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ASSESSMENT AND PRACTICE REGARDING HIGH QUALITY CPR AMONGREGISTERED NURSES IN TERTIARY CARE HOSPITALS IN RAWALPINDI

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ABSTRACT

Nurses are first witnesses to in-, hospital sudden cardiac arrest. Assessing clinicians' knowledge of evaluating potential cardiac arrest patients and identifying cardiac arrest, evaluating clinicians' knowledge of appropriate decisions and actions during cardiopulmonary resuscitation (CPR), and identifying which advanced life support courses had been completed and whether they were still valid were the goals of this study, This was a descriptive, cross sectional survey, The subjects were registered nurses who worked in a tertiary care hospital, Using systemic random sampling, Nurses from tertiary care hospital were invited to participate. Those whoconsented were included, until a sample of 249 was obtained, Total number of questions answered correctly in each category was counted and scored. In all categories, there was a highly significantly associated, and moderate and highly significantly correlated to each otherin the same direction ($p<0.001$), The mean score was 21.6±6.96 for 33 questions. It was estimated as 65.63±7.84 out of 100 points. Total scoresare converted into percentages and divided into pre-fixed grades as follows: >80 as excellent (22.8%), 60–80 good(55.2%), and <60 poor (22%) as shown in graph 1.1, Knowledge of CPR is good among the nursing students. However, skills of CPR have to be improved by current training programs at regular intervals. Their knowledge and practical approach have to be updated with the current guidelines in CPR.(Anatol J Cardiol 2017; 17: 140-5)

Keyword: *cardiac arrest, cardiopulmonary resuscitation, future nurses, training programs*

INTRODUCTION

Cardiopulmonary Resuscitation (CPR) is a critical lifesaving intervention that requires prompt and effective action from healthcare professionals. Registered nurses (RNs) play a vital role in providing high-quality CPR in tertiary care hospitals, where complex and critically ill patients are often treated. Despite advances in medical technology and training, cardiac arrest remains a leading cause of morbidity and mortality worldwide. (1) High-quality CPR, as defined by the American Heart Association (AHA), involves the provision of timely, effective, and uninterrupted chest compressions, ventilation, and defibrillation. However, studies have shown that RNs' knowledge and practice regarding CPR may be inadequate, leading to suboptimal patient outcomes.In tertiary care hospitals, RNs face

unique challenges, including managing complex patient conditions, navigating high-acuity environments, and coordinating multidisciplinary care teams. These factors can impact RNs' ability to provide high-quality CPR, highlighting the need for ongoing cardiopulmonary resuscitation (CPR) is a critical lifesaving intervention that requires prompt and effective action from healthcare professionals. Despite advances in[1] medical technology and training, cardiac arrest remains a leading cause of morbidity and mortality worldwide, with approximately 200,000 patients affected annually in the United States alone. (2)

Registered nurses (RNs) play a vital role in providing high-quality CPR in tertiary care hospitals, where complex and critically ill patients are often treated. RNs are typically the first responders to cardiac arrests, and their actions can significantly impact patient outcomes. However, studies have shown that RNs' knowledge and practice regarding CPR may be inadequate, leading to suboptimal patient outcomes. (3)

The American Heart Association (AHA) emphasizes the importance of high-quality CPR, defined as timely, effective, and uninterrupted chest compressions, ventilation, and defibrillation. High-quality CPR can improve survival rates by up to 30%. Nevertheless, RNs face unique challenges in tertiary care hospitals, including:

Managing complex patient conditions
Navigating high-acuity environments
Coordinating multidisciplinary care teams
Staying up-to-date with rapidly evolving CPR guidelines (4)

These factors can impact RNs' ability to provide high-quality CPR, highlighting the need for ongoing education, training, and assessment.education, training, and assessment.

Early cardiopulmonary resuscitation (CPR) of cardiac arrest victims can improve the likelihood of survival. The foundation for CPR is basic life support (BLS).Clinical experience alone does not enable healthcare professionals to maintain or increase competency in BLS or advanced cardiac life support (ACLS).CPR is often poorly performed despite widespread training according to the guidelines (5).Hospital employed registered nurses must be proficient in BLS and advanced life support (ALS) to detect and manage emergencies. Hospital educators spend a significant amount of time training and maintaining biennial BLS courses for hospital nurses and other health care providers. However, there are several variables that might affect skill retention, including instructor variations, too much time between the course and actual practice, the complexity of the skill being taught, lack of supervision and feedback during learning, and insufficient practice.

