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Cardiopulmonary resuscitation: knowledge among nurses in selected departments of a teaching hospital, Nepal

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Abstract

Introduction: Cardiopulmonary Resuscitation (CPR) is considered a core emergency skill in which all health care professionals must be proficient. If early basic life support CPR is instantiated, the survival rate is improved. This study aims to assess the knowledge regarding CPR among nurses.

Method: A descriptive cross-sectional study design was adopted among 150 nurses in critical care area of Patan Hospital Lalitpur Nepal, from January to April 2023. Researcher developed self-administered structured questionnaire was used for data collection. Statistical Package for Social Sciences (SPSS) version 20 was used for statistical analysis. Ethical approval was taken from the Institutional Review Committee of Patan Academy of Health Sciences.

Result: Study revealed that majority 143(95.3%) of the respondents had knowledge regarding meaning of sudden cardiac death. Same as 137(91.3%) knew the indication of CPR and most of the respondents 140(93.3%) knew the carotid pulse should be checked before starting CPR. More than half 131(87.3%) had knowledge regarding ratio of chest compression. We found more than half respondents 83(55.3%) knew the best time to switch. Nearly half of the respondents 61(40%) knew the component of high-quality CPR whereas minority of the respondents; 20(13.3%) knew the algorithm of adult cardiac arrest.

Conclusion: Majority of the respondents had knowledge regarding meaning, indication, site of pulse taking, and ratio of chest compression. Whereas more than fifty percent respondents had knowledge regarding, best time to switch, nearly half of respondents knew the components of CPR. Minority of respondents aware the algorithm of adult cardiac arrest.

Keywords: cardio-pulmonary resuscitation, knowledge, nurses

Introduction

Cardiopulmonary resuscitation (CPR) is an important medical procedure that is performed in an effort to manually preserve intact brain function until further measures are taken to restore normal spontaneous blood circulation and breathing in a person in cardiac arrest.[1] Early and effective CPR increases both survival rate and post-arrest quality of life.[2] It is a combination of rescue breathing and chest compressions.[3] Cardiac arrest is one of the leading causes of death in the world. Globally, the incidence of out-of-hospital cardiac arrest ranges from 20-140 per 100,000 people, and survival ranges from 2% to 11%.[4] Cardiovascular diseases contributed to 26.9% of total deaths and 12.8% of total Disability-adjusted Life Years (DALY) in Nepal.[5] Recognition and early intervention in incidents of cardiac arrest save lives.[6] First-line treatment for saving lives following cardiac arrest is CPR.[7] High-quality CPR comprises adequate rate and depth, which allows for complete chest recoil, minimizing interruptions in chest compressions and avoiding excessive ventilation.[8] Effective cardiopulmonary resuscitation thus requires nurses to possess appropriate attitudes, competencies, and adherence to the best nursing practice.[9] Inadequacy in any step of CPR due to lack of knowledge or skill is associated with poor return of spontaneous circulation and decreased survival rate.[10] The study done at a teaching hospital in Nepal reported only 2% had adequate knowledge regarding CPR among nursing personnel.[11] Similarly, another study done at Father Muller Medical College Hospital Mangalore India reported that 3.4% had adequate knowledge of CPR among staff nurses.[12] The objective of the study is to assess the knowledge regarding CPR among nurses.

Method

A quantitative descriptive cross-sectional design was used to assess the knowledge regarding Cardiopulmonary Resuscitation among nurses in critical care units i.e. Medical Intensive Care Unit, Surgical Intensive Care Unit, Operation Theatre, High Dependence Unit, and Emergency Department of Patan Hospital, Lalitpur, Nepal from January to April 2023. The study was approved by the Institutional Review Committee (IRC) of Patan Academy of Health Sciences (PAHS), Lalitpur, Nepal (IRC ref. no nrs2301241699). Patan Hospital is a tertiary-level hospital in Lalitpur District, Bagmati Province, Nepal. Non-probability enumerative sampling method was used. The total sample size was 166. Among them five respondents refused to participate, one respondent transferred to another ward, one respondent had service completed and one was on unpaid leave, while six respondents were nurse aids. Thus, the total sample size was 150.

