ASSESSMENT OF PRE-HOSPITAL CARE OF ROAD TRAFFIC INJURED PATIENTS ADMITTED AT MUHIMBILI NATIONAL HOSPITAL AND MUHIMBILI ORTHOPEDIC INSTITUTE DAR ES SALAAM, TANZANIA

By

Amon Nathan Kingu

A dissertation submitted in (partial) Fulfillment of the Requirements for the Degree of Master of Science in Nursing (Critical care & Trauma) of Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certifies that she has read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled ***Assessment of Pre-hospital Care of Road Traffic Injured Patients Admitted at Muhimbili National Hospital and Muhimbili Orthopaedic Institute Dar-es-salaam,*** **Tanzania,** 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.

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Dr. Sebalda Leshabari (*RN, PhD*)

(Supervisor)

Date: _____

DECLARATION

AND

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I, **Amon Nathan Kingu,** 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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DEDICATION

This study is dedicated to the people of The United Republic of Tanzania.

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ABSTRACT

Background: Injury and other medical emergencies are becoming increasingly common in low and middle-income countries. Most of the deaths from these conditions occur outside of hospitals, necessitating the development of pre-hospital care which is inadequately developed in Tanzania to meet the growing needs for emergency care.

Objective: The aims of the study was to assess and describe the current status of pre-hospital care of road traffic injured victims, establish the monthly prevalence of RTI patients admitted at Muhimbili National Hospital and Muhimbili Orthopedic Institute, and determine the resulting disabilities caused by road traffic crash injuries.

Methods: A descriptive cross-sectional study design using quantitative research methods was used. A non-probability convenience sampling method was used to select 161 road traffic injured patients from surgical, orthopedic and neurosurgical departments at MNH and MOI. A structured questionnaire which contained closed-ended questions was used to collect information. The total number of inpatients during study period was gathered through hospital data.

Results: Majority of patients 121(75.2%) were aged between 18–40 years with the mean age of 33.66 ± SD11.3years. Most 121(75.2%) were males with male to female ratio of 3:1. Primary school leavers and self employed patients were the largest groups of road traffic crash victims. Most crashes occurred along the highways and passengers were the most injured followed by drivers and pedestrians. Almost 12.4% of the respondents had used alcohol 6 hours before injury.

Motorcycles were responsible for most road traffic crashes followed by motor vehicles. Most cars (31.7%) did not have seat belt. Regarding helmet use most victims (46.0%) reported to have used helmet sometimes and 21(13%) have never used helmet in the past 30 days before

injury. Most victims (55.3%) sustained multiple injuries followed by fractures (32.9%) and most of them were transported to health facility by private cars.

A bigger proportion of RTI patients 97.5% received some form of pre-hospital care with some first aid before reaching the health facility. However, only 1.3% of these patients had pre-hospital care been provided by trained ambulance personnel. The pre-hospital care was unsatisfactory in the sense that it was provided by untrained and unskilled bystanders. Regarding the nature of pre-hospital care received most of them 137(87.3%) reported that they were removed from the wreck only and sent to health facility. Majority 149(92.5%) reported to have disability following the current road traffic injury mostly 92(61.7%) inability/difficult to use lower limbs and upper limbs.

Conclusion: There is an urgent need for the government to establish Emergence Medical Care System and shift informal pre-hospital care provided by untrained society to formal one rendered by trained and skilled health care professionals. Also there is a need to improve and reinforce the existing system of informal pre-hospital care provided by bystanders, friends/family and police with adequate and skillful training.

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OPERATIONAL DEFINITIONS

Disability: any restriction or lack of ability (resulting from an impairment) to perform an activity in the manner or within the range considered normal for a human being. The United Nations definition is: the term "disability" summarizes a great number of different functional limitations occurring in any population in any country of the world. People may be disabled by physical, intellectual or sensory impairment, medical conditions or mental illness. Such impairments, conditions or illnesses may be permanent or transitory in nature.

Disability-adjusted life years (DALYs): is a measure of the burden of disease on a defined population and the effectiveness of interventions. It is a composite index derived from the person-years of life lost and the years lived with disability. The indicator is used to quantify the loss of healthy life due to injury or disease. One disability-adjusted life year is one lost year of health life, either due to death or disability.

Emergency Medical Service (EMS): a network of services coordinated to provide aid and medical assistance from primary response to definitive care, involving personnel trained in the rescue, stabilization, transportation, and advanced treatment of traumatic or medical emergencies. Linked by a communication system that operates on both a local and a regional level, EMS is a tiered system of care, which is usually initiated by citizen action in the form of a telephone call to an emergency number. Subsequent stages include the emergency medical dispatch, first medical responder, ambulance personnel, medium and heavy rescue equipment, and paramedic units, if necessary. In the hospital, service is provided by emergency department nurses, emergency department physicians, specialists, and critical care nurses and physicians.

First aid: emergency treatment administered to an injured person at or near the injury site, prior to receiving professional medical cares.

Health facility: any place where primary, secondary or tertiary medical care is provided (i.e. health centre, clinic or hospital).

Injury: physical damage that results when a human body is suddenly or briefly subjected to intolerable levels of energy. It can be a bodily lesion resulting from acute exposure to energy (thermal, chemical, kinetic) in amounts that exceed the threshold of physical tolerance, or it can be an impairment of function resulting from a lack of one or more vital elements (oxygen, warmth), as in drowning, strangulation or freezing.

Morbidity: any departure, subjective or objective, from a state of physiological or psychological well-being. Both incidence and prevalence are measures of morbidity.

Mortality rate: an estimate of the portion of a population that dies during a specified period. The numerator is the number of persons dying during the period; the denominator is the number in the population, usually estimated as the midyear population.

Pre-hospital Care: emergencies medical services rendered to emergency patients for analytic, resuscitative, stabilizing or preventive purposes, precedent to and during transportation of such patients to and between hospitals.

