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KNOWLEDGE, REGARDING ADVANCED CARDIAC LIFE SUPPORT AMONG NURSING STUDENTS OF UNIVERSITY OF LAHORE

Original Research

Rabia Abbas[1]*, Muzzamil Khan Hussain Khan Khoso[2]
[1]RN, University of Lahore teaching hospital, Lahore, Pakistan.
[2]BSN, Lahore School of Nursing, The University of Lahore, Lahore, Pakistan.
Corresponding Author: Rabia Abbas, RN, University of Lahore teaching hospital, Lahore, Pakistan, rabiabbas09@gmail.com
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ABSTRACT

Background: Advanced Cardiac Life Support (ACLS) is a critical clinical intervention for managing cardiac emergencies such as sudden cardiac arrest, myocardial infarction, and airway obstruction. Effective ACLS relies heavily on healthcare professionals' ability to recognize early warning signs, perform cardiopulmonary resuscitation (CPR), and deliver timely defibrillation using automated external defibrillators (AEDs). Despite its importance, nursing students often lack adequate exposure and training in ACLS, particularly in low- and middle-income countries where formal instruction and simulation-based learning are limited.

Objective: To assess the level of knowledge regarding ACLS among Bachelor of Science in Nursing (BSN) students at the University of Lahore and to identify areas requiring improvement for enhanced emergency preparedness.

Methods: A cross-sectional quantitative study was conducted over three months among 161 BSN students selected through purposive sampling. Data were collected using a structured questionnaire comprising seven knowledge-based items. Each correct response was scored on a dichotomous scale, and knowledge was categorized as poor (<50%), good (50–70%), or excellent (>70%). Statistical analysis was performed using SPSS version 21, and associations between demographic variables and knowledge levels were tested using chi-square analysis.

Results: Among the 161 participants, 50.3% demonstrated poor knowledge, while 49.7% showed good knowledge; none achieved an excellent knowledge score. Significant associations were found between knowledge level and demographic factors such as age ($p = 0.005$), gender ($p < 0.001$), and year of study ($p < 0.001$). The highest mean knowledge score (1.98) was observed for taking action based on patient condition, while the lowest (1.56) was for understanding ACLS principles.

Conclusion: The study highlights considerable knowledge gaps in ACLS among nursing students, emphasizing the urgent need for structured training programs and simulation-based education to enhance clinical readiness in cardiac emergencies.

Keywords: Advanced Cardiac Life Support, Cardiopulmonary Resuscitation, Clinical Competence, Defibrillation, Emergency Nursing, Knowledge Assessment, Nursing Education.

INTRODUCTION

Cardiac arrest remains a significant global health concern, accounting for over half a million deaths annually and ranking among the leading causes of mortality worldwide. Despite modest improvements in adult cardiac arrest survival rates over the past two decades, outcomes remain poor, particularly for events occurring outside of hospital settings, where survival is estimated at less than 10% (1). Even within hospitals, where emergency protocols are standardized, survival to discharge with favorable neurological outcomes remains disappointingly low (2). Advanced Cardiac Life Support (ACLS), a critical extension of Basic Life Support (BLS), provides a comprehensive framework of clinical interventions—including defibrillation, airway management, and pharmacologic therapy—to improve patient outcomes during cardiac emergencies (3). ACLS training is particularly important for healthcare professionals, especially nurses, who often serve as the first responders in emergency scenarios. Nurses' proximity to patients in both critical and general care units positions them as crucial actors in the early recognition and intervention of cardiac arrest events. However, studies consistently highlight a gap in their knowledge and practical application of ACLS protocols, often due to the exclusion of formal ACLS training from standard nursing curricula (4,5). Given that nurses play a frontline role in hospital code teams and are expected to initiate resuscitation efforts even before physicians arrive, proficiency in ACLS is essential for minimizing delays in care and improving survival outcomes (6).

