method.

#### IV. DISCUSSION

This study aimed to evaluate and compare the effectiveness of video-based education and lecture methods in improving Basic Life Support (BLS) knowledge and practical skills among health students. The findings demonstrated that both educational methods significantly improved students' cognitive understanding and psychomotor competence regarding BLS procedures. Before the intervention, most participants had low to moderate knowledge and inadequate practical competence, indicating limited readiness to respond appropriately during emergency situations. After receiving both interventions, students showed statistically significant improvements in knowledge and skills. These findings indicate that educational strategies play an important role in developing emergency preparedness and first-response competence among health students.

Before receiving BLS education through video media, most participants demonstrated low to moderate levels of knowledge. This condition reflects inadequate initial readiness and limited exposure to emergency response concepts, especially among students who had never participated in previous BLS training. Following the intervention, a statistically significant increase in knowledge was identified, with the majority of participants achieving good knowledge levels ( $p = 0.001$ ;  $Z = -3.305$ ). This result indicates that instructional video media effectively facilitate students' understanding of BLS concepts and procedures. The integration of visual and auditory information within educational videos likely strengthened information processing and memory retention. According to Dual Coding Theory and the Cognitive Theory of Multimedia Learning, learners process verbal and visual information through separate but interconnected cognitive channels, thereby improving comprehension and long-term retention [32], [33]. Through realistic demonstrations, animations, narration, and sequential explanations, students were able to observe and mentally rehearse emergency procedures more effectively than through text-based learning alone.

The findings are consistent with previous studies reporting that video-assisted learning significantly improves emergency knowledge acquisition among healthcare students. Umami et al. [34] demonstrated that audiovisual learning media enhanced students' understanding of cardiopulmonary resuscitation concepts and increased confidence in emergency response. Similarly, Yosfiah et al. [35] found that video-based simulation learning improved both comprehension and readiness to perform first aid procedures. Video education provides opportunities for repeated observation, enabling learners to revisit procedural steps and reinforce memory independently. This repetitive exposure strengthens cognitive encoding and contributes to more durable learning outcomes. Furthermore, educational videos tend to increase learner engagement and motivation because students perceive audiovisual media as more interactive and easier to understand than conventional instruction methods [36].

In addition to improving theoretical understanding, video-based education also significantly enhanced students' practical BLS skills. Prior to intervention, most participants were categorized as not competent in performing BLS procedures, indicating insufficient psychomotor preparation and lack of procedural familiarity. After receiving video education, the majority achieved competency ( $p = 0.001$ ;  $Z = 3.325$ ). The effectiveness of video education in improving practical skills may be attributed to its ability to demonstrate movements, hand positioning, compression techniques, and procedural sequences in a realistic and structured manner. Observational learning theory explains that learners acquire skills by observing models, imitating demonstrated actions, and practicing repeatedly [37]. Educational videos support this process by allowing students to visualize correct techniques before attempting them independently.

These findings are supported by Edgar Dale's Cone of Experience, which emphasizes that direct and audiovisual experiences facilitate deeper understanding and retention compared with passive verbal instruction [38]. The realistic visualization provided by educational videos likely enhanced students' psychomotor learning by combining observation with guided practice. Similar results were reported by Sari et al. [39], who concluded that simulation videos significantly improved CPR performance among nursing students. Video-based learning also provides flexibility because learners can review procedural demonstrations multiple times according to individual learning pace, which may strengthen confidence and procedural accuracy. Consequently, video-assisted instruction appears particularly beneficial for emergency skill acquisition requiring coordinated psychomotor performance.

The lecture intervention likewise produced a significant improvement in BLS knowledge. Before receiving lectures, most participants demonstrated only sufficient knowledge, suggesting limited cognitive readiness and incomplete understanding of BLS concepts. After the intervention, the majority achieved good knowledge levels ( $p = 0.001$ ;  $Z = 3.306$ ). This finding indicates that lectures remain effective for delivering structured theoretical information and clarifying essential emergency concepts. Through direct explanation and interaction with instructors, students were able to organize

information systematically and ask questions regarding unclear concepts. Lecture methods are especially effective in transferring factual and procedural knowledge when delivered clearly and supported by educational materials [40].

