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Original Research Article

KNOWLEDGE OF CARDIO-PULMONARY RESUSCITATION AMONG FIRST-YEAR NURSING STUDENTS

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Abstract: *In the dynamic realm of healthcare, proficiency in cardiopulmonary resuscitation (CPR) stands as a cornerstone skill for nursing professionals. First-year nursing students represent the future frontline caregivers entrusted with the critical responsibility of preserving human life during emergencies.* ***Methods:*** *A descriptive cross-sectional study was conducted from January to April 2024 at the Superior University Department of Nursing in Lahore, to assess CPR knowledge among first-year nursing students. The study, involving 80 participants selected through convenient sampling, included students without prior CPR training. Data was collected using a demographic questionnaire and a CPR Knowledge Questionnaire, with scores ranging from 0 to 77. Analysis was performed using SPSS 25.* ***Results:*** *The results of the study provide a comprehensive overview of the participants' demographics and their knowledge about CPR. Most participants were under 30 years old (91.3%), with nearly equal numbers living in hostels (48.8%) and as day scholars (51.2%). A significant majority were single (95%). Knowledge about CPR varied, with 53.8% of participants having average knowledge and 46.3% having good knowledge. Responses revealed varying levels of understanding about CPR's purpose, procedures, and effectiveness, highlighting a need for improved education and training.* ***Conclusion:*** *The study shows that most nursing students are under 30 years old, with a near-equal distribution between hostel residents and day scholars, and a majority are single. Overall, 53.8% have average CPR knowledge, while 46.3% have good knowledge.*

Keywords: Knowledge; Cardio-Pulmonary Resuscitation; First-Year Nursing Students

Introduction

Cardio-pulmonary resuscitation (CPR) is a critical life-saving technique that involves chest compressions and artificial ventilation to maintain circulatory flow and oxygenation during cardiac arrest. The effective execution of CPR can significantly improve survival rates and neurological outcomes in patients experiencing sudden cardiac arrest. Globally, cardiac arrest remains a leading cause of mortality, and immediate intervention through CPR is vital for increasing the chances of survival (1, 2). In Pakistan, where cardiovascular diseases are prevalent and emergency medical services are still developing, the awareness and knowledge of CPR among healthcare providers, especially nursing students, is crucial (3).

Nurses are often the first point of contact in emergencies and are expected to be proficient in performing basic life support (BLS) techniques, including CPR (4). Nursing education plays an essential role in equipping students with the necessary knowledge and skills to perform CPR effectively. However, studies indicate varying levels of CPR knowledge among nursing students, particularly those in their initial years of education (5). This variation is attributed to gaps in theoretical training and practical exposure to life-saving procedures (6).

In Pakistan, where healthcare challenges such as the shortage of skilled health professionals and inadequate training facilities persist, there is an increasing emphasis on enhancing nursing education standards to prepare nursing students to handle emergencies competently(7,8). It is crucial to assess the knowledge of first-year nursing students regarding CPR to identify gaps and improve training programs, ultimately contributing to better patient outcomes in critical scenarios.

Methodology

The study employed a descriptive cross-sectional design to assess the knowledge of Cardio-Pulmonary Resuscitation (CPR) among first-year nursing students. This design was selected to provide a snapshot of CPR knowledge at a specific point in time, allowing for the identification of knowledge gaps and the need for educational interventions. The research was conducted at the Department of Nursing, Superior University, Lahore, Pakistan. This university was chosen due to its diverse nursing programs and access to first-year nursing students, making it a suitable setting for evaluating knowledge levels.

The data collection spanned four months, from January to April 2024, to allow adequate time for participant recruitment and data collection. A sample size of 80 first-year nursing students was estimated using a 95% confidence level and a margin of error of 5%. The study used a convenience sampling technique to recruit participants, chosen due to its feasibility and the availability of students during the study period. Although convenience sampling may introduce some degree of bias, it was deemed appropriate given the exploratory nature of the study.

Participants were selected based on specific criteria. The inclusion criteria included first-year nursing students who had not undergone formal training or certification in CPR, were aged 18 years or older, and provided informed consent to participate. Exclusion criteria comprised nursing students beyond the first year, students with prior CPR training, those employed as healthcare professionals, those with medical conditions or disabilities impeding their participation, and those who declined to provide informed consent.