CPR and emergency cardiovascular care guidelines are regularly renewed and published by the American Heart Association (AHA) and European regulation council (ERC). Formal training programs are conducted based on these guidelines. Formal certified BLS and ACLS training of healthcare professionals lead to definitive improvements in the outcome of CPR (6). However, very few evaluative studies are available in the literature. This study is undertaken to evaluate the long-term impact of formal certified CPR training program among nurses in a tertiary level referral superspecialty hospital in India and to identify self-reported outcomes of attempted CPR and training needs of nurses.

Literature Review

Cardiac diseases are a leading contributor to global mortality, accounting for approximately 30% of all fatalities (Abebe et al., 2021). Cardiopulmonary resuscitation (CPR) plays a vital role in providing essential life support and remains an effective initial response in cases of cardiac arrest (Nolan et al., 2019).(7) Stine et al. (2019) described CPR as a resuscitative medical procedure that involves a combination of rescue breathing and chest compressions until normal spontaneous blood circulation and breathing are restored. The potential of CPR to save lives during emergencies such as strokes, respiratory arrests, trauma, and airway obstructions is unquestionable (Nolan et al., 2019). (8)A successful resuscitation requires an integrated set of coordinated actions, including the immediate recognition of cardiac arrest, the activation of an emergency response system, high quality compressions, rapid defibrillation, effective

advanced life support, and integrated post-cardiac arrest care (Berg et al., 2020; Kurz et al., 2020). (9) In resource-limited settings, responding timely to a cardiac arrest poses considerable challenges due to lack of capacity to roll out trainings of healthcare providers; however even developed countries experience challenges with knowledge of, attitudes toward, and practice relating to CPR (Abebe et al., 2021). (10)Possessing the fundamental knowledge and skills, as well as the right mindset, is important for healthcare professionals if they are to deliver effective medical care (Ihunanya et al., 2020; Munezero et al., 2018; Zenani et al., 2022). (11)
The burden of cardiac arrest is on the raised, with global data suggesting a growing mortality rate. Several factors that can contribute to cardiac arrest include hypoxia and hypovolemia and imbalances in electrolytes including hypo-/hyperkalemia as well as hypo-/hyperthermia (Lee et al., 2019; Lott et al., 2021). (12)Other potential causes include coronary and pulmonary thrombosis, tension pneumothorax, cardiac tamponade, and cases of poisoning (Imazio& De Ferrari, 2021; Lee et al., 2019). Additionally, studies have highlighted obstetric hemorrhage and amniotic fluid embolism as inculded causes (Feldstein et al., 2022; Schaap et al., 2019).Within a hospital setting, thepredominant factor leading to high quality CPR is attributed to sudden cardiac-related conditions, which account for 60%, followed by respiratory insufficiency at 40% (Andersen et al., 2019). (13) Research suggests that undiagnosed inherited cardiac abnormalities and idiopathic ventricular fibrillation are additional causes of cardiac arrest (Steinberg et al., 2021). Performing high quality CPR has an important position in the chain of survival of adult cardiac arrest; thusit is crucial for nurses to possess up-to-date information so that cardiac arrest is recognized immediately and implemented effectively, including advanced life support and integrated post-cardiac arrest care (Berg et al., 2020; Soar et al., 2021). (14)Numerous healthcare regulatory bodies acknowledge that the American Heart Association (AHA) and European Resuscitation Council Guidelines have been regarded as a "gold standard" for the management of cardiac arrest and other life threatening emergencies (Rikhotso et al., 2021). Nurses, being the backbone of any health sector, are expected to initiate CPR in emergency situations (Tíscar-González et al., 2020; Umuhoza et al., 2021).A notable increase in survival rates has been observed in nations that have prioritized CPR training. A significant improvement in patient recovery and discharge rates has been observed in several well-developed nations, such as Sweden and Denmark, which have implemented a comprehensive CPR training policy (Uny et al., 2023). (15)Unfortunately, the implementation of CPR training is a costly endeavor that can only be afforded by highly industrialized countries that have the capacity to roll out training to both healthcare providers and the general population (Barnes & Paterson-Brown, 2017; Heeks&Ospina, 2019). There are inconsistencies in the evidence from lesser developed countries; some studies report that most nurses lack the required knowledge to detect initial signs of cardiac arrest, perform a carotid pulse assessment, and use a defibrillator (Chaudhary et al., 2023; Rajeswaran et al., 2018; Sachdeva, 2020; Veronese et al., 2018), while others report that health workers, including nurses, have adequate knowledge and a good attitude regarding CPR (Botes&Moepeng, 2020; Mersha et al., 2020). For this reason, there isan urgent need to investigate nurses' knowledge, attitudes, and practice in a less developed country, where no studieson this topic have been conducted.(16)
CPR is still a developing science, despite a high number of non-communicable diseases such as hypertension, high cholesterol, and diabetic mellitus (MoHSS, 2017), as well as road accidents, all of which can lead to cardiac arrest (Adanu et al., 2020; Jones et al., 2020). CPR training is part of nursing training at both the undergraduate and postgraduate levels.(17)
Early initiation of cardiopulmonary resuscitation (CPR) manoeuvres and activation of the chain of survival are key factors in the prognosis of patients who have suffered a cardiorespiratory arrest (CRA) (Balcázar-Rincón, Mendoza-Solís& Ramirez-Alcántara, 2015). Therefore, it is important to understand and master CPR techniques, as these are the main determinants of success rates in CRA care, irrespective of the setting in which they are performed.Early