The findings align with previous studies indicating that lectures can significantly improve health-related knowledge among students and community participants. According to health education theory, verbal explanation remains an important strategy for strengthening cognitive learning domains, especially when learners possess sufficient baseline readiness and educational background [41]. Lectures also enable educators to emphasize critical aspects of BLS algorithms, indications for cardiopulmonary resuscitation, and emergency decision-making processes. Although lectures may not provide direct procedural visualization comparable to videos, they contribute substantially to conceptual understanding and theoretical preparedness.

Regarding psychomotor skills, lecture-based education also significantly improved students' competence ( $p = 0.001$ ;  $Z = -3.334$ ), although the improvements were slightly less pronounced compared with video education. Before intervention, most students lacked adequate psychomotor ability due to limited practical exposure and insufficient procedural experience. Following lectures, many participants demonstrated improved competency, particularly those with prior BLS training or previous exposure to emergency situations. Nevertheless, the absence of detailed visual demonstrations and repeated procedural observation likely limited the extent of psychomotor improvement. Bloom's psychomotor learning theory emphasizes that skill mastery requires repetitive practice, direct observation, imitation, and guided experience [42]. Consequently, lectures alone may be insufficient for achieving optimal procedural competence without complementary demonstrations or simulations.

The comparative analysis between video education and lecture methods revealed no statistically significant difference in improving students' BLS knowledge ( $p = 0.378$ ;  $p > 0.05$ ). Although lecture methods demonstrated a slightly higher mean rank, the difference was not substantial enough to indicate superiority. This finding suggests that both methods are similarly effective in enhancing theoretical understanding when appropriately implemented. Previous studies similarly reported that educational effectiveness depends not solely on instructional media but also on learner characteristics, learning environment, prior knowledge, and teaching quality [43], [44]. Students from healthcare-related educational backgrounds may already possess foundational emergency knowledge, allowing both interventions to produce comparable cognitive outcomes. Additionally, factors such as intervention duration, participant motivation, and previous training exposure likely influenced the absence of significant differences.

Similarly, no statistically significant difference was observed between video education and lecture methods regarding practical BLS skills ( $p = 0.617$ ;  $p > 0.05$ ), although video-based education showed a slightly higher mean rank. These findings indicate that both interventions can improve psychomotor competence when accompanied by practice opportunities and adequate instruction. Nevertheless, video

education may provide additional advantages by facilitating repeated observation and realistic procedural visualization. According to multimedia learning principles, combining verbal explanations with visual demonstrations enhances procedural understanding and supports psychomotor acquisition more effectively than verbal instruction alone [33]. Therefore, integrating lectures with educational videos may represent the most effective strategy for simultaneously strengthening cognitive understanding and practical competence.

Several limitations should be considered when interpreting the findings of this study. First, the relatively small sample size limits the generalizability of the results to broader populations. Participants originated from specific educational settings and may not fully represent all healthcare students or community members. Second, differences in prior BLS exposure, educational background, and practical experience among participants may have influenced learning outcomes despite attempts to standardize interventions. Third, the short duration of intervention and immediate post-test evaluation restricted the assessment of long-term knowledge retention and skill sustainability. Psychomotor competencies, particularly emergency response skills, require continuous reinforcement and repeated practice to maintain proficiency over time [45]. Future studies should incorporate longitudinal follow-up assessments to evaluate retention and behavioral application of BLS competencies.

Despite these limitations, the findings carry important practical implications for nursing and health education. Effective BLS education is essential not only for healthcare professionals but also for students and community members who may become first responders during emergencies. The significant improvement observed following both interventions demonstrates that educational strategies can successfully enhance emergency preparedness among nursing and health students. Nursing students, in particular, can serve as educators and health promoters within the community by disseminating BLS knowledge and training to families, schools, health volunteers, and the general public. Strengthening community capacity in emergency response may increase survival rates during cardiac arrest and respiratory emergencies before professional medical assistance becomes available [46].

The findings further emphasize the importance of integrating multimedia learning strategies into emergency care education curricula. Educational institutions should consider combining lectures, instructional videos, demonstrations, simulations, and hands-on practice to optimize learning outcomes. Videos can provide realistic procedural visualization, while lectures facilitate conceptual clarification and structured discussion. The combination of multiple educational methods aligns with learner-centered educational approaches that accommodate diverse learning preferences and cognitive needs [47]. In addition, providing continuous refresher training and periodic competency evaluations is essential to maintain long-term BLS proficiency among healthcare students and community responders.

