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Empowering adolescents in school settings: Basic life support and choking education

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ABSTRACT

Previous studies have highlighted the importance of emergency preparedness in school settings. However, evidence on structured basic life support (BLS) and choking education among adolescents in rural and semi-rural areas remains limited, indicating a critical gap that this study addresses. This study aimed to improve the knowledge of junior high school students regarding basic life support and choking management at SMPN 4 Manggarabombang, Indonesia. A participatory educational intervention was implemented using an interactive lecture approach covering core concepts of BLS and choking management, followed by question-and-answer sessions and practical simulations to reinforce students' understanding. The program involved 30 students, consisting of 8 males (26.7%) and 22 females (73.3%), predominantly aged 12–13 years. Knowledge levels were assessed using pre-test and post-test instruments. The results demonstrated a clear improvement in students' knowledge following the intervention, with the mean pre-test score increasing from 5.03 to 6.87 in the post-test, representing an improvement of 1.84 points or 36.5%. The educational activity was well received by both students and school authorities, indicating high acceptability and feasibility of the program. These findings indicate that school-based BLS and choking education effectively improves adolescents' emergency response knowledge while fostering preparedness and social responsibility through collaboration between universities, schools, and communities.

ABSTRAK

Berbagai studi menunjukkan bahwa kegawatdaruratan dapat terjadi kapan saja di lingkungan sekolah, namun pengetahuan dan kesiapsiagaan siswa dalam melakukan Bantuan Hidup Dasar (BHD) dan penanganan choking masih terbatas, terutama di wilayah rural dan semi-rural, sehingga diperlukan intervensi edukatif yang terstruktur. Kegiatan ini bertujuan untuk meningkatkan pengetahuan siswa sekolah menengah pertama tentang Bantuan Hidup Dasar dan penanganan tersedak (choking) sebagai upaya penguatan kesiapsiagaan kegawatdaruratan di lingkungan sekolah. Intervensi dilaksanakan di SMPN 4 Manggarabombang menggunakan pendekatan edukatif partisipatif melalui ceramah interaktif yang membahas konsep dasar BHD dan penanganan choking, dilengkapi dengan sesi tanya jawab serta simulasi praktik untuk memperkuat pemahaman siswa. Kegiatan diikuti oleh 30 siswa yang terdiri dari 8 siswa laki-laki (26,7%) dan 22 siswa perempuan (73,3%), dengan mayoritas berusia 12–13 tahun. Evaluasi dilakukan menggunakan pre-test dan post-test untuk menilai perubahan tingkat pengetahuan peserta. Hasil menunjukkan adanya peningkatan pengetahuan yang signifikan setelah kegiatan edukasi, ditandai dengan peningkatan nilai rata-rata dari 5,03 pada pre-test menjadi 6,87 pada post-test, atau mengalami kenaikan sebesar 1,84 poin (36,5%). Temuan ini menunjukkan bahwa pendidikan BLS dan penanganan tersedak berbasis sekolah efektif meningkatkan pengetahuan respons darurat remaja serta menumbuhkan budaya kesiapsiagaan dan tanggung jawab sosial melalui kolaborasi perguruan tinggi, sekolah, dan masyarakat.

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INTRODUCTION

Emergency conditions may arise unexpectedly in school environments, where children and adolescents spend a significant proportion of their daily activities (Mulyanis et al., 2022a). School-age children are particularly vulnerable to injuries and sudden medical incidents that require immediate and appropriate first aid before professional medical assistance becomes available. The World Health Organization reports that approximately 20% of injury-related deaths among children aged 10–14 years in developing countries are associated with delays in initial emergency management (WHO, 2023; Purqan et al., 2023). One of the most frequent emergencies occurring in schools is choking, which often happens during eating or playing activities and can rapidly lead to airway obstruction, respiratory failure, and death if not promptly and correctly managed (Sudiana et al., 2024; Sulistyanto et al., 2025).

Despite the high burden and largely preventable nature of these emergencies, knowledge and skills related to Basic Life Support (BLS), including choking management and cardiopulmonary resuscitation (CPR), remain limited among students and educators (Amila et al., 2023; Rondhianto et al., 2023). In Indonesia, only about 15% of the population is reported to have adequate first-aid knowledge, with adolescents among the least prepared groups (Kemenkes RI, 2022). Globally, survival following out-of-hospital cardiac arrest (OHCA) remains low, at around 10%, and is strongly influenced by early recognition and bystander BLS actions (Kojima et al., 2020; Scapigliati et al., 2021; Birkun et al., 2022). These conditions highlight the urgent need to strengthen emergency preparedness in schools by empowering adolescents through structured basic life support and choking education as a public health priority.

