ASSESSMENT OF KNOWLEDGE AND SKILLS OF REGISTERED NURSES REGARDING CARDIOPULMONARY RESUSCITATION AT MUHIMBILI NATIONAL HOSPITAL, DAR ES SALAAM, TANZANIA.

By

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A Dissertation Submitted in Partial Fulfilments of the Requirement for the Degree of Master of Science in Nursing (Critical Care and Trauma) of The Muhimbili University Of Health And Allied Sciences.

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CERTIFICATION

The undersigned certify that have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled ***Assessment of Knowledge and Skills of Registered Nurses Regarding Cardiopulmonary Resuscitation at Muhimbili National Hospital, Dar es salaam, Tanzania,*** in Partial fulfillment of, the requirements for the degree of Master of Science in Nursing (Critical Care and Trauma) of the Muhimbili University of Health and Allied Sciences.

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DECLARATION AND COPYRIGHT

I, **Optatus Albert Silanda** declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature ..... Date....19.11.2010.

DEDICATION

This work is dedicated to my beloved parents, the late Mr Albert, and living Mrs Pauline Silanda and to my wife Elizabeth.

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ABSTRACT

Background: Cardiopulmonary resuscitation (CPR) is the procedure mostly done by nurses that requires the knowledge and skills of practitioners trained in the diagnosis, treatment, and management of cardiopulmonary arrest. There are measures that have been done to improve the CPR knowledge and practice among nurses, however, there has been no published study in Tanzania undertaken to asses CPR knowledge and practice among registered nurses who are leaders to most of clinical procedures in the hospital wards.

Objectives: The main objective of this study was to assess knowledge and skills on cardiopulmonary resuscitation among registered nurses working in various wards at Muhimbili National Hospital. There were two specific objectives, which guided the study; the first was to assess knowledge on cardiopulmonary resuscitation among registered nurses at Muhimbili national hospital. Second was to assess practice of cardiopulmonary resuscitation among registered nurses at Muhimbili national hospital.

Materials and Methods: The study employed a quantitative research methodology using a descriptive cross-sectional design. Study population was all registered nurses working in Muhimbili National Hospital. About 270 questionnaires were hand given to the respondents to asses their knowledge on CPR. In every ward, all available registered nurses who agreed to join in the study were asked to perform single rescuer BLS (basic life support) for 2 minutes on a manikin (Laerdal, Norway) placed supine on the floor to assess their practice on CPR. A bag-valve-mask device (BVM, Laerdal, Norway) for ventilation was also used. Skills on CPR practice were registered using the designed checklist. Collected data were analyzed using Epi Info 6 statistical packages to interpret the findings.

Results: All results presented in percentages in this study were rounded off. In this study, 70% of respondents reported to have undergone training on CPR during their basic nursing training. In this study, 18% of respondents reported to have in service training on CPR. Seventy percent (70%) of the respondents were not able to mention fundamental approaches of the BLS. In this study, (45 %) of the respondents could only answer seven to nine cognitive questions on CPR correctly, therefore graded to have moderate knowledge on CPR basing on the criteria that was used by researchers to assess knowledge in this study. Majority of respondents (65%) reported and validated to have no CPR guidelines in

their working areas. On skill assessment, 217 participants (77%) demonstrated low to poor skills performances of CPR practice.

Conclusion and recommendation: Registered nurses who participated in this study demonstrated considerable knowledge and skills gap in areas of identifying and application of the basic life saving measures (BLS) the process that gives a framework of CPR, in preservation of vital organs, and ultimately save life of the patient after cardiopulmonary arrest. From these findings, registered nurses, who are working at Muhimbili National Hospital, need to be provided with the in service training in order to update their knowledge for the benefit of their clients. This need to go together with the fact that each ward ought to be provided with easy to read/follow resuscitation guideline/algorithm to every staff in the ward for the easy referencing and standardized care. It is paramount important therefore, to establish a team of experts of CPR who will organize and formalise the training of CPR to enable registered nurses to have an updates in CPR knowledge for the benefits of clients in all working settings within the hospital. This will only be archived if the curriculum will be developed that will have to put the cardiopulmonary resuscitation as a must subject and prerequisite to employment in nursing.

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ABBREVIATION

ABC	Air way, Breathing, Circulation
AED	Automated electronic defibrillator
AHA	American Heart Association
ALS	Advanced Life Support
BLS	Basic Life Support
CPA	Cardiopulmonary Arrest
CPR	Cardiopulmonary resuscitation
DNR	Do not Resuscitate
EMD	Emergency Medicine Department
ERC	European Resuscitation Council
ICU	Intensive Care Unit
ILCOR	International Liaison Committee Resuscitation
KAP	Knowledge Attitudes Practices
MNH	Muhimbili National Hospital
MUHAS	Muhimbili University of Health and Allied Sciences
MOI	Muhimbili Orthopaedic Institute
MoHSW	Ministry of Health and Social Welfare
SCA	Sudden Cardiac Arrest
SPHSS	School of Public Health and Social Sciences
TNMC	Tanzania Nurses and Midwives Council
TPB	Theory of Planned Behaviour
WHO	World Health Organization

of nurses who are in daily contact with patients in caring process would aid in shaping nursing practice in all stages of clients state of illness. According to the study results by (Fegurson 1990; Hudak Gallo & Morton, 1997), it was identified that there were poor knowledge and skills retention following cardiopulmonary resuscitation training for nursing and other medical staff. Researcher suggests that, a provision of cardiopulmonary resuscitation training is mandatory for all medical staff especially nursing as they often discover the victims of in-hospital cardiac arrest, as reported by Ionnis, (2001). Many different methods of improving knowledge retention have been devised and evaluated. However, it has been emphasized that the content and style of most training lack standardization, as reported by Broomfield, (1996). According to Ionnis, (2001), the result of lacking standardization is for every nurse to administer CPR in haphazard manner that call for regular review of the knowledge and practices in this area.

In Tanzania, nurses are playing major roles in caring patients of various medical and surgical problems. Nurses working in Muhimbili National Hospital are expected to have been cared patients going into cardiopulmonary arrest, and more often, they might have been involved in rescuing the patient's life back to normal condition. Despite of this sought commendable job done by nurses in Tanzania, no documented research that explains the level of knowledge and skills of CPR among nurses in the country. The lack of research on CPR knowledge and practice among nurses in the country fuelled the need for this research in Muhimbili National Hospital.

1.1 Problem statement

Cardiopulmonary resuscitation is an integral part of hospital practice. Adam Jones, et al (1993) indicated that, only about 10% of patients who have cardiac arrests in hospital survive to be discharged'. He went on saying that; "Nurses' responses agreed poorly on both noting the patients intended to be resuscitated and those not intended for resuscitation'. This study set out to determine how nurses' knowledge of resuscitation status and proposed action in the event of a patient suffering a cardiac arrest agreed with the documented resuscitation status. The problem leading to this study is based on both the scholarly literature and the situation that exist in the study area. Huge numbers of patients who are critically ill, some being injured patients, due to accidents in major motorways are

admitted in Muhimbili National Hospital. Most of these patients are cared in general wards due to the limited space in the ICU. Ward based nursing care mighty have been including cardiac resuscitation for the most of serious patients in Muhimbili national hospital. Anecdotal observations in this hospital have revealed the nursing care to be suboptimal in many wards. According to the research, yet to be published, which was conducted by Mkoka (2009), he also claimed that nurses are rendering suboptimal nursing services in the study area. According to another study done by Hogan (2006), it showed that nurses' observation and recording vital signs of critically ill patients is minimal which accounts for missing signs of impending critical illness including cardiac arrest. Williams (2005) recommended that 'the care given to the patients must be optimum regardless of where the patient is and in all stages of illnesses'.

Lack of knowledge and CPR undue practices among nurses were taken as constraints on meeting this goal in Muhimbili national hospital. Few interventions are seen to have had been put in place in the process of optimizing care of critically ill patients who were being admitted in Muhimbili National Hospital. This included putting resuscitation trolleys in the wards that could be easily accessible by nurses during cardiopulmonary resuscitation. However, in Tanzania, little is known on the knowledge and practice of CPR among registered nurses as there was no information, which could be searched describing nurses' knowledge and practice on cardiopulmonary resuscitation. Therefore, there were compelling reasons for this study to be conducted in Muhimbili National Hospital to identify knowledge and practice gaps on CPR among registered nurses.

1.2 Rationale of the study

The purpose of this study was to assess knowledge and practice gaps on cardiopulmonary resuscitations among nurses in Muhimbili National Hospital. Identification of these gaps is expected to lead to the recommendation of proper interventions for these nurses to be knowledgeable and skilled on how to conduct CPR properly. The findings are expected to be presented to the Muhimbili National Hospital authority to be used as evidence-based advice towards improving the nursing practices for quality patient care. The findings will also be used to initiate policy and guidelines, for advancement of CPR among registered nurses in Muhimbili National Hospital. These research findings are expected to shade light

as referent point by any stakeholder who will need to improve the CPR services among nurses, or other health care providers and the community as a whole.

1.3 Definitions of Terms

Basic Life Support- Refers to maintaining an open airway and supporting breathing and circulation without using equipment other than a simple airway device or protective shield (Hardley 1993).

Cardiopulmonary arrest: Is the abrupt cessation of normal circulation of the blood due to failure of the heart to contract effectively during systole resulting to impaired air exchanges into the lungs.

Hypovolemia. Defined as lack of circulating body fluids principally blood volume

Hypoxia: Is defined as a lack of oxygen delivery to the heart, brain and other vital organs

Peri-arrest period: Is a period (either before or after) surrounding a cardiac arrest.

