

**ASSESSMENT OF KNOWLEDGE AND SKILLS OF TRIAGING  
AMONGST NURSES WORKING IN THE EMERGENCY  
DEPARTMENTS IN DAR ES SALAAM HOSPITALS**

Aloyce Robert

**MSc.N (Critical Care and Trauma) Dissertation  
Muhimbili University of Health and Allied Sciences  
November, 2010**

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**By**

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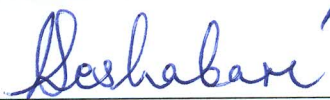
**A dissertation Submitted in partial Fulfillment of the Requirements  
for the Degree of Master of Science in Nursing (Critical Care and  
Trauma) of Muhimbili University of Health and Allied Sciences**

**Muhimbili University of Health and Allied Sciences**

**November, 2010**

**CERTIFICATION**

The undersigned certify that she has read and hereby recommends for acceptance by the Muhimbili University of Health and Allied Sciences a dissertation entitled *Assessment of Knowledge and Skills of Triaging Amongst Nurses Working in the Emergency Departments in Dar es Salaam Hospitals*, in partial fulfillment of the requirements for the degree of Master of Science in Nursing (Critical Care and Trauma) of Muhimbili University of Health and Allied Sciences.



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Dr. S. Leshabari  
(Supervisor)

Date: 22<sup>nd</sup> November 2010

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I, **Aloyce Robert**, 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.....

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## ABSTRACT

**Background:** Triage is an essential function in the emergency department. An effective triage system aims to ensure that patients seeking emergency care receive appropriate attention, in a suitable location, with the requisite degree of urgency and that emergency care is initiated in response to clinical need rather than order of arrival. The triage nurse in the emergency department is the first person that a patient encounters when presenting for emergency medical care to the department. Triage nurses' knowledge has been cited as an influential factor in triage decision-making, however there has been no study in Dar es Salaam hospitals undertaken to assess the knowledge of nurses working in the emergency departments on triaging. This study therefore aimed at assessing knowledge and skills of triage among nurses working in the emergency departments in Dar es Salaam hospitals.

**Objectives:** Two objectives guided this study: (1) To determine the knowledge of triage among nurses working in the emergency departments in Dar es Salaam hospitals. (2) To describe the skills of triage among nurses working in the emergency departments in Dar es Salaam hospitals.

**Materials and Methods:** Both descriptive cross-sectional and observational study designs were used and data were collected using structured questionnaire, observation checklist and review guide. The study population was all nurses (enrolled and registered) working in the emergency departments in Muhimbili National Hospital, and the municipal hospitals that are Mwananyamala, Ilala, and Temeke hospitals. Descriptive statistical data analysis such as frequencies and percentages were used to make interpretation of the data easier, whereby a computer program running SPSS 13.0 for windows was utilized in the analysis.

**Results:** Seventy eight percent (47/60) of the respondents had no postgraduate/post basic nursing training on emergency nursing care. Forty seven percent (28/60) of the respondents had never attended in-service training/education workshop on emergency nursing care. Among those who attended in-service training/education workshop on emergency nursing care, 13% reported that the workshop did not include information on how to triage patients. Approximately 67% (40/60) of the respondents had knowledge on what triage is all about. More than half (52%) of the respondents were not able to allocate proper patient's triage category. Fifty eight percent (35/60) of the respondents had no knowledge on waiting time limits for patients' triaged categories. Among the four hospitals observed, only one had triage nurses allocated for patients triage. Among the

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triage nurses observed while triaging patients, 84% of them did not assess for the respiratory rate. Pain assessment was not done by all triage nurses observed. Three of the four emergency departments participating in the study had no triage guidelines and triage assessment forms.

**Conclusions and Recommendations:** Nurses who participated in this study demonstrated significant knowledge and skills deficits on patients triaging in the emergency departments of the four hospitals that participated in the study. To correct this deficit and improve the knowledge and skills of these nurses, an in-service training/education workshop should be carried out as soon as possible, to be followed by a continuous professional development (CPD) program that should include refresher training, supportive supervision and clinical skills sessions on a regular basis. Besides CPD program, providing up-to-date policy guidelines on Emergency Triage Assessment and equipments is also needed so as to improve the quality of emergency care.



**LIST OF ABBREVIATIONS**

- WHO- -----World Health Organization  
UNICEF-----United Nations International Children's Emergency Fund.  
LMICs-----Low and Middle Income Countries.  
EDs----- Emergency departments  
DSM----- Dar es Salaam  
BScN-----Bachelor of Science in Nursing  
USA-----United States of America  
ECG----- Electrocardiography  
MUHAS-----Muhimbili University of Health and Allied Sciences.

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## CHAPTER I: INTRODUCTION

### Background

#### **The concept of triage**

When the needs or demands for medical treatment significantly outstrip the available resources, decisions must be made about how to distribute these resources, recognizing that not all needs will be satisfied immediately and some may not be satisfied at all (Iserson, 2007). Decisions about distributing scarce health care resources can arise at all levels, from societal choices within a national health care system (macroallocation) to individuals allocating immediate emergency treatment and transport among the multiple severely injured survivors of a motor vehicle crash or industrial accident (microallocation). Several terms, including “triage,” “rationing,” and “allocation,” are used to refer to the distribution of scarce resources in different health care contexts. This study focused on “triage,” the term most commonly used to mean the sorting of patients for treatment priority in emergency departments (EDs) (Iserson, 2007). It is the formal process of immediate assessment of all patients who present to the emergency department (Williams, 1992). The use of the term triage requires three conditions to be met: 1) At least a modest scarcity of health care resources exists. The degree of scarcity can vary considerably, from modest, as in a hospital ED where not every patient who presents for care can be served immediately, to dire, as after a catastrophic disaster in which hundreds or thousands of people may experience severe injuries in a short time; 2) A health care worker (often called a “triage officer”) assesses each patient’s medical needs, usually based on a brief examination. The outcome and grading of the patient is frequently the result of physiological and assessment findings; 3) The triage officer uses an established system or plan, usually based on an algorithm or a set of criteria, to determine a specific treatment or treatment priority for each patient (Iserson, 2007). Triage may result in determining the order and priority of emergency treatment, the order and priority of emergency transport, or the transport destination for the patient.

The World Medical Association has recommended that clinicians categorize disaster victims with a system that has been adopted worldwide in some form and which involves the following triage criteria: a) Those who can be saved but whose lives are in immediate

danger, requiring treatment immediately or within a few hours (red triage tag: "immediate"; priority 1); b) Those whose lives are not in immediate danger but who need urgent but not immediate medical care (yellow triage tag: "delayed"; priority 2); c) Those requiring only minor treatment (green triage tag: "minimal"; priority 3); d) Those who are psychologically traumatized and might need reassurance or sedation if acutely disturbed (no specific triage tag); e) Those whose condition exceeds the available therapeutic resources, who have severe injuries such as irradiation or burns to such an extent and degree that they cannot be saved in the specific circumstances of time and place, or complex surgical cases that oblige the physician to make a choice between them and other patients (black triage tag: "expectant"; no priority) (Kennedy, 1996).

Nursing triage refers to the formal process of early assessment of patients attending an accident and emergency department by a trained nurse, to ensure that patients receive appropriate attention, in a suitable location, with the requisite degree of urgency (George, 1993). Triage is an essential function in the emergency department as many patients may present simultaneously (Levasseur, 2002). An effective triage system aims to ensure that patients seeking emergency care receive appropriate attention, in a suitable location, with the requisite degree of urgency and that emergency care is initiated in response to clinical need rather than order of arrival (George, 1993; Levasseur, 2002; Purnell, 1993). Triage aims at promoting the safety of patients by ensuring that timing of care and resource allocation is requisite to the degree of illness or injury (Charles, 2001).

Historically, global health policy emphasized on program that concentrated on maternal and child health and the control of communicable childhood diseases (Gill, 1993). This resulted in major public health agencies focusing their support on selective program that address priority diseases and activities (Gill, 1993). The weakness of this approach is most apparent during crises, such as medical emergencies or incidents involving large numbers of casualties (Gill, 1993). Fortunately, experts in global health are beginning to take a more comprehensive view of health, including the provision of emergency medical care, than was traditionally the case. For example, World Health Organization (WHO) and United Nations International Children's Emergency Fund (UNICEF) have been

placing substantial emphasis on the strengthening of triage and emergency care within the context of the integrated management of childhood illnesses (Gove 1997). Emergency departments were developed during the 20th century in response to an increased need for rapid assessment and management of critical illnesses (Van Gerven, 2001). Which conditions and what levels of risk and severity warrant emergency medical attention? The unavoidable resolution of these fundamental questions facing emergency medicine lies in the development of standardized triage methodology (Christopher, 1999). Therefore, the emergency department triage plays a critical role in the emergency department (Considine, 2007).

