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Original Article

Knowledge, attitude and practice of Basic Life Support among medical students in a tertiary care teaching hospital in Western Assam

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ABSTRACT

Background: Basic Life Support (BLS) is an essential lifesaving skill for medical students, requiring adequate knowledge, positive attitude and practical competence.
Objectives: To assess knowledge, attitude and practice regarding BLS among undergraduate medical students in a tertiary care teaching hospital in Western Assam and to determine factors associated with BLS knowledge.
Methods: A descriptive cross-sectional study was conducted among 150 Phase II and Phase III MBBS students using a structured questionnaire. Knowledge was assessed using 10 items and categorized as poor, moderate or good. Data were summarized using descriptive statistics, and associations were tested using the Mann–Whitney U test.
Results: The mean age of participants was 22.05 ± 1.45 years; 60.0% were males and 84.0% had previous BLS training. The mean knowledge score was 7.17 ± 2.15. Good knowledge was observed in 54.7% of students, while 34.7% had moderate and 10.7% had poor knowledge. Lower correct responses were noted for the correct BLS sequence and early AED use. Most students supported mandatory BLS training in the MBBS curriculum. Although 77.3% had practiced BLS on a manikin or in simulation, only 2.7% had performed CPR on a patient. Knowledge scores were significantly higher among Phase III students, those with previous BLS training and those with manikin/simulation-based practice.
Conclusion: Medical students had satisfactory overall BLS knowledge and favourable attitude, but gaps remained in BLS sequence, AED use and real-life CPR exposure. Regular simulation-based BLS training and refresher sessions should be incorporated into the undergraduate curriculum.

Keywords*: Basic Life Support; cardiopulmonary resuscitation; medical students; knowledge; attitude; practice.*

INTRODUCTION

Basic Life Support (BLS) is a basic emergency procedure that is used to maintain airway, breathing and circulation in a person who has cardiac arrest or a life-threatening cardiopulmonary emergency until higher levels of care can be provided. It involves early recognition of cardiac arrest, early activation of emergency response, initiation of high-quality cardiopulmonary resuscitation (CPR), and early use of an automated external defibrillator (AED), when available [1]. According to the current resuscitation guidelines, good BLS is dependent on the correct rate and depth of chest compressions, full chest recoil, minimal interruptions of compressions, and prompt defibrillation, all of which are important links in the chain of survival [1,2].

Cardiovascular diseases and sudden cardiac arrest continue to be major causes of morbidity and mortality worldwide. Prevention and control of cardiovascular diseases are still key global health issues, especially in low and middle-income countries where emergency response systems may be weak [3]. In such settings, the presence of trained first responders can play a crucial role in improving outcomes following cardiac arrest. The knowledge and skills of BLS are critical for

healthcare personnel and trainees because survival rates drop rapidly with delays in starting CPR and defibrillating the patient [1,2].

Medical students are future doctors and can face emergency situations in clinical postings, hospital work, internship and professional practice. Hence, they should have sufficient knowledge, positive attitude and practical skills in BLS. Nevertheless, research among medical and health science students has demonstrated that BLS knowledge and practice is often insufficient despite generally positive attitudes towards learning and performing CPR. Tadesse et al. found that graduating health science and medical students had variable knowledge, attitude and practice on BLS and the need for training exposure to enhance preparedness was highlighted [4].

The same has been observed in India. Aroor et al. noted that the awareness of BLS and EMS was poor among the students of a tertiary care hospital in South India, and there is a need for proper training in undergraduate students [5]. Chandran and Abraham also mentioned that there was lack of knowledge of BLS among young doctors in India and that BLS training was an immediate need in medical education and clinical practice [6].

There is also evidence from other countries that BLS should be integrated into medical training early and reinforced on a regular basis. In a cross-sectional survey of medical trainees in Uganda, Ssewante et al. found that BLS was seen as an essential component of the medical curriculum and the need for structured training to enhance knowledge and attitude was emphasized [7]. Al-Mohaissen discovered that health students at a Saudi women's university had poor BLS knowledge despite positive attitudes towards training, which reflects a gap between attitudes and skills [8]. Albadi et al. also found that medical students in Oman lacked knowledge and attitudes about BLS, which further indicated the need for repeated formal training [9].

BLS is not just a theoretical competency, it is also a psychomotor skill that must be practiced many times with hands-on experience. Students can practice the technique of chest compression, ventilation, the sequence of CPR and the use of an AED in a controlled environment using simulation-based training and manikin-based practice. It is also important to have refresher training regularly, as knowledge and skills of CPR may fade over time if not practiced [1,2]. Therefore, it is important to assess the knowledge, attitude and practice of medical students to identify the gaps and plan the interventions based on the curriculum.