The primary research problem addressed in this study is the persistent gap between the high risk of life-threatening emergencies in school settings and the low competence of adolescents in BLS and choking management, particularly in rural areas with limited access to healthcare services (Kemenkes, 2018; Munot et al., 2022). Delays in providing appropriate first aid during choking or cardiac arrest substantially reduce survival chances, while reliance solely on external medical services is often inadequate in geographically remote contexts (Scapigliati et al., 2021; Yasir, 2024). The literature consistently proposes the integration of school-based, practice-oriented BLS education as a general solution to equip adolescents with essential life-saving skills and enable them to act as immediate responders (Park et al., 2020; WHO, 2023).

Scientific evidence increasingly supports the effectiveness of adolescent-focused and school-based BLS interventions. Peer-led and youth-involved educational models enhance engagement, skill retention, and willingness to intervene by leveraging adolescents' social networks (Banyard et al., 2022). Learning-by-teaching approaches and student leadership in emergency education have also been shown to improve both cognitive understanding and psychomotor performance in CPR and choking management (Courville et al., 2021).

Moreover, policy-supported school CPR initiatives and integration with local emergency medical services are associated with higher bystander CPR rates and shorter time to first intervention (Park et al., 2020; Jönsson et al., 2023). International programs such as Kids Save Lives demonstrate sustained improvements in knowledge, attitudes, and practical skills among secondary school students, confirming the feasibility and scalability of early BLS education (Parisis et al., 2022). Complementary strategies, including blended learning, digital tools, and periodic retraining, further strengthen the effectiveness and sustainability of school-based BLS programs (Gezer et al., 2023).

Although global and regional studies provide strong evidence supporting school-based BLS education, gaps remain in context-specific implementation, particularly in rural and resource-limited settings. Pediatric OHCA and choking epidemiology are still undercharacterized in many low- and middle-income countries, limiting data-driven policy and tailored intervention design (Morgan et al., 2021; Pireddu et al., 2024). Moreover, while international guidelines from the WHO, American Heart Association, and European Resuscitation Council advocate for CPR education in schools, variations in educational delivery, cultural adaptation, and practical skill emphasis persist (Bokan & Fišer, 2021; Donoghue et al., 2025).

In Indonesia, evidence on structured, practice-based BLS and choking education targeting early adolescents, particularly in rural schools distant from primary healthcare services, remains limited. Schools such as SMP Negeri 4 Mangarabombang in Takalar Regency represent contexts where immediate first aid capacity among students could critically influence emergency outcomes (Kemenkes, 2018; Lontoh et al., 2013). The novelty of this study lies in its focus on empowering adolescents in school settings through comprehensive basic life support and choking education tailored to a rural context. Accordingly, the objective of this study is to evaluate the effectiveness of a structured, practice-based BLS and choking education program in improving knowledge, skills, and emergency response readiness among junior high school students, contributing evidence to support scalable school-based emergency preparedness interventions.

METHODS

This community service activity employed a participatory educational method designed to provide interactive, practical, and engaging learning experiences for students. The approach integrated interactive lectures, group discussions, question-and-answer sessions, and hands-on simulation practices to enhance students' understanding and skills related to emergency management. The activity was implemented through three main stages: preparation, implementation, and evaluation.

The preparation stage involved initial coordination and planning conducted by the community service team consisting of doctoral students from the Public Health Sciences Program, Universitas Hasanuddin. During this stage, the team held planning meetings to determine the theme of the activity, target participants, implementation schedule, and task distribution among team members. Administrative arrangements and official permissions were obtained by submitting a formal request to the principal of SMP Negeri 4 Mangarabombang and the Takalar Regency Education Office. After approval, the team developed educational materials and media, including learning modules, leaflets, presentation slides, short demonstration videos on Basic Life Support (BLS) and the Heimlich maneuver, and training manikins for simulation exercises (See Figure 1). Coordination with the school was also carried out to conduct a site survey and to define the roles of the community service team, accompanying teachers, and student participants.

The implementation stage was conducted on Saturday, 1 November 2025, at SMP Negeri 4 Mangarabombang, Takalar Regency. A total of 30 students from grades VII and VIII participated in the activity. Prior to the educational session, participants completed a pre-test questionnaire to assess their baseline knowledge of Basic Life Support and choking management. An ice-breaking session was then conducted to create an interactive learning atmosphere and increase student engagement. Educational leaflets on emergency response and choking management were distributed to all participants. The material was delivered interactively using simple and age-appropriate language, supported by visual illustrations and short demonstration videos. The content focused on three main topics: (1) basic concepts of emergencies in school settings, (2) recognition and management of choking, and (3) fundamental principles of Basic Life Support. Following the theoretical session, students participated in practical simulations using manikins to reinforce their understanding and skills. Consistent with the participatory approach, students were encouraged to ask questions and engage in discussions throughout the session. At the end of the activity, participants completed a post-test using the same instrument as the pre-test to measure changes in knowledge levels.

