CARDIO-PULMONARY RESUSCITATION: KNOWLEDGE AND COMPETENCIES OF CHARGE NURSES WORKING IN PUBLIC HOSPITALS

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ABSTRACT

Cardiopulmonary resuscitation (CPR) is an emergency procedure performed in an effort to manually preserve intact brain function until further measures are taken to restore spontaneous blood circulation and breathing in a person who is in cardiac arrest.

This study was carried out to explore the existing knowledge & skills of charge nurses working in public hospitals about cardio pulmonary resuscitation.

A cross-sectional descriptive study was performed at the Nursing Department University of Health Sciences Lahore. One hundred charge nurses participated in this study. A self-administered structure questionnaire and observational check list were used to collect data from the study participants. A self-developed questionnaire containing 22 questions was distributed to the nurses and the filled questionnaires were analyzed as per the study objectives. A correct response was given a score of ‘1’ and the wrong responses were given a score of ‘0’. Resuscitation skills were tested by using the Anne manikin. The manikin was placed supine during the test.

Statistical Package for the Social Sciences (SPSS) version 20 was used for data analysis. The result was summarized by using both descriptive (frequencies and percentages, graphs, mean + SD etc.) and inferential (chi-square) statistics.

The mean± SD of the overall total knowledge scores was 9.67 ± 2.22 (the maximum possible score was 22). Mean skill score is 10.04 and standard deviation is ± 2.52 (the maximum possible score was 16). There was no significant association between the knowledge scores and skill scores.

From the finding, it was concluded that the majority of the nurses’ knowledge was found poor while skill is fair. It is recommended that CPR training programs should be implemented in all hospitals and nursing schools. Refresher courses should be arranged in periodic basis. Those nurses who are trained in providing CPR repetitive periodic CPR training sessions should be arranged to update their knowledge and skill.

Keywords: Cardiopulmonary resuscitation (CPR), Statistical Package for the Social Sciences (SPSS), American Heart Association (AHA), Knowledge and Competencies.

I. INTRODUCTION

Cardiopulmonary resuscitation (CPR) is a lifesaver in a fatal condition such as a heart attack or near drowning, in which victim’s respiration or heart has stopped its pumping action. It is a mix of chest compression and mouth-to-mouth breathing which provides oxygen and artificial blood circulation in lethal cases like respiratory arrest, airway obstruction trauma, stroke, and drowning. Cardiopulmonary resuscitation is not the definite treatment; it just keeps blood circulating in the body which results in uninterrupted supply of oxygenated blood to the brain. It will be a life-saver if it is promptly performed in a period of first golden 10 minutes by personnel who are competent and trained in resuscitation Techniques.
“CPR competency is the holding intellectual knowledge and psychomotor competence to perform CPR in a cardiac arrest cases” (Nori. M., 2012). Nurse’s proficiency in CPR is a crucial factor in patient outcome from cardiac arrest. Nurses are major working force in the health care system and because nurses are often the healthcare providers closest to the bedside and the first to respond to patient’s needs. Their knowledge and competencies in performing cardiopulmonary resuscitation are of great importance for the chance of survival after cardiac arrest. While most of the time, it has been observed that the actual management of patients by nursing staff is not up to the mark: there is often a failure to maintain a clear airway, ventilation is frequently suboptimum and external cardiac massage is often ineffective.

**CPR Guidelines**

According to American Heart Association (AHA) 2010 guidelines, successful resuscitation demands an integrated set of co-ordinate actions which is associated in the “Chain of Survival.” It includes the following:

- “Prompt identification of cardiac arrest and activation of the emergency response team.
- Early CPR with an emphasis on chest compressions.
- Quick defibrillations if required.
- Effective advanced life support
- Integrated post cardiac arrest care”.

**Recognition and Activation of Emergency Response**

If the adult causality is not responding with no respiration or gasping or having agonal breathing, the rescuer should activate the emergency response and rescuers should start CPR immediately.

**Chest compression**

It is the forceful rhythmic employment of pressure over the lower half of the sternum of the patient. Direct compression of the heart increases the intra thoraxes pressure, which results in increased blood flow. Chest compressions are the basic fundamental step of CPR. It is mandatory that at least Chest compressions should be provided to cardiac arrest cases. Chest compressions because of their usefulness are the basic CPR actions for all cases of cardiac arrest regardless of age.

**Guidelines**

- “All patients in cardiac arrest should receive chest compressions because Effective chest compressions are essential for the provision of blood flow during CPR.
- Compress the adult chest at a rate of at least 100 compressions per minute.
- Compression depth should be at least 2 inches/5 cm.
- Allow complete chest recoil after each compression.
- Minimize the frequency and duration of interruptions in compressions to maximize the number of compressions delivered per minute
- A compression-ventilation ratio of 30:2”

**Process**

- Make sure the victim is lying plane on their back at hard surface.
- Place dominant hand’s heal on the lower half of sternum
- Place the 2nd hand securely on the top of dominant hand.
- Press down firmly and smoothly, compress 2 inches/5 cm depth of the chest. Give 30 compressions at a rate of atleast 100 in a minute.