### **Triage Knowledge**

According to estimates from the WHO, almost 90% of deaths due to injuries occur in low and middle income countries (LMICs), and this situation will continue to represent an important global health problem in the upcoming years (Gove, 1999; Junaid, 2002). Among the many reasons why trauma is so devastating in many LMICs are the inadequate systems of hospital and community-based emergency care in place in these countries (George, 1993; Macfarlane, 2000). Another challenge is the lack of trained health care workforces, partly the result of a paucity of specialty training in trauma care (Gill, 1993). The effective emergency department triage training program will enhance patient throughput in the emergency room and improve patient care and maximize patient satisfaction by teaching critical care and management skills which expedite care and treatment in the emergency department. Factual knowledge appears to be more important than years of emergency nursing or triage experience in triage decision accuracy (Considine, 2007). A study done in Australia in 2000 found that, of the 172 triage nurses surveyed, only 57.6% had a post graduate qualification in emergency or critical care nursing, and over half (55.2%) were employed in emergency departments with no unit based orientation program specific to triage (Gerdtz, 2000). Another study that was done in Sweden found that there was a requirement for nursing staff to have a particular qualification and clinical experience for being allocated to triage work (Goransson, 2005). This is in support with a statement that was made by Australian Emergency Nurses' Association in 2000 which recommended emergency nurses to be prepared for



the triage role via structured unit based educational program (Levasseur, 2002 ). Infact some institutions recommend that all triage nurses undertake educational preparation prior to undertaking the triage role (Mallett, 1990; Williams, 1992).

### **Triage Skills**

In developing countries initial triage and treatment of patients in the emergency departments constitute one of the weakest links in the health system (Gove, 1999). A qualitative study of 21 hospitals in seven developing countries found that poor triage of incoming patients and inadequate provision of emergency care jeopardized the lives of arriving patients (Nolan, 2001). Fourteen of the facilities did not have an adequate triage system. A comprehensive review of the management of 131 children treated at these facilities found evidence of inappropriate or delayed triage in 8% of cases, poor clinical assessments in 41%, and potentially harmful delays in treatment in 19%. Triage is a complex process involving decision-making under uncertainty in an environment laden with emotion, driven by urgency and constrained by negotiation. The triage nurse's ability to make accurate clinical judgments about patient urgency and their need for intervention is essential to the delivery of safe and effective emergency care (Ung, 2000).

### **Problem Statement**

The triage nurse in the emergency department is the first person that a patient encounters when presenting for emergency care to the department. Triage aims to promote the safety of patients by ensuring that timing of care and resource allocation is requisite to the degree of illness or injury (Charles, 2001). An effective triage system classifies patients into groups according to acuity of illness or injury and aims to ensure that the patients with life-threatening illness or injury receive immediate intervention and greatest resource allocation (Charles, 2001). Triage nurses' knowledge and experience have been cited as influential factors in triage decision-making (Considine, 2007). Many triage education programs are underpinned by the assumption that knowledge acquisition will result in improved triage decisions (Considine, 2007). A study that was done across the emergency departments in the United States of America to examine the educational preparation of triage nurses, found that 43.3% of the emergency departments were run by nurses who had no educational preparation on triage (Purnell, 1993). Another study that was done in Sweden found that about 46% of the emergency departments researched were not using triage scales in rating the acuity of patients (Goransson, 2005).

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Triage is the keystone of organization of care in the emergency departments. However, its importance as a topic for clinical research and development needs high consideration in Tanzania. This is because during this study, I could not find documentation of any

study in Tanzania that assessed the knowledge and skills on triaging among nurses working in the emergency departments. That is why it was the intention of this study to assess the knowledge and skills of nurses working in the emergency departments on triaging so as to address their ability in handling emergency patients with the purpose of ultimately improving emergency care in the emergency departments in Dar es Salaam region.

**Purpose**

The purpose of the study was to assess knowledge and skills of triaging by nurses working in the emergency departments in Dar es Salaam hospitals.

**Broad Objective**

The major aim of this study was to assess knowledge and skills on triaging among nurses working in the emergency departments in Dar es Salaam hospitals.

**Specific objectives**

1. To determine the knowledge of triage among nurses working in the emergency departments in Dar es Salaam hospitals.
2. To describe the skills on triage among nurses working in the emergency departments in Dar es Salaam hospitals.

**Assumption of the study**

The main assumption of this study was that there are knowledge and skills deficits on triaging among nurses working in the emergency departments in Dar es Salaam hospitals.

**Significance of the study**

The study was expected to determine knowledge and describe skills on triage among nurses working in the emergency departments in Dar es Salaam hospitals. The determination of knowledge and description of skills was expected to provide insight on learning needs to the nursing education programs, and to recommend appropriate intervention to improve, support and advocate for evidence-based triage skills among nurses working in the emergency departments, hence improving the quality of care given to patients in the emergency departments in Dar es Salaam hospitals.

**Definition of terms**

The following were the operational definitions of terms as used by this study:

1. **Emergency department-** Is the term used by this study to mean an emergency unit, accident and emergency department or casualty unit that provides initial treatment to patients with broad spectrum of illnesses and injuries before the patient being admitted, transferred, or discharged.
2. **Knowledge on triaging-** Is the term that was used by this study to mean nurses knowledge on: what triage is all about, waiting time limits for patients triaged with different triage categories, assessment and assigning of patients triage category.
3. **Skills on triaging-** Is the term used by this study to mean all nursing triage activities involving assessing, observing, and recording patients' vital signs, assigning category and acuity of patients' conditions, and documentation of patient's assessment findings.
4. **Registered nurses-** Is the term used by this study to mean nurses with diploma, advanced diploma, or Bachelor of Science in Nursing.
5. **Enrolled nurses-** Is the term used by this study to mean nurses with certificate in nursing.
6. **Triage nurses-**Is the term used by this study to mean nurses who assess patients attending emergency medical services in the emergency department in order to determine their priority of care and proper placement for treatment.

## CHAPTER II: LITERATURE REVIEW

### **Knowledge on triaging**

Triage is the point at which emergency care begins (Whitby, 1997). Triage decisions are fundamental in determining the trajectory of emergency care (Williams, 1992). Accuracy of triage decisions is considered to be a major factor that determines patients' outcomes in the emergency department (Considine, 2007). Triage decisions can be classified as primary and secondary triage decisions (Williams, 1992). Primary triage decisions relate to the triage assessment, allocation of a triage category, and suitable location for treatment (Murray, 1996b; Williams, 1992). Secondary triage decisions relate to initiation of interventions to expedite care and promote comfort (Bucknall, 1999). The allocation of a triage category is based on the nature of the patient's presenting problem and the need for medical intervention as determined by the triage nurse (Charles, 2001). The triage category is important not only in correctly identifying the priority of the needs of a patient but also because it may have implications in the evaluation of the costs of a department (Williams, 1996). Sound clinical reasoning and accurate decision-making are integral parts of modern nursing practice and are of vital importance during triage in emergency departments (Ehrenberg, 2008). It is important that triage is carried out speedily, efficiently, sympathetically, and courteously within somewhat arbitrarily defined Patient's Charter limits (Williams, 1996).