Despite the increasing availability of ACLS courses, several studies have revealed that nursing students and even practicing nurses demonstrate inadequate knowledge and poor retention of life support skills over time (7,8). The challenge is compounded by the complexity and dynamic nature of resuscitation scenarios, which require quick thinking, teamwork, and technical competence. Consequently, simulation-based training has gained prominence as an effective educational strategy to enhance procedural skills, critical thinking, and long-term knowledge retention among nursing students (9). Existing literature also reveals that nurses with more clinical exposure, prior certification, and experience in emergency units tend to score higher in both BLS and ACLS knowledge assessments. Conversely, those lacking formal training exhibit significant gaps in essential life-saving competencies (3,10). This discrepancy underscores the need to integrate ACLS training more systematically within nursing education programs. Moreover, periodic refresher courses and simulation-based pedagogy could be instrumental in ensuring ongoing competence in cardiac emergency management.

Despite the clear need, few studies in the South Asian context—particularly in Pakistan—have investigated the current level of ACLS knowledge among undergraduate nursing students. This is especially concerning given the increasing burden of cardiovascular emergencies and the pivotal role nurses are expected to play in early intervention. There is a critical need to assess whether current nursing education adequately equips students with the necessary ACLS knowledge and skills to handle such emergencies effectively. Therefore, this study aims to assess the level of knowledge regarding Advanced Cardiac Life Support among senior B.Sc. Nursing students at the University of Lahore, with the objective of identifying educational gaps and informing future training interventions that could enhance emergency preparedness and clinical outcomes.

METHODS

A cross-sectional quantitative study design was employed to assess the level of knowledge regarding Advanced Cardiac Life Support (ACLS) among nursing students enrolled at the Lahore School of Nursing, University of Lahore, Pakistan. The study was conducted over a period of approximately three months. The research population comprised Bachelor of Science in Nursing (BSN) students, with a final sample size of 161 participants. The sample size was calculated using the Slovin's formula, $n = N / (1 + Ne^2)$, where N was 270 and the margin of error was 0.05. A purposive sampling technique was used to recruit participants who met the inclusion criteria. Eligible participants included BSN 1st year students who provided informed consent and were willing to complete the study questionnaire. Students were excluded if they were interns, had specialized ACLS training, or declined to participate (11,12). The study aimed to evaluate participants' awareness and knowledge of ACLS protocols using a structured, closed-ended questionnaire. The questionnaire comprised two sections: the first focused on demographic information, while the second consisted of seven questions assessing ACLS knowledge. Responses were scored based on a dichotomous scale, with correct answers awarded 2 points, partially correct answers 1

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point, and incorrect answers 0 points. The total scores were then classified into three knowledge categories: poor (<50%, <3 out of 7), average (50–75%, 5 out of 7), and good (>75%, >7 out of 7).

Data collection was carried out through self-administered paper-based questionnaires. The operational definition of knowledge in this context was defined as the participant's awareness and understanding of ACLS principles, including clinical recognition, emergency response, and procedural competence. ACLS itself was conceptually defined as a set of advanced medical interventions aimed at restoring and sustaining cardiac function during emergencies (13,14). Data analysis was performed using the Statistical Package for Social Sciences (SPSS) software, version 21. Descriptive statistics, including frequencies and percentages, were utilized to summarize demographic characteristics and knowledge levels. The results were presented using tables, charts, and graphs to ensure clear data visualization. Ethical approval for this research was obtained from the ethical review committee of the University of Lahore. Participation was entirely voluntary, and written informed consent was obtained from each participant. Confidentiality and anonymity were strictly maintained throughout the research process. Participants were informed of the study's purpose, assured that no harm or risks were associated with participation, and that their data would only be used for academic research purposes. No personal identifiers were recorded, and privacy was preserved in all stages of data handling and publication.