**Airway and Ventilations**

Airway opening (with a head tilt chin lift or jaw thrust) which, accompanied by rescue breaths promote oxygenation and ventilation. This procedure requires special training. It is difficult for a layperson and single rescuer. If the rescuer is inexpert in CPR techniques, he/she will provide hands only. For CPR (i.e. compressions without ventilation) trained single-rescuer will open the airway and will provide rescue breaths with chest compressions.
Guidelines

“Ventilation is mandatory for all those cases which have more chances of an asphyxia cause of the arrest e.g., cases of drowning of infants/child. Rescue breaths should be given by mouth-to-mouth or with bag-valve-mask to provide oxygenation and ventilation as under:

- Give each rescue breath over 1 second, Asynchronous with chest compressions.
- Give a sufficient tidal volume which will result in visible chest rise.
- Use compression to ventilation ratio of 30 chest compressions and 2 rescue breaths.
- Once an advanced airway is in place, rescuer will give rescue breath at regular rate of one breath after every 6 to 8 seconds and chest compression can be delivered without interruptions”.

Process

- Place one hand on the victim’s forehead and push with palm to tilt the head back.
- Place the other hand’ fingers under the lower jaw near the chin.
- Lift the jaw to bring the chin forward.
- Make sure that their head is titled back and their chin is lifted.
- Give 2 rescue breaths, taking about 1 second to complete each breath.

Statement of the Problem

It is general perception that a health care providers especially nurses have enough knowledge and competencies to deal with emergencies particularly cardiac arrest. But according to recent international research studies (Sita, P., Valarmathi, S. 2014, Marzooq, H., Lyneham, J. 2009.) findings are not so convincing. While in Pakistan no research study is done so far to know the nurse’s knowledge and skills of Cardiopulmonary resuscitation.

Despite of available opportunities, most of nurses are unable to acquire and update their CPR knowledge and skills.

In her own professional experience the researcher observed that due to sudden cardiac arrest many patients die in the hospital. The prognosis of cardiac arrest is very poor. In our country, we don’t have any data about the knowledge and skills of the charge nurses particularly working in public hospitals. The nurses are the backbone of the health care industry and most of the time they are the one who are the first responder to cardiac arrest. The investigator felt the need to know the existing knowledge and skills of charge nurses working in public hospitals.

Later the finding of this study can be used to plan the cardio pulmonary resuscitation program for nurses.

Purpose of the study

To explore the existing knowledge & skills of charge nurses working in public hospitals about cardio pulmonary resuscitation. Later the finding of this study can be used to plan the cardio pulmonary resuscitation program for nurses.

Objectives of the study

The objectives of this study were to:

1. Assess Cognitive Knowledge and Psychomotor Skills of charge nurses regarding CPR.
2. Identify the gaps between charge nurse’s current practices of CPR and international Guidelines.
3. Suggest in-service educational programs to get nurses trained in CPR processes.

Scope of the study

CPR is vital procedure which can increase the survival rate of highly fatal conditions of sudden cardiac arrest. Special equipment is not required for performing this procedure. It can be performed by lay persons as well as by medical personnel. However, for getting more productive outcome CPR should be provided according to latest international ILCOR guidelines. In clinical setup most of the health professionals including nurses are unaware of latest guidelines of CPR to deals with emergencies such as cardiac arrest. This study will provide baseline
information about the study topic. On the bases of study finding suggestions can be made for future in-service refresher courses for nurses.

High quality and sophisticated health care and well trained health professional, particularly nurses trained in CPR are required not only for the prevention of cardiac arrest but also it helps to decrease the mortality rate by providing promptly CPR. This study would reveal the existing knowledge and skills of charge nurses and indicates the need for emphasizing the necessity of using proper skills in CPR techniques.

**Significance of the study**

Word wild different studies have been done to determine the Nurses knowledge regarding CPR. The findings of these studies are not so convincing and majority of nurses had poor knowledge and skills of CPR. (Sita, P., Valarmathi, S.2014, Marzooq, H., Lyneham, J. 2009.) In Pakistan such studies to acquire the existing knowledge and skills of nurses regarding CPR have not been done so far. This study will provide base line data about CPR competencies of charge nurses.

Early initiation of CPR increases the probability of survival of cardiac arrest victim. The overall survival to discharge ratio after CPR is 12%. (H. Rafati, et al 2011). The survival rate can be increased further if CPR is performed by well-trained persons. The International Liaison Committee on Resuscitation (ILCOR) 2010 recommended that initial training in cardiopulmonary resuscitation should be included in the basic studies of all health care professionals. By knowing existing knowledge and skills of CPR, later CPR courses in accordance with the latest ILCOR 2010 guidelines can be arranged for Nurses. By doing this it will help to decrease the mortality rate with application of CPR guidelines in order to practice particularly in the case of cardiac arrest.

**Research Questions**

1. What is the existing knowledge and competencies of CPR among Charge Nurses working in public Hospitals?
2. Is CPR knowledge and practice of charge Nurses comparable to international guidelines?

**Hypothesis**

**H1:** There is probably significant difference in knowledge and competencies of charge nurses working in public hospitals regarding CPR in relation to international standards.

**II. DEFINITIONS OF TERMS**

**Cardiopulmonary Resuscitation**

It is an emergency medical intervention provided by one rescuer in an adult victim of cardiac or respiratory arrest. It is comprised of fast chest compressions to preserve artificial blood circulation and with rescue breathes.

**Knowledge**

It is the state of awareness or understanding with conscious mind. In this study, the

The researcher assesses the knowledge of cardio pulmonary resuscitation guidelines among charge nurses using a self-administered validated questionnaire.

**Cardiac arrest**

It is the sudden brief or lasting stoppage of the heartbeat. The cause can be ventricular fibrillation or systole.