Emergency nurses require in-depth knowledge and clinical expertise to provide care across the lifespan and to manage situations such as patient overcrowding and the use of complex technology (Fry, 2004b). A study done in Swedish emergency departments to identify the organization of and knowledge about triage work found varieties in several areas including education, personnel performing triage, facilities available and scales used (Goransson, 2005). A study in Australia found that 75% of the emergency nurses agree that the basic component of triage as rapid assessment, first aid, and prioritization of medical urgency (Burr, 2001). A study that was done to measure the interrater and intrarater agreement of triage assessments done by experienced personnel found poor interrater reliability and only poor to fair intrarater agreement among experienced triagers, indicating that experience alone does not result in improved triage decisions

(Wuerz, 1998). Further, although a number of studies have examined the role of experience as an independent influence on triage decisions, none has found a significant relationship between experience and improved triage decision-making (Burr, 2001; Dilley, 1998; Thomas, 2001; Ung, 2000). Although factual knowledge (i.e. knowledge gained through formal training) and knowledge gained from experience are inextricably linked, factual knowledge appears to play a more important role in triage decisions than years of emergency nursing or triage experience. Factual knowledge has also remained a key influence in triage decisions irrespective of the methods to evaluate triage decision-making (Considine, 2007). This could be the reason why the Australian Emergency Nursing Association recommended emergency nurses to be prepared for the triage role via structured unit based education programs informed by nationally established triage standards (Levasseur, 2002). In fact some institutions recommend that all triage nurses undertake educational preparation prior to undertaking the triage role (Mallett, 1990; Williams, 1992). Triage education has been considered essential for the development of expertise (McNally, 2001). Participants in a study done in Australia to stimulate discussion among emergency nursing colleagues regarding the need for national practice standards guiding the development of triage education and practice advocated the use of several methods, most favoured the completion of a comprehensive triage course along with mentoring by senior nurses in the clinical setting (McNally, 2001). The majority of the more than 2.2 million registered nurses in the United States are graduates of three-year nursing certificate or two-year affiliate programs. A minority (32%) come from four-year baccalaureate programs (Anderson, 1999). None of the nursing educational pathways adequately prepare the emergency nurse for clinical practice (Schriver, 2003). A study that was done to evaluate performance of a simplified algorithm and treatment instructions for emergency triage assessment and treatment (ETAT) of children presenting to hospital in developing countries found that the ETAT algorithm and treatment instructions, when carried out by nurses after a short specific training period, performed well as a screening tool to identify priority cases and as a treatment guide for emergency conditions. This is an indication that shows that for nurses perform effectively their triage role they need training and guidelines for emergency triage assessment and treatment (Tamburlinia, 1999).

In the past emergency department was taken to be a place where patients were kept after working hours waiting for doctors to come to see them (Zwicke, 1982). But now adays emergency department is the very important area for saving life of patients as the world has been shaped by many factors including increased number of injuries and changes in disease patterns with increased conditions that require emergency medical care. According to WHO (1990), about 90% of death injuries occurs in low and middle income countries (Murray, 1996b). Among the challenges mentioned by the above findings of WHO, is the lack of trained health care workforces especially to deal with trauma patients (Joshipura, 2003; Mock, 2003). Although these findings are of the past (1990) but according to WHO this situation was expected to continue to represent an important global health problems in the upcoming years(Murray, 1996a). Most of the nurses working in the emergency departments in developing countries are not prepared to take the triage role. This is supported by a study that was done in Malawi which found that many seriously ill children arriving at clinics were not recognized, instead of receiving immediate care they were left unattended for a long period. But in developed countries the situation is different. For example a study done in Australia found that about half (48%) of the nurses working in the emergency departments had undergone courses/seminars pertaining to triage (Burr, 2001). Another study that was done in Australia in 2007 reported lack of published studies that have examined the knowledge and clinical decisions of emergency nurses' who manage both adult and paediatric populations (Brennan, 2007).

### **Triage Skills**

An effective triage system classifies patients into groups according to acuity of illness or injury and aims to ensure that the patients with life threatening illness or injury receive immediate intervention and greatest resource allocation (George, 1993; Geraci, 1994; Levasseur, 2002 ; Van Gerven, 2001). The time to treatment described for each triage category refers to the maximum time the patient should wait for medical assessment and treatment (Whitby, 1997). A study in Mexico on verbal autopsies (approaches used to obtain cause of death by interviewing lay respondents on the signs and symptoms



experienced by the deceased before death) of 132 children who died revealed that late referral to tertiary care was judged to be one among the important contributory factors in more than half of the deaths (Reyes, 1993). Another study in Malawi also revealed that the conditions of many seriously ill children arriving at clinics had not previously been recognized. Instead of receiving immediate emergency care they were kept waiting for long periods before being given proper treatment which resulted into avoidable deaths and disabilities (Gove, 1999). The introduction of nurse triage, using the CAPE TRIAGE SCORE (CTS), resulted in an overall highly significant reduction in waiting time from 237 min to 146 min of patients attending a busy public hospital ED in South Africa (Bruijns, 2008).

A study that was done to determine current issues in triage found about 78% of the respondents indicating that triage should only be performed by a registered nurse while 22% believed enrolled nurses or registered nurses could perform the role. Majority of the respondents (77%) believed that the triage role should be compulsory and that all emergency nurses should be competent to perform the role (Burr, 2001). Triage role needs to encompass not only patient assessment and allocation of a triage code but also should include ordering radiology, pain management and haemodynamic observations (Burr, 2001). Worldwide, patients with pain including those suffering from painful musculoskeletal conditions often received inadequate pain relief or delayed care due to frequent ED overcrowding (Goh, 2007). A study done in Hong Kong to determine the time difference to analgesia administration for patients with painful limb conditions using an emergency triage nurse initiated pain management protocol versus analgesia administration by emergency doctors after consultation found that the time interval for pain relief of emergency department patients with painful limb conditions was reduced when the triage nurse initiated pain management (Goh, 2007). The same above study was used to determine the frequency of adverse events following such a protocol implementation of triage nurse initiated pain management and the result was that, no adverse drug reaction observed in patients who received intramuscular ketorolac given by triage nurses (Goh, 2007). Assessment of pain in the emergency triage centre by using pain rating scale should be incorporated as a 'fifth' vital sign (Lim, 2006). About 44% of

the nurses working in the emergency departments in Australia reported not receiving any unit-based orientation program on triaging, although most of them (89%) reported it to be essential (Burr, 2001). In that study many nurses (42%) reported feeling inadequately prepared for triage role. Even after attending unit-based triage program still some (14%) of the nurses were not feeling confident in taking the triage role. Also in the study 13% of the nurses reported never using triage guidelines, although most of them (95%) were aware of it. Another study that was done in Sweden found that about 46% of the emergency departments researched were not using triage scales in rating the acuity of patients (Goransson, 2005).

A study done in Australia found majority of nurses working in the emergency departments believing that triage documentation should include presentation history, pain assessment, patients vital signs, and neurological assessment (Burr, 2001). But a study that was done in 2004 found that pain assessment and treatment by health care professionals in the emergency department receives little attention (Rupp, 2004). Other studies found that respiratory rate is one of the vital signs that has been greatly neglected by health care professionals despite its vitalness in determining the outcomes of critically ill patients (Hodgetts, 2002; Hogan, 2006; McBride, 2005; Ryan, 2004).

Lack of equipments for assessing patients in the emergency departments has been found as one of the factors that contribute to triaging delays (Burr, 2001). A study done in Australia in the emergency departments of various hospitals found that the most available equipments was thermometer, followed by pulse oxymeter and sphygmomanometer; and less available ones were 12 lead ECG, spirometer, glucometer, and urinalysis strips. Only about 10% of the nurses assessed had access to all triaging equipments, while 2.5% of the nurses assessed had no any triage equipment in the triage area (Burr, 2001). Emergency nursing is at a historical crossroads in its journey as a profession, and is under considerable stress from interrelated societal and professional sources. It should find strength from its adherence to patient advocacy, the significance of its mission, collaboration with other professionals who share the ED workplace and common goals, and further development and recognition of its role in the emerging health care system.

Of all the strategies proposed to prepare emergency nursing for the future, the provision of adequate staffing resources for the ED is the most significant. Taking these steps today will strengthen the ED health care safety net for decades to come (Schriver, 2003).

## CHAPTER III: METHODOLOGY

### Study design

The study was conducted as a quantitative descriptive cross-sectional and observational aimed at assessing knowledge and skills on triage by nurses working in the emergency departments in Dar es Salaam hospitals. Observational study design was done in order to observe the triage skills and activities of the study participants in the natural settings thus getting the real picture of what were taking place in the emergency departments in respect to triage. A descriptive cross-sectional study design was utilized by this study in order to determine the triage knowledge of the study participants during the study period.

### Study setting

The study was conducted in Dar es Salaam region in the emergency departments of Muhimbili National Hospital and the three municipal district hospitals- Mwananyamala hospital, Ilala hospital, and Temeke hospital. The above mentioned municipal hospitals were chosen because they are public hospitals where most of the Dar es Salaam residents attend for public health services. Muhimbili hospital is the national referral hospital where patients with complicated health conditions are referred from all over the country, and all these patients pass through the hands of nurses working in the emergency department for triaging before being admitted.

### Study population

The study population in this study was all nurses (enrolled and registered) working in the emergency departments of the above mentioned hospitals in Dar es Salaam. These nurses were 78 in numbers.

### Sample size

The estimated sample size for the study was 165 participants, calculated by the use of the following formula (Cochran, 1963):

$$n = \frac{z^2 p q}{e^2}$$

where:

**Inclusion criteria**

The study included all registered and enrolled nurses who were employed and were working in the emergency departments of each selected hospital.

**Exclusion criteria**

The study excluded all registered and enrolled nurses who were on leave during the data collection period.