Overall, this study contributes valuable evidence regarding the effectiveness of video-based and lecture-based BLS education in improving knowledge and practical skills among health students. Both methods significantly enhanced cognitive and psychomotor competencies, although video education demonstrated a slight advantage in procedural learning. Future studies should explore long-term retention, integration of simulation-based training, and broader participant populations to strengthen evidence regarding optimal BLS educational strategies. Continuous development of accessible, engaging, and evidence-based BLS training programs remains essential to improve emergency preparedness, strengthen first-response capacity, and ultimately enhance patient safety and survival outcomes during critical situations.

## V. CONCLUSION

This study aimed to analyze and compare the effectiveness of lecture-based and video-based educational methods in improving Basic Life Support (BLS) knowledge and practical skills among students of Poltekkes Kemenkes Surabaya. The findings demonstrated that both methods significantly improved students' cognitive understanding and psychomotor competence regarding BLS procedures. In the video education group, the proportion of students with good knowledge increased from 21% before the intervention to 64% after the intervention, while competency in BLS skills improved from 0% to 71%. Statistical analysis showed a significant difference in knowledge ( $p = 0.001$ ;  $Z = -3.305$ ) and skills ( $p = 0.001$ ;  $Z = -3.325$ ) before and after the intervention. Similarly, in the lecture-based group, students with good knowledge increased from 15% to 78.6%, while competency in BLS skills improved from 0% to 64%. The Wilcoxon Signed Rank Test also demonstrated significant improvements in knowledge ( $p = 0.001$ ;  $Z = -3.306$ ) and practical skills ( $p = 0.001$ ;  $Z = -3.334$ ). However, the Mann-Whitney U Test indicated no statistically significant difference between the video and lecture methods in improving students' knowledge ( $p = 0.378$ ) or practical skills ( $p = 0.617$ ), suggesting that both methods were equally effective. Despite the absence of significant differences, video-based education showed a slight advantage in psychomotor skill acquisition due to its visual and procedural demonstrations, whereas lecture-based education was more beneficial for strengthening conceptual understanding and theoretical explanation. Therefore, integrating both methods is recommended to optimize learning outcomes in BLS education, particularly among healthcare students who require both cognitive mastery and practical competence in emergency response. Future studies are recommended to involve larger and more diverse samples, utilize randomized controlled designs, and evaluate long-term retention of knowledge and skills.

## ACKNOWLEDGEMENTS

The authors would like to express their sincere gratitude to the Director of Poltekkes Kemenkes Surabaya, the lecturers of the Applied Bachelor of Nursing Program, and the Pramuka Student Activity Unit (UKM Pramuka) for their support,

guidance, and facilitation throughout this study. The authors also appreciate all student participants who willingly contributed their time, cooperation, and active participation during the research process. Their valuable support greatly contributed to the successful completion of this study.

## FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

## DATA AVAILABILITY

No datasets were generated or analyzed during the current study.

## AUTHOR CONTRIBUTION

Titani Setyo Anggarnis conceptualized and designed the study, conducted data collection and statistical analysis, interpreted the findings, and drafted the manuscript. Sari Luthfiyah contributed to the study supervision, methodological development, and critical revision of the manuscript. Nikmatul Fadilah participated in data interpretation, literature review, language editing, and manuscript refinement. Endah Suprihatin provided academic supervision, contributed to the interpretation of the results, and reviewed the final manuscript critically for important intellectual content. All authors read, approved, and agreed to be accountable for the final version of the manuscript and ensured the integrity and accuracy of the work.

## DECLARATIONS

### ETHICAL APPROVAL

This study received ethical approval from the Health Research Ethics Committee of Poltekkes Kemenkes Surabaya with approval number EA/4010/KEPK-Poltekkes\_Sby/V/2025. The study was conducted in accordance with established ethical principles for research involving human participants. All participants provided informed consent prior to participation and were informed about the study objectives, procedures, potential benefits, and their right to withdraw from the study at any time without consequences. Participant confidentiality and anonymity were maintained throughout the research process.

### CONSENT FOR PUBLICATION PARTICIPANTS.

Consent for publication was given by all participants

### COMPETING INTERESTS

The authors declare no competing interests.

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