With this background, the present study was undertaken to evaluate the knowledge, attitude and practice of Basic Life Support among undergraduate medical students of a tertiary care teaching hospital of western Assam. The study also examined the relationship between BLS knowledge score and selected variables including gender, phase of study, previous BLS training and manikin/simulation based practice as shown in the study results.

OBJECTIVES

General objective

To assess the knowledge, attitude and practice regarding Basic Life Support among undergraduate medical students in a tertiary care teaching hospital in Western Assam.

Specific objectives

The specific objectives were to assess the knowledge level of undergraduate medical students regarding Basic Life Support and to evaluate their attitude towards BLS training, its inclusion in the MBBS curriculum, and willingness to perform CPR during emergencies. The study also aimed to assess their practical exposure to BLS, including manikin/simulation-based practice, witnessing BLS during emergencies, and performing CPR on patients. In addition, the study sought to categorize the level of BLS knowledge and determine its association with selected variables such as gender, phase of study, previous BLS training and prior manikin/simulation-based practice.

MATERIALS AND METHODS

Study design and setting

A descriptive cross-sectional study was conducted among undergraduate medical students in Kokrajhar Medical College and Hospital to assess their knowledge, attitude and practice regarding Basic Life Support.

Study population

The study population comprised undergraduate medical students enrolled in Phase II and Phase III of the MBBS course at the study institution. These phases were selected because students at this level have clinical and/or preclinical exposure relevant to emergency care and basic resuscitation practices.

Sample size and sampling technique
A total of 150 undergraduate medical students participated in the study. Of these, 70 students were from Phase II and 80 students were from Phase III. Participants were selected by convenient sampling from among eligible students who were available during the data collection period and willing to participate in the study .

Eligibility criteria
Students enrolled in Phase II or Phase III MBBS at the study institution, present during the period of data collection, and willing to provide informed consent were included in the study.

Students who were absent during data collection, unwilling to participate, or submitted incomplete questionnaires were excluded. Interns, postgraduate trainees, nursing students and students from other allied health courses were also excluded.

Study tool
The data was gathered through a pre-designed and structured questionnaire that was developed through literature search and standard BLS guidelines. The questionnaire was designed to assess four domains: sociodemographic and training characteristics, knowledge regarding BLS, attitude towards BLS, and BLS-related practice.

The first section recorded age, gender, phase of study and history of previous BLS training. The knowledge section contained 10 items related to the basic knowledge of BLS such as full form of BLS, first step in BLS, correct BLS sequence, site of chest compression, recommended chest compression rate, recommended compression depth in adults and infants, compression–ventilation ratio, full form of AED, and early use of AED. The attitude section evaluated the opinion about compulsory BLS training during the MBBS course, regular BLS training in medical colleges, usefulness of simulation training, willingness to perform CPR in emergency situations, fear of causing harm and lack of training as a barrier. The practice section evaluated manikin/simulation-based practice, frequency of practice, witnessing BLS during an emergency, performing CPR on a patient and perceived benefit of regular BLS workshops.

Scoring and categorization
Each correct response in the knowledge section was awarded one mark, while incorrect responses were given zero. The total knowledge score therefore ranged from 0 to 10. Based on the total score, knowledge was categorized as poor, moderate or good.

Knowledge category	Score range
Poor knowledge	0–4
Moderate knowledge	5–7
Good knowledge	8–10

Attitude and practice items were analyzed descriptively and were not included in the knowledge score.

Data collection procedure
After obtaining necessary permission from the institutional authority, eligible students were approached and informed about the purpose of the study. Participation was voluntary, and informed consent was obtained before data collection. The questionnaire was distributed to participants and collected after completion. Students were instructed to answer independently. Confidentiality and anonymity of responses were maintained throughout the study.

Study variables
The primary outcome variable was the knowledge score regarding Basic Life Support. Independent variables included gender, phase of study, previous BLS training and prior manikin/simulation-based practice. Other variables included age, attitude towards BLS training and practice-related exposure.

Statistical analysis
Data were entered in a spreadsheet and analysed using suitable statistical software. For continuous variables (age and knowledge score) mean and standard deviation were used. Categorical variables (gender, phase of study, previous BLS training, knowledge category, attitude responses and practice-related variables) were presented as frequencies and percentages.

Mann–Whitney U test was used to compare the knowledge score with selected categorical variables. The variables tested were gender, phase of study, previous BLS training and manikin/simulation-based practice. A p-value of less than 0.05 was considered statistically significant.