**Charge Nurse:**

A healthcare professional with the cooperation of other health care providers is responsible for: management, protection, and recovery of acutely or chronically ill persons, health promotion and preservation within families,
communities and populations. This is a group of nurses who have successfully completed their basic education in nursing and working as a registered nurses in hospitals.

Registered Nurse or Licensed Nurse means a person who is issued a Diploma/Degree of registration as a licensed nurse under Sections 15 (c) i and 26 (2j) of Act-1973 and who holds a valid license.

**Rescuer**

A person who rescues someone from harm or danger

### III. LITERATURE REVIEW

**Importance of CPR**

CPR is one of the most often performed care interventions in the world. Approximately 30% to 40% of hospital admitted patients who are dying experience CPR. When cardiac arrest or critical emergencies occur, quick and expert response can be differentiation between life and death and between intact survival and debilitation. In the incident of cardiac arrest the purpose of every revival effort is to avoid hasty cardiovascular fatality. CPR is essential in order to oxygenate the blood and for the maintenance of optimum perfusion of vital organs. Blood flow and oxygenation are essential to convey oxygen to the tissues. Brain damage may start to occur subsequent to the stoppage of blood flow for about four minutes and permanent damage after about seven minutes.

High-quality chest compressions without interruption increase the chances of cardiac arrest survival. Studies show that there is overall survival to discharge ratio after CPR is 12%. (H. Rafati, et al 2011).

Post cardiac arrest survival rate is still low in spite of the worldwide beginning of cardiopulmonary resuscitation about 6 decades ago. The deliverance of CPR, with properly given chest compressions and ventilations, resulted in a considerable survival advantage in both animal and human studies. (Benjamin S. Abella et al 2005)

A cohort study from January 2000 through November 2009 was done by Girotra, et al (2012) to see the tendency in survival after In-hospital heart attack. The total cohort was 84,625 hospitalized patients in 553 hospitals with a confirmed cardiac arrest. All patients received CPR by specially trained personnel. Post-cardiac arrest survival rate has considerably improved. It increased from 13.7% to 22.3% in terms of rates of survival to discharge. Rates of clinically considerable neurologic impairment among survivors reduced from 32.9 percent to 28.1 percent.

A study was conducted in India in which they examined the effects of CPR training of all health care professionals on the outcome of cardiac arrest patients. They examined work in terms of comeback of spontaneous circulation and rate of survival up-to hospital discharge. The sample was 627 in-hospital cardiac arrests patients, out of these 284 were pre- CPR- training period and 343 were post- CPR- training period. In the pre- CPR- training period, 52 cases (18.3 percent) recovered, in comparison with 97cases (28.3 percent) in the post- CPR- training period. Survival to hospital discharge was also notably greater in the post- CPR- training period (67 cases, 69.1 percent) than in the pre-CPR- training period (12 cases, 23.1 percents) (Kanwalpreet, Manender, and Anupam 2011).

The survival of in-hospital cardiac arrest (IHCA) is about 5 times higher in comparison with out-of hospital cardiac arrest. It is also suggested that 17 cases/100,000 population/year can recover from in hospital cardiac arrest in contrast to 4 patient/100,000 population/year in the case of out-of-hospital cardiac arrest. This difference in increased survival rate of IHCA is because of early and quality of CPR (Fredriksson et al., 2010).

In a 12-year study from the Swedish Cardiac Arrest Registry and Herlitz et al. included more than 17,000 victims with eye-witnessed cardiac arrest, lay bystander CPR increases the survival rate by two folds at one month (6.2 percent) and health-care provider eye-witnessed CPR increased survival rate by three folds (10.8 percent) correlated with no bystander CPR (3.1 percent), CPR is a forceful act of intervening that sooner it is accomplished the better will be the survival rates.

A study was conducted by Iqbal Zafar in 1995 at Medicine Department, Shaikh Zayed Hospital, Lahore. 34 (18%) out of 188 patients with in-hospital heart attack, who received CPR over a period of 13 months, survived to leave the hospital. Most cardiac arrests (36%) occurred at the age of 60-69 years. He has concluded that incidence of successful outcome for in-hospital CPRs which has not changed significantly over the past twenty-five years.
A retrospective study was conducted by H. Rafati, ET all 2011 at Baghiathollah hospital Tehran, Iran, to know the survival after in-hospital cardiac arrest during 2001 to 2008 in which they have included the 2262 adult patients who underwent CPR. The overall survival to discharge ratio after CPR was 12%.

Numerous research studies have proved that cardiopulmonary resuscitation could be life-saving when administered either by health care professionals or non-professionals. In numerous large studies, the timely provisions of CPR act as a key analyst of survival. The prompt and quality bystander CPR may be nearly twice over the probability of survival after cardiac arrest.

The finding of research studies have revealed that the chance of survival after cardiac arrest falls by 10–15% each minute with no treatment, and well-performed CPR have high likelihood of survival. Moreover, current investigations have recommended that promptly performed CPR keeps the heart in a state which is more supportive for defibrillation. The survival of cardiac arrest victims is dependent on the quality of CPR. Today’s utmost concerns are the quality of CPR and adherence to established CPR guidelines.

**Process of CPR**

CPR is a critical intervention which can recover from the highly fatal state of sudden heart arrest. This maneuver does not necessitate particular equipment and can be administered by professional and non-professional in a similar way. Though, to be effective, CPR must be administering according to published performance guidelines.