Knowledge: In this study, the term used to mean, "Nurses understanding of cardiopulmonary resuscitation procedure, equipments, drugs, and guideline.

Procedure Manuals: Are comprehensive sources for all procedures that are inherent in the care of critically ill patients.

Registered nurses: Deserve to have many definitions. In this study, is a nurse who is having either diploma, advanced diploma and or a degree in nursing who is registered and licensed to practice as a nurse as in accordance to the Tanzania Nurses and Midwives Council.

Skills: In this study, used to mean recognizing a patient of cardiac arrest, rescuers body position while performing cardiopulmonary resuscitation, blood flow determinations, and airway management and ventilation parameter including oxygenation

1.4 General objective

The main objective of the study was assessment of knowledge and skills of registered nurses regarding cardiopulmonary resuscitation at Muhimbili National Hospital, Dar es salaam, Tanzania.

1.5 Specific objectives were

1. To assess knowledge on cardiopulmonary resuscitation among, registered nurses working at Muhimbili National Hospital.
2. To assess skills on cardiopulmonary resuscitation among, registered nurses working at Muhimbili National Hospital

1.6 Study questions

1. What is a level of knowledge on cardiopulmonary resuscitation among registered nurses working at Muhimbili National Hospital?
2. What are the practices on cardiopulmonary resuscitation skills among registered nurse working at Muhimbili National Hospital?

1.7 Theoretical framework

The theoretical framework that guided this study was adopted from the Theory of Planned Behaviour (TPB) according to Ajzen, (1991) that proposes a model about how human action is guided. It predicts the occurrence of a specific behaviour provided if the behaviour is intentional. The model represents the variables, which the theory suggests would predict the intention to perform behaviour. Intentions are the precursors of behaviour that changes with availability of knowledge and skills, Jillian et al. (2004). The figure 1.1 below illustrates the concept.

Illustrations of the concept

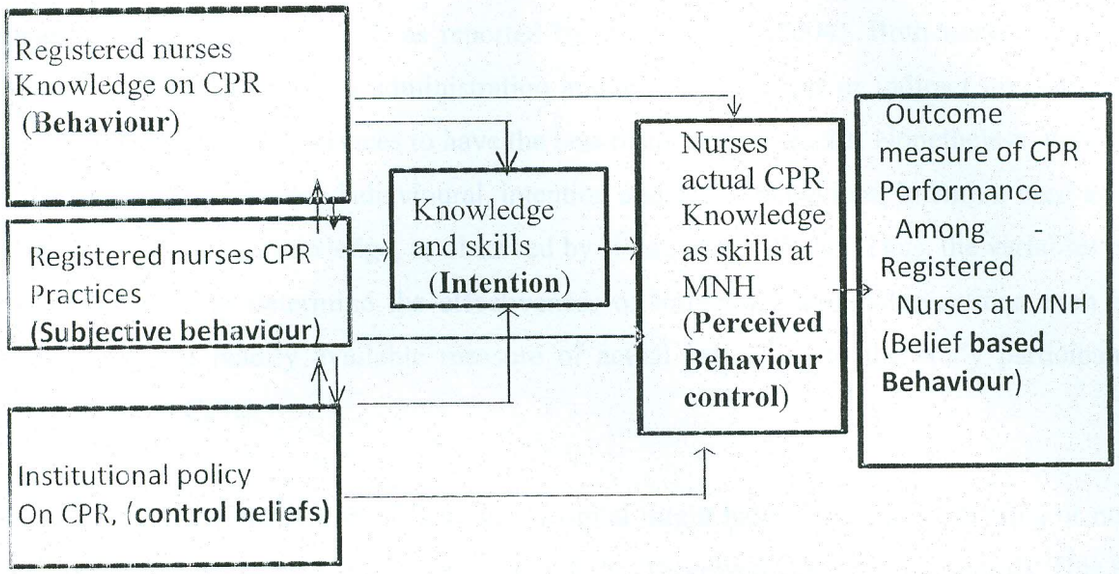

Figure 1.1: shows how knowledge, skills, and institutional policy can contribute to registered nurses CPR performance.

Variables used in this model reflect psychological constructs and so they have a special meaning within the theory. Here are some brief explanations of these special meanings and the way they were reflected in this study: In implementation research, on nurse's knowledge interventions designed to change the behaviour of registered nurses at Muhimbili National Hospital. The target behaviour defined carefully in terms of its Target, Action, Context, and Time (TACT). For example, in this study registered nurses behaviour considered the knowledge of CPR acquired in their formal training that applied towards eligible patients admitted to Muhimbili National Hospital. The target was the patient, the action was the resuscitation, the context was the clinical condition (cardiopulmonary arrest) and the time was (implicitly) during the resuscitation" (Fishbein, 1967). Registered nurses in Muhimbili National Hospital must have developed the certain ways, which they follow in doing CPR (Subjective norms). This is a person's own estimate of the social pressure to perform or not perform the target behaviour (Jillian et al. 2004). The Muhimbili

national hospital where these nurses work ought to have the CPR norms (control belief) which work in interaction with beliefs about how other people normally do when they have a patient with cardiopulmonary arrest. This kind of belief is obtained through knowing that nurses are training to do CPR, as reported by Jillian et al. (2004). Both nurses and the Muhimbili National Hospital administration authority have direct or indirect intention of providing the good CPR services to have the best resuscitation results. Nonetheless, was no direct relationship between behavioural, intention and actual behaviour, intention used as a proximal measure of knowledge, as observed by Jillian et al. (2004) Thus, the variables in this model used to determine the effectiveness of implementation interventions even if there was not a readily available measure of actual behaviour to the study participant (knowledge on CPR).

Registered nurses in Muhimbili National Hospital might have been either satisfied or not satisfied with their knowledge and practice in CPR (Perceived behavioural control). This is the extent to which registered nurse feels able to do or not able to do CPR. This had two dimensions: how much a nurse has control over the behaviour, and how confident a nurse felt about being able to perform or not perform the behaviour (e.g. knowledgeable but not sufficiently skilled in doing resuscitation). This was assessed by determining the knowledge and practices among the study group and control beliefs about the power of both situational and internal factors to inhibit or facilitate the performing the cardiopulmonary resuscitation to a patient (behaviour), as it was also observed by Jillian et al. (2004). The questionnaire that was including the measure of intention expected also to refer to the level of CPR knowledge in general. A questionnaire included a measure of knowledge towards defining the patient who needs resuscitation in general and a measure of intentions to start CPR, the knowledge of using the CPR tools and equipments and finally the CPR skills were also assessed so as to conclude on the research result which helped to answer the study questions.

CHAPTER II: LITERATURE REVIEW

2.0 General overview

Cardiopulmonary resuscitation (CPR) is the method of providing oxygen and blood circulation through the delivery of rescue breathing and chest compressions to victims of sudden cardiac arrest, which occurs when the heart loses its ability to pump blood and distribute oxygen through the blood. While much attention focuses on raising awareness and increasing education about the importance of bystander CPR carried out by lay people, CPR is most often performed by healthcare professionals, on the site of an emergency, either in an ambulance, or in the hospital. To resuscitate is to revive an individual from unconscious or apparent death. (Gibson 1991). Cardiopulmonary resuscitation (CPR) is the term used when artificial respiration, external cardiac massage, drug therapy and defibrillation, are administered to an individual following cardiac arrest. The Chain of CPR must involve well-trained first-aid staff, committed medical personnel, essential equipments, a well-established line of communication and efficient organization. The research conducted by Moretia and colleagues revealed that, failure of just one of these elements may result in failure of the system to fulfil its life saving function, a s reported by Moretia et al. (2007).

Since the first description of cardiopulmonary resuscitation in 1960, a cumulative meta-analysis of published outcomes after pre-hospital cardiac arrest 40 years later showed that survival is still dismal, and is generally less than 6%. Furthermore, analysis of mortality rates over a 19-year period has shown that survival rates have not been improving. Clearly, dramatic changes to recommendations on cardiovascular resuscitation need to be made,Wallace (1996). The basic principles of CPR were established three decades ago when the modern concept of practice of CPR and emergency cardiac care have been in evolution with the introduction of external chest compressions as was observed by American Heart Association (1987).

National and international bodies established in order to provide courses that aim to train people techniques of CPR supported by research based guidelines these bodies includes American Heart Association, Resuscitation Council UK, and European Resuscitation

Council, (1987). The ERC is committed to save lives by improving standards of CPR across Europe co-ordinating the activities of interested organisations and individuals. These achievements from the ERC have made many countries to adopt it in their curriculum. While no one knows precisely how many patients go into sudden cardiac arrest (SCA), Arrhythmia Alliance estimates that SCA claims the lives of 250 people every single day in the UK. Given that most of these patients receive CPR from a healthcare professional, training on how to deliver proper CPR and improving skill performance during the delivery of CPR are critical to saving lives.

2.1 Adherence to CPR Guidelines

Research shows that the quality of CPR has a direct impact on a victim's chance of survival. The Resuscitation Council (UK) is responsible for issuing CPR guidelines in the UK. These are updated every five years to help improve training and performance of CPR, which in turn will improve survival rates. The UK guidelines are based on those issued by the European Resuscitation Council, which are in turn derived from research and in association with the International Liaison Committee on Resuscitation (ILCOR). According to ILCOR report(2010), the most recent 2005 CPR guidelines put more emphasis on compressions than rescue breaths, recommending 30 chest compressions for every 2 breaths given to cardiac arrest victims. Updated guidelines on CPR techniques are due to be published in October 2010.