**Data collection**

Data were collected by the use of self-administered structured questionnaire (see appendix-i), observational checklist (see appendix-ii), and a triage equipments review guide (see appendix-iii). Both tools were in English language because this was the media of communication for the study participants during their basic nursing course training.

The questionnaire included: demographic data, and knowledge on emergency nursing triage. The questionnaire had a total number of 17 questions: six questions on demographic data and eleven questions on knowledge of triage, of which eight questions were scenario-based. The structured questionnaire was developed by the use of literature review and consultation of experts and specialists in emergency and trauma. Questions like what triage is all about, categorization and waiting time limits for each patient attending ED according to the level of severity of their condition, prioritization of patients by using physiological parameters and discriminators such as mechanisms of injury were developed through literature review. After the questionnaire was developed, then consultation was done to experts and specialists in emergency and trauma for review. The structured questionnaires were filled by the study participants at their working stations in their respective hospitals. The study participants were requested by the researcher to fill the questionnaires and return them in the same day and they were not allowed to make discussions in responding to the questions on the questionnaire. All the study participants managed to fill the questionnaires on the same day in their working stations and collected on the same day by the researcher except two participants whom one did not return the questionnaire and the other one returned the questionnaire unfilled after refusing to fill it, remained with the questionnaire for more than one day. This was done in order to determine the actual triage knowledge of the individual study

participants. The triage knowledge of the participants was determined by the use of the triage knowledge questions of the structured questionnaire. A participant was considered to have triage knowledge if was able to respond correctly on the respective triage knowledge question; and was considered to have no triage knowledge if responded incorrectly to the respective triage knowledge question. Approximate time to fill the questionnaire was thirty minutes.

The observational checklist (see appendix-ii) was used in observing the triage skills of the participants as they were performing their nursing triage activities. The checklist included observation on presence of a nurse dedicated to triage patients in the emergency departments of the surveyed hospitals, triage assessment and prioritization of care by the triage nurse, and documentation of the triage assessment findings and assigned patients category by the triage nurse. The observation was participatory and was done during the working days of the week (Monday to Friday) in the morning hours from 9am-11am and in the evening hours from 2pm- 5pm. It was done in the morning hours because this was the busy times of all the emergency departments surveyed as many patients were presenting at these times for medical services. Observation was also done in the evening hours at the emergency department of Muhimbili National Hospital because many referral patients and casualties were observed to be arriving at these times. The observation was done once to each study participant and each observation took a period of at least 60 minutes to 120 minutes. To avoid observing each study participant more than once, a roster having the names of all study participants was used where by each participant after been observed was ticked against his/her name.

The triage equipments review guide (see appendix-iii) assessed the presence of equipments that support the triage nurse in performing triage activities including thermometers, pulse oxymeters, sphygmomanometers, glucometers and strips, spirometers, 12 lead electrocardiographs, arterial blood gases analyzer, triage assessment form indicating level of severity of patients' illness, triage guidelines/policy, and pain assessment scale.

**Ethical considerations**

The ethical clearance was sought from the Research and Publication Committee of Muhimbili University of Health and Allied Sciences (MUHAS). The permission to conduct the study at the particular district hospital was obtained from the municipal council of each respective hospital. Then the permission to conduct the study at the particular district hospital was obtained from the hospital In-charge. The permission to conduct the study at Muhimbili National Hospital was obtained from the hospital administration. On the first day of the data collection the Nurse In-charge of the emergency department was consulted and the purpose of the study was explained to him/her. The study was explained fully (i.e. the aim of the study; significance of the study; how data will be collected, analyzed, and disseminated) to each participant before joining the study and if the participants agree to participate was given an informed consent form to sign (see the appendix-iv). For the purpose of confidentiality, the names of the participants were not required but instead code numbers were used in-place of names to ensure anonymity. The study participants were informed of their rights to refuse to join, answer any question or withdraw at any particular point during data collection process without being offended. All data that were obtained during data collection were stored under strict environment where the researcher (MSc Student) only had access and all filled data collection instruments are expected to be destroyed by burning after the dissertation had being accepted for the award of the postgraduate degree.

**Data analysis**

The data collected were cleaned, coded and then analyzed by using computer program running SPSS 13.0 for windows. Descriptive statistics was used to analyze the data obtained from the questionnaire, checklist and the review guide using percentages, and frequencies.

**Reliability**

This is the dependability with which an instrument measures an attribute or variable to establish if the participants in the study will be able to understand the instruction, the items and respond correctly to the instrument. The internal consistency was used to estimate the reliability of the instrument. The Cronbach's alpha was calculated to evaluate

internal consistency of the instrument and was found to be 0.4. The small coefficient obtained could be due to small number of study participants and small number of items in the instrument as this normally tend to affect Cronbach's alpha estimation (Spiliotopoulou, 2009). The number of study participants could not be increased as there was limited number of study population. But to ensure reliability the questionnaire was piloted by 8 nurses selected from the emergency department of Muhimbili National Hospital who were not included in the study and modifications were done accordingly. In addition the items and instructions in the instruments were reviewed by an expert in emergency and trauma nursing.

### **Validity**

The content for the items used to determine knowledge and skills on triage was identified through literature review and suggestions from an expert in emergency nursing. One nurse educator who is an experienced expert in emergency nursing and trauma was consulted to ensure content validity of the instruments.

### **Dissemination**

The research findings are submitted to the directorate of postgraduate studies in Muhimbili University of Health and Allied Sciences as a dissertation for the award of Master degree in Critical Care and Trauma Nursing, also to Muhimbili national hospital, Municipal council of each respective hospital, each district hospital, and the Muhimbili University library. With the purpose of spread of knowledge, the research findings are expected to be published in nursing journals and presented in scientific workshops and conferences local and internationally.



## CHAPTER IV: RESULTS

### Demographic profile of the respondents

Sixty out of 62 respondents completed and returned the questionnaire thus a response rate of 97%. One respondent returned the questionnaire but unfilled and another one did not return the questionnaire. A total of 62/66 (94%) study participants from the four hospitals surveyed received the questionnaires as shown in Table 1 below.

**Table 1: Nurses surveyed from different hospitals' EDs in DSM**

Hospitals	Nurses available	Nurses surveyed	%
Muhimbili	33	30	91
Mwananyamala	12	12	100
Amana	12	12	100
Temeke	09	08	89
<b>Total</b>	66	62	94

Fifty two percent (31/60) of the respondents were nurses with a diploma, 42% (25/60) were Enrolled nurses, 3% (2/60) were nurses with advanced diploma in nursing, and 3% (2/60) were nurses with a degree in nursing. This information is shown in Table 2 below.

**Table 2: Nursing educational level of the nurses**

Education level	Frequency(n)	%
Certificate	25	42
Diploma	31	52
Advanced diploma	02	3
BSc. N	02	3
<b>Total</b>	60	100

The table 3 below shows the distribution of the study participants according to their level of education and working hospital.

**Table 3: Frequency distribution of the respondents in relation to level of education and working place.**

Level of Education	Muhimbili hospital		Mwananyamala hospital		Amana hospital		Temeke hospital	
	Frequency(n)	%	Frequency(n)	%	Frequency(n)	%	Frequency(n)	%
Certificate	7	23	4	40	8	67	6	75
Diploma	22	73	6	60	2	17	1	13
Adv.diploma	0	-	0	-	1	8	1	13
BSc. N	1	3	0	-	1	8	0	-
<b>Total</b>	30	-	10	-	12	-	8	-