A questionnaire on CPR was developed based on the American Heart Association Guidelines 2020, books, and research from e-journals. The tool was validated by three different experts in the related field. A self-administered questionnaire was used for data collection. The data collection proforma had two parts; Section I: Base-line proforma. It consisted of details related to the current working area, work experiences, level of education in nursing, and training related to CPR. Section II: Structured knowledge questionnaire on CPR consisted of 18 multiple choice questions; one question on meaning and one question on indication, 13 questions on process, and three questions on effectiveness related to CPR. Question number 1 related to meaning, question number 2 related to indication, question number 3, 4, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, and 18 related to process, and question no 5, 12, and 13 related to effectiveness of CPR.

Written permission was obtained from the Nursing Director of the Patan Hospital before data collection from nurses who were working in the selected departments of the hospital and were willing to participate in the study. The participation was voluntary. All the nurses of an identification number were kept on each questionnaire set before the distribution of the questionnaire. The master

list of names of the nurses with the code number was kept separately from the principal researcher so that respondents' names were not on the questionnaire set. The same identification number was put in the questionnaire set so that it could be correlated. The collected data was used for research purposes only. The self-administered questionnaire required approximately 10 to 15 minutes to complete. The questionnaire was distributed amongst the nurses who were asked to fill the questionnaire in the presence of researchers and then the completed questionnaire was collected on-site by the researchers and the research team. Data was collected from 1-2 nurses per day. The collected data from respondents were checked for completeness. The right answer was awarded a score of 1 and 0 for the wrong answer. The data were edited, classified, coded, categorized, and entered in SPSS version 20 and again checked, cleaned, edited, and coded for further analysis. The data were analyzed in descriptive statistics such as frequency, the percentage for categorical variables, and mean, SPSS version 20 was used for statistical analysis.

Result

Out of 150 nurses, 88(58.67%) nurses had Bachelor of Nursing (BNS) courses. Nearly one-fourth, 29(19.33%) had completed Bachelor Sciences in Nursing (B.Sc.) and the same number of nurses had completed a Proficiency Certificate Level (PCL) Nursing course, nearly half the respondents; 66(44%) had 1-5 y of work experience and only 14(9.33%) nurses had more than 10 y work experience, more than one third 48(32%) were working in Medical ICU (MICU) (followed by 14(9.33 %) in Surgical ICU (SICU), Table 1.

Among 150 nurses, 45(30%) had received CPR training, and 105(70%) had never received any training regarding CPR, Figure 1.

Regarding knowledge of CPR, 143(95.33%) correctly answered that "an abnormal rhythm develops and the heart stops beating unexpectedly" the meaning of sudden cardiac arrest, and 137(91.33%) answered "unconscious" and "pulseless" is the indication of CPR, Table 2.

Regarding knowledge of the process of performing CPR 45(30%) answered that "Shout for nearby help" is the immediate next action if the patient doesn't respond when you touch his shoulder and shout, "Are you OK?" 140 (93.33%) respondents answered carotid pulse should be checked before starting, and 100(66.67%) answered correctly about the right position for CPR in an adult. Regarding the sequence of CPR in an adult 113(75.33%) answered correctly, and 44(29.33%) answered correctly regarding the location of hands for performing CPR in an adult, and regarding depth for chest compression and rate of chest compression per minute in adults 34(22.67%), and 90(60%) answered correctly respectively, and

Table 1. Demographic characteristics of nurses who participated in the study for Cardiopulmonary Resuscitation, N=150

Characteristics	N(%)	Characteristics	N(%)
Level of education			
PCL Nursing	29(19.33%)	BN/BNS Nursing	88(58.67%)
B.Sc. Nursing	29(19.33%)	Master in Nursing	4(2.67%)
Total work experience in years			
<1	33(22.00%)	6 to 10	37(24.67%)
1 to 5	66(44.00%)	>10	14(9.33%)
Current working area			
MICU	48(32.00%)	HDU	15(10.00%)
Operation theatre	40(26.66%)	SICU	14(9.33%)
Emergency Ward	33(22.00%)		

PCL Nursing: Proficiency Certificate Level in Nursing; B. Sc. Nursing: Bachelor of Sciences in Nursing; BNS: Bachelor of Nursing Sciences; MICU: Medical Intensive Care Unit; HDU: High Dependency Unit; SICU: Surgical Intensive Care Unit