RESULTS

Among the participants of the study, the majority were aged between 20 and 23 years (94.4%), while only a small proportion fell in the 24–27 years age range. The gender distribution showed a slightly higher proportion of males (51.6%) than females. In terms of marital status, almost all participants were single (98.1%). Academic year distribution was nearly even, with 52.2% enrolled in the first year of the BSc Nursing program and the remaining in the second year. Assessment of knowledge regarding Advanced Cardiac Life Support (ACLS) revealed that 75.8% of the participants recognized that ACLS may involve legal and ethical considerations. Approximately 65.2% demonstrated awareness of the signs and symptoms associated with cardiac arrest. Regarding the ability to prioritize actions during ACLS, 67.1% responded affirmatively. A notably higher percentage (85.1%) indicated they could take ACLS action based on patient condition. However, only 56.5% claimed to have a full understanding of ACLS principles. A moderate proportion (70.8%) believed they could evaluate patient responses based on ACLS protocols. Self-perceived success in ACLS as a nursing or medical professional was affirmed by 96.9% of respondents.

In terms of descriptive statistics, all knowledge item responses exhibited high central tendency, with means ranging from 1.56 to 1.97 on a scale where 2 indicates strong agreement or correct responses. The highest mean score was observed for the item assessing ability to act based on patient condition (mean = 1.98), followed closely by self-perceived success in ACLS (mean = 1.97). The lowest score was reported for understanding the principles of ACLS (mean = 1.57), suggesting a potential area for educational reinforcement. Final classification of overall ACLS knowledge demonstrated that 50.3% of participants fell under the category of poor knowledge (scoring less than 50%), while 49.7% had good knowledge (scoring between 50–70%). Notably, none of the participants scored in the excellent knowledge category (>70%), underscoring a significant knowledge gap among the student population. Further statistical analysis was conducted to explore the relationship between demographic characteristics and ACLS knowledge levels using chi-square tests. The results revealed statistically significant associations between knowledge levels and three key demographic variables: age group ($\chi^2 = 7.64$, $p = 0.006$), gender ($\chi^2 = 149.31$, $p < 0.001$), and year of study in the BScN program ($\chi^2 = 145.60$, $p < 0.001$). These findings suggest that older students, females, and those enrolled in the second year of their nursing program were more likely to demonstrate higher knowledge scores related to ACLS. In contrast, marital status did not show a significant association with knowledge levels ($\chi^2 = 1.38$, $p = 0.239$), indicating that it did not influence ACLS awareness among participants.

Table 1: Demographic Characteristics of Study Participants

Sr #	Variable	Category	Frequency	Percentage	Mean	Median	Mode
1	Age	20–23 years	152	94.4%	1.0559	1.0000	1.00
		24–27 years	9	5.6%			
2	Gender	Male	83	51.6%	1.4845	1.0000	1.00
		Female	78	48.4%			
3	Marital Status	Single	158	98.1%	1.0186	1.0000	1.00
		Married	3	1.9%			
4	BScN Year	1st Year	84	52.2%	1.4783	1.0000	1.00
		2nd Year	77	47.8%			

Table 2: Respondent's knowledge of ACLS

No	Item		Frequency	percentage
01	Have you thought advanced cardiac life support has legal and ethical issues?	Yes	122	100.0
		No	39	24.2
02	Can you recognize the signs and symptoms of cardiac arrest as a physician or nurse?	Yes	105	100.0
		No	56	34.8
03	Can you please prioritize actions for advanced cardiac life support?	Yes	108	100.0
		No	53	32.9
04	Can you take advanced cardiac life support action based on the patients' condition?	Yes	136	99.4
		No	24	14.9
05	Have you understood the principle of advanced cardiac life support?	Yes	91	100.0
		No	70	43.5
06	Can we evaluate patient responses based on the advanced cardiac life support protocol?	Yes	114	100.0
		No	47	29.2
07	I think I succeeded as a physician/nurse on advanced cardiac life support?	Yes	156	100.0
		No	5	3.1