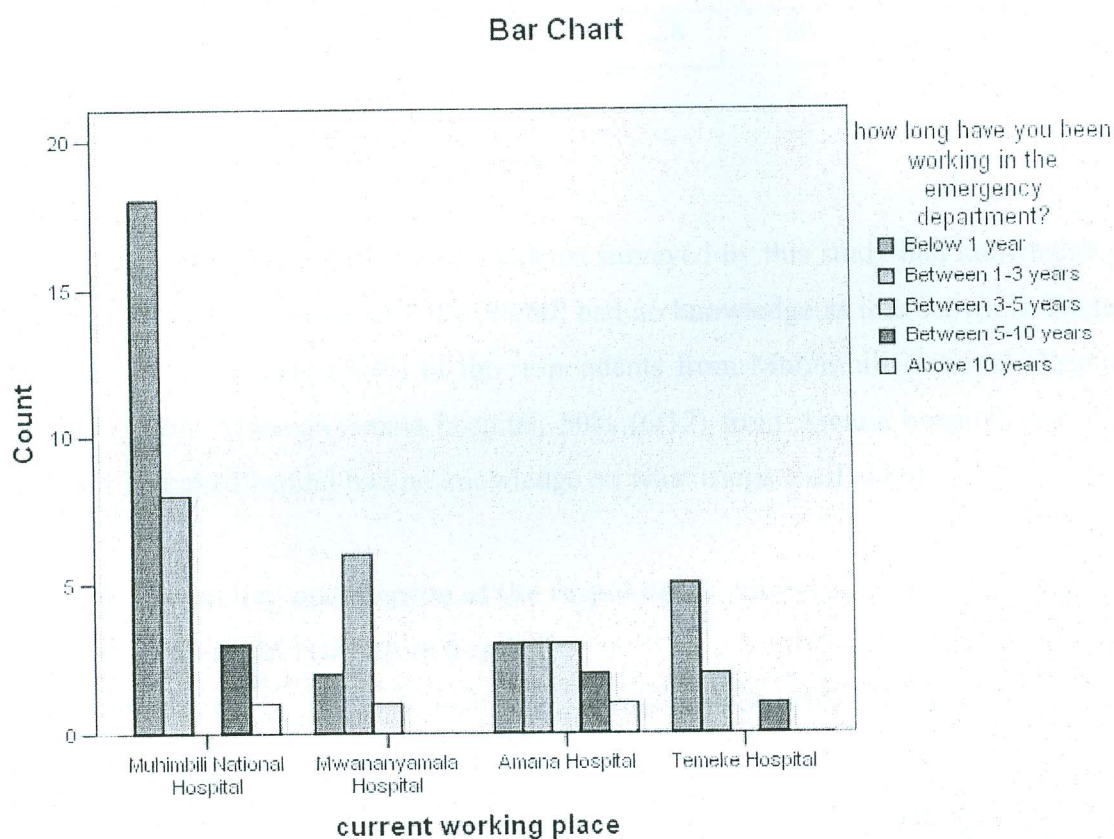
Seventeen percent (10/60) of the respondents had postgraduate/postbasic nursing qualification of certificates in emergency/trauma care and 5% (3/60) in critical/intensive care. Seventy eight percent (47/60) of the respondents had no postgraduate/post basic nursing qualifications in emergency/trauma, or critical/intensive care. Twenty seven percent (8/30), 40% (4/10), and 12% (1/8) of the respondents from Muhimbili, Mwananyamala, and Temeke hospitals respectively had postgraduate/postbasic nursing qualifications in emergency/trauma or critical/intensive care. The emergency department of Amana hospital had no any nurse with postgraduate/postbasic nursing qualifications in emergency/trauma, or critical/intensive care as shown in Table 4 below.

**Table 4: Postgraduate/post basic nursing training of the respondents:**

Hospitals	Certificate in emergency/trauma	Certificate in critical/intensive	No training (%)	Total
Muhimbili	7	1	22(73%)	30
Mwananyamala	2	2	6(60%)	10
Amana	0	0	12(100%)	12
Temeke	1	0	7(88%)	8
<b>Total</b>	10	3	47(78%)	60

Forty eight percent (28/59) of the respondents had worked for a period of one year and below in the emergency departments of the surveyed hospitals, while 32% (19/59) had worked for a period of between 1-3 years, and 7% (4/59), and 10% (6/59) had worked for a period of between 3- 5 years, and 5-10 years respectively as it is shown in Fig.1 below.

**Fig 1: Bar chart showing duration the respondents have worked in the ED**



Forty seven (28/60) of the respondents surveyed by this study had no in-service training/education on emergency nursing care. Eighty eight percent of the respondents from Temeke hospital, 58% from Amana hospital, 60% from Mwananyamala hospital, and 27% from Muhimbili National Hospital had no in-service training/education on emergency nursing care as shown in Table 5 below. Thirteen percent of the respondents who had attended emergency nursing in-service training/education, their training did not include how to triage patients.

**Table 5: In-service training/education on emergency nursing care of the respondents**

Hospitals	In-service training		
	Yes	No	Total
Muhimbili	22	8	30
Mwananyamala	4	6	10
Amana	5	7	12
Temeke	1	7	8
<b>Total</b>	32	28	60

**Knowledge of triage**

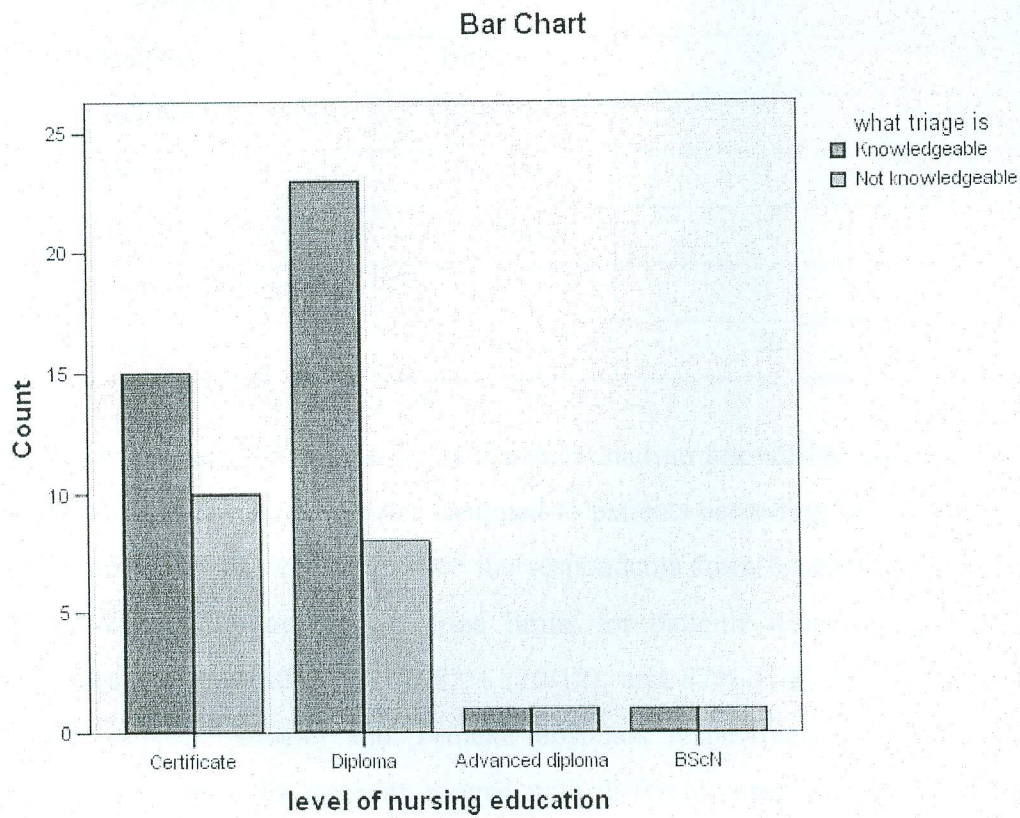
Sixty seven percent (40/60) of the respondents surveyed by this study had knowledge on what triage is all about, whereas 33% (20/60) had no knowledge as it is shown in Table 6 below. Seventeen percent (5/30) of the respondents from Muhimbili National Hospital, 40% (4/10) from Mwananyamala hospital, 50% (6/12) from Amana hospital, and 63% (5/8) from Temeke hospital had no knowledge on what triage is all about.

**Table 6: Frequency distribution of the respondents' knowledge on what triage is all about in relation to hospitals.**

Hospitals	Knowledgeable	Not knowledgeable	Total
Muhimbili	25	5(17%)	30
Mwananyamala	6	4(40%)	10
Amana	6	6(50%)	12
Temeke	3	5(63%)	8
<b>Total</b>	40(67%)	20(33%)	60

Sixty percent (15/25) of the enrolled nurses and 74% (23/31) of the diploma nurses had knowledge on what triage is all about as shown on the Fig. 2 below.

**Fig 2: Bar chart showing knowledge on what triage is all about in relation to respondents' level of education.**



Sixty eight percent (19/28) of the respondents who had worked in ED for a period of one year and below had knowledge on what triage is all about, whereas 63% (12/19), 75% (3/4), and 67% (4/6) of the respondents who had worked for a period of between 1-3 years, 3-5 years, and 5-10 years respectively had knowledge on what triage is all about as shown in Table 7 below.