Data collection was carried out using a structured and validated questionnaire, consisting of sections on demographic information and CPR knowledge assessment. The knowledge section covered key aspects of high-quality CPR, including the recognition of cardiac arrest, the components of CPR, and the algorithm for adult cardiac arrest management. The questionnaire was adapted from previously validated instruments to align with international guidelines for CPR knowledge assessment. Self-administered questionnaires were distributed to participants at the study site, with prior briefings on the study's objectives and clear instructions for completing the questionnaire. Confidentiality measures were implemented to ensure participant anonymity.

Ethical approval for the study was obtained from the Institutional Review Board of Superior University, Lahore. Written informed consent was secured from all participants before data collection began, in adherence to the principles of the Declaration of Helsinki. This ensured the protection of participants' rights and the ethical conduct of the study.

The data were analyzed using Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize demographic characteristics and CPR knowledge scores. Inferential statistics, such as independent sample t-tests and one-way analysis of variance (ANOVA), were employed to compare knowledge scores across demographic variables. A p-value of less than 0.05 was considered statistically significant. This comprehensive methodological approach aligns with international standards, thereby enhancing the study's credibility for publication in high-impact factor journals.

Results

This chapter describes the demographic characteristics of participants and the knowledge level of participants.

Table 1 presents the age distribution of the participants. The majority of students, 73 (91.3%), were under 30 years old. A smaller portion, 6 students (7.5%), were between 31 and 35 years old, and only 1 student (1.3%) was in the 36 to 40 age range.

Table 2 details the residence status of the participants. Among them, 39 students (48.8%) resided in hostels, while 41 students (51.2%) were day scholars.

Table 3 describes the marital status of the participants. The majority, 76 students (95.0%), were single, while 4 students (5.0%) were married.

Table 4 presents the participants' general knowledge and perceptions about Cardiopulmonary Resuscitation (CPR). The data shows that 25% are aware of CPR's importance in clinical practice, while 31.3% are not, and 43.8% are unsure. Forty per cent believe knowledge of CPR should be mandatory for healthcare professionals, but 22.5% disagree, and 37.5% are uncertain. Although 41.3% recognize CPR as a basic emergency need, 28.7% do not, and 30% are unsure. Participation in CPR awareness programs is favored by 26.3%, with an equal percentage against it, and 47.5% uncertain. Views on CPR's ethicality and correctness are divided: 36.3% find it inhuman, 33.8% disagree, and 30% are unsure. Similarly, 32.5% see CPR as more harmful than beneficial, while another 32.5% disagree, and 35% are unsure. Additionally, 42.5% think CPR is a waste of resources, 23.8% do not, and 33.8% are unsure. Lastly, 48.8% support mandatory CPR training for medical undergraduates, 17.5% oppose it, and 33.8% are unsure. These responses highlight the mixed perceptions and significant uncertainty about CPR among participants.

Table 5 presents participants' knowledge about the main goal and accuracy of Cardiopulmonary Resuscitation (CPR). It shows that 46.2% correctly identified the purpose of CPR, while 53.8% were incorrect. For the updated order of CPR interventions, 51.2% answered correctly and 48.8% incorrectly. Regarding the recommended compression to ventilation ratio, 38.7% were correct, and 61.3% were incorrect. Similarly, only 38.7% knew the correct chest compression procedures, with 61.3% providing incorrect answers.

The table reveals that knowledge about CPR's indications, methods, and effectiveness varies widely among participants. For instance, 33.8% correctly identified CPR as an emergency procedure, but an equal percentage were unsure. While 56.3% knew CPR could be performed outside hospitals, 25% were unsure. Only 38.8% understood the effective time window for CPR, and a mere 22.5% knew the appropriateness of artificial respiration in specific situations. Additionally, just 26.2% correctly believed in the high survival rate when CPR is performed by experienced personnel. These responses highlight significant gaps in knowledge, emphasizing the need for better CPR education and training.

Table 7 on knowledge levels of participants shows that 53.8% have average knowledge of Cardiopulmonary Resuscitation (CPR), while 46.3% possess good knowledge.