Ethical considerations

The study was conducted after obtaining approval from the concerned institutional authority/ethics committee. Written informed consent was obtained from all participants. Participation was voluntary, and participants were assured that non-participation would not affect their academic standing. Data were collected anonymously and used only for academic and research purposes.

RESULTS

A total of 150 undergraduate medical students participated in the study. The mean age of the participants was 22.05 ± 1.45 years. Males constituted a higher proportion of the study population, and slightly more than half of the participants belonged to Phase III. Most students had received prior BLS training. The demographic and training characteristics of the participants are shown in Table 1.

Table 1. Demographic and training characteristics of participants, n = 150

Variable	Category	Frequency, n	Percentage
Age, years	Mean ± SD	22.05 ± 1.45	—
Age range	Minimum–maximum	19–28	—
Gender	Male	90	60.0%
	Female	60	40.0%
Phase of study	Phase II	70	46.7%
	Phase III	80	53.3%
Previous BLS training	Yes	126	84.0%
	No	24	16.0%

Knowledge regarding BLS was assessed using 10 knowledge-based items. Overall, participants demonstrated satisfactory knowledge, with a mean knowledge score of 7.17 ± 2.15 out of 10. More than half of the students were categorized as having good knowledge. However, comparatively lower correct responses were observed for the correct BLS sequence and early use of AED. The item-wise knowledge responses and knowledge categories are presented in Table 2.

Table 2. Knowledge regarding Basic Life Support among participants, n = 150

Knowledge item	Correct response	Correct, n	Percentage
Full form of BLS	Basic Life Support	144	96.0%
First step in BLS	Check responsiveness	132	88.0%
Correct BLS sequence	C-A-B	68	45.3%
Correct site of chest compression	Lower half of sternum	128	85.3%
Recommended chest compression rate	100–120/minute	116	77.3%
Recommended depth of chest compression in adults	2 inches	108	72.0%
Recommended depth of chest compression in infants	1.5 inches	94	62.7%
Compression–ventilation ratio	30:2	120	80.0%
Full form of AED	Automated External Defibrillator	126	84.0%
AED use if available	Use first/early	40	26.7%
Knowledge score	**Mean ± SD**	**7.17 ± 2.15**	—
Knowledge category	Poor, 0–4	16	10.7%
	Moderate, 5–7	52	34.7%
	Good, 8–10	82	54.7%

The item-wise distribution of correct responses for BLS knowledge is shown in **Figure 1**. The figure highlights that while most students answered several core BLS knowledge items correctly, important gaps remained regarding the correct BLS sequence and early AED use.

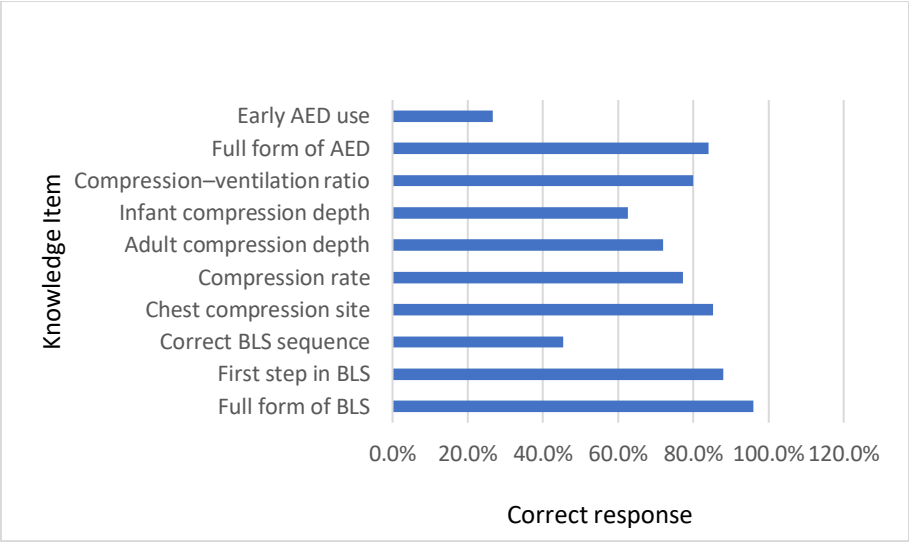

Figure 1. Item-wise correct responses on Basic Life Support knowledge among medical students.

Participants showed a generally favourable attitude towards BLS. Most agreed that BLS training should be mandatory in the MBBS curriculum and that regular BLS training should be conducted in medical colleges. A large proportion of students were willing to perform CPR in an emergency. However, fear of causing harm and lack of proper training were identified as barriers by some participants. The attitude responses are summarized in **Table 3**.