initiation of CPR manoeuvres is so important that over the past few years training efforts have targeted the general public, especially in primary and secondary schools (López-Messa et al., 2017; Hansen et al., 2017; Sorets&Mateen, 2015). This training has showed them how activate the chain of survival and initiate CPR manoeuvres as soon as possible.However, internationally some studies have reported a lack of knowledge among healthcare professionals, including nurses (Muñoz Camargo et al., 2019; Almeida et al., 2021; Medina-Hernando & Martinez-Ávila, 2013; Plagisou et al., 2015) and physicians (Balcázar-Rincón, Mendoza-Solís& Ramirez-Alcántara, 2019; Howell et al., 2017). Basic aspects of CPR, such as the correct compression and ventilation sequence, do not appear to be correctly understood by all healthcare professionals and it has been suggested that CPR training needs tobe improved in medical (López-Messa et al., 2019) and nursing schools (López-Messa et al., 2019; Medina-Hernando & Martinez-Ávila, 2013; Dal &Sarpkaya, 2017), as well as postgraduate training (Medina-Hernando & Martinez-Ávila, 2017).In 2019 the International Liaison Committee on Resuscitation (ILCOR) reported that basic and advanced life-support knowledge and skills are likely to deteriorate over a short period of time, approximately 3–6 months (Dal &Sarpkaya, 2018; MokhtariNori et al., 2017; Nolan et al., 2010), and it recommends periodic evaluationsto identify those professionals who need to refresh their knowledge and/or skills (Nolan et al., 2019).The reported incidence of intra-hospital cardiopulmonary arrest in Spain differs widely between, from one to five patients per 1,000 patients admitted, with an overall survival rate of 20% (Sandroni et al., 2019).

Nurses are generally the first healthcare professionals to detect CRA and activate the chain of survival at healthcare institutions (Nyman &Sihvonen, 2020) and it is crucial that they keep their knowledge and skills updated (Dal &Sarpkaya, 2017).Deciding whether to initiate and/or stop CPR manoeuvres is sometimes difficult, because ethical and legal issues may influence the decision-making process (Pyl& Menard, 2018; Püttgen&Geocadin, 2007).)Over the past 10 or 20 years most elderly patients institutionalized in the USA have died with a written limited therapeutic effort (LTE) order (Cherniack, 2019). Similarly, LTEs and the interest in ethical issues in clinical practice have also increased in other countries. Do not Resuscitate (DNR) decisions are part of LTE, and they can be affected by factors as functional and premorbid status, quality of life and probability of survival. A systematic review conducted by Cook (Cook et al., 2017), suggested that it could be ageism in some DNR decisions when the decisions don't take in accountother factors like the described before. International and local cultural, legal, religious and socioeconomic factors arevery important in the decision making too (Lippert et al., 2020).

