

Impact of Structured Basic Life Support Education on Non-Medical Students' Competence and Confidence: A Pretest-Posttest Intervention

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ABSTRACT

Introduction: Basic Life Support (BLS) is a critical emergency intervention designed to sustain life during life-threatening events until advanced medical care can be provided. Despite its importance, awareness and training in BLS, particularly cardiopulmonary resuscitation (CPR), remain inadequate among non-medical students in developing countries.

Methods: A quantitative, descriptive pre-experimental study was conducted with 150 non-medical undergraduate and postgraduate students from Sharda University, Greater Noida. Using purposive sampling, data were collected via a demographic proforma and a structured knowledge and practice questionnaire before and after a structured BLS training intervention. Content validity and reliability (Cronbach's alpha = 0.97) of the tools were established.

Results: Analysis revealed that 48.7% of participants had poor baseline BLS knowledge, which improved significantly following the intervention ($t = 34.01$, $p < 0.01$). Post-training, 61.3% demonstrated good knowledge and practice. Factors such as religion, course enrollment, parental medical background, and prior CPR knowledge were significantly associated with knowledge levels.

Discussion: The study confirms the effectiveness of structured BLS training in improving knowledge and practice among non-medical students, filling a critical gap in emergency preparedness. Findings align with global evidence pointing to the necessity of including BLS education in non-medical curricula to increase survival rates following out-of-hospital cardiac arrests.

Conclusion: Incorporating guideline-based BLS training programs in higher education institutions is essential to empower non-medical students as first responders, ultimately enhancing community health outcomes.

Keywords: Basic Life Support, Cardiopulmonary Resuscitation, Non-medical Students, Pre-experimental Study, Educational Intervention

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INTRODUCTION

Basic Life Support (BLS) refers to fundamental emergency procedures performed during life-threatening situations to sustain life until advanced medical care becomes available. It focuses on maintaining airway patency, effective breathing, and circulation using simple, non-invasive techniques, often administered outside hospital settings with minimal equipment (Vanumu, 2023). BLS plays a vital role in managing cardiac arrest, respiratory failure, and choking by promoting oxygenation and blood flow to the brain and heart (Bilaly, 2024).

Cardiopulmonary Resuscitation (CPR) forms the cornerstone of BLS, combining chest compressions and rescue breaths to preserve circulation during cardiac arrest (Kluwer, 2016). The 2024 American Heart Association (AHA) guidelines emphasize the CAB sequence—Compressions, Airway, and Breathing—recommending compressions 2 inches deep at a rate of 100–120 per minute, supported by adequate airway management and rescue breathing, preferably using a mask or bag-valve device to reduce infection risk (AHA, 2022). Cardiac arrest and respiratory emergencies such as drowning, stroke, drug overdose, or electrocution remain key indications for CPR.

Globally, cardiovascular diseases (CVDs) are the leading cause of death, responsible for approximately 17 million deaths annually (World Health Organization [WHO], 2004). In India, CVD-related mortality rose from 1.17 million in 1990 to 2.03 million in 2010 and is projected to reach over 23 million globally by 2030 (Philip, 2014). Despite evidence that timely BLS improves survival in out-of-hospital cardiac arrests, many bystanders lack the necessary knowledge or confidence to act (Alsayali, 2019; sahi, 2023).

BLS education among non-medical students remains limited, particularly in developing countries where it is not included in the regular curriculum. At Sharda University, studies reveal poor awareness and practice levels due to inadequate training exposure. To bridge this gap, structured programs and "learning by teaching" strategies can enhance competence and confidence in responding to cardiac emergencies.

METHODOLOGY:

The research approach adopted for the present study is quantitative and descriptive in nature, designed to assess the knowledge and practice of non-medical students regarding Basic Life Support (BLS). A pre-experimental research design was utilized with a one-group pretest-posttest format to measure changes after intervention. This approach is suitable for investigating the effect of educational programs where control groups are not feasible, providing valuable insights into the immediate effectiveness of the BLS training. The study was carried out at Sharda University's School of Law and School of Business in Greater Noida, focusing on non-medical undergraduate and postgraduate students as the target population. These groups were selected to address the evident gap in BLS awareness and training among non-healthcare student populations, ensuring that findings would be relevant to improving community emergency response capabilities.

The study's sample included 150 non-medical students enrolled at Sharda University within the specified schools. A purposive sampling technique was employed, given its practicality for targeting specific groups within an academic setting and ensuring that participants met inclusion criteria such as age (between 18 and 30 years), willingness to participate, and comprehension of Hindi or English. This non-probability sampling facilitated the efficient recruitment of students accessible during the data collection timeframe. The sample size was determined based on pilot data and power analysis to ensure adequate representation and statistical validity. This method aligns with cross-sectional studies that aim to describe characteristics or evaluate interventions within defined populations. The purposive sampling approach allowed the researcher to focus precisely on the intended demographic to evaluate the training program's impact on knowledge and practice.