Road traffic injury: an event occurring on a street, road or highway, in which at least one vehicle in motion is involved, by collision, crashing or losing control, and which causes injury or death.

Trauma: a serious injury or shock to the body, such as from violence or an unintentional injury.

LIST OF ABBREVIATIONS

DALYS	Disability Adjusted Life Years
EMS	Emergency Medical Services
GCS	Glasgow Coma Scale
HIC	High Income Countries
LMIC	Low and Middle Income Countries
MNH	Muhimbili National Hospital
MOI	Muhimbili Orthopedic Institute
MUHAS	Muhimbili University of Health and Allied Sciences
NBS	National Bureau of Statistics
RTC	Road Traffic Crash
RTI	Road Traffic Injury
SSA	Sub Saharan Africa
UNICEF	United Nations Children's Fund
USA	United States of America
WHO	World Health Organization

CHAPTER ONE

1.0 Introduction

1.1 Background of the study

One among the major global health problem of the second millennium is the rapid and extensive growth in non-communicable diseases and injuries [Beaglehole, Irwin, & Prentice, 2003]. However, road traffic injuries has recently become one among major health care concern to all countries but is worse in low and middle-income countries (LMIC) [Beaglehole et al., 2003]. Road traffic Injury (RTI) though preventable, is a rapidly growing, public health problem worldwide [WHO, 2009; Jayaraman et al., 2009; Mackenzie et al., 2010]. The WHO projects that Road Traffic Injuries may become the third leading cause of Disability Adjusted Life Years (DALY's) lost by 2030, and that will be a change from the 9thplace it holds today [WHO, 2009]. It is estimated that over 1.2 million people die from road traffic injury each year this is about 3,300 per day around the world. While another 50 to 60 million suffer from disabling injuries. Over ninety percent of the road traffic deaths occur in low and middle income countries [WHO, 2009].

Statistics show that mortality rate due to RTI's in Low and Middle-Income Countries (LMIC's) including Sub-Saharan Africa (SSA) is about 20 per 100,000 population while in High Income Countries (HIC's) it is about 10.3 per 100,000 population [World health day report, 2009]. Which is predicted to increase by 80% in LMIC's and to decline by 30% in HIC's by 2020 [Kopits, & Cropper, 2003]. In Sub-Saharan Africa including Tanzania, RTI has become a huge health problem and constitutes a burden on underfunded and oversubscribed health services [Norberg, 2000; Bener, 2005]. The reasons for the high burden of road traffic crashes in LMIC's are: growth in the numbers of motor vehicles; higher number of people killed or injured per crash; poor enforcement of traffic safety regulations; inadequacy of health

infrastructure, and poor access to health care [Nantulya, & Reich, 2002; Museru, & Leshabari, 2002; Bener, 2005]. In East Africa, Tanzania and Kenya accounts for more road traffic deaths than other countries with 34.3 and 34.4 deaths per 100,000 populations respectively [Peltzer, 2011].

Injuries related to road traffic crashes contribute significantly to the number of disabilities and taking out a number of lives in Tanzania, a study done by chalya et al., [2012] about injury characteristics and outcome of RTC victims in northwest Tanzania showed that of the 1,678 patients reported to the Accident & Emergency department at Bugando Medical Centre there were 294 deaths, accounting for an overall mortality rate of 17.5%. 52(3.8%) were discharged with permanent disabilities such as limb amputations 40(23.8%), patients with permanent neurological deficit 5 patients, severe spinal injuries with paraplegia in 4 patients, post traumatic seizures in 2 patients and penile amputation 1 patient.

In that study chalya et al., [2012] reported none of the patients had pre-hospital care, he found that most traffic injured victims were transported to hospital by relatives, taxi drivers, police, and other motorists who are usually unrelated. In another study Coxl and Shao [2007] revealed many patients who needed critical care in the golden hour after RTC died due to the absence of formal pre- hospital services. Road traffic victims were brought to hospital by private transport or sometimes the police.

It has been shown that trauma system development in high-income countries has reduced preventable deaths, including those from road traffic injuries, by 50% in recent decades [Mock et al., 2006]. While was estimated that improved trauma systems in low and middle income-countries could prevent one to two million deaths in severely injured patients [Mock, Jurkovich, nii-Amon-Kotei, Arreola-Risa,& Maier, 1998]. Based on community surveys from other urban sub-Saharan African settings, at that time an estimated 4,000 patients did not reach the hospital [Mock, nii-Amon-Kotei, & Maier, 1997]. Ninenty percent of road injured patients

that reach hospitals have mild injuries, and this suggests that severely injured patients are unable to access emergency care [Kobusingye, & Lett, 2000].

It was also found by Mock and colleagues [2002] that in many LMIC in advent of traffic injuries and their interventions, individuals whose primary role is not emergency care, provide transportation for emergency patients, this is not a formal response system but is often provided by other public servants (often police or fire personnel) in vehicles that were not intended for medical care and transport. The main emphasis is on transportation of emergency patients. In some countries, taxi drivers play a large role in the transportation of traumatic emergencies. Some systems have begun to provide basic first aid training to those who provide transportation; however, medical care is typically not their primary role or responsibility [Mock, et al., 2002]. In such systems, because transportation is generally performed in vehicles not intended for patient care, so there is little or no care provided at the scene or en-route to hospital.