Table 3. Attitude towards Basic Life Support among participants, n = 150

Attitude item	Agree/Yes, n (%)	Neutral/Maybe, n (%)	Disagree/No, n (%)
BLS training should be made mandatory in MBBS curriculum	146 (97.3%)	4 (2.7%)	0 (0.0%)
Regular BLS training should be conducted in medical colleges	138 (92.0%)	12 (8.0%)	0 (0.0%)
Simulation-based training is more effective than lectures	142 (94.7%)	8 (5.3%)	0 (0.0%)
Willing to perform CPR in an emergency	128 (85.3%)	18 (12.0%)	4 (2.7%)
Fear of causing harm prevents me from performing CPR	50 (33.3%)	82 (54.7%)	18 (12.0%)
Lack of proper training is a barrier to perform CPR	142 (94.7%)	8 (5.3%)	0 (0.0%)

With regard to practice, most students had practiced BLS on a manikin or in simulation. However, real-life exposure was limited, as only a small proportion had witnessed BLS during an emergency and very few had performed CPR on a patient. Most participants believed that regular workshops and practice would improve their confidence and CPR performance. Practice-related findings are shown in **Table 4**.

Table 4. Practice regarding Basic Life Support among participants, n = 150

Practice item	Response	Frequency, n	Percentage
Practiced BLS on manikin or in simulation	Yes	116	77.3%
	No	34	22.7%
Frequency of BLS practice on manikin/simulation	None	34	22.7%
	Once	51	34.0%
	More than once	65	43.3%
Witnessed BLS during emergency	Yes	30	20.0%
	No	120	80.0%
Performed CPR on a patient	Yes	4	2.7%
	No	146	97.3%
Believed regular BLS workshop and practice would improve confidence and CPR performance	Yes	142	94.7%
	Maybe	8	5.3%

Practice-related exposure and perceived need for regular BLS workshops are illustrated in **Figure 2**. The figure demonstrates a clear gap between simulation-based practice and actual real-life CPR performance.

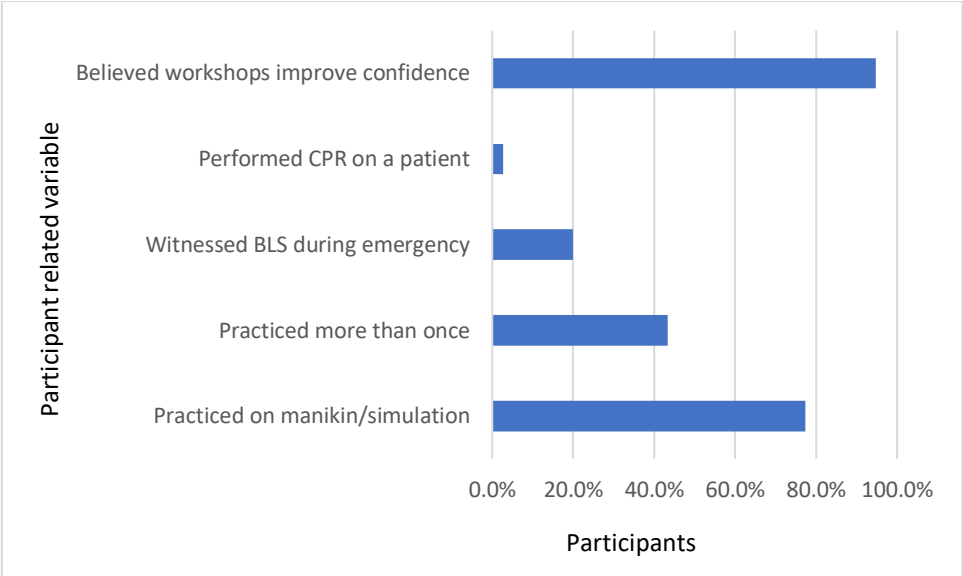

Figure 2. Practice exposure and perceived need for BLS workshops among medical students.

The association between knowledge score and selected participant characteristics was assessed using the Mann–Whitney U test. Knowledge scores were significantly higher among Phase III students, students with previous BLS training, and those who had practiced BLS on a manikin or in simulation. No statistically significant difference in knowledge score was observed between male and female students. The association between knowledge score and selected variables is shown in Table 5.