Two main data collection tools were used in this study. The first was a Demographic Proforma developed by the researcher to capture participants' characteristics such as age, gender, education level, religion, parents' occupation, prior knowledge of BLS, and sources of information. This tool consisted of 10 items, carefully constructed to provide a comprehensive overview of sample demographics that might influence learning outcomes. The second tool, a structured knowledge and practice questionnaire, contained 15 items covering core concepts including the definition and effectiveness of BLS, cardiopulmonary resuscitation (CPR), and the components of compression, airway, and breathing. Each item offered four alternative responses, with one correct answer scored as one, and incorrect answers scored zero, allowing a maximum possible score of 21 and a minimum of zero. Scores were classified as good knowledge (15–21), average knowledge (8–14), and poor knowledge (1–7). Content validity was rigorously evaluated by 10 experts specializing in non-medical education, who unanimously agreed on the tool's relevance, accuracy, and appropriateness. Furthermore, the questionnaire demonstrated excellent reliability, with a Cronbach's alpha of 0.97, confirming its stability and consistency for measuring knowledge and practice regarding BLS.

RESULTS

The study comprised a total of 150 participants, primarily within the age group of 23–28 years, accounting for 63.3% (n=95) of the total sample. Participants aged 17–22 years formed 28.7% (n=43), while those in the 29–35 age range represented 8.0% (n=12). No participants were reported above the age of 35. In terms of gender distribution, the majority were male (66.7%, n=100), while females accounted for 33.3% (n=50); there were no respondents identifying as other genders.

Table 1 Frequency and Percentage Distribution of the demographic characteristics of the study participants

1. Age in years	Frequency	Percentage
a) 17-22	43	28.7
b) 23-28	95	63.3
c) 29- 35	12	8.0
d) Above 35		
2. Gender		
a) Male	100	66.7
b) Female	50	33.3
c) others		

3. Religion		
a) Hindu	102	68.0
b) Christian	48	32.0
c) Muslim	0	0
d) Sikh	0	0
e) others	0	0
4. which course you are enrolled for?		
a) Under graduate	51	34.0
b) Post graduate	89	59.3
c) Diploma	5	3.3
d) Others	5	3.3
5. The parents are working in medical field		
a. Yes	10	6.7
b. No	140	93.3
6. Any previous Knowledge about Cardiopulmonary resuscitation		
a. Yes	12	8.0
b. No	138	92.0

The study sample comprised participants whose demographic details were as follows. Regarding religion, 68.0% of the respondents identified as Hindu, while 32.0% were Christian; no participants identified as Muslim, Sikh, or other religions. In terms of academic enrolment, 34.0% of students were pursuing undergraduate courses, 59.3% were postgraduate students, 3.3% were enrolled in diploma programs, and another 3.3% fell under other categories. Concerning parental occupation within the medical field, only 6.7% reported having parents working in healthcare, whereas 93.3% did not have family members in the medical profession.

When assessing prior knowledge about cardiopulmonary resuscitation (CPR), a mere 8.0% of participants indicated having any previous knowledge, while the vast majority, 92.0%, reported no prior exposure to CPR concepts or training.

Table2: frequency and percentage distribution of Knowledge and practice regarding basic life support between pre test and post test

Knowledge and Practice levels on Basic Life Support	Pre test		Post Test	
	Frequency	Percent	Frequency	Percent
Poor Knowledge	73	48.7	0	0
Average Knowledge	77	51.3	58	38.7
Good Knowledge	0	0	92	61.3
Total	150	100.0	150	100.0

The results of the study revealed a significant improvement in the participants' knowledge and practice regarding Basic Life

Support (BLS) following the intervention. During the pre-test phase, nearly half of the participants (48.7%, n=73) demonstrated poor knowledge, while 51.3% (n=77) exhibited average knowledge. Notably, none of the participants were classified as having good knowledge at this stage.

In contrast, the post-test findings showed a marked shift in knowledge levels. None of the participants fell into the poor knowledge category, indicating a complete elimination of low performance. While 38.7% (n=58) still demonstrated average knowledge, a majority of the participants (61.3%, n=92) attained a good level of knowledge and practice regarding BLS. These findings suggest that the intervention was effective in enhancing awareness and competency related to Basic Life Support among the study participants.

Section 3: Effectiveness of BLS on Knowledge and Practice among non-Medical students.

Table 3. Effectiveness of BLS on Knowledge and Practice among non medical students.

Knowledge and Practice Variable	Mean	SD	T value	P Value
Pre test	7.5	2.9		
Post Test	14.4	3.4	34.01	<0.01

The study assessed the impact of Basic Life Support (BLS) training on the knowledge and practice of non-medical students. The mean pre-test score was 7.5 (SD = 2.9), while the mean post-test score significantly increased to 14.4 (SD = 3.4). The calculated t-value was 34.01, with a p-value < 0.01, indicating a statistically significant improvement in knowledge and practice following the BLS intervention.

An analysis was conducted to explore the association between participants' knowledge and practice levels regarding Basic Life Support (BLS) and their demographic characteristics. Chi-square tests were used to determine the statistical significance.