The chances of success of resuscitation efforts after cardiac arrest depend upon quality of CPR (Chest compression depth, rate, and ventilation rate). If CPR is not managed appropriately, chances of survival from cardiac arrest will remain poor in patients. (Perkins et al., 2011)

During fatal cardiac arrhythmias which are common in cardiac arrest, if CPR is performed first, and then electrical shock, it has a greater chance of being successfully terminated. In a recent randomized trial which was done in Norway, the study finding recommended that in cases of prolonged cardiac arrest, delaying defibrillation in order to first provide several minutes of CPR considerably improved the victim survival after cardiac arrest.

Prompt as well as quality CPR have significant impact on post-cardiac arrest patients survival.

**Nurses Knowledge and skills of CPR**

A descriptive study was done to know the theoretical knowledge of nurses working in 16 units in seven cities in the region of Campinas, SP, Brazil concerning cardiopulmonary arrest and resuscitation. The sample size was 73 nurses. The data was collected through questionnaire. This study concluded that nurses have insufficient theoretical knowledge of cardiopulmonary resuscitation guidelines (Latino-Am, E. 2011).

A cross-sectional questionnaire-based study was done at the College of Medical Sciences-Teaching Hospital, Bharatpur, Nepal, among the nurses who were working in the hospital during October 2010. To inquire the Nurses Knowledge of Cardiopulmonary Resuscitation in above-mentioned institution. Self-developed validated questionnaires which contained 21 questions were used. 70 out of 175 nurses replied with 40 percent response rate. The study concluded that knowledge of the nurses was found poor and suggested the need for regular training for nurses.

A study was done on actual cardiac arrests to review the CPR performance of nurses at cardiac arrests. This research is conducted to inquire nurses' ability to initiate and maintain effective CPR; sample size was 50. The finding indicates that nurses effectively handled all segments of CPR in the majority of in-hospital cardiac arrest cases. These finding are different and in contrast from most of the studies which indicate lacking in nurses’ CPR knowledge and performance. One of the reasons for such contrary results can be that majority of the research studies have been done in simulated settings while Nurses' actual management of cardiac arrests in a contextual environment is considerably different (Boyde & Wotten, 2001). A quasi-experimental study was conducted at Teiside College of health, England, to know the preservation of fundamental CPR skills and knowledge of registered nurse. The finding states that if CPR courses are not regularly updated, they deteriorate quickly.
A repeated experimental study was conducted to examine the sustainable effects of cardiopulmonary resuscitation (CPR) reeducation on nurses’ knowledge and skills. They included one-sample group of 47 nurses working in general hospital. They were observed for their skills of CPR 3 times at an interval of 4 months. The result shows that Nurses’ skills between the first and second time dropped, but they improved between the second and third time because of the effects of reeducation. The study was concluded with that reeducation of CPR improves nurses’ knowledge and skills (Oh SI, Han S.S.2008).

IV. METHODOLOGY

Research design

A descriptive cross-sectional study design was used which is non-interventional type of research study. In this type of research study the researcher does not interfere with the factors in the study. The events are observed and recoded as they occur and did not modify anything during the study.

The descriptive study is the type of observational study in which disease or condition and possibly related factors are determined at a specific point in time with a defined population. This gives only picture of incidence and aspect of a circumstance or variables but not causes or effect relationship.

This study is done because no prior study has been conducted in Pakistan for nurses on cardiopulmonary resuscitation. The study was focused on knowing the existence nurses’ knowledge and skill.

Study Setting

The study was carried out as partial fulfillment of Master in Nursing Sciences program at the University of Health Sciences Lahore.

Duration of Research Study

The entire duration of the study was 12 months period starting from April 2014 to March 2015.

Study population

The nurses are population which is the integral part of the study. This is also known as targeted population (Polit & Beck 2006:258). In this study, population was registered nurses of all age groups, educational status, job area diversity, Nurses having professional experience of not less than five years of service. The selection was made on the basis of inclusion and exclusion criteria.

Sample Selection criteria

The Nurses are drawn as a sample of study from target population on the basis of following inclusion and exclusion criteria;

Inclusion criteria

According to Burns and Groves (2009:367), inclusion criteria in which characteristics of participants do meet to participate in the study. In this study, the following participants were included as:

Qualified/ fully trained nurses are having experience of 5 years and more.

Working in hospitals attached with teaching institutes.

Willing to participate in the study.

Exclusion criteria:

Exclusion criteria are the characteristics that respondents have lack of specifications or requirements, not to be included in the study (Burns & Groves 2009:367). In this study, the following participants were excluded as:
Nurses having worked/ trained abroad

Nurses working in pediatric department

Sample Size

Adequacy of sample size in research studies is an important task for researchers because the study is planned on it. Inadequate, inappropriate sample size may create ambiguity in results. The sample size was computed by the following formula keeping the power of study equal to 90% and the level of significance equal to 5%. The calculated sample size was 74.

\[
n = \left[ \frac{Z_{1-\beta} \left\{ \sqrt{P_1(1-P_1)} \right\} + Z_{1-\alpha/2} \left\{ \sqrt{P_0(1-P_0)} \right\}}{(P_1 - P_0)^2} \right] \times (P_1 - P_0)^2
\]

- \( Z_{1-\beta} = 90\% \) power of study = 1.28
- \( Z^2_{1-\alpha/2} = \) for 95% confidence level = 1.96
- \( P_1 = \) Anticipated prevalence = 65%
- \( P_0 = \) Actual Proportion = 80%
- \( n = \) Sample Size with 90% power of study = 74

The calculated sample size was 74, but for more statistical accuracy, I took 100 subjects from selected hospitals 25 from each hospital in this study. The difference of 15% is significant. (Marzooq, H., Lyneham, J. 2009 total 100 subjects the mean knowledge score was 42%)

Therefore, sample size consist of one hundred (n= 100) nurses because higher the sample size lower the margin of error. Polit et al. (2006:244) stated that the larger the sample, better the results. The limitation for data collection were insufficient budget, travelling issues, lack of interest of nurses.