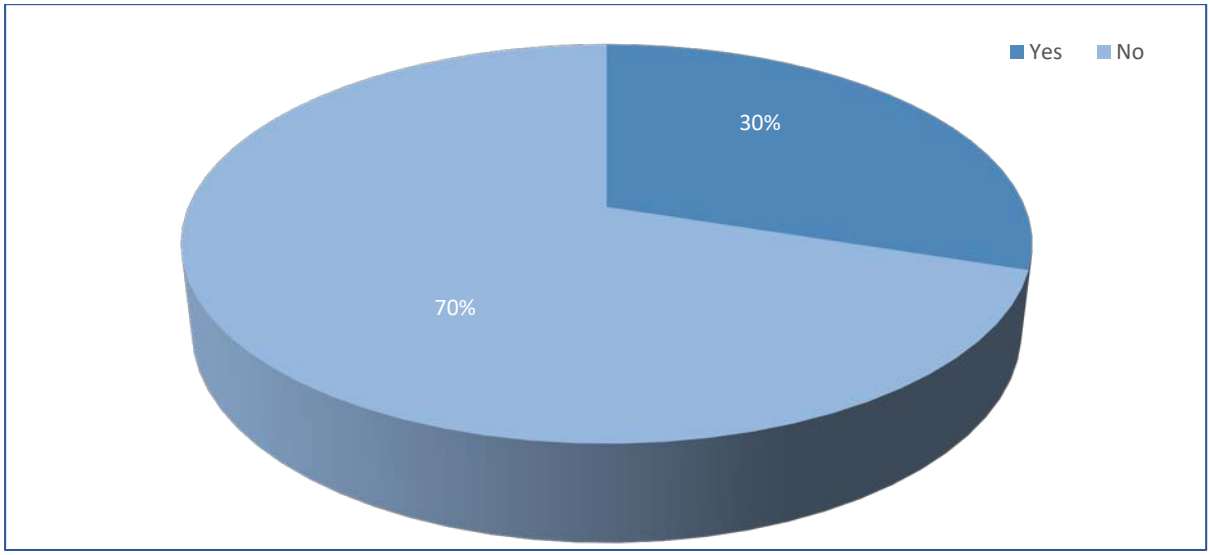

Figure 1. Training of nurses on CPR who participated in the study for CPR, N=150

Table 2. Knowledge among nurses regarding the meaning and indication of CPR, N=150

Characteristics	Correct N(%)	Incorrect N(%)
Knowledge regarding the meaning and indication of CPR		
Meaning of sudden cardiac arrest	143(95.33%)	7(4.67%)
Indication of CPR	137(91.33%)	13(8.67%)

Table 3. Knowledge among nurses regarding the process of performing CPR, N=150

Characteristics	Correct N(%)	Incorrect N(%)
Knowledge regarding process of performing CPR		
If the patient doesn't respond when you touch his shoulder and shout, "Are you OK?" what is your next action	45(30.00%)	105(70%)
Which Pulse should be checked before starting CPR	140(93.33%)	10(6.67%)
Right position for CPR in an adult	100(66.67%)	50(33.33%)
Sequence of CPR in an adult	113(75.33%)	37(24.67%)
The location of hands for performing CPR in an adult	44(29.33%)	106(70.67%)
The depth for chest compressions in adult	34(22.67%)	116(77.33%)
The rate of chest compression per minute in adult	90(60.00%)	60(40.00%)
The ratio of chest compressions to breaths when providing CPR to an adult	131(87.33%)	19(12.67%)
Best timing of defibrillation	96(64.00%)	54(36.00%)
The best time to switch for effective delivery of chest compressions	83(55.33%)	67(44.67%)
percentage of oxygen should be delivered	126(84.00%)	24(16.00%)
Basic maneuver for airway management	98(65.33%)	52(34.67%)
Method for opening airway during CPR in a suspected case of cervical neck injury	108(72.00%)	42(28.00%)

Table 4. Knowledge among nurses regarding the effectiveness of performing CPR. N=150