Table 5. Association between knowledge score and selected variables

Variable	Category	n	Knowledge score, mean ± SD	Median	p-value
Gender	Male	90	6.96 ± 2.19	7	0.068
	Female	60	7.50 ± 2.06	8	
Phase of study	Phase II	70	6.06 ± 2.33	6	<0.001
	Phase III	80	8.15 ± 1.38	8	
Previous BLS training	Yes	126	7.59 ± 1.89	8	<0.001
	No	24	5.00 ± 2.17	6	
Practiced BLS on manikin/simulation	Yes	116	7.62 ± 1.79	8	<0.001
	No	34	5.65 ± 2.58	6	

Test applied: Mann–Whitney U test.

Overall, the findings indicate that the participants had satisfactory knowledge and a favourable attitude towards BLS. However, specific knowledge gaps and limited real-life CPR exposure were observed. Higher knowledge scores were associated with senior phase of study, prior BLS training, and manikin/simulation-based practice.

DISCUSSION

The overall knowledge score of undergraduate medical students in the present study was 7.17 ± 2.15 which was satisfactory. The participants' knowledge was good in more than half (54.7%), moderate in 34.7% and poor in 10.7%. However, there were significant item-wise differences, especially in the correct BLS sequence (45.3%) and early AED use (26.7%) . These results suggest that students were aware of some of the basic concepts, but algorithmic and time critical aspects of BLS need to be reinforced.

The knowledge level in the present study was better than that reported by Chandrasekaran et al., in which 84.82% of the participants scored less than 50% in BLS awareness [10]. Likewise, Almesned et al. found that healthcare students and professionals had poor BLS knowledge, with none of the participants scoring 100% and only 4.3% scoring between 80-89% [11]. The relatively better performance in the present study might be associated with previous BLS exposure, with 84.0% of the participants having received previous BLS training.

However, the low rate of correct response for early AED use is a concern, as timely defibrillation is a key part of resuscitation. Ghanem et al. found similar lack of practical and action-oriented BLS skills among Egyptian medical students, with a deficiency in compression-related and rescue-breathing skills [12]. This implies that BLS teaching

should not only be based on the recall of facts, but also on the correct sequence, decision making and application in emergency situations.

In the current study, prior BLS training was a significant predictor of knowledge scores. The scores of students with prior training were 7.59 ± 1.89, while the scores of untrained students were 5.00 ± 2.17. Ahmad et al. also found a similar pattern, where the mean score of the previously trained students was higher than the mean score of the overall study group [13]. This is an argument for formal and repeated BLS training during undergraduate medical education.

There was also a significant difference between the knowledge scores of the Phase III and Phase II students (8.15 ± 1.38 vs. 6.06 ± 2.33) . This could be due to higher levels of clinical exposure and opportunities for skill-based learning for senior students. Alkarrash et al. also found that BLS awareness among medical undergraduates was dependent on academic and training-related factors [14]. These results indicate that BLS training should be started early and gradually repeated throughout the various stages of MBBS curriculum.

There was a definite disconnect between simulation and real-life experience in practice. While 77.3% of students had performed BLS on a manikin or in simulation, 20.0% had observed BLS during an emergency and 2.7% had performed CPR on a patient. The mean knowledge score of students who practiced on a manikin or in simulation was significantly higher than the mean knowledge score of students who did not practice on a manikin or in simulation (7.62 ± 1.79 vs. 5.65 ± 2.58) . Baklola et al. also reported that prior CPR/BLS training was correlated with knowledge and confidence and that the majority of students believed that CPR training should be required [15]. These findings highlight the importance of simulation-based teaching to enhance preparedness prior to real-life exposure.

Students' attitudes towards BLS were very positive. The majority of the participants felt that BLS training should be compulsory in MBBS curriculum (97.3%), regular training should be done in medical colleges (92.0%) and simulation based training is more effective than lecture (94.7%). But 33.3% said they were afraid of doing harm and 94.7% said they were afraid of not being trained properly to do CPR. This suggests that future training should involve supervised hands on practice, demonstration of AED, simulation and repeated feedback to enhance competence and confidence through scenarios.

There was no significant difference between genders and knowledge score, indicating that academic phase and previous training and simulation-based practice were more important factors in BLS knowledge than gender. Overall, the results emphasize the importance of structured, repeated and competency-based BLS training in the undergraduate curriculum, especially the proper BLS sequence, early use of AED, and the reinforcement of practical skills.

CONCLUSION

The present study showed that undergraduate medical students had satisfactory overall knowledge and a favourable attitude towards Basic Life Support. However, important gaps were observed in the correct BLS sequence, early AED use and real-life CPR exposure. Higher knowledge scores were significantly associated with senior phase of study, previous BLS training and manikin/simulation-based practice. These findings highlight the need for structured, mandatory and repeated simulation-based BLS training with regular refresher sessions and AED demonstration in the undergraduate medical curriculum.

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