Sampling Technique

Polit et al. (2006) depicted that sampling method or technique is the process in which researcher select the sample from a population and collect information regarding a phenomenon of interest. Through this method, the selection of population is made easy for the study. Therefore, the selection of participants from targeted population was through non-probability convenient sampling technique.

The non-probability convenient sampling technique involves selecting all those who may be conveniently available and agree to participate. Among the merits of this technique are that it is easier and manageable. It could also mean surveying friends or colleagues that the researcher has regular access to meet them, but the demerits are that it may not be possible to generalize the results to the universe. Here the selection involves ‘choice ‘and not ‘chance’. It has less chances of receiving representative sample.

Data Collection Method

Data was collected through a systematic process based on the logical sequence of predetermined steps by using convenience sampling technique and by self-prepared, validated questionnaire and checklist. No attempt was made to assess the nurses for their knowledge of drugs, the use of defibrillator. Resuscitation skills were tested by using the Anne manikin. The manikin was placed supine during the test. After completing the voluntarily and anonymously questionnaire, every participant attempted resuscitation on the manikin. The participants were asked to assume that it is a real patient who is lying still on the floor of hospital corridor to whom he/she had just discovered. There was no traumatic injury. Please demonstrate how you would address this situation.

Data Collection Instruments
A research instrument is a structured approach to collect data in which researcher is predetermined about and which way, the data will be collected. The researcher will outline some study-based questions to obtain desired information. Data is structurally collected by means of formal written document known as “instrument” and this can be of questionnaire and observation scale.

Based on past professional experience, a questionnaire for the Knowledge assessment and checklist were designed. An extensive related literature review based on ILCOR 2010 guidelines was reviewed. This is validated by subject experts such as doctors and researchers involved in resuscitation teaching and research.

Two research instruments were used in this study:

**Tool I: A questionnaire to assess Nurses knowledge**

This questionnaire consisted of 2 distinct sections.

**Section-A Nurses' bio-socio-demographic data:** consisted of contact information (optional) items including participant’s name, age, sex, address. Professional Background includes Professional education. Professional experience, working department, type/ nature of job, CPR training attended, Attempts of CPR.

**In section-B: Nurses' knowledge related to cardiopulmonary resuscitation**

Which is consisted of 22 multiple choice questions about CPR though which knowledge is acquire about the patients’ and rescue’ position during CPR, how to assess cardiac and respiratory system of the victims, uses of barrier devices while performing CPR, how to open air way, depth and rate of chest compression for adult, ratio of chest compression to breathing, critical characteristic of high-quality CPR, obstacle in performing CPR, when to stop CPR and complication of CPR.

One point is given to each correct answer while zero score was given to wrong answers. A total score was given to each participant (0 being the lowest and 22 being the highest possible score); the total scores were then converted into total score percent. The level of knowledge was categorized as poor (<50%), fair (50-75%) and good (>75%).

**Tool II: Nurses' performance related to cardiopulmonary resuscitation observational method based on checklist**

It includes 16 steps for adult victims related to CPR procedure to assess psychomotor skills of the nurses, the possible responses for each step were performed or not performed. One point is allocated to each correctly and completely performed step, while zero score was given to incomplete, wrong or not performed steps. A total score was given to each participant (0 being the lowest and 16 being the highest possible score); the total scores were then converted into total score percent. The level of performance was categorized as poor (<50%), fair (50-75%) and good (>75%).

**Data Collection process**

The data collection process started through pilot testing of the tool. Data was collected from twine city’s public hospitals. Formal approval was obtained prior to data collection from the following hospitals:

- Benazir Bhutto Shaheed Hospital, Rawalpindi.
- Holy Family Hospital, Rawalpindi.
- District Head Quarter Hospital, Rawalpindi.
- Pakistan Institute of Medical Sciences, Islamabad.

Informed consent was taken from each participant and enough time was given them to read questionnaire carefully and fill it as they truly perceived. All nurses were being ensured and informed that confidentiality will strictly be maintained regarding your information and will not be disclosed to any one of profession or in relationship.

**Ethical consideration**
The study was approved by the Ethical Review Committee in research University of Health Sciences, Lahore.

An official permission to carry out the study was obtained from the head of selected institutions. Study participants were invited to a separate room and they were asked to complete the questionnaire. The anonymity of the responder was provided by coding the questionnaire and checklist. Nurses' written consent to participate in the study was obtained after explaining the purpose of the study.

**Pilot study and findings**

Pilot testing of questionnaire was carried out in order to maintain tool’s internal validity and reliability. According to Gay, Mills and Airasian, (2006) pilot test is like “a dress referral” this means that initially study is conducted on small scale prior to the full-scale because researcher attempted to achieve some objectives. The validity and reliability of the instrument of the study was maintained.