Characteristics	Correct N(%)	Incorrect N(%)
Knowledge regarding the effectiveness of performing CPR		
Spent for checking pulse before initiation of high-quality CPR	116(77.33%)	34(22.67%)
Component of high-quality CPR	61(40.00%)	89(60.00%)
Algorithm of adult cardiac arrest	20(13.33%)	130(86.67%)

131(87.33%) answered correctly regarding 30 compressions and two breaths as the ratio of chest compressions to breaths when providing CPR to an adult, 96(64%) were aware of the best timing of defibrillation, and 83(55.33%) agreed that two minutes is the best time to switch for effective delivering of chest compressions and 126(84%) believed that the 100% oxygen should be delivered during resuscitation to correct hypoxemia and improve tissue oxygenation and 98(65.33%) answered correctly the basic maneuver for airway management same as 108(72%) answered correctly regarding the method for opening the airway during CPR in a suspected case of cervical injury, Table 3.

Regarding time spent checking pulse, 116(77.33%) knew the correct answer which was 10 s time spent checking pulse before initiation of high-quality CPR. Likewise, a component of high-quality CPR 61(40%) answered correctly that; "minimizing interruption in CPR" is the component of high-quality CPR, whereas only 20(13.33%) answered correctly regarding the algorithm of adult cardiac arrest, Table 4.

Discussion

In the current study involving 150 respondents, 137(91.3%) gave the correct answer that "unconscious" and "found to be pulseless" are indications of CPR. A similar finding has been reported in a study from Jimma University, Ethiopia among 243 medical students, the majority of 193(79.8%) respondents had identified the major indication of CPR.[1] This might be because they have sufficient knowledge regarding the indication of CPR. However, the findings of this study are contradictory to the findings of the study from Malawi East Africa which showed that among 61 nurses of the adult general ward, 39(53%) respondents knew the indication of CPR.[13] Similarly the finding has been reported by yet another study from Europe which showed that among 1012 medical students from 99 different universities and 14 different countries, nearly fifty percent 498(49.3%) knew that 'unresponsiveness' and 'absence of normal breathing' are the indications of CPR.[14] This might be due to insufficient medical education. The results suggest the importance of continuous learning for healthcare professionals to reinforce their knowledge and ensure that they remain updated with the latest guidelines and practices.

In the present study, most of the respondents 140(99.3%) correctly replied that carotid pulse should be checked before starting CPR. A similar finding has been reported by a study from Kathmandu, Nepal which showed that among 145 teaching faculties of clinical (MBBS, Nursing) or non-clinical (MSc, BDS) background and residents of post-graduate programs in Basic Medical Sciences majority of respondents 124(86%) had given right answer regarding site for checking pulse in an apparent cardiac arrest.[15] This might be due to widely accepted guidelines. CPR guidelines are often based on international standards provided by organizations like the American Heart Association (AHA) or the International Liaison Committee on Resuscitation (ILCOR). In contrast, the finding has been reported by a study from Helsinki which showed that among 298 nursing students only nine (3%) respondents knew the carotid pulse should be checked before starting CPR.[16] This step is vital to ensure that CPR is administered to individuals who are actually in cardiac arrest. The consistency of this knowledge across different studies reinforces its importance and proper understanding among healthcare professionals.

The current study revealed that the majority of the respondents 113(75.3%) correctly replied to the sequence of CPR in an adult. In contrast, the finding has been reported by a study from Kathmandu Nepal which showed that among 145 Teaching faculties of clinical (MBBS, Nursing) or non-clinical (MSc, BDS) background and residents of post-graduate programs in Basic Medical Sciences Nearly half 74(51%) respondents had given right answer on the sequence of CPR in adult.[15] Another contradictory finding has been

reported from Kathmandu Nepal, which showed that among 50 nurses from intensive and high care units, more than half 31(62%) gave the right answer.[11] Another study from Turkey, showed that among 401 nursing students less than one-fourth 87(21.8%) of respondents replied incorrectly.[7] Another study from Malaysia showed that among 393 college students, only one-fourth 104(26.5%) knew the correct sequence.[8] These above findings suggest that healthcare professionals at our site are better trained and up-to-date on the correct sequence of CPR which is essential for effective resuscitation.