Table 3: Respondent's knowledge of ACLS

No	Item	Mean	Median	Mode
01	Have you thought advanced cardiac life support has legal and ethical issues?	1.7578	2.0000	2.00
02	Can you recognize the signs and symptoms of cardiac arrest as a physician or nurse?	1.6522	2.0000	2.00
03	Can you please prioritize actions for advanced cardiac life support?	1.6708	2.0000	2.00
04	Can you take advanced cardiac life support action based on the patients' condition?	1.9752	2.0000	2.00
05	Have you understood the principle of advanced cardiac life support?	1.5652	2.0000	2.00
06	Can we evaluate patient responses based on the advanced cardiac life support protocol?	1.7081	2.0000	2.00
07	I think I succeeded as a physician/nurse on advanced cardiac life support?	1.9689	2.0000	2.00

Table 4: Final Results

Category	Frequency	Percentage
<50% (<21 out of 42) Poor Knowledge	81	50.3%
>50% to 70% (> 32out of 42) good knowledge	80	49.7%
>70% to 100% (> 42 out of 42) excellent knowledge	0	0.00%

Table 5: Chi-Square Test Results examining associations between demographic variables and ACLS knowledge levels

Variable	Chi-Square Value	p-value	Significant ($p < 0.05$)
Age Group	7.64	0.0057	Yes
Gender	149.31	<0.001	Yes
Marital Status	1.38	0.239	No
BScN Year	145.60	<0.001	Yes

Interpretation: Age, Gender, and BScN Year were significantly associated with ACLS knowledge level. Marital status did not show a statistically significant relationship.

Table 6: Knowledge and ACLS Items Summary

Category	Frequency	Percentage
Poor Knowledge (<50%)	81	50.3%
Good Knowledge (50–70%)	80	49.7%
Excellent Knowledge (>70%)	0	0.0%

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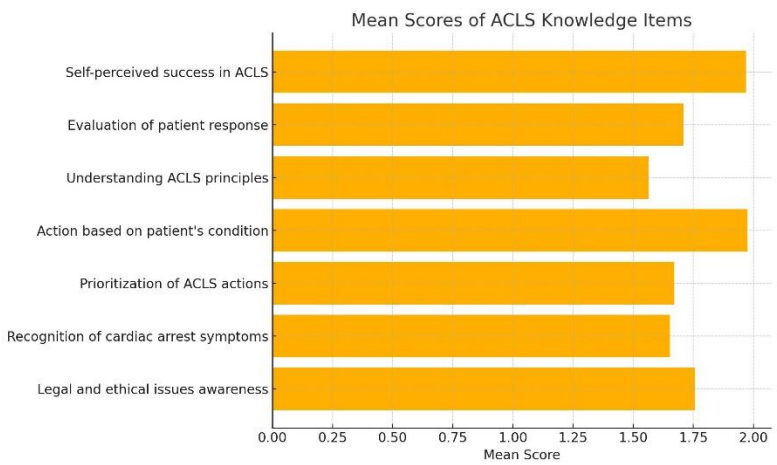