Data for pilot study collected from specified population of 10 nurses by using questionnaire. The findings of pilot study revealed that content and language used in questionnaire were quite clear and easily understandable to the participants. No further changes or remarks were left on questionnaire by each participant when it was repeated to other participants but showed the same results with no changes. Therefore, instrument’s internal validity and reliability was maintained by using Cronbach’s alpha which was resulted 0.86. This showed good result and ready for full scale study. Giliem and Gliem (2003) stated that Cronbach’s alpha is the applicable test for pilot study on a small scale level study which maintained internal validity and reliability of instruments and scored ranged from 0 and 1 and ranked as under:

<table>
<thead>
<tr>
<th>Cronbach’s alpha</th>
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<tr>
<td>Excellent ≥0.9</td>
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<tr>
<td>Good ≥0.8</td>
</tr>
<tr>
<td>Acceptable ≥0.7</td>
</tr>
<tr>
<td>Questionable ≥0.6</td>
</tr>
<tr>
<td>Poor ≥0.5</td>
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<td>Unacceptable ≤0.5</td>
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**Data Analysis**

After collecting filled questionnaires from each participant, all forms were coded accordingly and each form was checked either fully filled or partially filled. All questionnaires’ data were entered into computer software as soon as possible by using Statistical Package for the Social Sciences (SPSS) version 20 for storage and analysis to avoid missing of entries or wrongly entered data.

The data was analyzed by using both approaches descriptive and inferential statistical methods. To summarize the results in descriptive statistics, mean ± standard deviation for quantitative variables like age. For qualitative variables, frequency, percentages and graphs were shown, like gender, type of professional education, working area, cardio-pulmonary resuscitation training, and attempts of CPR.

**RESULTS & DISCUSSION**

As there is lack of literature about nurse’s knowledge of CPR in Pakistan, therefore it is of valuable essence to inquire the existing knowledge and skill of charge nurses regarding CPR. This study was carried out to assess the current knowledge and competencies of charge nurses regarding CPR and to identify the gaps between current practices of CPR among charge nurses and standards.

This chapter includes the analysis, interpretation and discussion of the data which is collected for this study. The data was entered and analyzed by using Statistical Package for Social Sciences (SPSS) version 20.0. Collected data were analyzed and results of the study were discussed in three sections.

**Section 1:** refer to the description of participant Professional background characteristics which includes their Professional Education, Professional Experience, undergone cardio-pulmonary resuscitation training, ever done CPR by yourself.

**Section 2:** refers to the Knowledge assessment of charge nurses regarding adult CPR according to ILCOR 2010 guidelines with statistical analysis and discussion.
Section 3: Refers to the description of skill observation of charge nurses regarding adult CPR according to ILCOR 2010 guidelines with statistical analysis and discussion.

SECTION 1: Professional background analysis and discussion:

Data of one hundred (n=100) of study subjects were collected from the target population on the basis of the predetermined selection criteria. The response rate of participants was 100% because of convenient sampling.

Professional Education

According to professional education data search, it was found that 66 percent of participants were holding diploma in General nursing. 24 percent were having post basic diploma while 10 percent possess post- RN Bsc.N Degree. Majority of the nurses had diploma in general nursing. Trends to acquire higher education like post- basic diplomas, Post RN-BSc.N, is now emerging in Pakistan. There is no statistical significant difference between knowledge score (p-value = 0.297) and skill scores (p-value = 0.164) of nurses holding diplomas, post-basic diplomas, and Post RN-BSc.N degree)

Table -4.1

<table>
<thead>
<tr>
<th>Professional Education</th>
<th>Knowledge level</th>
<th>p-value</th>
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<tbody>
<tr>
<td></td>
<td>Poor n (%)</td>
<td>Fair n (%)</td>
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<tr>
<td>Diploma</td>
<td>47 (71.2)</td>
<td>19 (28.8)</td>
</tr>
<tr>
<td>Post Basic Diploma</td>
<td>13 (54.2)</td>
<td>11 (45.8)</td>
</tr>
<tr>
<td>Post RN BSc.N Degree</td>
<td>6 (60)</td>
<td>4 (40)</td>
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</table>
Working area of Majority (34 percent) of nurses are General ward. 26 percent in intensive care, 10 percent in coronary care unit, 12 percents in accident and emergency, 4 percent in dialysis unit, and 14 percents are working in other area of hospital.

After data analysis there is no statistical significant difference is found on knowledge score (p=0.295) as well as skill score (p=0.555) of nurses working in different departments.

The finding of the research study done by Mustafa 2014 support this study in terms of that there is no relationship between nurses’ knowledge score and working area.
For analysis and discussion on the number of participants according to professional experience it was found that 41 out of 100 nurses were having clinical experience of 5 years, 33% were having 6-10 years of experience, 13% were having 11-15 years of working experience and 13% were having 16 years and above of clinical experience as a charge nurse.

During statistical analysis nurses having 11-15 years, 6-10 years of working experience possessed better knowledge score when it was compared to the junior and senior nurses. But overall knowledge score of nurses including all groups were found poor that is less than 50%.

Nurses having 6-10 years of working experience perform better skill score while overall skill score of nurses belonging to all group is fair (50% - less than 75%).