In the present study, nearly one-third of 44(29.3%) of the respondents knew the location of hands for performing CPR in an adult. In a similar finding a study conducted in Beni-Suef University Hospital, Upper Egypt showed that among 205 junior doctors and medical students (60 junior doctors and 145 medical students), nearly one third 27(45.0%) junior doctors and 56(38.6%) medical students knew the correct answer.[17] In a similar study it was found that in Bahir Dar, Ethiopia among 416(322 nurses and 94 physicians), 118(29.8%) respondents knew the correct answer.[18] In contrast, the finding has been reported by yet another study from Lahore which showed that among 724 doctors, more than half 484(66.9%) of respondents had knowledge about the location of hands for performing CPR in an adult.[19]

The variability in knowledge regarding the correct location of hands for performing CPR on adults is evident. This suggests that more emphasis should be placed on educating individuals about the proper technique for performing CPR to maximize its effectiveness.

The finding reported by a study from Selangor Malaysia showed that among 175 registered nurses, the majority 120(83.9%) respondents agreed that the 30 compressions and 2 breaths are the ratio of chest compressions to breaths when providing CPR to an adult.[20] In the present study we found the similar finding 131(87.3%) respondents gave correct answer regarding compression/breathing ratio. This suggests that many respondents have a good understanding of the appropriate balance between chest compressions and breaths during resuscitation. In contrast another study from Kathmandu, Nepal showed that among 50 nurses from intensive and high care units, more than half; 32(64%) gave the right answer.[11] The variation in findings could be attributed to the lack of CPR training and guidelines provided to nurses in these regions.

In the present study, we found that more than half of 90(60%) respondents were aware that 100-120 compression/minute is the perfect chest compression. In contrast finding a study conducted in Malmo, Sweden, showed that among 133 cardiovascular Nurses, 131(87.3%) respondents knew the right answer.[21] Also a contrasting finding from Botswana, shows that 154(48.2%) nurses indicated that they did not know the answer.[22] This suggests that the quality and extent of training programs available to healthcare professionals could play a crucial role in influencing their knowledge about critical medical procedures.

The current study revealed that one third 45(30%) of the respondents correctly replied that shout for help is the next immediate action if the patient doesn't respond when you touch his shoulder and shout, "Are you OK?" A similar finding from Karachi, Pakistan showed that among 140 nurses, one-fourth 35(25%) of the respondents gave correct answers.[23] This consistency highlights the universal nature of immediate action in healthcare emergencies and the potential effectiveness of standardized training programs. However, more research is needed to explore the nuances and factors influencing these responses further.

In the present study, we found that more than half of 83(55.3%) respondents correctly replied about the best time to switch for effective delivery of chest compressions. However, a study conducted in Witwatersrand, South Africa, reveals a lower level of knowledge among 133 nurses, with

only 30(23%) of the respondents providing the correct answer.[24] This suggests a potential gap in CPR training or awareness in that specific region.

The current study revealed that one-fourth of 34(22.7%) of the respondents correctly replied regarding the depth of chest compression during CPR. We found a similar finding from Karachi, Pakistan which showed that among 284 doctors 69(24.2%) of the respondents gave correct answers.[25] The consistency of these results indicates the need for targeted efforts to improve the understanding of CPR guidelines, specifically the depth of chest compression, among healthcare professionals. This improvement could have a significant impact on patient outcomes in emergencies.

Some of the limitations of the present study include; that it was limited to staff nurses of critical and high-care units in a single hospital and thus the findings may not be generalized in another setting.

Conclusion

The findings of the study among the nurses showed that most nurses have a good understanding of certain aspects related to site of pulse taking, ratio of chest compression of CPR. There are clear areas of improvement in their knowledge, particularly related to specific techniques, timing to switch, and algorithms. Addressing these gaps through targeted training and ongoing education can enhance the overall quality of CPR provided by nurses and improve patient survival rates during cardiac arrest events.

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Conflict of Interest

None

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None

Author Contribution

Concept, design, planning: RJ, RM, SM, RB; Literature review: All; Data collection/ analysis: All; Draft manuscript: All; Revision of draft: All; Final manuscript: All; Accountability of the work: All.

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