Many studies identified among the challenges of trauma care in many low/middle-income countries are the inadequate systems of hospital and community-based emergency care in place [Razzak, & Kellermann, 2002; Goosen, Bowley, Degiannis, & Plani, 2003; Joshipura, Shah, Patel, Divatia, & Desai, 2003]. Often the roads used to transport trauma victims to hospitals are unpaved [Williams, 2001; Goosen, et al., 2003; Bishai, Hyder, Ghaffar, Morrow, & Kobusingye, 2003], and there are inequities between urban and rural areas in regard to access to emergency response systems as well as pre-hospital [Pusponegoro, 2001; Joshipura, et al., 2003; Arreola-Risa, et al.2000; Mock, Tiska, Adu-Ampofo, & Boakye, 2002]. Inequitable income levels within countries and constrained resources [Razzak, &Kellermann, 2002; Joshipura, et al., 2003] are compounding problems. In some settings, recognition of the impact of trauma on public health is limited, and thus there is little public education focusing on injury prevention [Mock, Arreloa-Risa, & Quansah, 2003; Joshipura, et al., 2003]. Another

challenge is the lack of trained health care workforces, partly the result of a scarcity of specialty training in trauma care [Quansah, 2001; Mock, et al., 2003; Joshipura, et al., 2003].

In Tanzania, there are several healthcare challenges as an indirect consequence to an unsteady economy; According to the Tanzania National Bureau of Statistics, Tanzania is classified by the UN as one of the least developed countries [NBS, 2011]. About 25% of Tanzanians were living below the poverty line in 2007. The health system is gradually expanding, but not enough to cover the unmet needs of the population. There is an acute shortage of staff only 35% of required personnel were in place to provide health services [NBS, 2011]. Regarding trauma and emergency care, efforts have been shown in some areas like establishment of orthopedic and trauma institute in MOI, renovation of the emergency medical department in MNH, upgrading of municipal hospitals in Dar es Salaam, upgrading of regional hospitals in the country and the initiation of new post graduate courses in critical care and trauma as well as emergency medicine in MUHAS. In an effort to improve post crash response mechanisms in Tanzania, a trauma-team training program was offered to help nurses and physicians assess and assist victims of traffic crashes [Bergman, et al., 2008]. An evaluation of this program showed a positive response by students and a post-training simulation showed an overall improvement in response capabilities. However, widespread implementation is necessary for countrywide improvement in post-crash response capability [Bergman, et al., 2008].

1.2 Problem statement

This study aimed at describing the pre-hospital care given to road traffic injured patients who were admitted in June, 2013 at Muhimbili National Hospital and Muhimbili Orthopedic Institute. The increasing frequency of road traffic accidents and Injuries experienced in Dar es Salaam in the last five years underscore it as an important cause of morbidity, temporary or permanent disability as well as mortality. It thus becomes of public health significance and interventions to reduce the consequences of injury are pre-requisite as it has been done in developed countries. The WHO attested to the high rates of injuries in developing countries as due to various factors not withstanding hazardous environments and workplaces, income and gender inequalities, poorly designed roads, inadequate enforcement of traffic regulations, poorly maintained motor vehicles, alcohol abuse, lack of efficient emergency medical response systems and overburdened health-care infrastructures.

Injuries demand a large societal and economic charge on society and many studies done elsewhere have established the economic and socio hazard of trauma through road traffic crashes including various interventions. Due to these early intervention studies, developed countries have reduced the morbidity and mortality related to road traffic injuries by instituting effective pre-hospital trauma care that minimizes the consequences of serious injury, including long-term morbidity or mortality. Despite the reliable information from the National bureau of Statistics in Tanzania, that reported an increase of 24% injuries and mortality related to road traffic crashes from 2006 to 2009 [NBS, 2011], to date, Tanzania lacks definitive studies that have assessed hazard regression models for factors affecting early hospital deaths/ disability or mortality rates after trauma. Since the cost hazards of trauma have been shown elsewhere, the concept is applicable in Tanzania and cannot be different but what is necessary is to study the feasibility of establishing pre-hospital trauma care to avert a certain degree of morbidity/disability and mortality. To counteract the lack of efficient emergency medical response systems as declared by WHO and be able to apply intervention

studies, it is pre-requisite to describe first, the type of care road traffic injured patients receive immediately after injury and also estimate the degree of disability that result as a consequence. This initial descriptive study is of essence to determine how pre-hospital trauma care can be implemented given the overburdened health care systems that currently exist in the country, and Dar es Salaam is used as a base.

1.3 Rationale and justification of the study

The aims of this study therefore, was to assess pre-hospital care of road traffic injured patients with the aim of documenting and describing the nature of pre-hospital care that had been provided to surviving RTI patients (at scene and en-route to healthcare facility within the defined study period and compare the degree of injuries/disability of those surviving patients. This information is vital to determine of the need to establish a structured pre-hospital care system or let the system operate as it is.

This study assumes that RTI patients that had severe injuries had a greater likelihood of death and was thus missed in the wards and those that had severe injuries and lacked pre- hospital care of any kind also had higher mortality and the surviving patients either had received pre-hospital care, or had less severe injuries. The results will inform health care teams and others of the nature of the pre-hospital care that is feasible within the existing system, and quantify the lack of it as well as form a baseline of severity of injuries associated with or lack of pre-hospital care. These results highlights the baseline pre-hospital care package that is likely to work or not in our settings after classification of the type of pre-hospital care that is found to be effective in saving lives/prevent further injury to RTI patients and thus create awareness of the hazards of deficits in injury prevention mechanisms as well as generate hypothesis for further studies that can be operational in interventions to limit the mortality and disabilities of road traffic injured.

1.4 Objectives of the study

1.4.1 Broad objective

To assess the situation of pre-hospital care rendered to road traffic injured patients admitted in June, 2013 in Muhimbili National Hospital and Muhimbili Orthopedic Institute, Dar-es-Salaam, Tanzania.

1.4.2 Specific objectives

1. To establish the prevalence of RTI patients admitted in June, 2013 at Muhimbili National Hospital and Muhimbili Orthopedic Institute.
2. To describe the nature of pre-hospital care provided to RTC victims admitted on June, 2013 at Muhimbili National Hospital and Muhimbili Orthopedic Institute.
3. To determine the injury related disabilities caused by road traffic crashes among survivors admitted in June, 2013 at Muhimbili National Hospital and Muhimbili Orthopedic Institute.