<table>
<thead>
<tr>
<th>Professional Experience</th>
<th>Knowledge level</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor n (%)</td>
<td>Fair n (%)</td>
</tr>
<tr>
<td>5 years</td>
<td>31 (75.6)</td>
<td>10 (24.4)</td>
</tr>
<tr>
<td>6-10 years</td>
<td>18 (54.4)</td>
<td>15 (44.5)</td>
</tr>
<tr>
<td>11-15 years</td>
<td>7 (53.8)</td>
<td>6 (46.2)</td>
</tr>
<tr>
<td>16 years and above</td>
<td>10 (76.9)</td>
<td>3 (23.1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Professional Experience</th>
<th>Skill level</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor n (%)</td>
<td>Fair n (%)</td>
</tr>
<tr>
<td>5 years</td>
<td>9 (22.0)</td>
<td>29(70.7)</td>
</tr>
<tr>
<td>6-10 years</td>
<td>5(15.2)</td>
<td>25 (75.8)</td>
</tr>
<tr>
<td>11-15 years</td>
<td>2 (15.4)</td>
<td>9 (69.2)</td>
</tr>
<tr>
<td>16 years and above</td>
<td>2 (15.4)</td>
<td>8 (61.5)</td>
</tr>
</tbody>
</table>
Lunz et al. (2013) supported it by concluding that the perceived need for cardiopulmonary resuscitation training does not correlate with clinical experience. Self-assessment about the training-frequency need decreases while the period of clinical experience increases.

After the statistical analysis, it was examined that most of the charge nurses working in public hospital were not having any CPR training. 57 percent of the nurses had not been gone through any CPR training. 43 percent of the nurses responded that they had attended CPR training workshops. Those who participated in the CPR training workshops were on a little higher score according to the knowledge (Table 4.5) and skill (Table 4.6) statistical analysis as compared to those who did not get any CPR training. Even though the difference existed in both groups but it is not a statistically significant difference in terms of knowledge level (p-value = 0.871) and in skill score (p-value = 0.326). Passali et al. (2011) supported it by concluding that the study participant who had undergone CPR training resultant in better theoretical CPR knowledge.

<table>
<thead>
<tr>
<th>CPR Training</th>
<th>Knowledge level</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor n (%)</td>
<td>Fair n (%)</td>
</tr>
<tr>
<td>Yes</td>
<td>28 (65.1)</td>
<td>15 (34.9)</td>
</tr>
<tr>
<td>No</td>
<td>38 (66.7)</td>
<td>19(33.3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPR Training</th>
<th>Skill level</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor n (%)</td>
<td>Fair n (%)</td>
</tr>
<tr>
<td>Yes</td>
<td>6(14)</td>
<td>34 (79.1)</td>
</tr>
<tr>
<td>No</td>
<td>12 (21)</td>
<td>37(64.9)</td>
</tr>
</tbody>
</table>
The study subjects who went through any CPR training among them 23 percent were get trained from private institutions while 20 percent were get their CPR training from public institutions. After the statistical analysis it was examined that nurses who were trained from private institutions achieved higher knowledge as well as skill score as compared to those who get trained from public hospitals. The difference in knowledge score (p= 0.56) and in skill score (p= 0.50) among nurses who get trained in either in public or from private institutions is not statistical significant difference.

12 % which is the highest percentage of the study participants were trained in 2013. the lowest percentage which is 1% get training in 1995, 2001, 2007 and 2015.
75 percent of study subjects were having experience of doing CPR while 25 percent of nurses did not performed CPR in their entire professional experience. After statistical analysis it was observed that those nurses who had practical experience of doing CPR in their professional life not only performed better skills but also they obtained higher knowledge score.

Husna et al. (2011) supported it by concluding that experience of involvement in direct care contributed to the potential of more competencies and mastery of skill in nursing practice.

44% attempted 1-5 actual CPR and 12% practiced CPR resuscitation 6-10 times and 21% practiced CPR resuscitation on patient have better knowledge scores than nurses who had attempted 1-5 or more than 10 times actual CPR. While in skill score nurses who have attempted 1-5 actual CPR had performed better then rest of nurses.

**Section 2:-Knowledge assessment of charge nurses regarding adult CPR**

This section deals with distribution of Knowledge score of charge nurses regarding adult CPR.

22 multiple-choice questions were given in self-administered questionnaire to assess the participant knowledge level about CPR. The analyses of the participant response are displayed in Chart (4.9) that shows their best responses to each of the questions. Variation in the correct answer was found to each question might be because of the nature of question and understanding of the participant. More than 80% of the participants’ correctly responded to question no 1. Lowest correct responses were observed to question no-21. The remaining correct answered were ranging from 6 to 91%.
As the prime objective of conducting this research study was to assess the charge nurse’s existing knowledge of CPR according to pre-selected criteria of knowledge level. It was observed that none out of 100 nurses was having good knowledge as the participant corrected 75% or more than 75% of questions. 34 % of study subjects was having fair knowledge as they corrected 50% or more than 50% of questions. 66 percent which is the majority of nurses were having poor knowledge regarding CPR as they corrected less than 50% of the questions in the self-administered study questionnaires. The fields of lesser knowledge are the functions of body systems CPR artificially takes over (6 %) ratio of compressions to ventilation (10%) cause of airway obstruction in an unconscious patient (8 %), when to stop performing CPR (5 %).

The fields of higher knowledge are CPR abbreviation (95 %), cause of sudden death in adults (91%), uses of barrier devices (88 %).