Recent studies report that compliance to guidelines and CPR performance by healthcare professionals are considered poor, which is likely to be detrimental to survival. According to a study published in the Journal of the American Medical Association, revealed that CPR performed both outside and inside the hospital setting, often does not meet standard guidelines. The 2005 study, led by Benjamin Abella, MD, of the Hospital of the University of Pennsylvania, revealed very poor CPR quality in the in-hospital setting, referencing too few and shallow chest compressions and too many ventilations per minute. Another study in the Journal of the American Medical Association, led by Dr Lars Wik, showed that healthcare professionals are also not adhering to established CPR guidelines in or out-of-hospital situations. The study found that during the administration of CPR, there were no chest compressions delivered nearly half of the time and, when delivered, just around one-

third adhered to recommended CPR guidelines, Wilk et al, (2005). Additionally, a study in Resuscitation examining depth and uniformity of compressions found that too-shallow chest compressions are common during the delivery of CPR to cardiac arrest patients in both in-hospital and out-of-hospital settings. Subsequent research has indicated that increasing compression depth is associated with increased defibrillation success and survival rates, Wilk et al, (2005).

Numerous studies show that increased training and the use of CPR assistance and feedback devices can greatly improve CPR skill and performance. A systematic review conducted by healthcare professionals from the US and the UK, published in Resuscitation this year, found that there was good evidence to suggest that CPR feedback/prompt devices during CPR training improve skill acquisition and retention and may also improve the quality of CPR in clinical practice, Wilk et al, (2005). Interruptions can also impede CPR performance and be detrimental to patient survival. Another study in Resuscitation examined the link between the quality of CPR prior to defibrillation and clinical outcomes. This study, led by Dana Edelson, MD, of the University of Chicago Hospital, concluded that longer interruptions and shallow chest compressions result in defibrillation failure, Wilk et al, (2005). Therefore, approaches to minimise or eliminate interruptions and optimise compression depth may significantly improve resuscitation success.

The guidelines of the ERC for basic life support (BLS) suggest that the initial management of an apparently lifeless casualty should include an assessment of the airway, breathing, and circulation before any active intervention takes place. The term BLS refers to maintaining an open airway and supporting breathing and circulation without using equipment other than a simple airway device or protective shield, Hardley (1993). BLS according to the UK Resuscitation Council (1994) comprises the element initial assessment, then airway maintenance, expired air ventilation (rescue breathing), and chest compressions. When all are combined, the term 'Cardiopulmonary Resuscitation' is used this is according to URC (1994). Furthermore, according to the research done by European Resuscitation Council, it was stated that when a simple airway or facemask for mouth-to-mouth ventilation is used this is defined as 'BLS with airway adjunct'. Its purpose is to maintain adequate ventilation and circulation until means can be obtained to reverse the

underlying cause of the arrest, ERC, (1994). In the most comprehensive review of resuscitation literature ever performed, given the fact that patient survival depends on competent and immediate initiation of CPR following cardiac arrest, it is essential that all staff should have the skills and knowledge to perform CPR as and when necessary be able to do ALS (Advanced Life Support).

2.2 Nurses' knowledge's on cardiopulmonary resuscitation

One of the greatest challenges facing all educational programmes today is how to assure health workers are competent in CPR, as was reported by Broomfield(1996). Competence, according to Benner (1984 p.25) once said that, "typified by the nurse who has been on the same or similar situations two or three years, develops when the nurse begins to see his or her actions in terms of long-range goals or plans of which he or she is consciously aware''. Some researchers (Brennan; Braslow & Kaye 1996) argued then, that in order to have nurses competent in performing CPR both aspects (skills and knowledge) should be examined, Hamilton (2005).

In a study done by Ferguson (1990), suggested that resuscitation skills and knowledge should be refreshed and updated regularly Other researchers observed that, in order to be competent in CPR, a nurse should review and update his/her skills at least three to six months so to maintain his/her resuscitation skills at a stable level (Berden et al 1993). For competent performance in a clinical area, the hospital resuscitation must be viewed as three distinct procedures (Basic Life support, BLS with airway adjuncts, Advanced resuscitation), in which nurses needed to display confidence and competence, according to their level of training, Hamilton (2005). In a result of a study which was conducted by Sadoh (2005) on, the knowledge and practice utilising the 2000 CPR guidelines of doctors and nurses in Benin City, using cross sectional study which was conducted in six health facilities in Benin City. In that, study a structured self-administered questionnaire used to test the knowledge and practice of CPR of 145 doctors and nurses in the selected facilities. Of the 145 respondents who filled the questionnaires, 88 (60.7%) were doctors and 57(39.3%) were nurses. There was poor knowledge of CPR amongst the respondents, Sadoh (2005). According to the research, which reported by Sadoh (2005), knowledge was significantly poorer amongst nurses than doctors' respondents were. Only 73 respondents

(50.3%) would perform mouth-to-mouth resuscitation, while 17(11.7%) respondents were aware of the 2005 guidelines, Sadoh (2005). The observed poor knowledge of CPR and low awareness of the changing CPR guidelines amongst respondents in this study buttresses the need for regular CPR training of health professionals in Nigeria (Sadoh, 2005). This fact calls for the other research in this area at Muhimbili to build up an evidence based caring process.

2.3 Registered nurses knowledge on the usage of cardiopulmonary resuscitation instruments/equipments

In the study carried by Batcheller et al. (2000) when was testing the performance, knowledge was assessed using a skill checklist and the skills were assessed using a recording resuscitation manikin. McKee et al. (1994) studied the retention of automated external defibrillator (AED) skills in 63 nurses, found that 80% were able to use the device, and performed the sequence correctly. According to the research results, the most common mistake for the remaining 20% was the failure to reassess the patient after the sequence of three shocks. According to Kaye et al. (1995) recruited 140 BLS trained qualified nurses to use an AED and found that 99% performed competently directly after training, 97% at 1–3 months, 100% at 4– 6 months and 89% at 7–9 months. This result however, made no explicit whether the efficacy of chest compressions and ventilations assessed.

2.4 Nurses' cardiopulmonary resuscitation practices

The lack of resuscitation skills of nurses in basic and advanced life support identified as a contributing factor to poor outcomes in post cardiac arrest, as reported by Marzooq (2009). According to Marzooq (2009) an effort to improve cardiac arrest outcomes, recent investigations have focused on the timing and quality of CPR which involves nurses who are always close to most of the patients' potential to cardiopulmonary arrest. WHO report on resuscitation (1996), indicated that nursing research involves the study of all aspects of nursing practice in all contexts and that developments in the nature and scope of nursing practice supported by research so that the effectiveness of nursing knowledge and practice can be supported by research findings. Cheilel's (1993a) suggestion to the contribution of research is that it does not provide standard solutions that can be transferred reliably from

one situation to another; therefore may not influence behaviour directly. Its contribution to the body of nursing knowledge, however, promotes the development of an enlightened practice. Furthermore, the methodology of research into resuscitation should allow full exploration and analysis of real CPR attempts from many perspectives and many levels. More research into CPR attempts needed to explore and describe the reality, rather than the theory, of an event, that remains a source of fear and anxiety to most nurses, Chellel (1993a).

This research aimed to explore to understand whether the available information in review and result could also be true to nurses who are working at MNH. On their study, Moser and Coleman's (1992) literature review found a difference in the rate of deterioration of CPR skills and knowledge. Research result also showed that skill appeared to decline at a faster rate than knowledge, declining as early as 2 weeks after training and diminishing to pre-training levels by 1–2 years later, Lewis et al. (1993). According to Leith (1997), it was noted that a sample of intensive care nurses retained knowledge over a 6- and 12-month period but were unable to achieve the standard required to pass the practical test.

The research on CPR (concerning nursing skills) would assist in the identification of any issues that might have needed development or further exploration for implementing specific practical solutions in order to improve the quality of care provided to patients. Study might for instance, indicate a probable re-examination of the nurses' role during CPR which in turn would help in the establishment of certain specific measures for improving training techniques, skills and finally the delivery of care in cardiac arrest cases in the Muhimbili National Hospital.

3.0 CHAPTER III: METHODOLOGY

3.1 study design

The quantitative descriptive research approach was utilized. This involved collecting data in order to test hypotheses or answer questions regarding the subjects of the study. The data typically collected through a questionnaire, and observation. This involved the collection of numerical data in order to explain, predict, and/or control phenomena of interest; data analysis was mainly statistical (deductive process).The descriptive cross-sectional study design was finally utilized. Cross-sectional surveys aim at describing and quantifying the distribution of variables in a study population at one point of time. This covered, for example: Socio-economic characteristics of study participants, such as their age. education, the behaviour or practices of study participants and the knowledge, and opinions which helped to explain their behaviour (knowledge and skill studies), or Events that occurred in the population. It is therefore, this study design that allowed data collection on assessment of CPR knowledge and skills among registered nurses at Muhimbili National Hospital to be done only at one occasion with the same subjects at one point in time.

3.2 Study area/setting.

The study was conducted in Muhimbili National Hospital, which is situated in Dare Es Salaam city. Muhimbili National hospital has a large number of nurses as they are 963 (4.4%) out of estimated 22,000 nurses in the country (MOH & MNH 2009). It is unique and largest among other three tertiary hospitals in the country. It is this uniqueness of Muhimbili National Hospital that made even nurses who are working in this hospital to have been exposed in caring patients with various illnesses, and possibly resuscitating them when they go into cardiopulmonary arrest. Muhimbili National Hospital also admits most of the patients who are involved in motor traffic accidents making them potential in developing cardiopulmonary insults of both cardiac and non-cardiac in nature. This kind of observation was made in accordance to the one that was also done by International Liaison Committee Resuscitation guideline, (2004). According to Odero's (2004), report finding when studied the impacts of road traffic accidents in Tanzania, he had the similar observations. Most of these seriously injured patients, who were mostly admitted in

Muhimbili National Hospital, deserved the sequence of nursing interventions in their chain of survival that the cardiopulmonary resuscitation was the central part of it.