CHAPTER TWO

2.0 Literature review

2.1 General overview

For every road traffic fatality, at least 20 people sustain non-fatal injuries [Peden, M. et al., 2004]. The severity of injuries sustained ranges from those that can be treated immediately and for which medical care is not needed or sought, to those that result in a permanent disability.

Pre-hospital trauma care is a strategy which aims to reduce the severity of injury consequences once a road traffic crash has occurred [Buylaert, 1999]. Minor injury patients will often need the help of a general practitioner and optimal medical and psychological follow up care is important to alleviate pain and distress. For major injuries, clinical experts define the post-crash care needed as the chain of help starting with action taken by the victims themselves or more commonly by bystanders at the scene of the crash, emergency rescue, access to the pre-hospital medical care system, and trauma care and helping road crash victims who have suffered debilitating injury re-integrate into work and family life. The effectiveness of such a chain depends upon the strength of each of its links [Buylaert, 1999].

Documenting the number of people who incur a non-fatal injury and/or disability as a result of a road traffic crash is important to guide a country's planning services, i.e. making sure that these casualties receive the best possible care [Mock,et al., 2004].The results of a study in the United States (Blincoe, et al., 2002) revealed that 5.27 million people had sustained non-fatal road traffic injuries in 2000, 87% of which were considered "minor", according to the maximum injury severity scale.

2.2 Prevalence of road traffic injury patients admitted to health facilities

Injuries sustained by victims of a road traffic crash vary in type and severity. The World Health Organization uses a severity ratio guideline of 15 serious injuries (requiring hospital admission) and 70 minor injuries for every road death [Peden, et al., 2004]. Data from the WHO Global Burden of Disease 2002 project show that almost a quarter of those injured severely enough to require admission to health facility sustain a traumatic brain injury; 10% suffer open wound, such as lacerations, and nearly 20% experience fractures to the lower limbs. Studies in both HIC's and LMIC's have found that motor vehicle crashes are the leading cause of traumatic brain injury [Thurman, 2001.Santikarn, Santijiarakul, & Rujivipat, 2002.Baldo, et al.,2003.Aare,& Von Holst, 2003].

A comprehensive survey of numerous studies in LMIC's [Odero, Garner, & Zwi, 1997] found that road traffic-related injury accounted for between 30% and 86% of trauma admissions in these countries. The mean length of hospital stay reported in 11 of 15 studies for inpatients with road traffic injuries was 20 days. People with road traffic injuries accounted for 13–31% of all injury-related attendees and 48% of bed occupancy in surgical wards and were the most frequent users of operating theatres and intensive care units. The increased workload in radiology departments and increased demand for physiotherapy and rehabilitation services were largely attributed to road traffic injuries [Odero, Garner, & Zwi, 1997].

Individual country studies report similar findings. For instance, out of 2,913 trauma patients who had attended the University of Ilorin teaching hospital in Nigeria over a period of 15 months, 1,816, or 62.3%, had suffered road traffic injuries [Solagberu, et al. 2002]. In Kenya road traffic injury patients represent between 45-60% of all admissions to surgical wards [Odero, et al., 2003]. Similarly, studies in India show that road traffic injuries account for 20-50%. Of emergency room registrations, 10-30% hospital admissions and 60-70% of people hospitalized with traumatic brain injuries [Gururaj, 2008].

2.3 Nature of Pre-hospital care and treatment rendered to road traffic injury survivors.

Many fatal injuries may be prevented or their severity reduced by adequate pre-hospital trauma care [Marson, 2001.Husum, 2003. & Beaglehole, 2003]. The major benefits of pre-hospital care are realized during the second phase of trauma, when the timely provision of care can limit or halt the cascade of events that otherwise quickly leads to death or lifelong disability. Without pre-hospital care, many people who might otherwise survive their injuries may die at the scene or en-route to the hospital. Most deaths in the first hours after injury are the result of airway compromise, respiratory failure or uncontrolled haemorrhage. All three of these conditions can be readily treated using basic first aid measures. Prompt pre-hospital care may also prevent a number of delayed deaths from trauma [Marson, 2001.Husum, 2003. & Beaglehole, 2003].

Measures that are useful for preventing deaths in this phase include proper wound and burn care, adequate immobilization of fractures, support of oxygenation and blood pressure during the first hours after a traumatic brain injury, as well as other measures that reduce the likelihood of complications developing later [Marson, 2001.Husum, 2003. & Beaglehole, 2003]. Deaths occurring in the first, immediate phase of injury cannot be directly prevented by improving the quality of pre-hospital care and hospital-based emergency care, but an organized system of care may support injury prevention efforts by systematically collecting data that are useful for implementing prevention programmes, such as identifying high risk settings, high-risk behaviours, high-risk products and high-risk groups. Unfortunately, most of the world's population does not have access to pre-hospital trauma care. In many countries, few victims receive treatment at the scene and fewer still can hope to be transported to the hospital in an ambulance. Relatives, untrained bystanders, taxi drivers or truck drivers, or a police officer, when it is available, usually provides transport. As a result, many victims may needlessly die at the scene or during the first few hours following injury.

The old system of ‘scoop and run’ without any treatment is no longer practiced in HIC’s, to ‘stay and play’ at the scene may also be harmful for the Prognosis of the patient [Buylaert, 1999]. A recent survey of pre-hospital literature found only 24 randomized controlled trials and concluded there was insufficient data to provide a strong evidence base for the effectiveness of many common pre-hospital interventions [Bunn, Kwan, Roberts, & Wentz, 2001].