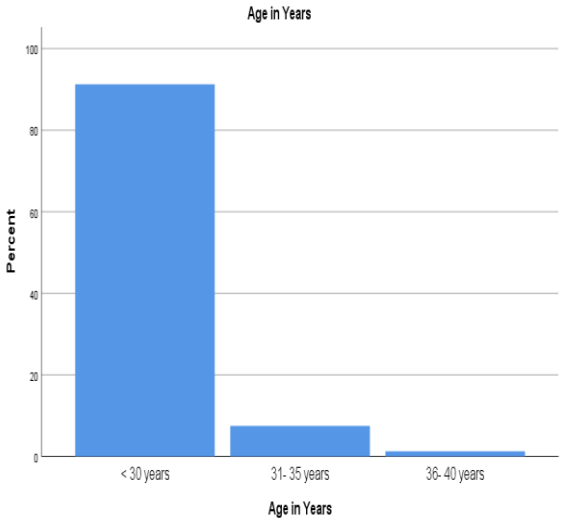

Figure 1 Age of participants

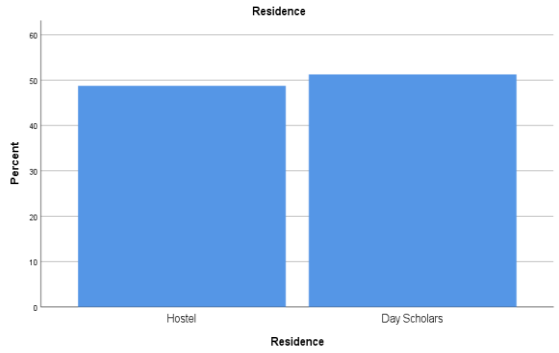

Figure 2 Residence of participants

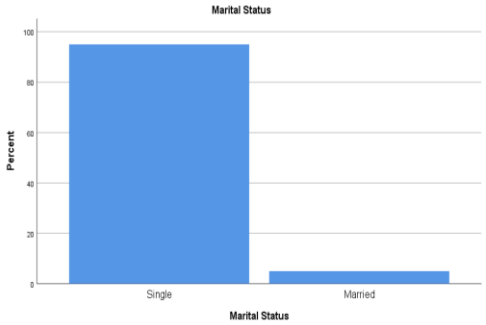

Figure 3 Marital Status of participants

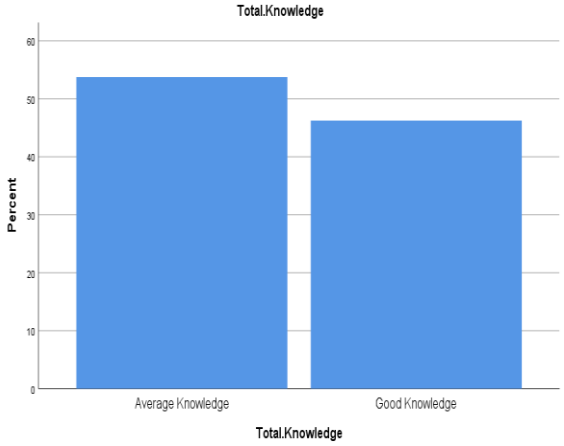

Figure 4 Total knowledge of participants.

Table 1 Age of participants

Age in Years	Frequency	Percent
< 30 years	73	91.3
31- 35 years	6	7.5
36- 40 years	1	1.3
Total	80	100.0

Table 2 Residence of participants

Residence	Frequency	Percent
Hostel	39	48.8
Day Scholars	41	51.2
Total	80	100.0

Table 3 Marital Status of Participants

Marital Status	Frequency	Percent
Single	76	95.0
Married	4	5.0
Total	80	100.0

Tale 4 General Knowledge Cardiopulmonary Resuscitation

Sr#	Statements	Yes f (%)	No f (%)	Don't Know f (%)
1	I am aware of the importance of CPR in clinical practice	20 (25%)	25(31.3%)	35(43.8%)
2	According to me, knowledge about the correct CPR procedure is mandatory for all healthcare professionals and it should be made compulsory	32 (40%)	18(22.5%)	30(37.5%)
3	I believe CPR is a basic emergency need for the betterment of mankind and health status	33(41.3%)	23(28.7%)	24 (30%)
4	I would like to participate in CPR awareness programs and have lifesaving experience	21(26.3%)	21(26.3%)	38(47.5%)
5	I believe CPR procedures are arduous, unethical, incorrect and purely inhuman	24(36.3%)	27(33.8%)	24(30%)
6	Rather than being beneficial, it is more harmful to the patients	26(32.5%)	26(32.5%)	28(35%)
7	Conducting CPR is simply a waste of manpower and time	34(42.5%)	19(23.8%)	27(33.8%)
8	Teaching and mastering CPR intervention should be made mandatory for all medical undergraduates	39(48.8%)	14(17.5%)	27(33.8%)