3.3 Study population

All available registered nurses (diploma nurses, advanced diploma nurses and nurses with degree) employed at Muhimbili National Hospital were eligible to participate into the study. It was possible to draw the sample from this population as Muhimbili National Hospital at that time was employing about 580 registered nurses (MNH data, May, 2010).

3.4 Sampling technique

The list of wards in the hospital was obtained from the administrative offices of the Muhimbili National Hospital. Wards within Muhimbili National Hospital where nurses work were selected randomly. This was involving a use of ballot papers on getting the units, where within each unit; we randomly selected number of wards and eligible nurses within each ward at Muhimbili National Hospital. From those wards selected, the convenience sampling method utilized to recruit eligible participants into the study. This sampling method refers to the collection of information from members of the population who are conveniently available to provide it. Instead of obtaining information from those who are most readily or conveniently available, it might sometimes become necessary to obtain information from specific target group. Therefore the registered Nurses working in various clinical settings at MNH were our target group selected to join in the study, after amicably explanation of the research purposes to the block mangers and unit in-charges and finally to the study participants.

3.5 Sample size estimation

Sample size estimation of this study was carried out by using findings of one study which was previously conducted under the domain of knowledge and skill retaining and deterioration phenomenon by McKee et al. (1995) just to reflect my sample size. Findings in this study were utilized to get a manageable sample size due to time constrain but still without compromising the research findings. In McKee's study, which was conducted to assess knowledge and skill of cardiopulmonary resuscitation, the result revealed 20% of

nurses were not knowledgeable and lacked skills on application of the AED. It was therefore our assumption that the same proportions of the result could happen to our research participants on the aspect of knowledge and practice (skills).

Sample size was calculated by using formula:

$$N = \frac{Z^2 P (1-P)}{E^2}$$

Where N= sample size, Z= standard score corresponding to the given confidence level set at 95 %, (=1.96) P = Estimated proportion of registered nurses taken from the total number of study population which is 20% (= 0.2) and E = standard error that is 5% (= 0.05)

Therefore $N = \frac{(1.96)^2 (0.2) (1-0.2)}{0.05^2}$

$N = 275$

The sample size was supposed to be 275 registered nurses. This study involved registered nurses who were working in the Muhimbili National Hospital wards and other clinical setting in the Muhimbili National Hospital. Researchers recruited 270 registered nurses who were assessed for their skill competencies of CPR and were given the questionnaire there after.

3.6 Inclusion criteria

All registered nurses working at MNH who were informed and voluntary agreed to participate were included in the study.

3.7 Exclusion criteria

Excluded in the study were; those registered nurses who were not willing to voluntary participate in the study and those registered nurses who were not working in the clinical area at the time of conducting this search.

3.8 Data collection procedure/instruments

The principal researcher formulated the questionnaires. The questionnaire was presented to the experts in the field of study to obtain their opinions about the minimum mark that was to be achieved by the respondents. The involvement of the expert professionals in the

study field in setting the standards enhanced the validity and reliability of the questionnaire as measuring instrument. Questionnaire was also pilot tested before being administered. This process helped to test the reliability, to identify imperfection and to allow for corrections. All questionnaire were formulated in English and no translation was made into ''Swahili'' (Tanzanian popular spoken language) because English was the media of communication for the study participants during their nursing training, (see appendix iii). The data collection tool was a self-administered structured questionnaire containing both closed and open-ended questions. Twelve questions were set to assess knowledge of the study participants.

The mainstay of the questions were focusing on identification of the patient who has developed cardiac arrest, equipments to be used, drugs and the importance of having CPR guidelines. Possible score ranged from 1 to 12, which then grouped into four levels of knowledge assessment. Loosely structured observation guide used as a guide while doing observation in collecting data basing on cardiopulmonary resuscitation skills among registered nurses in Muhimbili National Hospital (see appendix II). This designed checklist adopted from Brennan & Kaye (1996) was used by the researcher in this study, to measure levels of skill performance among the study participants. To assess base line BLS skills of registered nurses, researchers visited the hospital wards unannounced. In every ward, all available registered nurses who agreed to participate in the study were asked to perform single rescuer BLS for 2 min on a manikin placed supine on the floor (270 registered nurses from different wards participated).

The registered nurses were given the scenario, and were asked to demonstrate the steps to follow when doing CPR on an unresponsive man who (assumed) is found in his bed. A bag-valve-mask device (BVM, Laerdal, Norway) for ventilation which is currently present in Muhimbili National Hospital ward resuscitation trolleys and Laerdal manikin (Laerdal, Norway) was used. It was assumed that assessment of vital signs was completed and that the resuscitation team (wherever applicable) was not alerted. In each day of skill observation, subjects brought into the room, where they completed the performance-based portions of the CPR evaluation. A researcher to ensure compliance supervised each room. Skills performance was measured by an evaluator using a CPR skills checklist (annex ii)

based on the one developed by Brennan, et al. single researcher (evaluator) was assigned to each subject, and completed one checklist for each assigned subject. Researcher were instructed to enter a value of "1" next to the skills the subject successfully completed, or a "0" next to each skill the subject completed incorrectly, completed out of sequence, or failed to complete. A score was issued for each subject by adding the total number of correct items on the checklist. None of the evaluators used for skills evaluation had prior contact with the subjects. The similar measuring instruments were given to all study participants. Sufficient time was allowed to complete the questionnaires.

3.9 Data management and quality control

Prior to data collection four days training for two research assistants was conducted whereby elaborations on how to administer, present research tools. Clarifications was made on data collection tool, that was composed of the items like, demographic data form the study participants which included information concerning name, age, sex, and education background so as to enhance the uniformity of data collected by researchers. Issues related to anonymity and how to care completed instruments, ready for data analysis, the whole process of data collection and what was expected from the information given by the participants were also generally explained. The researchers used observational checklist to measure the quality of CPR performance in a single rescuer.

Researchers watched the performance of an individual participant and then marked on previous prepared and validated checklist form. All forms were peer reviewed carefully, and all uncompleted questionnaires excluded before data analysis. The research team comprised of the one researcher and two research assistants who were equipped with the language, culture of the study participants and who had a specialised knowledge in critical care. Refinements of the questionnaire made basing on the gaps identified. The principal researcher was the responsible person for supervision of the group to ensure that quality and research procedure followed to minimize bias. All filled schedules and questionnaires were kept locked by the principle researcher. Data from the completed instruments were evaluated, using the scoring criteria formulated by the researcher and validated by the anaesthesiologists ready for the whole process of data analysis. Table 3 reflects to the scoring criteria.

Table 3.1 Scoring criteria used on assessing registered nurses knowledge of cardiopulmonary resuscitation in the study area

Score	Criteria used for given knowledge score
1	Registered nurse could answer ten to twelve questions on CPR knowledge
2	Registered nurse could answer seven to nine questions on CPR knowledge
3	Registered nurse could answer four to six questions on CPR knowledge
4	Registered nurse could answer three questions and below on CPR knowledge

Knowledge score criterion	Knowledge categories
1	High knowledge
2	Moderate knowledge
3	Fair knowledge
4	Poor knowledge

The above table shows how registered nurses' knowledge was categorised as poor, fair, moderate, and high according to respective and each registered nurse's score. These scores were combined to form four categories/levels of knowledge as seen in the same table.

3.10 Validity

Validity means that a scientific observations actually measure what they intend to measure (your conclusions are true). Validity refers to the soundness of the observations and to the accurateness of the data collected by the research method/instrument. To ascertain this, the questionnaire formulated in English tested to know if it could convey the intended meaning. Questionnaire's content tested in collaboration with two anaesthesiologists working in ICU at Muhimbili National Hospital.

3.11 Reliability

Reliability means that someone else using the same method in the same circumstances should be able to obtain the same findings (findings are repeatable). Reliability (repeatability) refers to the possibility to replicate (repeat) the observations and is related to the precision of the instrument used for scientific observations. The questionnaire used for

assessing registered nurses CPR knowledge, as several studies reported in literature conducted using the same approach. Checklist used to measure the CPR skills among registered nurse was adopted from the one developed by Brennan et al. (1996) which was also utilized by Rehberg at al.(2009) when they did a research on comparison of effectiveness of computer based CPR training versus a class based one with good result.

3.12 Data analysis and presentation

Filled questionnaire, were cleaned, coded, and entered into a computer using Epi Info 6 statistical programme. Data was analyzed using the same programme. The chi-square test with P-Value set at ≤ 0.05 considered statistical significant. Univariate analysis to assess the associations between demographic and cognitive variables with selected items of knowledge performed with Chi-squire test where it seemed appropriate. Furthermore, the findings presented using percentages, bar charts and two by two tables. Continuous variables presented as means, nominal as percentages and ordinal variables as median and its range.

3.13 Results dissemination

It is expected that the study from this study would generate important information on care of the patient who may develop cardiac arrest. Results will be disseminated to different stakeholders e.g. Muhimbili university library, Muhimbili National Hospital, Ministry of Health-Tanzania. In addition, the results will be presented into various scientific community including national and international conferences and in the scientific journals. Research results would be available to the research participants in a form of recommendation so that every one would benefit from the knowledge and advices reached hitherto.