The World Health Organization [Sasser, Varghese, Kellermann, & Lormand, 2005] distinguishes between basic and advanced systems of pre-hospital care. Basic Life Support (BLS): Consists of emergency medical care to restore or sustain vital functions (airway, respiration, circulation) without specialized medical equipment and to limit further damage in the period preceding the arrival of specialized, advanced emergency medical care. Advanced Life Support (ALS): Medical care given by medical doctors and nurses trained in critical care medicine with the use of specialized technical equipment, infusion of fluids and drugs aimed to stabilize or restore vital functions. Advanced life support is an integral part of a system of emergency medical services that needs adequate medical supervision.

While advanced systems are impressive and undoubtedly benefit some patients, WHO state that there is little evidence that they are inherently superior to systems that offer basic pre-hospital care. [Sasser, Varghese, Kellermann, &Lormand, 2005].They may also hinder the overall provision of pre-hospital care if they lead system planners to divert scarce resources from basic interventions that benefit large numbers of patients to interventions that benefit fewer patients. With few exceptions (such as early defibrillation for victims of cardiac arrest), most advanced interventions have not been scientifically proven to be effective because the necessary randomized trials have not been conducted. In contrast, improved outcomes have been documented after bystanders and health-care providers have been educated to provide the fundamental elements of trauma care [Sasser, Varghese, Kellermann, &Lormand, 2005].

Scientific knowledge about the efficacy of pre-hospital medical care techniques is, thus, still evolving. The optimal approach needs to be determined for different types of trauma patients and well-controlled studies need to be carried out to address this question further. It is clear, however, that only essential treatment should be given so there is no unnecessary waste of time [Buylaert, 1999]. Measures to protect the victim from further injury, basic life support measures such as providing a free airway and techniques used to aid breathing are considered essential. Mouth to mouth resuscitation and mask bag valve ventilation and decompression are also essential techniques. Measure to reduce circulatory failure and maneuvers started for immobilizing possible fractures to prevent further damage are also considered to be essential treatments [Buylaert, 1999].

2.4 Disabilities related to Road Traffic Injuries

While information on road traffic deaths is available in most HIC's, there is no systematic information which can be compared on the health of survivors. There are a variety of definitions of 'serious injury'; many serious injuries are not reported [OECD-IRTAD. 1994]; data on the long term health consequences of road traffic injury is not collected on a systematic basis; and while rating systems have been developed and are in use, there are no international standards for describing and quantifying the disabilities arising from traffic injuries, particularly those involving neurological trauma [IRCOBI. 2006].

The European Federation of Road Accident Victims has estimated that a minimum of 150,000 survivors in road crashes sustain permanent disability in EU (15) countries every year. Disability is usually defined as an individual's inability to carry out a normal range of daily activities due to physical and/or psychological squeals [Peden, et al., 2004]. Permanent disability, such as paraplegia, quadriplegia, loss of eyesight, or brain damage, can deprive an individual of the ability to achieve even minor goals and result in dependence on others for

economic support and routine physical care. Less serious but more common injuries to ankles, knees and the cervical spine can result in chronic physical pain and limit an injured person's physical activity for long periods. Serious burns, contusions and lacerations can lead to emotional trauma associated with permanent disfigurement. Road crashes can also result in a variety of long-term psychiatric and psycho-social problems [Peden, et al., 2004].

In-depth studies indicate that: Motor vehicle crashes are the leading cause of traumatic brain injury [Peden, et al., 2004]. The majority of whiplash injuries are sustained by car occupants in crashes and around 50% of these are in rear impacts [Krafft, 1998]. 22% of a sample of patients attending hospital with fractures to the upper or lower limb, or a soft tissue injury to their cervical spine ("whiplash") had some form of disability 4years after the crash [Murray, Pitcher, & Galasko, 2001]. Pedestrians and motorcyclists suffer the most severe injuries as a result of motor vehicle collisions, report more continuing medical problems and require more assistance, compared with other types of road user [Peden, et al., 2004].

A study in turkey estimated that, of approximately 95,000 people injured in road traffic crashes in 2005 13% had a subsequent disability, while in India an estimated 2 million people have a disability that result from a road traffic crash [Esiyak, et al., 2005. Gururaj, 2006].

CHAPTER THREE

3.0 Methodology

3.1 Study design

This study deployed a quantitative, descriptive, cross-sectional design to assess the magnitude of provision of pre-hospital care services and the circumstances of road traffic crashes in Dar es Salaam. This approach was chosen because new meanings might be discovered, that will describe that which exists in pre-hospital care and forms the basis for future research. The design was ideal because it provides a quick data gathering with regard to the time allocated to accomplish the study. A quantitative design was chosen because the data was presented numerically in the use of frequency tables and percentages. The researcher would be able to describe the relationships between variables. Problems with the current practice of pre-hospital care might be identified.

3.2 Study setting

The study was conducted at Muhimbili National Hospital and Muhimbili Orthopedic Institute located in Ilala district Dar-es-salaam city, Tanzania. MNH is a tertiary referral hospital serving patients from all over the country. It has 1,500 bed capacity and attending 1,000 to 1,200 out patients a week. The hospital has eight blocks which are Sewahaji, Mwaisela, Kibasila, Maternity block, and Pediatric complex, new outpatient department, Psychiatric and the new block for cardiac centre. MOI is an orthopaedic institute providing care and treatment to all patients with orthopedics, traumatology and neurosurgery problems. The institute has a bed capacity of 150 beds (private 30 and public 120). MNH and MOI admits most of the patients who sustain trauma especially those involved in road traffic crash direct from scene or from other hospitals making them potential for need of pre-hospital care. Also both are

University teaching hospitals. This study included all wards receiving adult RTI patients involving kibasila block for surgical cases, sewahaji, mwaisela blocks and the private wing for orthopedic and neurosurgical cases.

3.3 Study population

All adult patients above the age of 18 years of both sex admitted to kibasila surgical wards, sewahaji, mwaisela and the private wing for orthopedic and neurosurgical wards who sustained road traffic injury were targeted.