**Table 7: Knowledge on what triage is all about in relation to duration of working in the ED**

Duration of working in ED	Knowledgeable	Not knowledgeable	Total
Below 1 year	19(68%)	9	28
Between 1-3 years	12(63%)	7	19
Between 3-5 years	3(75%)	1	4
Between 5-10years	4(67%)	2	6
Above 10 years	1	1	2
<b>Total</b>	39(66%)	20	59

Fifty eight percent (35/60) of the respondents had no knowledge on waiting time limits for the different triage categories assigned to patients according to the severity of health conditions. Fifty percent (15/30) of the respondents from Muhimbili National Hospital had no knowledge on waiting time limits for patients triaged with different triage categories whereby 30% (3/10), 83% (10/12), and 87% (7/8) of the respondents from Mwananyamala, Amana, and Temeke hospitals respectively had no knowledge on waiting time limits for patients triaged with different categories as per the severity of their medical conditions as shown in Table 8 below. Among these respondents who had no knowledge on waiting time limits for patients triaged with different categories, 58% (21/36) were enrolled nurses and 36% (13/36) were diploma nurses as shown in Table 9 below.

**Table 8: Respondents' knowledge on waiting time limits for patient's triaged category in relation to working place.**

Hospitals	Knowledgeable	Not knowledgeable	Total
Muhimbili	15(50%)	15(50%)	30
Mwananyamala	7(70%)	3(30%)	10
Amana	2(17)	10(83%)	12
Temeke	1(13)	7(87%)	8
<b>Total</b>	25(42%)	35(58%)	60

**Table 9: Respondents' knowledge on waiting time limits for patient's triaged category in relation to education level.**

Education level	Knowledgeable	Not knowledgeable	Total
Certificate	4(17%)	21(58%)	25
Diploma	18(75%)	13(36%)	31
Advanced diploma	1(4%)	1(3%)	2
BscN	1(4%)	1(3%)	2
<b>Total</b>	24(100%)	36(100%)	60

Fifty two percent (31/60) of the respondents were not able to assign proper triage categories of patients based on the scenarios presented to them with various health conditions. Fifty three percent (16/30) of the respondents from Muhimbili National Hospital, 60% (6/10), 50% (6/12), and 50% (4/8) of the respondents from Mwananyamala, Amana, and Temeke hospitals respectively were not able to assign proper patient's triage category. Forty four percent (11/25) of the enrolled nurses and 55% (17/31) of the diploma nurses failed to assign proper patient's triage categories.

### **Triage Skills**

There were nurses assigned for patients triage at Muhimbili National Hospital whereby 50% (19/38) of the eligible study participants were observed while performing their triage activities. The remainders 50% of the eligible study participants were not observed because were not allocated to triage patients during the time of data collection. The triage nurses at Muhimbili National Hospital were triaging patients but without following the triage guidelines which has the risks for over-triage or under-triage. There was little link between assessment findings and assigning of patient's category. The triage nurses judged the patients' categories more by observation which is more subjective rather than using the assessment findings to judge the patients' categories which is more objective. Therefore the assessment of patients seem to be more of routine rather than as a necessary step in determining the patient's category of care.

There was no nurse assigned for patients triage at Mwananyamala, Amana, and Temeke hospitals emergency departments. In the emergency departments of these hospitals patients were grouped into: priority group which include stretcher/referral patients, and queue group which include walk-in patients. The priority group patients were handled by untrained personnel (health attendants) who were stationed at the entrance to the emergency departments to receive patients brought by either ambulances or private transports and they gave them priority to care by taking them to the treatment rooms. The queue group patients were left to line-up waiting to be attended without any prior assessment to determine the acuity level of their illnesses.

The triage performance by the respondents from Muhimbili National Hospital involved assessment of the airway, respiratory status, and circulatory status. The respiratory status assessment by the triage nurses did not involve auscultation of breath sounds, look for chest movement, and 32% (6/19) of the triage nurses observed did not assess the breathing patterns of the patients. The respiratory rate was not assessed by 84% (16/19) of the triage nurses who were observed. Eighty four percent (16/19) of the triage nurses observed assesses arterial oxygen saturation.

Blood pressure measurement was assessed by about 90% (17/19) of the observed triage nurses at Muhimbili national hospital. Cold/warm extremities assessment as a sign of circulatory failure was not assessed by 32% of the triage nurses who were observed. Pulse rate assessment was done by about 90% (17/19) of the observed triage nurses but pulse status such normal, weak, or thready pulse were not assessed.

Temperature measurement and neurological status assessment were done by the observed triage nurses.

Pain assessment and short history taking (presenting problem, medical history, and medication history) were not done at all by the triage nurses. Pain assessment was not even included in the triage assessment form.



The observed triage nurses did document all the assessment findings in the triage assessment form except the patient's assigned category. The triage nurses were assigning patient's triage category for medical urgency but they did not document it in the triage assessment form.

No re-assessment on regular basis of those patients who after triaging were waiting to enter the treatment rooms was done to determine if the conditions of the patients had deteriorated and need to be seen more urgently.

#### **Availability of equipments that assist in performing triage**

Pulse oxymeter, 12 lead ECG, triage assessment form, which are very important equipments for assessing and prioritizing patients in the emergency departments were only available in Muhimbili National Hospital. Pain assessment scale was not available at all the four studied hospitals' emergency departments. Table 10 below show the availability of equipments in each hospital studied.

**Table 10: Availability of equipments which assist triage activities in the studied hospital's emergency departments**

<b>Equipments/hospitals</b>	<b>Muhimbili</b>	<b>Mwananyamala</b>	<b>Amana</b>	<b>Temeke</b>
Thermometer	Present	Present	Present	Present
Pulse oxymeter	Present	Not present	Not present	Not present
Sphygmomanometer	Present	Present	Not present	Present
Stethoscope	Not present	Present	Not present	Present
Glucometer with strips	Present	Present	Not present	Present
Urinalysis strips	Present	Not present	Not present	Not present
Spirometry	Not present	Not present	Not present	Not present
12 lead ECG	Present	Not present	Not present	Not present
ABG analyzer and reagents	Not present	Not present	Not present	Not present
Triage assessment form	Present	Not present	Not present	Not present
Pain assessment scale	Not present	Not present	Not present	Not present

Among the four hospitals studied, only Muhimbili National Hospital had triage guidelines for rating the acuity of patients in the emergency department. The triage guidelines of Muhimbili National Hospital stated what actions should be taken according to patients triage category but it did not specify within which duration of time.

## CHAPTER V: DISCUSSION

The objectives of this study were to determine the knowledge and describe the skills on triaging among nurses working in the emergency departments in Dar es Salaam hospitals. Therefore this discussion part of the study is going to focus on these two objectives.

### **Knowledge of triage**

Forty seven percent (28/60) of the respondents in this study had no in-service training/education in emergency nursing care. This is to say that about half of the nurses working in the emergency departments in Dar es Salaam hospitals had no educational preparation on emergency nursing care. This is a very challenging situation bearing in mind that these nurses are working in the public hospitals where majority of the population in the region are depending for health care services and also this is the largest city in the country which is overpopulated and crowded with a lot of transports leading to increased risk for accidents/injuries, and that require health care providers, emergency health care staff in particular, to be well equipped in handling patients presenting with various health conditions. In many countries, a registered nurse is assigned to perform triage at the ED. Studies show that the qualifications needed for triage work varies, though several authors suggest that performing triage requires special knowledge (Goransson, 2005). WHO in 1990 reported that about 90% of injuries occur in low and middle income countries (Murray, 1996a). Among the challenges mentioned in this report was the lack of trained health care workforces to deal with trauma patients. This report brings challenges to developing countries like Tanzania as we are left far back in the training of emergency medical care staff compared to developed countries. For emergency nurses to work effectively they require in-depth knowledge and clinical expertise in order to be able to provide care across the lifespan and to manage situations such as patients overcrowding (Fry, 2004a). Knowledge of triage has been cited as one of the key factor that influences patients' outcomes in the emergency department (Considine, 2007).

Sixty seven percent (40/60) of the respondents knew what triage is all about. This is in support to a study that was done in Sweden in 2005 in which the concept of triage was

known to 78% of the respondents (Goransson, 2005). Fifty eight percent (35/60) of the respondents had no knowledge on waiting time limits for different triage categories assigned to patients according to the severity of medical conditions. The concept of triage when being performed at an emergency department is to ensure that patients are treated in order of their clinical urgency and that the treatment is appropriate timely (Goransson, 2005). With 58% of the nurses working in the emergency departments in Dar es Salaam hospitals lacking knowledge on waiting times for different triage categories, this indicates that there is such a great possibility of failing to render a timely emergency care to patients attending emergency medical services in these emergency departments, thus increasing the risk of avoidable deaths and disabilities especially to those patients who are in need of medical emergency care to save their life or to avoid loss of their body part. Lack of knowledge on waiting time for each patient attending emergency medical services may result into a potentially harmful delay in treatment (Burr, 2001).