3.14 Ethical consideration

The ethical clearance was obtained from the research and publication committee of Muhimbili University of Health and Allied Sciences, (See appendix iv). Thereafter the permission to conduct the study was asked from Muhimbili National Hospital administrative authority and granted as is to be seen in an appendix vi. The aim of the study was explained to the recruited participants, the potential study participants were

informed about the issue of voluntary participation, and those who signed the informed written consent recruited in the study. The chance was open for any one who wished not to participate even at the time when he/she already signed to participate, (see appendix i). All study participants were given the consent to read and those who admitted to have understood the content eventually signed agreeing to participate before starting the data collection. Safety to the participants ensured for the whole period of data collection. It was explained that, in case of an unforeseen injury, medical treatment was to be provided according to current standard of care in Tanzania. No compensation was to be given. Confidentiality guaranteed, through participant's state of anonymity, only numbers were used to identify participants, instead of names. The result of this study was directly to benefit the participants, as they would be having an evidence-based kind of CPR manoeuvres to be used to patients who may develop cardiac arrest in their caring process in Muhimbili National hospital.

4.0 CHAPTER IV –RESULTS

This chapter includes description of the results starting with analysis of the participants demographic data. Analysis of data regarding registered nurses knowledge and practices on cardiopulmonary resuscitation approaches and managements are also described.

4.1 General Demographic Data of the study participants

The study involved 270 registered nurses working in various wards and other clinical setting at Muhimbili National Hospital. The study was conducted between May and June 2010. Registered nurses completed questionnaire constituting demographical data and information on previous CPR training and exposure were 220. Each questionnaire completed immediately by the participants after being tested on CPR practice. Among the study population 246 (91%) were female and 24(9%) were male registered nurses. The mean age group of the study participants was 5.02 (Sd 10) years.

Duration of services of the participants was between 1 year of service and 40 years. Majority of the registered nurses who participated to this study were those with an ordinary diploma level of education as they were 188 making (80%) of all study participants, while those with nursing degree were 13%. Registered nurses with advanced diploma in nursing education were the lowest of the all categorise who were eligible for the study, as it constituted 7% of the study participants. Many of the study participants were those who aged 40- 49 as they were 94 being (43%) of all the study participants. Those who mostly participated into this study were registered nurses who had worked with the Muhimbili National Hospital for the period ≤ 9 years as they were 118 being (54%) of the all study participants. Nevertheless, the duration of service is not reflecting the number of years passed since when the study participants finished nursing school, but accounted the duration of the service starting from the time of first employment within the study area (MNH). Table 4.1 reflects the result.

Table 4. 1: Demographic information of the study participants

Description		**Frequency**	**Percentage**
Sex of participant	Male	24	9
	Female	246	91
Education level	Degree in Nursing	31	13
	Advanced Diploma	16	7
	Diploma in Nursing	188	80
Age group	**Range in years**		**%**
	≤ 29	40	18
	30-39	75	34
	40-49	94	43
	50+	11	5
Working duration	**Range in years**		**%**
	≤ 9	118	54
	10-19	49	22
	20-29	32	14
	30+	21	10
TOTAL		**270**	**100**

This table shows that, many registered nurses recruited in the study were female, (91%), 188 respondents had diploma level of education and 118 respondents (54%) were those who have worked with the Muhimbili National Hospital in a period less or equal to nine years.

4.2 CPR Knowledge among Registered Nurses at Muhimbili National Hospital

After completing the skill evaluation, subjects filled a 22-item questionnaire. This tool was used for CPR knowledge evaluation and had about twelve questions that were assessing knowledge of respondents based on knowledge on CPR procedure itself, resuscitation equipments, resuscitation drugs, availability, and the usefulness of resuscitation guidelines.

Prepared 270 instruments were given to registered nurses who were enrolled into this study. The study tools were containing both closed and open-ended questions. Twelve questions were set to assess knowledge of CPR to the study participants. The mainstay of the questions were focusing on identification of the patient who has developed cardiac arrest, resuscitation equipments to be used, resuscitation drugs and the importance of having CPR guidelines. Possible score ranged from one to twelve, which then grouped into four levels of knowledge assessment. A scoring system for registered nurses knowledge on cardiopulmonary resuscitation, formulated by the principal researcher, and validated by the two anaesthesiologists who are experts in a field of cardiopulmonary resuscitation. Respondent were asked if at all they had CPR training in their former nursing studies, whereby 220 respondents answered this question. There was a precisely adequate number of the study participants who had been trained on CPR in their nursing training as 153 of respondents (70%) reported to have undergone training on CPR during their basic nursing training. This shows that significant number of the respondents had training on CPR in their early nursing training. Despite of the majority of respondents admitting to have had learned CPR when they were training, only 79 respondents (36%) were able to define accurately the meaning of CPR. Respondents were asked to state the reasons of doing cardiopulmonary resuscitation, the result was that, 107 respondents (49%) managed to state out properly on what was the reason(s) of doing CPR, where of 163 respondents (51%) of the respondent gave an awry reasons.

Respondents were asked if they had on job formal training on cardiopulmonary resuscitation. The result revealed that, 165 respondents (82%) did not have attended any of the in-service training on CPR. Only 36 respondents (18%) admitted to have attended the in service courses in CPR ranging from four to five days training. Respondents were asked to explain through reflection if they have had cared a patient who developed cardiopulmonary arrest in the period not exceeding six months. Answers to these were expected to assist into knowing the magnitude of the problem. In this aspect, 87 respondents (40%) agreed to have encountered patients who have had cardiopulmonary arrest, in their presence in the period of six months prior to filling the questionnaire. It was however, noted that 132 respondents (60% denied to have encountered such patient for the same period. When they were to answer the steps they took on trying to rescue the patient,

66 respondents (30%) were able to mention properly how they could manage doing ABC of the basic resuscitation measures, while 154 respondents (70%) were not able to mention ABC approach of the BLS. These results showed that majority of the study participants were not conversant with the fundamental approach of CPR. When they were to mention the sequence of CPR manoeuvre, which they could follow in rescuing the client who was assumed to has cardiopulmonary arrest out of the clinical area but within the Muhimbili National Hospital compound, they were 154 respondents (57%) who wrote their opinions. Table 4.3 reflects the result.

Table 4.2 Frequency distribution of knowledge on CPR initial approaches mentioned by the participants

Correct CPR measure mentioned	Responses	Freq.	%
Check responsiveness and call for help	Those who mentioned	40	26
	Those who did not mention	114	74
Check ABC, Start with rescue breathe following with chest compression	Those who mentioned	24	16
	Those who did not mention	130	84
Arrange immediate transfer to EM D	Those who mentioned	34	22
	Those who did not mention	120	78

The result in this table shows that, many of the respondents were not able to mention the correct techniques to be used in rescuing the friend who is in CPA as evidenced by low responses at every correct measure.

Respondents were tested if they could mention correctly on what were the two cardinal signs that would indicate that a client was in the cardiopulmonary arrest. The total number of respondents who answered this question was 178 being 68% of all study participants. Among them, 95 respondents (53%) mentioned absence of heartbeat and loss of breathing as the two cardinal signs of cardiopulmonary arrest; moreover, 83 respondents (47%) were only able to mention a single sign correctly. The rest of 92 respondents (32%) failed to mention either, absence of breathing or absence of heart beat as the cardinal signs of CPA. This result shows that majority of respondents had generally enough knowledge on signs

of cardiopulmonary arrest. Respondents were to determine an appropriate time after cardiopulmonary arrest and for them to have been started their cardiopulmonary resuscitation so that one could get the good result in rescuing a patient. Table 4.4 reflects the results.

Table 4.3 Result on the correct time to start cardiopulmonary resuscitation, study participants responses

Correct time required to start CPR	Frequency	%
Less than 4 minutes	96	46
More than ten minutes	40	19
Within 15 minutes	67	32
Others (no answer)	6	3

From this table it shows that, 133 respondents, (54%) were not knowledgeable with the actual time that should not be exceeded for the CPR.

Respondents asked to choose among three options on what was the best way for a rescuer to know that a rescue breathe for cardiopulmonary arrest (CPA) victim was effective. The table below shows the respondents responses on this question.

Table 4. 4 Responses on how to determine effectiveness of the assisted rescue breathe as given by respondents

Response on the area to look	Frequency	%
The stomach rises visibly	20	10
The chest rises visibly	167	86
The rescuer can hear an air leak around the mask	7	4

From the above table it shows that 167 respondents (86%) were able to mention clearly, a sign of the chest movements as the sign to be associated with effective rescue breathing in CPR.

When study participants were to choose the best way of ventilation to chest compression ratio, results showed clearly that most of the study participants were able to answer correctly the best option of resuscitation in case they encounter a patient who is in the CPA. Majority of the respondents, (60%) responded very well that they could be able to ventilate twice and apply thirty chest compressions.

4.3 Registered Nurses Knowledge on cardiopulmonary resuscitation equipment

In order to understand whether respondents were knowledgeable on the instruments and equipments used in CPR, respondents requested to name four instruments/equipments that are supposed to be kept in the trolley (Crash cart) as for CPR preparations. Table 4.6 reflects the results.

Table 4.5 Resuscitation equipments as were mentioned by respondents to be seen in this table

instrument	Responses variability	Frequency	%
Face mask	Those who mentioned this	12	8
	Those who did not mention this	144	92
Ambu bags	Those who mentioned this	97	62
	Those who did not mention this	59	38
Laryngoscope	Those who mentioned this	32	21
	Those who did not mention this	124	79
Annexed oxygen cylinder	Those who mentioned this	14	9
	Those who did not mention this	142	91

From this table it was observed that most of the participants mentioned an ambu bag to be a fore instrument to be seen in the crash cart. Very few number of the respondents mentioned annexed oxygen, facemask, and laryngoscope.