3.4 Sampling technique

The study used non-probability convenience sampling technique enrolling all adult patients above the age of 18 years admitted to surgical wards at MNH, orthopaedic and neurosurgical wards at MOI due to road traffic crash.

Data collection period was from 1st to 30th June, 2013 for 30 days. Hospital survey conducted earlier indicated average five patients are admitted per day due to RTIs. Patients admitted to the surgical wards at MNH, orthopaedic and neurosurgical wards at MOI due to road traffic crash and who fulfilled the selection criteria were enrolled**.** Convenient non-probability sampling technique is considered as the best of all non-probability samples because it includes all subjects that are available that makes the sample a better representation of the entire population [Peck et al, 2001, Yates et al, 2003]. One hundred sixty one, (121 men and 40 women) participated in the study. There was no participant declined or drop out from the study.

3.5 Sample size

The formula for sample size calculation was as follows (conchran, 1963):

$n = Z^2pq/e^{2.}$

Where; n = is the required sample size:

Z = is the confidence level of significance for 95% CI

Q = 1 – p

E = is the maximum allowed error (taken as 5%)

p = is the estimated proportion of road traffic injured patients admitted from all admissions.

A study conducted in India showed 30% prevalence for road traffic injuries [Gururaj, 2008].

$n = 1.96^2 * 0.3(1 – 0.3) / 0.05^2$

n = 3.8416 * 0.3*0.7/ 0.0025

n = 323

The calculated and required sample size for the study is 323 participants.

Reflection on actual sample size and power calculation:

The sample size for this study was expected to be 323 participants. However the study ended up with 161 participants. The small sample size in this study makes low power of the study and hence biased due to less external validity for the whole study

3.6 Eligibility criteria

3.6.1 Inclusion criteria

All conscious adult patients above age 18 years of both sexes who sustained road traffic injury admitted to kibasila, sewahaji, mwaisela and the private wing wards were included in the stud

3.6.2 Exclusion criteria:

Unconscious patients admitted in the wards after road traffic crash during data collection period; Those who failed to give proper information, or were critically ill with GCS<8 and there were no relatives to give information on what happened in relation to RTIs sustained; Children admitted after RTC.

3.7 Data collection instrument

A structured interview questionnaire was used to collect data from patients. The instrument contained nine sections; Socio-demographic factors, Injury event factors, Traffic-related injuries, counterpart, seat belt and helmet use, Nature of medical care and treatment of injury, Transport to health facility, place of medical care, and Injury-related disability with closed ended questions. The tool was adopted from WHO validated questionnaire and guidelines for conducting community surveys on injuries and violence [WHO, 2004] during literature reviews (see appendices).

The instrument was translated from English to Swahili language by skilled personnel in both languages and checked and agreed by the supervisor. It was translated because Swahili is the language used by most of the study participants; however, the data collection process was done in both Swahili and English as need arises.

3.8 Pre-testing

Before data collection a pilot study was conducted to pre-test the accessibility of the target population and instrument's capability i.e. to check if the instrument would be able to collect relevant information as desired, to identify potential problem areas, unanticipated interpretations and cultural objections to any of the question. A sample of 10 road traffic injured patients was selected randomly from Mwananyamala trauma ward to test the study

tool that they were not included in the main study. On completion, the results of the pre-test were discussed with colleagues, the interviewers and, with the translators. Any necessary changes to the instructions to interviewers were made at this stage. The pre-test revealed that respondents failed to answer questions regarding their role in the accident, the level of alcohol drank before the accident and on the use of helmets and seat belts. The study considered these as legible questions to be answered only that they were regarded as pinning their responsibilities for the accident and agreed to retain the questions. Questions on the degree of disabilities were also answered with difficulty since some of the actions had not been tried by the patients at the scene or were inapplicable to these patients. No questions was modified or changed.

3.9 Recruitment of research assistant

One research assistant with BSc, degree in nursing who was previously trained on data collection methods using the study questionnaire was recruited to collect data from study participants. The reason for the need of the research assistant was to include maximum number of participants from all study settings. The research assistant was well trained on the objectives of the study, interview approach, and criteria for involving participants and needs of consistency during interview, when to start and end data collection process, by showing how to fill the questionnaire and provided the tool to practice by doing interview to some participants under supervision of researcher and was evaluated before actual data collection. The training was conducted in the lecture room in Sewahaji block for one day before the data collection period**.**

3.10 Data collection process

Road traffic injured patients were identified through nursing staff from each respective ward. In each ward, in charge introduced the investigator who took time to introduce the study objectives, aim of the study and explained the importance of establishing pre-hospital care for such patients. All road traffic injured patients who were admitted during data collection period were invited to participate in the study. Patients were screened for inclusion and exclusion criteria, those who met the inclusion criteria were asked to participate, The researcher selected RTI patients who were not at the acute phase of the injury because at the acute phase patients/victims could be uncooperative and is unethical and those who agreed were after informed consent to participate in the study and consecutively enrolled into the study, Those who were in the acute phase of injury were seen the next day and their ability to participate in the study were assessed. Consenting study participants were interviewed by the researcher and research assistant, those with exclusion criteria were excluded from the study, research assistant interviewed 56 participants and the researcher interviewed 105 participants. Recruitment of patients to participate in the study was done in MNH and MOI wards where they were managed, those who died before interview, and pediatric patients were missed in the study regardless of being admitted because of difficulty to get information related to RTC and pre-hospital emergency care.

Data was collected using a structured questionnaire by researcher/research assistant everyday for twelve hours during day time. Patients were assigned a combined number based on the bed occupancy succession and date of admission as identity to avoid repeated interview of same participant. Interview was administered to the participants once on the same day of admission or within 24 hours. The interview was read audibly by investigator to each participant, the study participants responded to the interview and responses recorded into the tool by circling the appropriate one among the listed items. Data collected from participants were checked

each day for missing data and clarity. Information on the number of road traffic crash victims, admissions, and treatments during the month of the study period was obtained from hospital database using both electronic and manual statistics.