Over the past few years, cardiopulmonary resuscitation (CPR) has received much importance. Various internationally and nationally accepted guidelines for CPR have been published, and formal training programmes based on these guidelines are being conducted by certified training centresworldwide.The aim of these training coursesis to impart both knowledge and understanding of CPR and to provide a standardised quality care to cardiac arrest victims in accordance with the specific guidelines.A lot of data are available on survival after CPR in different clinicalscenarios, but very few studies have been conducted to assess the effectiveness of formal resuscitation training programmes on the outcome of CPR. We designed a retrospective study to evaluate the impact of training nurses in theAmerican Heart Association (AHA)-certified basic life support (BLS) and advanced cardiac life support (ACLS) training course on the outcome of CPR in our hospital.

Methodology

The questionnaire was first conducted among registered nurses of Holy family Hospital Rawalpindi and Benzir Bhutto Hospital Rawalpindi. It had been designed according to 2015 AHA guidelines (8, 10 Although there is a minor 2020update (11) after the institutional ethical approval, we did not change the questionnaire (Questionnaire 1) because its statements are current according to the new guidelines. In

our study, selected 249 registered nurses from Holy family and Benzir Bhutto Hospitals Rawalpindi. The questionnaire comprised of three parts, first one dealing with general questions in regard to the importance of CPR in clinical practice, second one consisted of the main goal and accuracy of CPR intervention, and the last segment comprised of questions targeting the indication methods, and effectiveness of CPR. To understand the knowledge in depth and avoid bias, certain statements were deliberately reframed as negative questions. The answered questions were rewarded are follows: correct scores received positive points whether the questions were written in a negative manner or not, and the incorrect questions received no points.Data entry, scores, descriptive statistics were done using

Duration of study
The duration of study was Three months August, September, October of 2024.

Target Population
The target Population is Registered nurses working in Holy family Hospital Rawalpindi and Benzir Bhutto HospitalRawalpindi.

Sampling
Systematic random sampling technique was used for Sample.Sample taken from Holy family Hospital Rawalpindiand Benzir Bhutto Hospital Rawalpindi.

Sample Size
The sample size was 249 Nurses with the known sample calculation.

Inclusive criteria:
Registered Nurses only.

Exclusive criteria:
Student Nurses was not included.

Data Analysis
IBM SPSS software version 20. Was used for data analysis.Mean and standard deviations were used to present rawscores and other quantitative variables. Percentages were calculated and presented as either intervals of the scores or common categorical variables. Spearman correlations coefficient was evaluated to see relationship between scores. P values less than 0.05 were accepted as significant.
249 randomly chosen nurses who worked in the Holy Family and BBH hospitals participated in a cross-sectional study. Data collection was done using a cross-sectional study approach. A pretested structured questionnaire was used to gather data from research participants in public hospitals during August , September of 2024.

RESULTS AND DISCUSSION
Table 1. Percentage, Mean & Standard Deviation of responders to the general statements regarding the importance of cardiopulmonary resuscitation in clinical practice

No.	Statement	Mean	Standard Deviation	Yes (%)	No (%)	Don't know (%)
1	I am aware about importance of CPR in clinical Practice	1.20	0.480	84.0	12.4	3.6
2	According to me, knowledge about correct CPR procedure is mandatory to all health care professionals, and it should be made compulsory	1.24	0.489	78.8	18.4	2.8
3	I believe CPR is a basic emergency need for the betterment of mankind and health status	1.34	0.529	69.2	28.0	2.8
4	I would like to participate in CPR awareness programs and have lifesaving experience	1.37	0.602	69.6	24.0	6.4