There are 81 respondents who were able to mention other equipments and instruments, which are not necessary for resuscitation. In this group, 77 respondents (95%) were able to mention things other than those used directly for resuscitation. If you look at this result, it clearly shows that there is knowledge deficit on this aspect.

4.4 Registered nurses Knowledge on resuscitation drugs

Respondents were also asked to mention about three CPR absolute drugs which the use in day-to-day resuscitation when they are in a process of augmenting any of the bio physiological changes of an individual with cardiac arrest. The researchers listed the drugs that are commonly used in CPR and only three were to be listed by the respondents, include, Atropine, adrenaline, ephedrine, aminophylline, hydrocortisone, dextrose (strength 5%-50%) and dopamine. All registered nurses in their varying level of education backgrounds responded. Table 4.7 reflects the results.

Table 4.6 Association of knowledge on CPR drugs versus their qualification

Number of CPR drugs mentioned	Participants qualifications						Total
	Degree		**Adv. diploma**		**Diploma**		n
	n	(%)	n	(%)	n	(%)	
1	0	(0.0)	0	(0.0)	6	(8.5)	6
2	3	(23.1)	3	(25)	22	(31.0)	28
3	9	(69.2)	8	(66.7)	25	(49.3)	42
Mentioned but other drugs	1	(7.7)	1	(8.3)	10	(11.2)	12
Total (%)	13	(100)	12	(100)	63	(100)	88

(X^2=12.13, df=12, p=0.43)

It shows that most of the study participants know resuscitation drugs in varying degrees. A group of registered nurses with degree level of education were more knowledgeable with CPR drugs as nine respondents in this category, (69%) out of 13 were able to mention correctly all of CPR drugs.

Respondents with a degree level of educations managed to mention all the three resuscitation drugs correctly as requested. This result however, lacks the statistical significance as the p value =0.43. The results showed that registered nurses who had a degree level of education were relatively more able to mention all the resuscitation drugs accurately compared to registered nurses with advanced diploma and diploma nursing

education. Respondents were asked if they had a cardiopulmonary resuscitation guidelines/ protocol in their ward. Two hundred and five, (76%) respondents answered this question. Moreover, 134 respondents (65%) said they do not have CPR guideline in their working areas. Only 71 respondents (35%) admitted to have a cardiopulmonary resuscitation guidelines/ protocol in their ward. Moreover, 197 respondents (96%) said it was with the importance to have the guideline in place in their working areas while only 8 respondents (4%) could see no meaning behind having the guideline. It was also put forward for the respondents to give reasons of why did they wanted the guidelines to be displayed in each ward. Respondents' responses on the reasons of having CPR guideline were that; again 64% of responses were not congruent to the reasons of having the guidelines in the ward. This shows that despite of demanding to have the CPR guideline in their wards, many of the respondents were not able to mention the reasons of having CPR guidelines in their working place.

4.5 CPR process and opinions of registered nurses at Muhimbili national hospital

On responding to the question that wanted them to freely state how they rank themselves in CPR knowledge, about 51 respondents (26%) of all who responded to the question, said they had an adequate experience on CPR, moreover, 144 respondents (74%) said their knowledge was not adequate. Respondents were to suggest on the ways that could have been more appropriate on improving the level of understanding on cardiopulmonary resuscitation knowledge and skill. The figure below reflects the result.

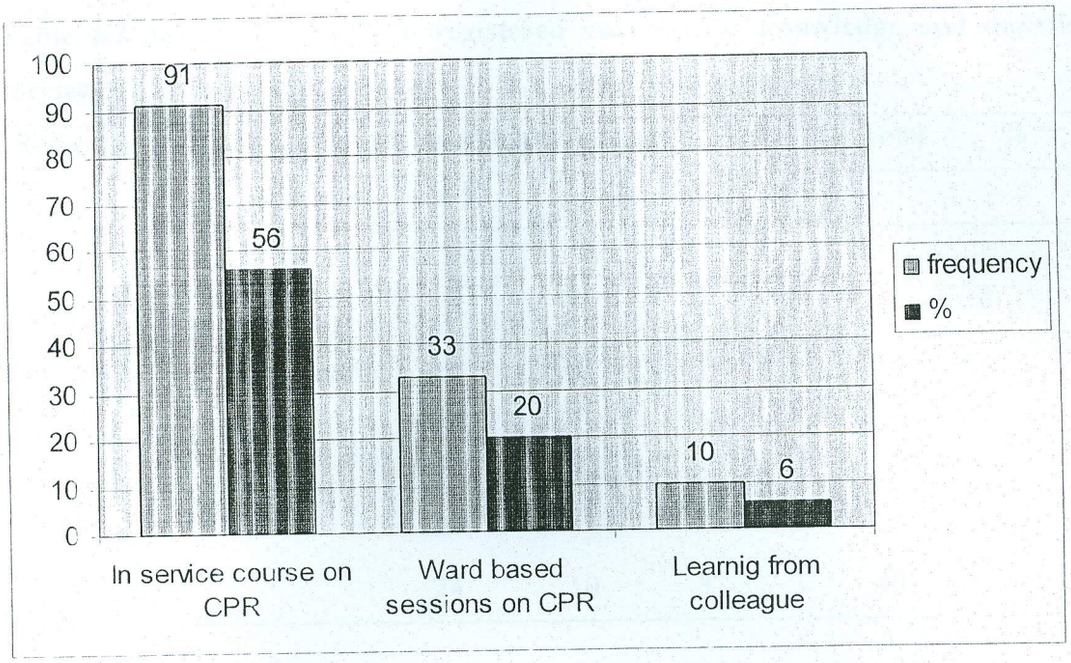

Figure 4.2 this figure shows that many of the respondents suggested the in-service as the better way of improving the knowledge and skill in CPR as per 91 respondents (56%) suggestions.

After getting analysis of all the responses, the researcher in this study did an overall knowledge assessment on CPR among the participants. Assessment based on duration of service as the single factor from the demographic information to be associated to participants' knowledge on cardiopulmonary resuscitation. The assessment was done in reference to the study tools that were completely filled in regards to the twelve items, which were determining participants' resuscitation knowledge. The assessment criterion, which used to determine registered nurses knowledge in the study arae as seen in table 4.2 above, was used. Table 4.8 reflects the results.

Table 4.7 Association between registered nurses CPR knowledge and duration of service

Responses/	Knowledge/	working experience in years				Total	%
tc	score	≤9	10-19	20-29	30+		
4-6 questions	Fair	8	2	1	0	11	28
7-9 questions	Moderate	11	6	1	0	18	45
10-12 questions	High	5	2	1	3	11	27
Total		24	10	3	3	40	100

(X^2=47.2, df=27, p value= 0.000.)

Findings presented in the table above showed 5 among 11 respondents in the same group, (45%) with high knowledge on cardiopulmonary resuscitation, resuscitation medications, guidelines and equipments were those who were in the nursing services in the duration of ≤ 9 years.

Results also shows that, 18 respondents (45 %) were of moderate CPR knowledge as they were able to answered seven to nine questions on CPR, while 11 respondents (27.5%) answered ten to twelve questions, thus had high knowledge on CPR. This results showed that registered nurses who had been in the service for few years were relatively more able to answer knowledge based questions, compared to those of long duration in service. This data was computed by the Epi-Info statistical Package to find out if that association was with any statistical significance. The result showed there were a significant (p=0. 00) association between knowledge on CPR and duration of service. Those registered nurses who had worked in the hospital in a period less or equal to nine years had relatively higher knowledge on CPR than those of long duration.

4.6 Results of General resuscitation skill measurements among the participants

Ten items were used in the checklist guide and few participants (23.3%) had moderate to high skill on the resuscitation performance. The rest (76.7%) participants had poor to low skill on CPR. Resuscitation skill measurements among registered nurses were put in priorities and were grouped into broad categories, which, wherever possible, paralleled the sequence of interventions during a resuscitation episode. These categories included, recognition of cardiac arrest, body position, blood flow determinations, airway management and ventilation parameter including oxygenation. In this category, 156 participants (58%) were not able to demonstrate the ability to assess safety of both patient and self. In the aspect of assisted breathing, 204 participants (76%) were not able to assist the breathings as required.

Majority of study participants could fairly demonstrate the need of checking circulation to the patient who was assumed to have been in cardiopulmonary arrest as 70% of them were able to do so. They also showed the ability to locate the position of their hands correct when they were to start cardiac compression maneuver. On checking responsiveness by touching the manikin and speaking loudly, 159 participants (59%) were not able to mention the initial approach of the resuscitation. In Calling for help or indicates help should be called, 144 participants (53%) were bale to call for help. Opening airway using the head tilt chin lift, 223 participants (83%), were able to demonstrate the ability to open airway using the head tilt chin lift. On aspect of checking breathing at least three seconds, majority of the participants could not demonstrate well how to check whether the patient was in the respiratory arrest, about 63% demonstrated wrongly.

On attempting at least two breathes in such that the chest rises at once and not more than twice, it was seen that, 204 participants (76%) were not able to demonstrate fairly, the way to do in making sure that they could facilitate breathing in the patient who had an arrest. Among all, 188 participants (70%) were able to check the circulation for five second as required and 53% of the participants could locate the compression position by feeling the bear chest. Among all study group, 220 participants (82%) were not able to demonstrate accurately the number of the chest compressions to be followed by the ventilation. Among

all study group, 159 participants (59%) failed to demonstrate opening airway between every set of compression using thee head tilt chin lift, and 223 participants (83%) were note able to demonstrate the need to re allocate the compression position between every set of compression. Table 4.9 reflects the results.