3.11 Data processing and analysis

The information gathered from study participants was cleaned at the end of each data collection days for data completeness. No incomplete information in the instruments was found, modification of the groups of responses to some questions by putting together the answers that looked the same was made at this stage to condense analysis.

The data was coded and entered into a computer and then analyzed by using computer program running Statistical Package for Social Sciences (SPSS software version 20.0) by univariate and bivariate techniques. Data was summarized in the form of proportions and percentages and displayed in frequency tables for categorical variables. Proportions of participants were computed with 95% confidence intervals and P-values were computed using Chi-Squire Test to analyze the association of variables. A P-value of less than 0.05 was considered to constitute a statistically significant difference.

3.12 Reliability and validity

3.12.1 Reliability

In the conduct of the study, reliability of the study was assured by using a standardized and validated tool that had been used across the different cultures and the Cronbach's alpha was calculated to evaluate internal consistency of the instrument, Cronbach's alpha is the reliability coefficient which is commonly used as a measure of the internal consistency where by the instrument is administered on the same participants twice and the correlation their score is estimated [Bland, & Atman, 1997]. The researcher ensured reliability of the instrument by

pre testing and asking questions that participants were likely to understand and relevant to the subject. Also the study was conducted among free-living humans with unevenly distributed characteristics to ascertain the issue of confounding.

3.12.2 Validity

This study is internally valid, since the conclusion was logically drawn from the results produced by analysis done by software. The instrument employed in this study was adopted and validated by recognized institution the world health organization. The consecutive sampling of all patients as they came ensured that selection and sampling of patients was not biased and minimized the sampling error. The question of external validity can be ascertained as the sample from these two institutions was representative and can be generalized to the whole Dar es Salaam since patients who are admitted to these hospitals are from all three districts of Dar-es-Salaam region.

3.13 Ethical consideration

The study was carried out after the approval by the Research and publication Committee of the Muhimbili University of Health and Allied Sciences (MUHAS). Permission to conduct the study was sought from Muhimbili National Hospital and Muhimbili Orthopedic Institute administrative authority. The aim of the study was explained to the eligible participants. Potential study participants were informed about issues of voluntary participation, and those who signed the informed written consent were interviewed. Participants were informed that they can withdraw or decline from the study at any time. No one was coerced for the participation. The informed consent was translated from English to Swahili in order participants to understand before giving their informed consent (see appendices informed consent). All study participants were given the consent to read and those who admitted to understand the content eventually they signed to agree to participate before starting the data

collection. Safety to the participants was ensured for the whole period of data collection. Participants were assured for confidentiality of their names and the answers they gave in the interview instrument; instead of names code numbers were used to ensure anonymity. All data that was obtained during data collection was stored under strict environment where the researcher (Msc student) and supervisor only accessed and all filled data collection instruments will be destroyed by the researcher after the dissertation accepted for the award of the postgraduate degree. The WHO validated questionnaire and guidelines for conducting community surveys on injuries and violence is allowed for free utilization.

CHAPTER FOUR

4.0 Results

4.1 Admission pattern and treatment

During the period under data collection a total of 401 road traffic crash victims reported to Muhimbili National Hospital and Muhimbili Orthopedic Institute Emergency Departments after injury. 362 were admitted at the surgical, orthopedic, neurological and pediatric orthopedic wards, 91 patients had treatment at Emergency Departments and then discharged, and 9 victims brought dead. Among admissions, 161patients were included in the study and responded to the questionnaires, 132 were from MOI and 29 were from MNH as 201 patients of those who were admitted were excluded in the study due to several reasons, either they were unable to communicate, unable to remember what happened after crash, or were children. Data are presented in frequencies, tables, figures and percentages. The association between variables was assessed for significance using p-values. A p-value of < 0.05 was considered to be statistically significant different.