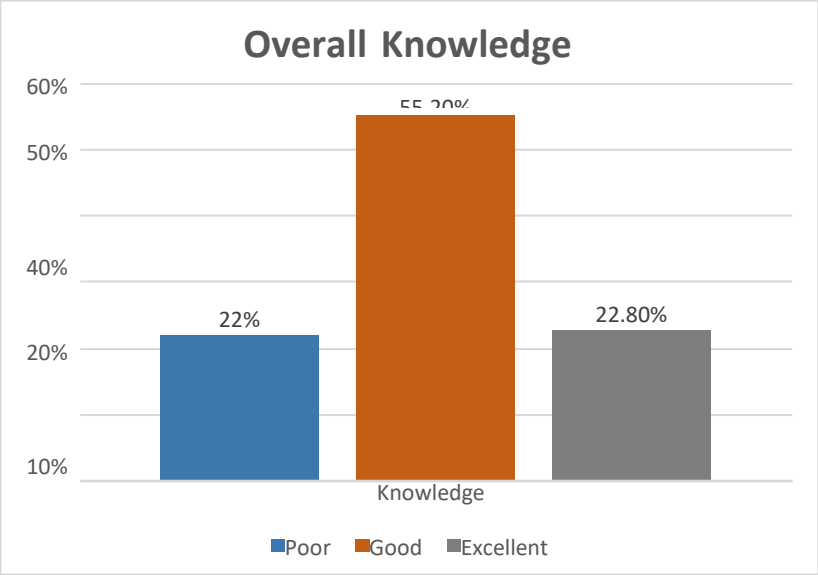
5	I believe CPR procedures are arduous, unethical, incorrect and purely inhuman	1.92	0.547	19.2	69.6	11.2
6	Rather than being beneficial, it is more harmful to the patients	2.12	0.609	13.2	61.6	25.2
7	Conducting CPR is simply a waste of man power and time	1.66	0.537	36.8	60.0	3.2
8	Teaching and mastering CPR intervention should be made mandatory to all medical undergraduates	1.40	0.614	66.8	26.4	6.8

Table 2. Percentage, Mean & Standard Deviation of responders to the statements regardingthe indications, methods and effectiveness of cardiopulmonary resuscitation

No.	Statement	Mean	Standard Deviation	True (%)	False (%)	Don't know (%)
1	CPR is an emergency procedure which is attempted in an effort to return life in cardiac arrest	1.32	0.555	72.0	23.6	4.4
2	It has to be attempted always inside of a hospital not outside	1.78	0.550	28.8	64.8	6.4
3	CPR is generally only effective if performed within 6–7 minutes of the stoppage of blood flow to vital organs	1.58	0.799	62.0	18.4	19.6
4	Artificial respirations are more appropriate than CPR, if a person is not breathing but has palpable pulse (i.e.,respiratory arrest)	1.41	0.576	63.2	32.4	4.4
5	On average, 85–90% of people who receive CPR survive if conducted by experienced personnel	1.58	0.852	65.6	10.4	24.0
6	The brain may sustain damage after blood flow has been stopped for about 4 mins and irreversible damage after about 7 mins	1.40	0.544	24.0	34.0	2.8
7	According to the recent survey people with no	2.06	0.560	12.8	68.4	18.8

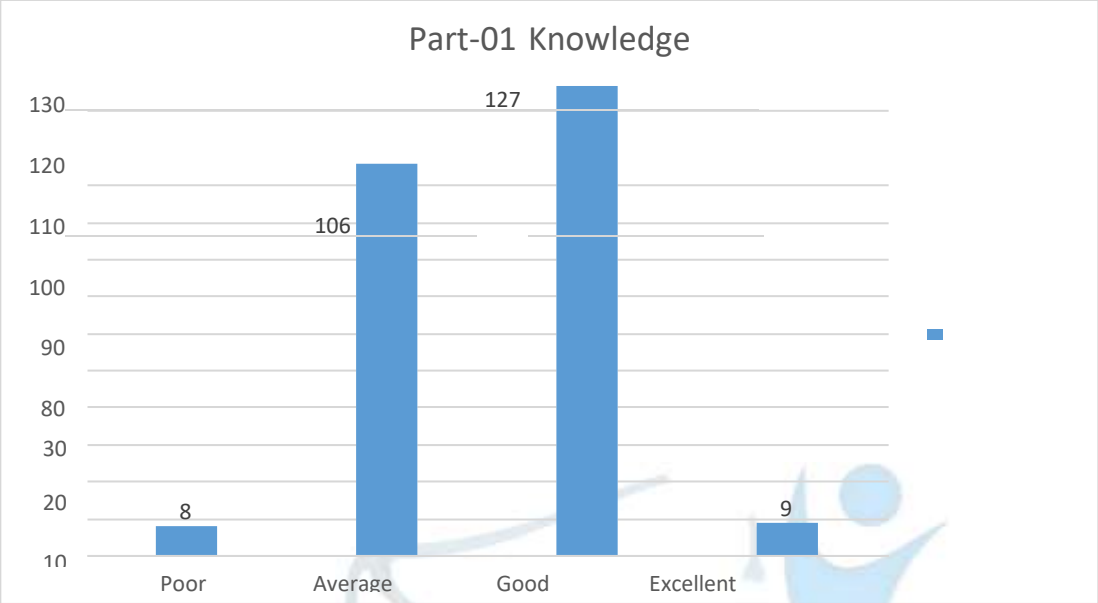
	connection tothe victim are more likely to perform CPR than a member of their family					
8	If blood flow ceases for>10 hrs, virtually all cells of the body die	1.53	0.689	58.0	30.8	11.2
9	CPR is generally continued until the person regains return of spontaneous circulation or is declared dead	1.37	0.589	68.4	26.0	5.6
10	Defibrillator is an electrical device used as shock to the heart and needed to restore a viable or "perfusing" heartrhythm	1.44	0.693	67.6	20.8	11.6
11	Compression-only CPR by the lay public is recommended to an adult having cardiac arrest out of hospital	1.50	0.596	55.6	39.2	5.2
12	The survival rate is very high if immediate CPR is donefollowed by defibrillation within 3–5 minutes of sudden cardiac arrest	1.28	0.510	74.4	22.8	2.8
13	Compression-only CPR is less effective in children than inadults, as cardiac arrest in children is more likely to have a non-cardiac cause	1.99	0.570	16.8	67.6	15.6
14	It is always better to be calm and contented while conducting CPR rather than look frightened	1.49	0.756	66.8	17.2	16.0
15	CPR is often severely misrepresented in movies and television as being highly effective in resuscitating a person who is not breathing and has no circulation	1.99	.634	20.4	60.0	19.6