The reasons of this poor knowledge among nurses are might be the lack of in-service CPR training opportunities, majority of the nurses working in public hospital are diploma nurses and degree nurses are very few according to their professional educational background.

The above-mentioned discussion justified that charge nurses do not have sufficient knowledge of current international CPR guidelines.

The same result was found in some previously done study. A study presented by Plagisou et al. (2015) declared that nurses had not enough knowledge about the CPR. The study findings were similar to the findings from few other countries as well. A study conducted by Sita, P., Valarmathi, S. (2011) at Nepal concluded that the nurses have poor knowledge regarding the CPR techniques. Xanthos Tet al (2012) 84% of study participants are fail in
BLS theoretical questionnaire which infers a low level of BLS knowledge among the nurses. Passali et al. (2011) concluded that in Greece nurses’ knowledge regarding CPR was sub-optimal.

**Section 3: Skill observation of charge nurses regarding adult CPR**

![Chart-4.11](image1)

11 out of 100 participants were having good skill as the participant performed 75% or more than 75% of skill. 71% performed fair skill as they performed 50% or more than 50% of task. 18 study participants were having poor skill as they performed less than 50% of task. The fields of higher skill are, proper position (79%), artificial breaths with Bag Valve Mask, (75%). The fields of lesser skill are, observes the standard precautions (23%), depth of chest compression (48%).

![Chart-4.12](image2)

Out of 22 Knowledge scores the mean knowledge score is 9.67 and standard deviation is 2.22.

Out of 16 the mean skill score is 10.04 and standard deviation is 2.52.

Ilczak et al. (2013) concluded that the nurse’s level of knowledge and skill was insufficient for the proper implementation of the CPR algorithm. The results of the research study were not satisfactory. A study was conducted at Karachi, Pakistan by Ilyas et al. (2014) and they found that health personnel have adequate skills in cardiopulmonary resuscitation.
Table -4.7

There is a weak relationship (r = 0.109) between knowledge score and skill score. The difference is statistically insignificant because of p-value is 0.281. The reason of difference in knowledge score and skill score is might be because of after getting job most of the nurses did not get enough time or opportunity to take part in any training programs. They are more focused on acquiring clinical practical skill than updating knowledge.

**Correlation**

<table>
<thead>
<tr>
<th>Knowledge score</th>
<th>Knowledge Score</th>
<th>Skill Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td></td>
<td>r = 0.109</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>p-value = 0.281</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>N = 100</td>
</tr>
</tbody>
</table>

**Strength of the study**

This study will have an input to the generous pool of knowledge to the nursing profession to encourage the nurses for CPR training. No research study has been conducted prior to the existing study in the target area to inquire about the charge nurses knowledge regarding CPR in Pakistan. This will also help hospital management particularly nursing administrators, to identify the training need of the nurses and plan the intervention.

This study may also help to introduce and follow the international CPR algorithm. In response, it may reduce patient’s mortality rate due to cardiac arrest.

**Limitations**

Convenient sampling technique and smaller sample size limit the generalization of the study result to population.

This study was restricted to only assess the nurses’ knowledge and practice of CPR of adult victim with single rescuer. Other aspects of CPR like use of defibrillator and CPR of child and infant is not included in this study.

**Implications**

The scope of this study may be extended in future researches to plan in service CPR training sessions for all charge nurses. Furthermore, this study may give a direction for the researcher in a way to explore more particularly about the uses of defibrillator in cardiac arrest victims and about pediatric CPR.

**SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

This chapter presents the summary of finding, concluding remarks and recommendations regarding the current study.

**Summary**

This section presents the Study titled as “Cardio-Pulmonary Resuscitation: Knowledge and Competencies of Charge Nurses Working in Public Hospitals”. A total of 100 charge nurses having at least 5 years of working experience from four major public hospitals of Rawalpindi and Islamabad city were taken in the study. A self-developed validated questionnaire, observational check list and non-probability convenient sampling techniques were used for data collection. The results are summarized as under.

The result indicated that a major portion (66 %) of charge nurses were having poor knowledge of CPR as they scored less than 50% of scores on knowledge based questions.

34 % were found with fair knowledge; none of the nurse had good knowledge of CPR according to arbitrary scale.
CPR skill 11 out of 100 participants were having good skill as the participant performed 75% or more than 75% of skill. 71% were performed fair skill as they performed 50% or more than 50% of task. 18 study participants were having poor skill as they performed less than 50% of task.

CPR knowledge and skill is influenced by professional background including professional qualification, professional experience, previous CPR training. SPSS version IBM-20 and Microsoft Excel were used for data analysis.

**Conclusion**

On the basis of study finding, it is concluded that Knowledge of CPR among charge nurses is poor and deprive in Pakistan. There are learning requirement of the nurses particularly working in public hospital which need to be filled by providing in-service CPR training. Training and experience can be resultant in enhancement of knowledge and skill. Thus standard CPR training and assessment are recommended at public hospital.

**Recommendations**

On the basis of this study finding, it is recommended that:

1. CPR training programs should be implemented in all nursing schools.
2. Refresher courses should be arranged in periodic basis.
3. Those nurses who are trained in providing CPR repetitive periodic CPR training sessions should be arranged to update their knowledge and skill.
4. Standard protocols and procedures of Cardiopulmonary resuscitation should be developed by nursing administrators and educators.
5. This study can be replicated in other cities of Pakistan and by using larger sample size.
6. A study can be conducted to factor affecting the nurses CPR knowledge and skill.

**REFERENCES**