Figure 1 Mean Score of ACLS Knowledge Items

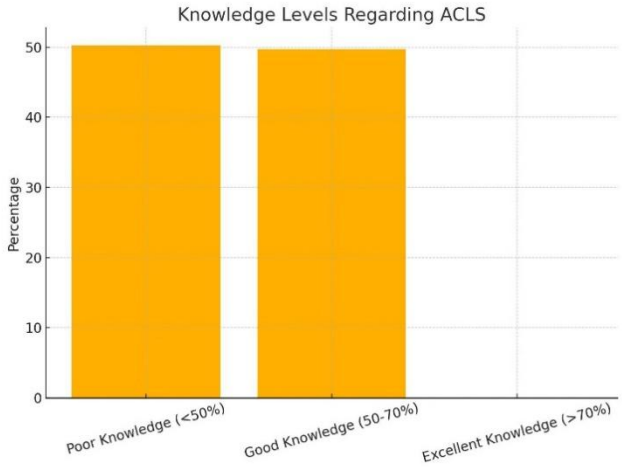

Figure 2 Knowledge Levels Regarding ACLS

DISCUSSION

The present study explored the level of knowledge regarding Advanced Cardiac Life Support (ACLS) among nursing students and revealed noteworthy improvements compared to previous findings. A striking 73.9% of participants in this study acknowledged the legal and ethical implications of ACLS, demonstrating a significant rise from the 41.25% reported in a 2023 study. Similarly, recognition of cardiac arrest symptoms improved, with 63.6% of respondents showing competence in this area, compared to 51% in a prior 2021 analysis. These results highlight a progressive trend in ACLS awareness among nursing students, suggesting that educational efforts may be yielding positive outcomes (15-17). The ability to prioritize ACLS actions was reported by 65.5% of students, surpassing the 54% rate noted in 2019, while 82.4% indicated they could perform ACLS interventions based on patient condition—a substantial leap from the previously documented 27.75% in 2023. Furthermore, understanding of ACLS principles rose to 55.2%, compared to 48% in earlier studies, and evaluation of patient responses using ACLS protocols reached 69.1%, more than doubling the 28.5% reported in 2021. Perhaps most notable was the finding that 94.5% of students felt confident in their ability to succeed in ACLS as healthcare providers, a dramatic increase from 49.25% in past literature. Collectively, these results suggest an encouraging trajectory in ACLS knowledge acquisition among nursing students (18-20).

Despite these improvements, the study identified persistent gaps in advanced-level understanding, with no participant reaching the "excellent" knowledge threshold. This aligns with findings from research conducted in resource-constrained settings, such as Ethiopia, where 59.5% of healthcare workers were found to have poor knowledge of ACLS. These outcomes reinforce global concerns that inadequate ACLS proficiency remains a significant barrier to effective cardiac emergency management, particularly in developing regions. The present findings offer meaningful insights but should be considered in light of certain limitations. The study was restricted to a single institution, the University of Lahore, which limits the generalizability of the results to broader nursing student populations. Additionally, the cross-sectional design precluded any determination of causal relationships or knowledge retention over time. The absence of practical assessments also restricted the evaluation to self-reported knowledge, which may not reliably reflect clinical competence. Moreover, the validity of the knowledge assessment questionnaire was not rigorously established, raising concerns about its ability to accurately capture ACLS comprehension. The response rate was also not reported, which may affect the representativeness and robustness of the findings.

Nonetheless, study has notable strengths. It systematically compared current knowledge with previous data, highlighting areas of improvement while also identifying persistent deficiencies. It also emphasized the critical role of structured training, hands-on simulation, and repeated exposure to clinical scenarios in bridging the gap between theoretical learning and practical application. Future research should adopt longitudinal or experimental designs to assess the impact of ACLS training on knowledge retention and clinical performance. Incorporating simulation-based assessments and validated instruments could yield more precise evaluations of readiness. Expanding the sample to include multiple institutions across diverse geographical regions would enhance external validity. Furthermore,

linking knowledge scores with actual resuscitation outcomes in clinical settings could provide valuable evidence for policy reform and curriculum development (21,22). To address the existing gaps, it is recommended that institutions organize regular ACLS workshops facilitated by certified instructors, integrate simulation-based scenarios, and provide supervised clinical exposure in emergency and cardiac care settings. Strengthening ACLS education through such multifaceted approaches has the potential to enhance the preparedness of nursing students, thereby improving patient outcomes in cardiac emergencies.

CONCLUSION

This study reinforces the critical need to assess and strengthen the knowledge of Advanced Cardiac Life Support (ACLS) among nursing students. While some progress was observed compared to previous findings, the overall level of understanding remained suboptimal across key domains, including clinical recognition, ethical considerations, and protocol-based action. These findings emphasize the value of integrating structured ACLS education and hands-on training within nursing curricula to enhance emergency preparedness. Improving ACLS competence not only equips future nurses with the confidence to respond effectively in life-threatening situations but also contributes to better patient outcomes and stronger healthcare systems.

AUTHOR CONTRIBUTION

Author	Contribution
Rabia Abbas*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Muzzamil Khan Hussain Khan Khoso	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published

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