Graph 1.1
Knowledge and practice regarding high quality CPR amongexperience or newly graduate nurses in tertiary care hospitalN=250



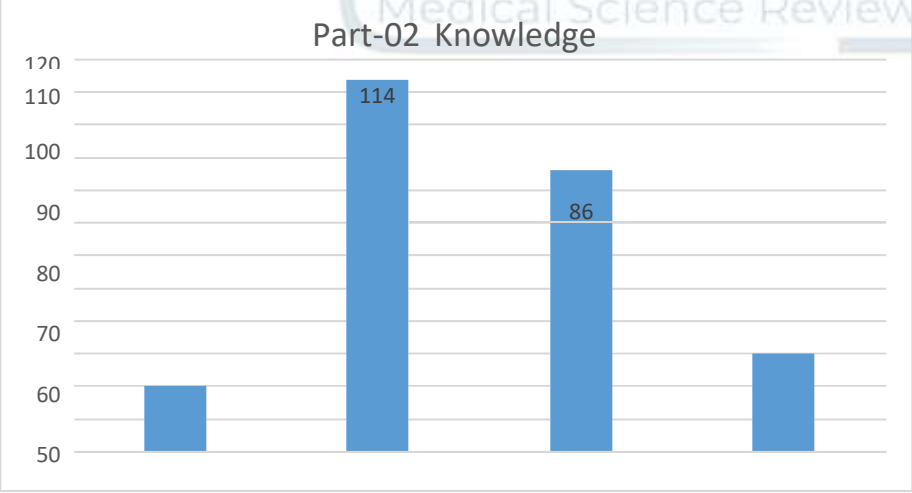
The above graph shows that out of 100%, 22% samples had poor knowledge. 55.2% samples had good knowledge. 22.8% samples had excellent knowledge

Graph 1.2
Knowledge regarding importance of cardiopulmonaryResuscitation (CPR) in clinical practice
N=250