Fifty two percent (31/60) of the respondents were not able to assign proper triage categories of patients based on the scenarios presented to them with various health conditions. The triage nurse's ability to make accurate clinical judgments about patient's urgency of care and the need for intervention is essential to the delivery of safe and effective emergency care (Ung, 2000). Although this was a scenario-based assessment of the accuracy of triage decisions which are argued to differ from those decisions made from the real triage environment (Charles, 2001), but still with such a large number of respondents (about 52%) lacking accuracy in their triage decisions, one may argue that there is still a high chance of assigning a wrong triage category to patients attending emergency medical services in the hospitals where the study was done. Accuracy in making triage decisions about patient's triage category has been considered as one of the major factors that influence patient's outcomes in the emergency department (Considine, 2007). This is very important as it helps to avoid under-triage or over-triage of patients which results into denying of patients right of receiving treatment in according to the medical urgency of their conditions. An over-triage decision is the allocation of a triage category of a higher acuity than is indicated by the patient's physiological status and risk factors. This result into patient's waiting time until medical intervention been shorter.

Although this is not detrimental to the patient in question, but the effects of inappropriate allocation of resources has the potential to adversely affect other patients in the ED (Charles, 2001). Under-triage decision is the allocation of a triage category of a lower acuity than is indicated by the patient's physiological status and risk factors. This prolong the patient's waiting time until medical intervention and there is potential for patients to deteriorate whilst waiting or being subjected to prolonged pain or suffering which increase the risk of an adverse patient's outcome (Charles, 2001). Inappropriate triage decision may result in delays for all patients attending the ED and also in excess costs of care by the patient and the facility (Goransson, 2005). The fact that 52% of the respondents were not able to accurately assign proper patients triage categories may also be related to educational preparation of the respondents as it was found with this study that about 47% of the respondents had no training on emergency nursing care and even among those who had training exposure on emergency nursing, 13% of them reported the training not including how to triage patients. This is supported by a statement from the Australian Emergency Nurses Association in 2000, which recommended that emergency nurses should be prepared for the triage role via structured unit based education programs (Levasseur, 2002). In fact knowledge has remained to be a key factor that influence triage decisions in the emergency department (Considine, 2007).

### **Triage Skills**

In this study there were nurses dedicated for patients triage at Muhimbili National Hospital emergency department during all the time of study. About 50% of the eligible study participants at Muhimbili National Hospital emergency department were observed in this study as they were performing their triage activities. The remained 50% study participants at Muhimbili National Hospital emergency department were not observed because they were not allocated in the triage rooms to triage patients instead they were allocated in the treatment and resuscitation rooms to attend patients. The triage nurses at Muhimbili National Hospital were triaging patients without following the triage guidelines thus creating risks for over-triage or under-triage. A study by Fry and Burr found about the same situation in Australia where by only 27% of the nurses reported to always use the triage guidelines for triage code allocation although majority of them

(95%) were aware of it (Burr, 2001). There was little link between assessment findings and assigning of patient's triage category. The triage nurses judged the triage categories of the patients more by observation which is more subjective rather than using the assessment findings to judge the patients' categories as this is more objective. Therefore the assessment of patients seems to be more of routine rather than as a necessary step in determining the patient's triage category of care. An effective triage system should ensure that patients seeking emergency care are allocated a triage category according to their objective clinical assessment (Levasseur, 2002 ). This will reduce subjective errors in decision-making that are likely to occur when the triage nurse use visual assessment to determine the level of patients acuity. But also when the triage nurses assesses and allocate patient's triage category by using the triage guidelines it create uniformity in their triage performance thus ensuring reliability of the triage activities.

In this study there was no nurse assigned for patients triage at Mwananyamala, Amana, and Temeke hospitals' emergency departments. In the emergency departments of these hospitals patients were grouped into two: priority group which include stretcher/referral patients, and queue group which include walk-in patients. The priority group patients were handled by untrained personnel (health attendants) who were stationed at the entrance to the emergency departments to receive patients brought by either ambulances or private transports and gave them priority to care by taking them to the treatment rooms. The queue group patients were left to line-up waiting to be attended without any prior assessment to determine the acuity level of their illnesses. But studies have shown that an effective triage system aims to ensure that patients seeking emergency care receive appropriate attention, in a suitable location, with the requisite degree of urgency and that emergency care is initiated in response to clinical need rather than order of arrival (Geraci, 1994; Levasseur, 2002 ; Mallett, 1990). Lack of a nurse trained and dedicated to triage patients in the emergency departments of the above mentioned hospitals create high chances for poor management of patients as patients seemed to be managed according to the order of arrival rather than according to the urgency of their need for care. A study that was done in 21 hospitals in seven developing countries found that poor triage of incoming patients and inadequate provision of emergency care

jeopardized the lives of arriving patients and a further comprehensive review of the management of children treated at these facilities found a potentially harmful delays in treatment in 19% of the children (Nolan, 2001). Another study that was done in Malawi revealed that the condition of many seriously ill children arriving at clinics had not previously been recognized, instead of receiving immediate emergency care they were kept waiting for long periods before being given proper treatment. This resulted in avoidable deaths and disability (Gove, 1999). The above mentioned hospitals' emergency departments that were observed by this study are also operating under more less same environment as there are no nurses assigned for patients triage, thus exposing those patients who come to seek emergency medical care in the same kind of unhealthy environment as that reported by the studies above.

The triage performance by the respondents from Muhimbili National Hospital involved assessment of the airway, breathing, and circulation. The respiratory status assessment by the triage nurses did not involve auscultation of breath sounds, look for chest movement, and 32% of the triage nurses observed did not assess or document the breathing patterns of the patients. The respiratory rate was not assessed by 84% of the triage nurses who were observed by this study. On contrary 84% of the triage nurses observed assesses arterial oxygen saturation. The tendency of nurses neglecting assessment of respiratory rate has been identified by many studies (Hodgetts, 2002; Hogan, 2006; McBride, 2005; Ryan, 2004). In these studies it was found that, of the four vital signs (pulse rate, blood pressure, respiratory rate, and temperature), respiratory rate was often not recorded and most frequently completely omitted from hospital documentation. But respiratory rate has been determined to be a better indicator of serious illness such as cardiac arrest and admission to intensive care unit than heart rate and blood pressure, thus been a better means of discriminating between stable and at-risk patients (Subbe, 2003). Therefore if 84% of the observed nurses at Muhimbili National Hospital as observed by this study did not assess for respiratory rate, then there was high chance of allocating a wrong triage category to patients seeking emergency medical services and hence jeopardizing their life with an increased risk to avoidable deaths and disabilities. On contrary about the same number (84%) of triage nurses who were observed by this study assesses for arterial

oxygen saturation. This was probably done in place of respiratory rate assessment. But studies suggest that pulse oxymetry measurement should not be a replacement for respiratory rate measurement as it is not specific indicator of serious illness and it is also not specific (Goldhill, 2004; Hodgetts, 2002).

Pain assessment and short history taking (presenting problem, medical history, and medication history) were not done at all by the triage nurses at the emergency department in Muhimbili National Hospital. Pain assessment was not even included in the triage assessment form. The lack of pain assessment by the triage nurses and its absence in the triage assessment form of the emergency department at Muhimbili National Hospital may be a reflection of lacking aggressive pain management plans. A study that was done to review emergency department pain management skills found pain treatment been inconsistency and inadequacy. This inconsistency and inadequacy appears to stem from a multitude of potentially remediable practical and attitudinal barriers that include a lack of educational emphasis on pain management skills in nursing and medical school curricula and postgraduate training programs, and inadequate or nonexistent clinical quality management programs that evaluate pain management (Rupp, 2004). This could be the same circumstances facing the emergency departments observed by this study as there was no pain assessment to the patients that was observed during triage. Pain is frequently the chief symptom reported by patients who come to the emergency department (Tanade, 1995). That is why pain assessment has being noted to be the fifth vital sign or the component of the primary assessment (Tanade, 1995). Although some have noted the need to make pain management a priority, patients often receive inadequate pain relief and health care professionals seem to pay little attention to the assessment and treatment of pain in the emergency department (Tanade, 1995).

In this study there was no re-assessment on regular basis of those patients who after triaging were waiting to enter the treatment rooms was done to determine if the conditions of the patients had deteriorated and need to be seen more urgently. The patients triaged as priority or queue group were assessed once in the triage rooms, after that they had to wait until they enter the treatment rooms with no regular re-assessment to



determine their progress. This practice could jeopardize the life of patients as their conditions might have changed after the first triage assessment, thus requiring change of the allocated medical urgency. Triage is an ongoing process involving continuous assessment and re-assessment (Charles, 2001).