The evaluation stage aimed to assess the effectiveness of the educational intervention in improving students' knowledge of Basic Life Support and choking management. Evaluation was conducted by comparing pre-test and post-test results using an instrument consisting of 12 identical multiple-choice questions administered before and after the intervention. The collected data were analyzed descriptively to determine changes in knowledge levels and to quantify the improvement achieved through the educational activity. Informed consent was obtained from the school authorities and participants prior to the activity, and all procedures were conducted in accordance with ethical principles of community-based educational interventions.

Figure 1
Presentation of Material

RESULTS AND DISCUSSION

Respondent characteristics and baseline knowledge

The results demonstrate that the majority of participants were female (73.3%), aged 12–15 years, and predominantly enrolled in grade VII (83.3%) (See Table 1). These demographic characteristics are relevant because early adolescents are at a developmental stage where cognitive capacity and social awareness are rapidly evolving, making them receptive to structured health education interventions. Baseline knowledge assessment indicated that students already had a relatively good understanding of general emergency concepts, such as the purpose of first aid in emergencies (86.7% correct), the definition of basic life support (BLS) (76.7% correct), and the importance of ensuring scene safety (76.7% correct) (See Table 2). However, substantial gaps were identified in more technical competencies, including the correct location and frequency of chest compressions (23.3% correct each), abdominal thrust procedures (20%), and the first action when encountering a choking victim unable to breathe (6.7%). These findings highlight uneven prior knowledge, with conceptual understanding exceeding procedural competence.

Table 1
Respondent characteristics

Characteristics	Total (N=30)	Percentage (%)
Sex		
Male	8	26.7
Female	22	73.3
Age Category (Years)		
12	11	36.7
13	12	40
14	6	20
15	1	3.3
Class		
7th	25	83.3
8th	5	16.7

Table 2
Pretest and posttest results

Questions	Pre-test				Post-Test			
	True		False		True		False	
	n	%	n	%	n	%	n	%
The purpose of first aid in emergencies	26	86.7	4	13.3	29	96.7	1	3.3
Definition of basic life support	23	76.7	7	23.3	28	93.3	2	6.7
Ensuring safety before providing first aid	23	76.7	7	23.3	27	90	3	10
Eligible providers of basic life support	12	40	18	60	21	70	9	30
Conditions requiring basic life support	13	43.3	17	56.7	23	76.7	7	23.3
Correct location for chest compressions	7	23.3	23	76.7	14	46.7	16	53.3
Recommended rate of chest compressions	7	23.3	23	76.7	11	36.7	19	63.3
Recovery position after regaining consciousness	11	36.7	19	63.3	11	36.7	19	63.3
Cnditions to stop chest compressions	10	33.3	20	66.7	13	43.3	17	56.7
Causes of choking	14	46.7	16	53.3	20	66.7	10	33.3
Procedure for performing abdominal thrust	6	20	24	80	10	33.3	20	66.7
First action for a choking victim unable to breathe	2	6.7	28	93.3	4	13.3	26	86.7

The pattern observed aligns with previous studies indicating that adolescents often possess general awareness of emergency care but lack accurate procedural knowledge required for effective intervention (Mulyanis et al., 2022; Rondhianto et al., 2023). Similar school-based BLS education programs have reported low baseline scores in chest compression techniques and choking management, particularly in the absence of prior hands-on training. Compared with earlier studies that relied solely on lectures, the participatory educational approach used in this program, combining interactive lectures, discussion, and simulation, appears to offer an advantage by addressing both cognitive and psychomotor domains. This approach is consistent with evidence suggesting that active learning strategies significantly enhance retention and skill acquisition among adolescents.

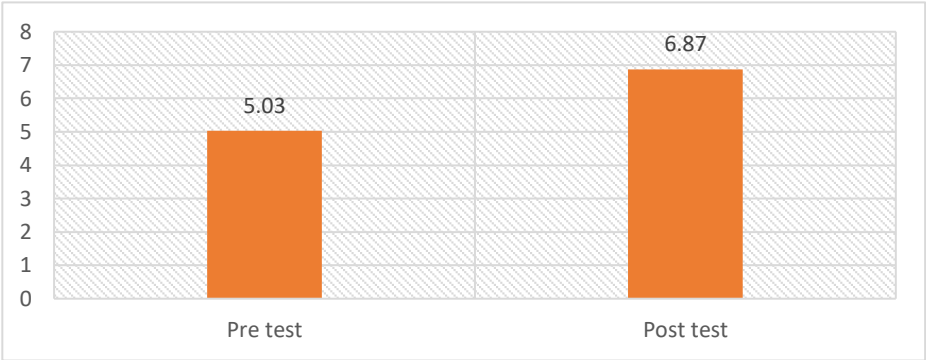
The identification of critical knowledge gaps prior to the intervention underscores the vulnerability of school environments to emergency situations when students are unprepared. Addressing these gaps is essential for improving immediate bystander response and potentially reducing morbidity and mortality associated with choking and sudden cardiac events. The findings support the integration of structured BLS education into school health programs, particularly in rural or semi-rural settings where access to immediate medical assistance may be limited.