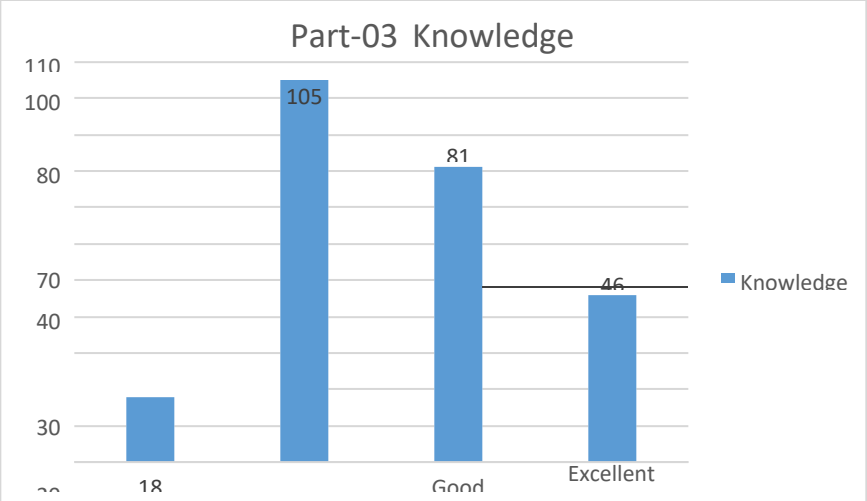
The above graph shows that out of 250 samples, 8 sample had poor knowledge. 106 samples had average knowledge. 127 samples had good knowledge. 9 samples had excellent knowledge.

Graph 1.3
Knowledge regarding the main goal and accuracy of cardiopulmonary resuscitation (CPR) intervention
N=250



The above graph shows that out of 250 samples, 20 sample had poor knowledge. 114 samples had average knowledge. 86 samples had good knowledge. 30 samples had excellent knowledge and Effectiveness of Cardiopulmonary ResuscitationN=250

Graph 1.4
Knowledge regarding indications, Methods



The above graph shows that out of 250 samples, 18 sample had poor knowledge. 105 samples had average knowledge. 81 samples had good knowledge. 46 samples had excellent knowledge. Total number of questions answered correctly in each category was counted and scored. In all categories, there was a highly significantly associated, and moderate and highly significantly correlated to each other in the same direction ($p<0.001$).

The mean score was 21.6±6.96 for 33 questions. It was estimated as 65.63±7.84 out of 100 points. Total scores are converted into percentages and divided into pre-fixed grades as follows: >80 as excellent (22.8%), 60–80 good (55.2%), and <60 poor (22%) as shown in graph 1.1.

Graph 1.2 shows knowledge regarding importance of Cardiopulmonary Resuscitation (CPR) in clinical practice. Overall mean was 5.572 out of 8 which is equivalent to 69.65 out of 100. Out of 250 samples, 8 sample had 1-3 answers correct which we marked as poor knowledge having 3.2%. 106 samples had 4-5 answers correct which we marked as average knowledge having 42.4%. 127samples had 6-7 answers correct which we marked as good knowledge having 50.8%. 9 samples had all 8 answers correct which we marked as excellent knowledge having 3.6% overall.

Graph 1.3 shows knowledge regarding the main goal and accuracy of cardiopulmonary resuscitation (CPR) intervention. Overall mean was 6.008 out of 10 which is equivalent to 60.08 out of 100. Out of 250 samples, 20 sample had 1-4 answers correct which we marked as poor knowledge having 8%. 114 samples had 5-6 answers correct which we marked as average knowledge having 45.6%. 86 samples had 7-8 answers correct which we marked as good knowledge having 34.4%. 30 samples had all 9-10 answers correct which we marked as excellent knowledge having 12% overall.

Graph 1.4 shows knowledge regarding indications, methods and effectiveness of Cardiopulmonary Resuscitation (CPR). Overall mean was 9.809 out of 15 which is equivalent to 65.39 out of 100. Out of 250 samples, 18 sample had 1-6 answers correct which we marked as poor knowledge having 7.2%. 105 samples had 7-9 answers correct which we marked as average knowledge having42%. 81 samples had 10-12 answers correct which we marked as good knowledge having 32.4%.46 samples had 13-15 answers correct which we marked as excellent knowledge having 18.4% overall.

Conclusion}

This questionnaire survey demonstrated that up-to-date CPR skills in Registered Nurses were good, which could be more improved by well-designed certified training programs. At least, certified programs training basic skills of CPR should be a mandatory component in the all health-related fields like medical, paramedical, and nursing colleges and faculties. From this study, we suggest that all members of our

community and especially health care professionalsshould join CPR training programs.

Limitation of Study

There are some limitations in our study. First, we have mostly regarded these empty statements under the estimation “do not know” when a statement is not indicated by participantsLimited CPR duration:

Short CPR durations may not reflect real-world scenarios.

Difficulty measuring CPR quality: Challenges in quantifying CPR effectiveness.

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