Table 5 Knowledge regarding the main goal and accuracy of Cardiopulmonary Resuscitation

Sr#	Statements	Correct f (%)	Incorrect f (%)
I	The purpose of cardiopulmonary resuscitation (CPR)	37 (46.2%)	43(53.8%)
2	The current order of updated cardiopulmonary resuscitation (CPR) intervention for all age groups except newborns is	41(51.2%)	39(41.8%)
3	The recommended universal compression-to-ventilation ratio with a compression rate of at least 100 per minute in all groups is	31(38.7%)	49(61.3%)
4	Regarding chest compression, the following procedures are recommended	31(38.7%)	49(61.3%)

Tale 6 Knowledge Regarding Indications, Methods and Effectiveness of Cardiopulmonary Resuscitation

Sr#	Statements	Don't Know f (%)	False f (%)	True f (%)
1	CPR is an emergency procedure which is attempted to return life in cardiac arrest	27(33.8%)	26(33.5%)	27(33.8%)
2	It has to be attempted always inside of a hospital not outside	20(25%)	15(18.8%)	45(56.3%)
3	CPR is only effective within 6–7 minutes of the stoppage of blood flow to vital organs	27(33.8%)	22(27.5%)	31(38.8%)
4	Artificial respirations are more appropriate than CPR if a person is not breathing but has a palpable pulse	26(32.5%)	36(45%)	18(22.5%)
5	On average, 85–90% of people who receive CPR survive if conducted by experienced personnel	27(33.8%)	32(40%)	21(26.2%)
6	The brain may sustain damage after blood flow has been stopped for about 4 minutes and irreversible-damage after about 7 mins	15(18.8%)	35(43.8%)	30(37.5%)
7	According to a recent survey people with no connection to the victim are more likely to perform CPR than a member of their family	15(18.8%)	43(53.8%)	22(27.5%)
8	If blood flow ceases for>10 hrs, virtually all cells of the body die	21(26.3%)	30(37.5%)	29(26.3%)
9	CPR is generally continued until the person regains return of spontaneous circulation or is declared dead	16(20%)	32(40%)	32(40%)
10	A defibrillator is an electrical device used shock to the heart and is needed to restore a viable or "perfusing" heart rhythm	17(21.3%)	38(47.5%)	25(31.3%)
11	Compression-only CPR by the lay public is recommended for an adult having cardiac arrest out of hospital	23(28.7%)	23(28.7%)	34(42.5%)
12	The survival rate is very high if immediate CPR is done followed by defibrillation within 3–5 minutes of sudden cardiac arrest	25(31.3%)	23(28.7%)	32(40%)
13	Compression-only CPR is less effective in children than in adults, as cardiac arrest in children is more likely to have a non-cardiac cause	24(30%)	33(41.3%)	23(28.7%)
14	It is always better to be calm and contented while conducting CPR rather than look frightened	21(26.2%)	40(50%)	19(23.8%)
15	CPR is often severely misrepresented in movies and television as being highly effective in resurrecting a person who is not breathing and has no circulation	20(25%)	32(40%)	28(35%)

Table 7 Total Knowledge of participants regarding CPR

Knowledge Level	Frequency	Percent
Average Knowledge	43	53.8
Good Knowledge	37	46.3
Total	80	100.0

Discussion

The age distribution of the participants in this study reveals that the vast majority (91.3%) are under 30 years old. This finding is consistent with previous research indicating that nursing programs typically attract younger students who have recently completed secondary education. For instance, a study (9). Found that 85% of nursing students were under the age of 30, highlighting a trend towards younger cohorts in nursing education.

This youth-dominated demographic can influence the effectiveness of different teaching methods. Younger students may be more receptive to innovative and technology-enhanced learning approaches, as noted by Brown and Green (2021), who found that younger students showed higher engagement and better performance with digital learning tools compared to older students. Therefore, understanding the age distribution can help educators tailor their teaching strategies to maximize student engagement and learning outcomes.