Table 4. 8 Participants' skills measurement results

Scores in preliminary skill test			**Frequency**	**Percentages**
1			1	0.4
2			42	15.6
3			52	19.3
4			63	23.3
5			49	18.1
6			24	8.9
7			19	7.0
8			10	3.7
9			10	3.7
Total scores			270	100
Final skill results among the participants				
Grades	ranges	Description of skill performance		
1	8-9	High performance	19	7.0
2	6-7	Moderate skill performance	44	16.3
3	4-5	Low skill performance	122	41.5
4	2-3	Poor skill	95	35.2
TOTAL			270	100

From the above table majority of the study participants could only perform well in only four areas among the ten areas of checklist. According to skills, measuring results, it shows that majority of study participant demonstrated to have poor to low skill performance in CPR, as 217 participants (77%) were those who scored two to five points in the final grades of participant's skills test.

5.0 CHAPTER V : DISCUSSION

5.1 Pre ambles. This chapter begins with a discussion of findings of this study that aimed on assessing knowledge cardiopulmonary resuscitation among registered nurses at Muhimbili national hospital basing on resuscitation skill, knowledge on the resuscitation instruments, medication and on the use and availability of the resuscitation guidelines. This is then followed by the discussion on identification and limitation of the study and its implication for nursing practice. Discussion processes, however, goes through availing information's and findings from other researches relevant to this study.

5.2 Registered nurses knowledge on Cardiopulmonary resuscitation

This study represents the first multi-parameter, quantitative evaluation of an actual representation of CPR knowledge and practice among registered nurses, what they normally do during in-hospital cardiac arrest at Muhimbili national hospital in Tanzania. Using impedance measurement techniques, we found that quality of CPR was often deficient from guideline recommendations, in several specific parameters, including chest compression rate, compression depth, and ventilation rate. Specifically, chest compression rates were often less than the recommended 100/min, compression depth was often more shallow than the minimum 38 mm, ventilation rate was higher than the recommended 12 to 16/min. Majority of the participants, (77%) could not follow fundamental rules for the management of cardiac arrest. Only 23% participants correctly followed the resuscitation procedure according to the 2005 guidelines of the Resuscitation Council.

Basic life support skills of many participants was poor, as 83% of them demonstrated wrongly or failed to demonstrate (hands position, lack of knowledge of the basic ABC) as if they were checking the pulse correctly on manikin's chest before starting CPR manoeuvre. The result is similar to that one found in literature when it was explained that, 'lack of resuscitation skills of nurses in basic and advanced life support has been identified as a contributing factor to poor outcomes in post cardiac arrest' as observed by Marzooq (2009). Marzooq (2009), further observed that an effort to improve cardiac arrest outcomes depended on focused on the timing and quality of CPR. From that observation registered nurses who lacked the skill even on where to place hands, need to be taught to **save** most

of lives of our patients who happen to develop cardiac arrest in the clinical areas. It is however important to do a research which will support any of scientific debate on the level of resuscitation knowledge. This is supported by a WHO report on resuscitation (1996), which indicated that nursing research involves the study of all aspects of nursing practice in all contexts and that developments in the nature and scope of nursing practice must be supported by research so that the effectiveness of nursing can be evaluated, and practice can be supported by research findings. Chellel's (1993a) suggestion to the contribution of research is that it does not provide standard solutions that can be transferred reliably from one situation to another, and, therefore may not influence behaviour directly.

Its contribution to the body of nursing knowledge, however, promotes the development of an enlightened practice. The study found that there are great numbers of patients who were developing in hospital cardiopulmonary arrest in the wards. This was done by deliberately asking if the participants could have encountered a patient who had cardiopulmonary arrest as about 40 percent admitted to have had seen and cared for. This is not a small number, and this study could not know the results of all those arrest, but the result had proved that, only 10% of the patients who get in hospital cardiac arrest do survive after cardiac arrest in America (AHA, 2005). This implies that the situation in our setting can be devastating. It was however, generally observed from this current study that registered nurses cardiopulmonary resuscitation practices are suboptimal. While the hospital administration is embarking into the standard proficiency of care that will bring the hospital to be the centre of excellence (MNH, MOH&SW 2009), this study found that some registered nurses who are leaders of nursing duties and functions in their ward, were not able to demonstrate the basic life saving manoeuvre.

However, according to the 2007 Tanzania Nurses Code of Conduct and the professional proficiency, the nurse has an ethical responsibility in the interest of the welfare of her patient to be a loyal and competent colleague to the other heath team, (TNMC, 2007). So registered nurses in the study area were obliged to have courage and determination on the improving their knowledge and practice on CPR. It is my observation that, nurses have dependent, independent, and interdependent roles in their interaction with other health workers.

Arranging and equipping the emergence cardiopulmonary resuscitation trolley is an interdependent nursing role in all clinical care setting. The need to have emergency care trolley is of far importance in every ward, ICU, Emergency Medical Department and it is the duty of the charge nurses to identify the deficiencies of its enclosures to update it and keep it leady for use. In this study, findings show that the majority of the registered nurses had low knowledge about the equipments and instruments that are to be kept in the resuscitation trolley. It is fact, considering that most of the registered nurses are caring patient including some who are seriously sick who are potential to develop cardiopulmonary arrest. It is imperative therefore, for the nurses to be knowledgeable about the signs of pre-arrest and cardinal signs of cardiopulmonary arrest to enable them to take appropriate care during such an emergency.

This observation promptly supported by an American Heart Association (2005), resuscitation guideline that recommends all hospital staff that is in contact with the patients should have regular resuscitation training, Maden, (2006). In this study majority of nurses failed to mention the initial signs and failed to demonstrate the approaches to basic life saving measures. Registered nurses had the lowest grades on the issues that be done in assistance of breathing, number of chest compressions, and the steps to do if the patient is not responding to the initial measures of resuscitation. The result showed that, 83% participants were able to open-up the airway satisfactorily in the skill station. This was an unexpected observation as its mainstay was maintaining a patent airway. It was obviously not reflecting to their clinical/ practices ability, as 82% of participants were not able to successful ventilates with a bag-mask apparatus; a technique that involves maintaining a patent airway. The result obtained in the study is tallying with the result of the study on the related study participants that conducted and published by Bell et al (2006).

Findings from this study indicated that there is low mean score of study participants on cardiopulmonary resuscitation and the application of the basic life support. By considering the way nurses responded to the question that were set to explore reflection on the reasons of doing CPR and how and when to do it. Registered nurses indeed showed the considerable knowledge and practice gaps. Despite of the majority of respondents admitting to have had learned CPR when they were training they were unable to define

accurately the meaning of CPR. The other area of concern was to know whether the respondents could be able to determine the actual time which should not be acceded for the one to have identified the cardiopulmonary arrest and be able to have had started CPR. Majority were not knowledgeable with the actual time that should not be acceded for the CPR commencements, as 54 percent of the respondents were not able to mention the actual time of less than 4 minutes.

According to some data in a study which was conducted and reported by Xing Jian-sheng (2005) about 88% of cardiopulmonary which were taking place only 10% of the patients could survive the attack on being properly managed with CPR which commenced within 4 to 6 minutes after CPA. He gave an emphasis that "Thus, if people waste time by thoughts of asking help and waiting, the optimal time to save lives will be missed." When they were to answer the steps they could take on trying to rescue the patient identified to be in CPA, about 70 percent of the respondents were not able to mention ABC approach of the BLS. This result is worth to be understood and reflected, as this will aid and work as the clue for the people in the study area to address this as a challenge that needs attention.

5.3 Registered Nurses Knowledge on resuscitation tools and equipment

In order to understand whether respondents were knowledgeable on the instruments and equipments, which are used in CPR, respondents, requested to name four instruments/equipments that are supposed to be kept in the trolley as for CPR preparations. The study identified many of the hospital wards are having the resuscitation trolley that are not equipped with the necessary resuscitation instruments and equipments including annexed full oxygen cylinders. The reasons to this is well associated with the registered nurses who are leaders of the nursing functions in the wards to be lacking knowledge on the equipments and instruments to be placed in the resuscitation trolley. This evidenced by the haphazard answers from the respondents when they were responding to the question on this domain which concerned mentioning instruments to be found in the crash carts. It is blatant fact that most of the cardiac arrest do happen unnoticed so if nurse who are in wards remains unprepared the chain of survival to the patient will not be achieved. Many respondents were able to mention other equipments and instruments that are not necessary

for resuscitation. In this group, 95 percent of the respondents were able to mention other things other than those used directly for resuscitation, where 5 percent of them could not mention any of the equipment. If you look at this result, it clearly shows that there is knowledge deficit on this aspect. These gaps of knowledge of resuscitation among the respondents can be associated to lack of on job formal training in the field of resuscitation among the registered nurses in the study area.

Ideally, the equipment used for cardiopulmonary resuscitation (including defibrillators) and the layout of equipment and drugs should be standardized throughout an institution. The choice of resuscitation equipment should be defined by the resuscitation committee and will depend on anticipated workload and specialized local requirements. Whilst it is difficult to plan for every eventuality, institutions should undertake a risk assessment to determine what additional resources may be required depending on local circumstances and specific locations (e.g., in some areas there may need to be provision for failed intubations, patients with tracheostomies etc). Where possible, resuscitation equipment should be single use and latex free and to be evenly updated.