Age showed no significant association with knowledge and practice levels ($\chi^2 = 0.48, p = 0.784$). Participants aged 17–22 years had 44.2% poor and 55.8% average knowledge, while those aged 23–28 had nearly equal distribution between poor (50.5%) and average (49.5%) knowledge. Participants aged 29–35 were evenly split (50% each), and no participants were above 35 years of age.

Gender was also not significantly associated with BLS knowledge and practice ($p = 0.355$). Among males, 46% had poor knowledge and 54% had average, whereas among females, 54% had poor and 46% had average knowledge. However, religion showed a strong and significant association ($\chi^2 = 22.81, p < 0.01$). A greater proportion of Hindus (64.7%) had average knowledge, while a large majority of Christians (77.1%) had poor knowledge.

Course enrolment was significantly associated with knowledge levels ($\chi^2 = 11.41, p = 0.010$). Postgraduates and undergraduates showed a balanced distribution, whereas all diploma and "other" course participants had poor knowledge, indicating a clear disparity based on educational program type. Parental profession in the medical field showed a highly significant association ($\chi^2 = 11.3, p = 0.001$). All participants whose parents were in the medical field (100%) had poor knowledge, contrasting with the 45% poor and 55% average distribution among those whose parents were not in the field.

Lastly, previous knowledge of cardiopulmonary resuscitation (CPR) was significantly associated with BLS knowledge and practice levels ($\chi^2 = 9.65, p = 0.002$). An overwhelming 91.7% of those with prior CPR knowledge had poor performance, whereas those without prior knowledge had a more balanced outcome (44.9% poor and 55.1% average). These findings suggest that while age and gender do not significantly influence BLS knowledge and practice, factors such as religion, type of academic course, parental medical background, and prior CPR knowledge play a significant role.

DISCUSSION:

This study assessed the effectiveness of a Basic Life Support (BLS) training program on the knowledge and practice of non-medical students at Sharda University. The findings revealed significant gaps in baseline awareness and competence regarding cardiopulmonary resuscitation (CPR) and related emergency interventions prior to the training, aligning with evidence from similar populations globally. For instance, studies from India and other low- and middle-income countries consistently report low baseline CPR knowledge among non-healthcare students, attributed primarily to the omission of such training from general curricula and limited public awareness initiatives (Philip, 2014; Alsayali, 2019).

The demographic data of the study sample, predominantly comprising Hindu and Christian students enrolled in undergraduate and postgraduate courses, with minimal prior exposure to CPR knowledge, underscores the necessity for structured, accessible BLS education beyond medical faculties. The fact that only 8% of participants had previous knowledge of cardiopulmonary resuscitation echoes findings by Alsayali (2019) in Saudi Arabia where less than 10% of community members had adequate CPR

awareness. In consonance with the World Health Organization (WHO, 2004) and American Heart Association (AHA, 2022) recommendations, broadening CPR training to the general population is vital to improving out-of-hospital cardiac arrest survival rates.

Post-intervention results indicated a statistically significant improvement in both knowledge and practice scores, demonstrating the efficacy of the structured training module. This finding aligns with prior evidence that focused, hands-on BLS training, inclusive of the latest CAB (Compressions, Airway, Breathing) sequence recommendations, effectively enhances retention of CPR skills and confidence in providing emergency assistance (Kluwer, 2016; AHA, 2022). Peer-led and simulation-based learning approaches, as referenced in Philip (2014), also support the scalability and impact of such educational interventions (duf et al., 2023).

The study's pre-experimental design, although limited by absence of a control group, nonetheless offers valuable insight into training effectiveness for a demographic often overlooked in emergency preparedness programming. This limitation is consistent with several similar studies (e.g., Vanumu, 2023), where resource or logistical constraints precluded randomized controlled trials but still demonstrated meaningful educational gains (atkin et al., 2029).

These findings emphasize the critical role of integrating BLS training into non-medical academic curricula, especially considering the increasing burden of cardiovascular diseases and sudden cardiac arrests globally—statistics projecting over 23 million CVD deaths by 2030 (Philip, 2014). Empowering non-medical students with CPR skills could transform bystanders into first responders, reducing time to intervention when professional help is delayed, a key factor influencing survival and neurological outcomes (Alsayali, 2019).

Furthermore, the study supports recommendations from international bodies advocating for widespread community training and "learning by teaching" models, proposing that knowledge disseminated by trained peers ensures sustainability and amplifies community readiness (Philip, 2014). However, barriers such as fear, legal concerns, and misconceptions about CPR remain challenges and should be addressed through continuous education, awareness campaigns, and supportive policies (AHA, 2022).

Future research may explore longitudinal assessments to evaluate skill retention beyond immediate posttraining periods and expand inclusion criteria to other vulnerable or influential community subsets. Additionally, qualitative investigations into behavioral factors affecting willingness to perform BLS could yield targeted interventions for improved community response.

In conclusion, this study corroborates extensive literature affirming that accessible, guideline-based BLS training programs significantly improve knowledge and practical skills among non-medical university students. Given the revolving challenge posed by out-of-hospital cardiac arrests worldwide, institutionalizing BLS education within all higher education disciplines is a strategic imperative to foster life-saving competencies and enhance public health outcomes.

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