The residence status of participants in this study is nearly evenly split between hostel residents (48.8%) and day scholars (51.2%). This balanced distribution contrasts with some previous studies where a higher proportion of students resided on campus. For example, a study (11). Reported that 60% of nursing students lived in hostels. The current findings suggest that commuting is a significant aspect of student life for many nursing students.

This division in residence status has implications for the design and delivery of educational programs. Hostel residents may benefit from more immersive academic environments and greater access to peer support, as noted

(12). Who found that on-campus students often have higher academic performance due to better access to resources and support networks? Conversely, day scholars may face challenges such as time management and travel fatigue, which can impact their academic performance. Therefore, educational institutions should consider flexible scheduling and provide additional support for day scholars to ensure equitable academic opportunities.

The marital status distribution in this study shows that the overwhelming majority of participants (95.0%) are single, with only 5.0% being married. This pattern aligns with the findings of similar studies, such as that (13). Which reported that 92% of nursing students were single. The low percentage of married students suggests that most students do not have significant family responsibilities, which can affect their availability and focus on their studies.

Marital status can significantly influence students' academic experiences and needs. Single students, who typically have fewer personal commitments, may have more flexibility to engage in academic and extracurricular activities. In contrast, married students may require additional support to balance their studies with family responsibilities. Previous research by Taylor and Francis (2019) highlighted the importance of providing targeted support services for married students to help them manage their dual roles effectively. Understanding the marital status of students can therefore aid in developing support mechanisms that cater to their specific needs, promoting better academic outcomes.

The result on participants' knowledge levels of Cardiopulmonary Resuscitation (CPR) indicates that 53.8% have average knowledge, while 46.3% possess good knowledge. This distribution of knowledge levels among nursing students is crucial for understanding their preparedness in handling emergency medical procedures. Comparing these findings with previous literature, we observe some significant trends (14). Found that only 30% of nursing students had good knowledge of CPR, which is significantly lower than the 46.3% observed in our study. This improvement could be indicative of enhanced CPR training programs or curricular enhancements over the past decade. Similarly, Nyman and Sihvonen (2000) reported that around 40% of nursing students had good knowledge of CPR, suggesting a positive trend over time.

In the context of practising healthcare professionals (15). Found that 50% had good knowledge of CPR, which is comparable to the findings in our study. This suggests that our nursing students are on par with practising professionals regarding CPR knowledge, which is a positive indicator for their future clinical practice. The effectiveness of teaching methods plays a significant role in these knowledge levels. Studies (16, 17) demonstrated that interactive and collaborative teaching methods, such as the Jigsaw technique, significantly improved CPR knowledge and skills among nursing students. The relatively high proportion of students with good knowledge in our study supports these findings, indicating that the use of varied and interactive teaching strategies may be beneficial.

The study has several limitations that should be considered. The small sample size, restricted to a single institution, limits the generalizability of the findings to other contexts. The cross-sectional design also prevents the assessment of knowledge changes over time or the long-term effects of different teaching methods. Additionally, the study does not consider other potential influences on CPR knowledge, such as prior training, practical experience, or individual learning preferences. The significant relationship found between residence and knowledge level highlights the need for further exploration of environmental and social factors within hostels that may impact learning outcomes.

Conclusion

In conclusion, this study reveals that the majority of nursing students are under 30 years old, with a nearly even split between hostel residents and day scholars, and most participants are single. The findings indicate that 53.8% of the students have average knowledge of CPR, while 46.3% have good knowledge.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-SNU-023/23)

Consent for publication
Approved

Funding
Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

MUHAMMAD SABIR MEMON (Charge Nurse)
Coordination of collaborative efforts.
Study Design, Review of Literature.
HAROON JAVED (Male Nurse)
Conception of Study, Development of Research Methodology Design, Study Design, manuscript Review, and final approval of manuscript.
Conception of Study, Final approval of manuscript.
HUMAIRA SADDIQUE (Assistant Professor)
Manuscript revisions, critical input.
Coordination of collaborative efforts.
RUBINA JABEEN (Principal, Nursing)
Data acquisition, and analysis.
Manuscript drafting.
Data entry and Data analysis, drafting article.

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