5.4 Registered nurses adherences, to international CPR Guidelines and knowledge on the usage of resuscitation drugs/ medications

Provision need to be made in all clinical areas to have immediate access to resuscitation drugs and equipment to facilitate rapid resuscitation of the patient in cardiopulmonary arrest as is instructed by AHA (2005). On the research, this was conducted and reported by Ko et al (2005); it showed that the quality of CPR has a direct impact on a victim's chance of survival. The Resuscitation Council (UK) is responsible for issuing CPR guidelines in the UK. These are updated every five years to help improve training and performance of CPR, which in turn will improve survival rates. The UK guidelines are based on those issued by the European Resuscitation Council, which are in turn derived from research and in association with the International Liaison Committee on Resuscitation (ILCOR, 2004). In this study, majority of registered nurse claimed that they are lacking CPR guideline, though majority of them could not mention the reasons of those guidelines. In few areas where those guidelines were present, checked and validated by the researchers, they were the fresh prints of AHA, (2005) resuscitation algorithms. The similar effort has to be made

by the Muhimbili National Hospital authority to distribute the same in other wards and other clinical settings to attain the similar goal of improving CPR training and thus improving the survival rate of the patients developing cardio respiratory arrest in the study area. Lack of knowledge on resuscitation guidelines, though was not the mainstay of this research, is partly supported by the a result of a study which was conducted by Sadoh (2005) on, the knowledge and practice on utilising the URC (2000) CPR guidelines among doctors and nurses in Benin City. Literatures showed that knowledge of the existence and the use of the resuscitation guideline was significantly poorer amongst nurses than to doctors' respondents.

According to the report in that study results, only 17 respondents (11.7%) were aware of the 2005 guidelines (Sadoh, 2005). The study report avails the information that, it was that observed poor knowledge of CPR and low awareness of the changing CPR guidelines amongst respondents in that study buttresses the need for regular CPR training of health professionals in Nigeria (Sadoh, 2005). This fact called for this research to be done at Muhimbili National Hospital to build up an evidence base caring process. It is also expected that the result in this study will work as a better reference in improving the CPR knowledge and practices among nurses and other health workers at not only MNH but also to others in Tanzania.

5.5 Resuscitation knowledge process and experience among registered nurses at Muhimbili national hospital.

The other area of concern was to know from respondents on the experience and contextual ideas they have on CPR. About 74 percent of the respondents said the knowledge was not adequate. The same responses were also identified in the results of research done by Nagashima et al (2003) when they concluded that 80% of the nurses did not have enough knowledge about CPR, despite passing educational programmes about resuscitation. The other area of interest was to know if there was resuscitation guidelines/protocol in their ward. Many respondents, (65%) said they do not have CPR guideline, only few participants could agree and validated to be having the CPR guideline in their working areas. Moreover, (96%) of the respondents said it was with the importance to have the guideline in place in their working areas.

In this study, registered nurses knowledge gap on cardiopulmonary resuscitation was associated with their educational background; however no statistically significant (p value =0.43) different between the group existed. Those who attained higher education were relatively more knowledgeable compared to those with low educational background. The study has also shown that knowledge was associated with duration of work in years whereby those have worked longer were not competent on CPR cognitive knowledge compared to recent employed one in the study area. However, the long serviced ones were able to demonstrate skill well than the recent ones. The result has thereby supported the facts to the previous conducted study on the similar subjects, sourced in a literature review, which explained that there is much CPR knowledge deficit with long working duration, Hamiliton (2005). The issue of retentions of CPR knowledge was put forward among other causes of CPR knowledge deterioration with time.

5.6 Participants' opinion on CPR knowledge and practice at Muhimbili national hospital

Participants in this study mentioned various areas to be looked at, in order to improve CPR knowledge and practices. It was identified that some of study participant were not trained to do CPR in their early nursing training, this is eventually resulting in lack o f both knowledge, and information among such registered nurses. The study also identified that majority of nurses have not been exposed to the on going in service training in CPR. This might has made many registered nurses to fail to update the available resuscitation trolleys in their wards. This might, in one way or other hampered the intention of the hospital goals of providing the high quality standard of care as it embarks into being full-fringed centre of Excellency.

5.7 Application of theory of planned Behaviour (TPB) in the study

The theory of theory of planned Behaviour (TPB) was used in this study to discover what are the knowledge and practice of CPR among the registered nurses working at Muhimbili National Hospital. The sketched model (figure 1) was used as a valuable map in depicting the total view of the different but closed dimensions. Findings are linked with theoretical framework of which expected that nurses in the area would have been accustomed with the certain behaviour (subjective behaviour) of which they might have acquired within their

area of practice. This might have been with a good intention. Intentions are the precursors of behaviour, Jillian et al. (2004). Nevertheless, as they had been lack of institution policy (control belief) governing CPR, each registered nurse expected to have developed (perceived behaviour control), the personal and sometimes easy way of performing the CPR procedure, which according to the results of this study, it was seen that they are so many gaps (belief-based behaviour) which have to be filled. The process of filling such gaps ought to be communicated back to registered nurses working at Muhimbili National Hospital, as they are the ones to be involved in making the change. The process of communicating expected to assert all the concerned stakeholders in looking into the issues surrounding resuscitation knowledge and practices among registered nurses working at Muhimbili National Hospital.

6.0 CHAPTER SIX: CONCLUSION AND RECOMMENDATION

6.1 Nursing implication

The result of this research has helped to identify the level of knowledge and skills among registered nurses in the MNH. From this research, a number of factors ought to be suggested for the appropriate interventions to be taken by the Muhimbili National Hospital administration. It has been identified that nurses lack even the fundamental knowledge on cardiopulmonary resuscitation; this will be sorted out if the management will appreciate this as a challenge that needs to be addressed through involving registered nurses themselves. This study has identified the areas where nurses had gaps on both practice and knowledge in resuscitation. This might help educators to concentrate on those areas mentioned to have showed a great CPR knowledge deficit.

It is predicted that, if these nurses are trained well in identified gaps, it will save the lives of the patients and at the same time reducing the disease burden that can result due to the complication after cardiac arrest. It is known that, if you do not serve the life you will make other people surfer from the loss of their beloved. Poor knowledge shown by registered nurses in this study may have important implications such as nurses' anxiety and uncertainties, unnecessary restrictions by the other healthcare providers, lack of professional socialization, which may compromise and mitigate integration of their former knowledge and understandings to their current practices. Among other things, nurses have the professional obligation and are within the capacity to address these issues and change the trajectory.

6.2 Limitation of the study

Some limitations of this study should be acknowledged. First, because this study was conducted at a single large institution, external validity is relative and uncertain. A multi-centre study is required to achieve more validity. The presence of data collector could influence the situation that was being observed (resuscitation practice). All these kind of limitations were considered so that they would not affect the outcome of the study. The use of the manikin which was not showing the result electronically could also affect precision of the results. This was done according to the real situation in the study area as we

currently do not have such electronic controlled manikins, but still we needed to have an evidenced baseline descriptive study like this that would help in modifying our clinical teaching and practices in regard to the CPR. Nevertheless, an attempt was made to use the manikins which could show whether the compressions were adequate and that which could also show the air entering when one attempted to give a rescue breathe. Few study participants were not able to bring back their questionnaires this could not affect the result as; they had no characteristics that distinguished them from those who did not drop out. Training of interviewers and standardization of observational guide, checklist, similar sampling procedures and tools distribution of questionnaires were also important in reducing the bias. Knowledge of the environment events enabled the researcher to be sensitive to external events that could affect validity.

6.3 Conclusion

The results in this study has been congruent to other studies and to its great extent, it has shown how registered nurses who participated in this study demonstrated considerable knowledge and practice gap in areas of identifying and application of the basic life serving measures. The study has revealed that; registered nurses had low knowledge on fundamental approach of basic life serving measure, which is an integral part of the resuscitation procedure despite of them having training in CPR in their early nursing training. Registered nurses could also demonstrate to have poor to moderate knowledge on identification and the usage of CPR equipments. Few of the registered nurses reported to have attended in-service training in CPR. The need to have training was the foremost need of majority of the study participants. It is paramount important therefore, to establish a team of experts of CPR who will organize and formalise the training of CPR to enable registered nurses to have an updates in CPR knowledge for the benefits of our clients in all working settings within the hospital. This will only be archived if the curriculum will be developed that will have to put the cardiopulmonary resuscitation as a must subject and prerequisite to employment in nursing.

6.4 Recommendations

This study raises some important themes and issues related to the knowledge and practices on CPR among nurses at MNH of which researchers and practitioners might take note. The recommendations involve practical, research and policy implications as follows:

1. Hospital administration has to formulate a resuscitation operational team, which will plan the CPR training for all nurses in the hospital; this will help in improving quality of care to be given to the patient who may develop cardiopulmonary arrest.
2. Registered nurses need to be provided with the in-service training in order to update their knowledge for the benefit of their clients. This should go together with the fact that each ward needs to be provided with the resuscitation logarithm and be socialized to every nursing staff in the ward for the standardized care and for easy referencing.
3. Basic theory and skills of CPR, especially the main steps and methods of BLS, are key points and highlight of the training. Training organizers have to put in place the training policy that will strengthen supervision and evaluation, awarding qualified trainees. If done positively would increase the morale of care and timely identification of the patient who develops cardiac arrest.
4. There is a need to have a policy to realize the goal and to guarantee the stability and continuous running of a standardized training mode on CPR, administrative intervention to be conducted by functional departments of the Muhimbili National Hospital.
5. There is a need to have a strong support from the medical schools and social organizations, as well as the long-term efforts of nurse educators in the entire health training system and services to see the value of CPR as there is increased numbers of sudden deaths, some being those that can be prevented by an effective and timely CPR.
6. Long-term mechanism for continuing education and research should be established and increase the intensity of training especially in the areas where registered nurse could show the weaknesses in cardiopulmonary practices.

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