Effectiveness of the educational intervention

Post-intervention evaluation demonstrated a marked improvement in students' knowledge across most items. The highest gains were observed in questions related to the objectives of first aid in emergencies, the fact that BLS can be performed by anyone, and the recognition of conditions requiring BLS. Overall, the mean knowledge score increased from 5.03 in the pre-test to 6.87 in the post-test, representing an absolute increase of 1.84 points or 36.5% (see Figure 2). This improvement indicates that the educational intervention was effective in enhancing students' understanding of BLS and choking management.

The magnitude of knowledge improvement observed in this study is comparable to, and in some cases exceeds, outcomes reported in similar adolescent-focused BLS education programs (Rondhianto et al., 2023). The added value of the current program lies in its contextualization within the school setting and its emphasis on simulation-based reinforcement, which helps translate theoretical knowledge into practical readiness. Unlike top-down health promotion models, this participatory approach positions students as active learners and potential first responders, thereby strengthening the sustainability of knowledge transfer.

Figure 2
Pre- and Post-Test Analysis Results



From a scientific perspective, these findings contribute to the growing evidence that early adolescent health education can significantly improve emergency preparedness. Practically, the results suggest that even short, well-designed educational activities can yield meaningful improvements in knowledge. This has important implications for scaling similar interventions in schools, particularly in rural areas where emergency response times may be prolonged.

implications for adolescent development

Beyond knowledge gains, the program demonstrated broader implications for adolescent development. Participation in BLS and choking management education encouraged students to develop empathy, social responsibility, and concern for the safety of others. These outcomes align with psychosocial developmental theories that emphasize the formation of identity and social values during adolescence (Mulyanis et al., 2022).

Consistent with empowerment-based health education models, this program supports the role of adolescents as agents of change within their schools and communities. Previous studies have shown that youth empowerment through life-skill education is more effective than directive approaches, as it fosters ownership, confidence, and peer-to-peer dissemination of knowledge (Rondhianto et al., 2023). The present findings reinforce this perspective by demonstrating both cognitive and social benefits.

The integration of BLS and choking education into school-based programs has the potential to build a culture of preparedness and mutual care. By equipping adolescents with essential life-saving skills, schools can contribute to the development of resilient communities capable of responding effectively to emergencies. Furthermore, such programs strengthen collaboration between educational institutions, higher education, and the community, thereby supporting sustainable public health interventions in school settings.

CONCLUSION

The emergency education program on basic life support and choking management at SMPN 4 Mangarabombang, Takalar Regency, was successfully implemented and received positive responses from both students and school stakeholders. The findings demonstrate that the participatory educational approach, integrating theoretical instruction with practical simulation, was effective in improving students' knowledge of emergency and choking management, as evidenced by a 36.5% increase in mean knowledge scores. This confirms that structured, school-based emergency education can significantly enhance adolescents' preparedness to respond to life-threatening situations. Beyond technical competence, the program contributed to adolescent character development by fostering empathy, social responsibility, and awareness of personal and collective safety. These outcomes highlight the broader value of emergency education as a life-skill intervention that supports psychosocial development while strengthening a culture of preparedness within the school environment. The study underscores the importance of introducing emergency response education at an early age to build resilient and health-literate communities.

Sustained support from schools and continued collaboration with higher education institutions are essential to expand and maintain the positive impact of such programs. Future development should focus on integrating basic life support and choking management into the school curriculum, providing advanced training for selected students as school-based first aid cadres, and developing accessible educational modules for students and teachers. Although this study was limited by its short intervention period and focus on knowledge outcomes, future research should assess long-term skill retention and behavioral readiness to further strengthen evidence for scalable school-based emergency education programs.

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AUTHORS' CONTRIBUTION

Aminuddin Syam contributed to program design and provided methodological guidance. Indra Fajarwati Ibnu conceptualized the community service program, coordinated implementation activities, supervised data collection, and led the preparation and revision of the manuscript. Fitria Hasanuddin and Andi Nur Anna were responsible for field implementation and participant engagement. Ernawati Ernawati, Firawati Firawati, and Mantasia Mantasia contributed to educational material development, data documentation, and technical support during program execution. All authors reviewed and approved the final manuscript.

COMPETING INTEREST

The author(s) declare no potential conflict of interest with respect to the research, authorship, or publication

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