The triage nurses documented the assessment findings on the triage assessment form with exception of the assigned patients triage category. The triage assessment form had a place for documenting the triage category assigned to patient but all triage nurses observed by this study did not document it. The effect of this is that it will be difficult to monitor and evaluate the patients' progress as whether improving or deteriorating. A study to compare consistency between care given to patients and documentation found that only 40% of the nurses activities observed were documented (De Marinis, 2010). The consequence of poor documentation is that the nursing triage records can not be a reliable source of information to assess the quality of emergency care given to patients in the emergency department.

#### **Availability of equipments for assisting triage performance**

Among the four hospitals studied, only Muhimbili National Hospital had triage guidelines for rating the acuity of patients in the emergency department. The triage guidelines of Muhimbili National Hospital stated what actions should be taken according to patient's triage category but it did not specify the waiting time limit for each category. The time to treatment described for each triage category refers to the maximum time the patient should wait for medical assessment and treatment (Whitby, 1997). The concept of triage when being performed at an emergency department is to ensure that patients are treated in order of their clinical urgency and that the treatment is appropriate timely (Goransson, 2005). Therefore the waiting time according to patient triage category is important to be known as time is very critical, particularly in the emergency department where the patient's outcomes depend much on time spent before receiving definitive treatment (golden hour principle).

The most available equipments were thermometer, glucometer, and sphygmomanometer. Triage assessment form, 12 lead ECG, pulse oxymeter, and urinalysis strips were available only in one of the four hospitals' emergency departments surveyed. Lack of equipments for assessment has been found as one of the factors that contribute to triaging delays (Burr, 2001). The implications of not having adequate or lacking equipments for triaging patients in the EDs is that proper, thorough, and effective assessment of patients can not be done, thus causing inaccurate decision-making on prioritization of patients care which may lead to avoidable disabilities and deaths.

### **Limitations of the study**

The researcher observed study participants from only one hospital as the rest of the hospitals surveyed by this study had no nurses allocated for patients' triage in their emergency departments, as a result the triage assessment skills of these nurses were not observed. Therefore the findings on triage assessment skills can not be a representative sample for nurses working in the emergency departments in Dar es Salaam hospitals. But the researcher managed to observe how patients are handled in the surveyed emergency departments which had no nurses allocated for patients' triage, and the findings can give a representative picture of what is happening in the emergency departments in Dar es Salaam hospitals in respect to triaging.

The researcher observed the participants while they were doing their triage activities as the way to describe skills on triaging. With this approach there was a possibility for the participants to behave differently or being psychologically upset and failing to behave normally, thus making it difficult for the study to get the actual triage skills which are normally done. This was controlled by participatory observation and observing the participants for a longer period of time (of at least one participant for 60 to 120 minutes) thus getting an opportunity to observe the participant while triaging as many patients as possible. Spending a longer time with the study participants and using participatory observation approach makes the study participants get use of the researcher thus get settled psychologically and behave normally as she/he performs the triage activities.

The reliability of the instrument was tested by calculating the Cronbach's alpha to determine the internal consistency of the questionnaire which was found to be 0.4. The small coefficient might be due to small number of study participants who were involved in this study and the small number of items used in the questionnaire which has the tendency of affecting the Cronbach's alpha estimation (Spiliotopoulou, 2009). Maximizing the number of study participants responding to a scale has been found to increase the value of Cronbach's alpha by increasing the amount of covariance among item responses (Helms, 2006). In this study the number of study participants were small (= 62) but could not be increased as there was limited number of study population (=78). But in order to ensure reliability, the questionnaire was piloted by 8 nurses from the emergency department at Muhimbili National Hospital who were not included in this study and the modifications were done accordingly. In addition the instruments were reviewed by an experienced expert in emergency and trauma nursing.

## CHAPTER VI: CONCLUSION AND RECOMMENDATIONS

### **Implications of the findings for nursing practice, nursing education, and nursing management**

There are several implications arising from the findings by this study:

1. More than half (52%) of the nurses involved in this study failed to allocate proper patient's triage category. This implies that about half of the nurses working in the emergency departments of the hospitals in Dar es Salaam region triage patients attending emergency medical services with knowledge deficit on triaging. This knowledge deficit can be solved through in-service training programs. Areas of emphasis in the training programs should include patients' assessment, basic anatomy and physiology, and allocation of patients triage category based on assessment findings.
2. Among the four hospitals surveyed only one had nurses allocated for patients triage with these nurses demonstrating knowledge and skills deficits on patients' assessment. This implies that triage is probably not yet recognized by the emergency department nursing administration and the emergency nurses as an important aspect in provision of quality emergency care to patients attending emergency health care services in the emergency departments of the surveyed hospitals. Therefore awareness on the role of the triage nurse and the importance of triage assessment and prioritization of care to patients attending emergency medical services is needed to nurses and nursing administration of the EDs in the surveyed hospitals.
3. The knowledge and skills deficits noted by this study imply that the pre-service nursing education curriculum on emergency nursing care needs to be reviewed. Putting emphasis on reviewing the contents of the triage assessment to include the importance of triage assessment in the emergency department, and the interpretation of the assessment findings in determining the medical urgency of the patients' conditions.

4. Lack of equipments that assist triage nurses in doing thorough assessment of the patients who seek emergency medical care could affect the quality of nursing care delivered at the triage area. There was triage assessment form and guidelines only in one of the four emergency departments surveyed. Availability of equipments, policy and guidelines that assist the triage nurse in performing his/her triage activities effectively should go hand in hand with establishment and promotion of triage knowledge and skills in the emergency departments of the surveyed hospitals.

### **Recommendations**

1. Awareness on the importance of triage in the provision of quality emergency care to patients seeking health care services in the emergency department should be made to the emergency department staff, particularly the nursing staff, as these nurses are the ones who mostly triage patients in the emergency departments. Emphasis should be on assessing and allocating triage category of medical urgency by trained health care personnel who is knowledgeable on triage (enrolled or registered nurse with proper knowledge and skills on triaging) to every patient seeking health care services at the emergency department.
2. The emergency department nursing administrations of the studied hospitals need to develop a formal unit-based training program that will prepare the emergency nurses to take the triage role. The training program should be conducted in such a way as to address the knowledge and skills deficits that has been identified by this study.
3. While putting efforts to improve the triage assessment and prioritization of care in the emergency department, this should go together with efforts to increase availability of equipments that will assists triage nurses to thoroughly assess the patients, thus being able to establish proper patient's triage category according to medical urgency.

4. The emergency department administrations of the studied hospitals need to develop triage policy and guidelines that will be used by the emergency staff as a tool to guide triage assessment and prioritization of emergency care. The triage policy and guidelines should state the actions to be taken and waiting time limit as per patient's triage category of medical urgency.
5. Nursing education program on emergency nursing care need to be reviewed, to include establishing postgraduate/postbasic nursing course on emergency/critical care at a level of certificate or diploma that will prepare nurses who are capable to take the emergency care and triage roles. But also the pre-service nursing curriculum needs to be reviewed. Emphasis should be on reviewing the contents of the triage assessment to include the importance of triage assessment in the emergency department, and the interpretation of the assessment findings in determining the medical urgency of the patients' conditions.
6. The same study can be done using large number of nurses from different emergency medical departments in Tanzania. This may help to come up with national triage policy and guidelines that will set-up a standardized platform for screening and redirection of patients in the emergency medical departments across the whole country.

### **Conclusion**

The findings by this study show that there are knowledge and skills deficits on triaging among nurses working in the emergency departments of the surveyed hospitals in Dar es Salaam region. More than half (52%) of the nurses involved in this study failed to allocate proper patient's triage category. About 58% of the nurses involved in this study had no knowledge on waiting time limits for patients' triaged categories. There were no nurses allocated for patients triage among the three out of four hospitals' emergency departments surveyed. Patients were left to line-up waiting

to enter the treatment rooms without any prior assessment to determine the severity of their medical conditions. Most of nurses observed while triaging patients, their assessment did not include respiratory rate assessment, pain assessment, and re-assessment of patients to monitor their progress as they were waiting to enter the treatment rooms. There were no documentations of the assigned patients triage categories of medical urgency, and short history taken. Only one of the four emergency departments surveyed had guidelines and triage assessment form for guiding triage practices. With these findings it is therefore imperative to establish formal unit-based triaging training program that will help to establish and improve emergency nurses' knowledge and skills on triaging in Dar es Salaam hospitals. Nursing schools need to consider the need to establish a postgraduate/postbasic course on emergency/critical care at the level of certificate or diploma that will prepare nurses in the country who are capable to take the emergency and triage roles in the emergency medical departments.

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