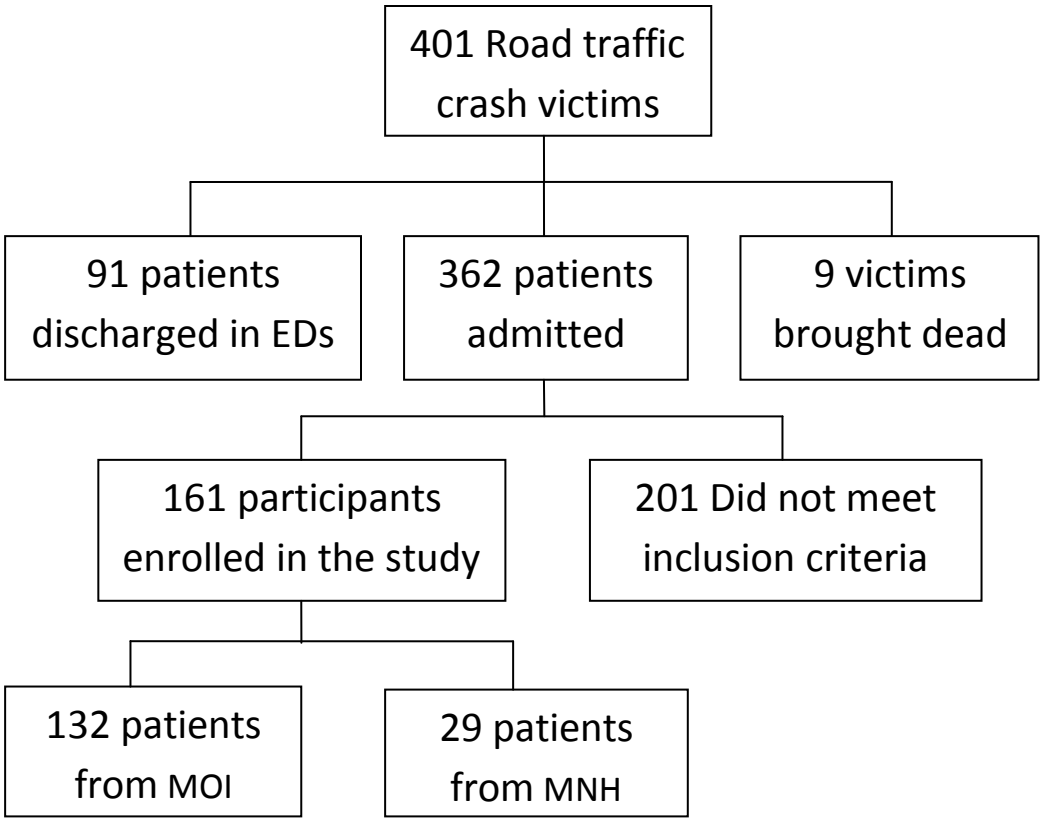

Figure 1: Flow chart showing Admission and treatment of road traffic crash victims and their participation in the study.

In both hospitals the overall admissions were 2,801, there were 1,832 males and 969 females of which 2,430 and 371 were admitted at MNH and MOI respectively. Those admitted after been involved in road traffic crash were accounting for 12.9% of all admissions from those hospitals, 86.5% from MOI and 1.6% only from MNH of which 80.7% were males and 19.3% females.

4.2 Socio-demographic characteristics of respondents

Table 1: Shows the distribution of the Socio-demographic characteristics of road traffic injured victims admitted to MNH and MOI, TZ, in June 2013

Characteristic	Frequency(n)	Percent (%)	P-Value
Age			
18 – 40 years	121	75.2	
41 – 63 years	37	23.0	
≥64 years	3	1.9	**0.014**
Gender			
Male	121	75.2	
Female	40	24.8	**0.276**
Level of education			
No formal education	13	8.1	
Primary school	107	66.5	
Secondary school education	31	19.3	
University/College education	10	6.2	**0.267**
Occupation			
Self-employed	95	59.1	
unemployed	32	19.8	
Employed	24	14.9	
Farmer	10	6.2	
Total	**161**	**100**	

The majority of patients 121(75.2%) were aged between 18 – 40 years old. The minimum and maximum ages were 18 and 70 years respectively with the mean of 33.66 ± SD11.3years.

Most respondents 121(75.2%) were males and 40(24.9%) were female giving a male to female ratio of 3:1. Majority 107(66.2%) of respondents were primary school leavers. Regarding occupational status of respondents, most of them 95(59.1%) was self employed.

4.3 injury related factors

Table 2: Displays the factors contributing to the occurrence of a crash which lead to an injury among respondents (n=161)

Factor	Frequency(n)	Percent (%)
Place of injury		
Highway	90	55.9
Street roads	71	44.1
Alcohol intake 6 hours before injury		
No	141	87.6
Yes	20	12.4

Table two shows that most respondents 90(55.9%) reported that the crash which lead to his/her injury occurred along the highways and 71(44.1%) occurred along the street roads. Regarding alcohol use, 20(12.4%) of respondents had used alcohol 6 hours before injury.

4.4 The role of victim at the time of injury

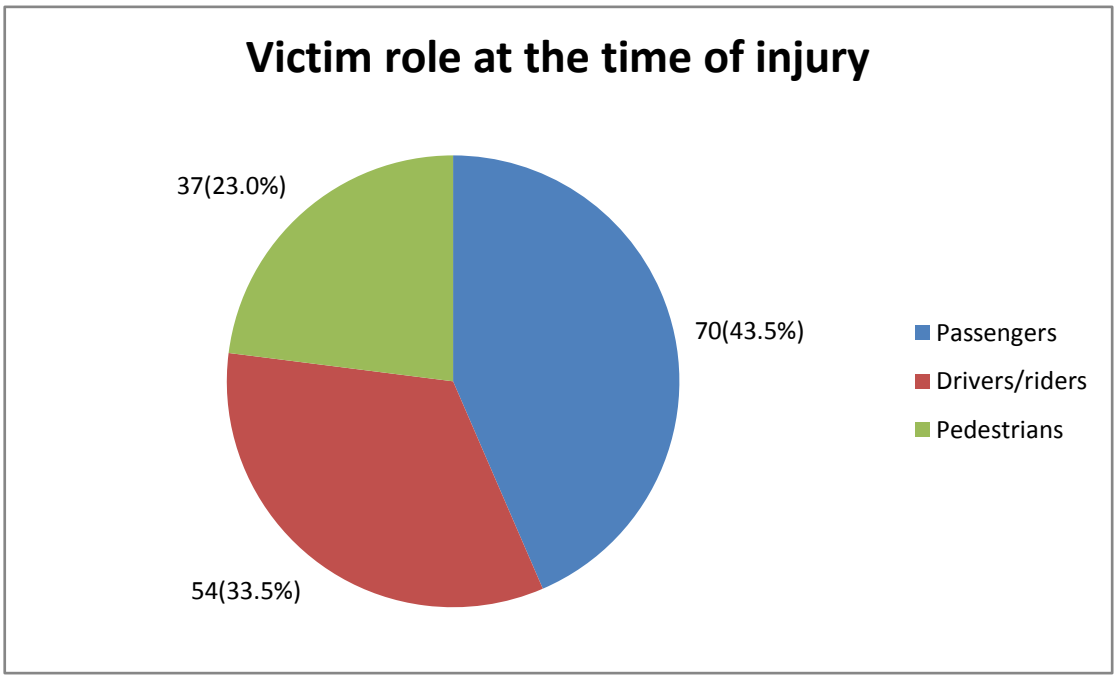

Figure 1: Shows the distribution of the victim's role at the time of injury

At the time of injury, most respondents 70(43.5%) were dwelling as passengers, 54(33.5%) were drivers or riders and 37(23.0%) were pedestrians.

4.5 Mode of transport at the time of injury

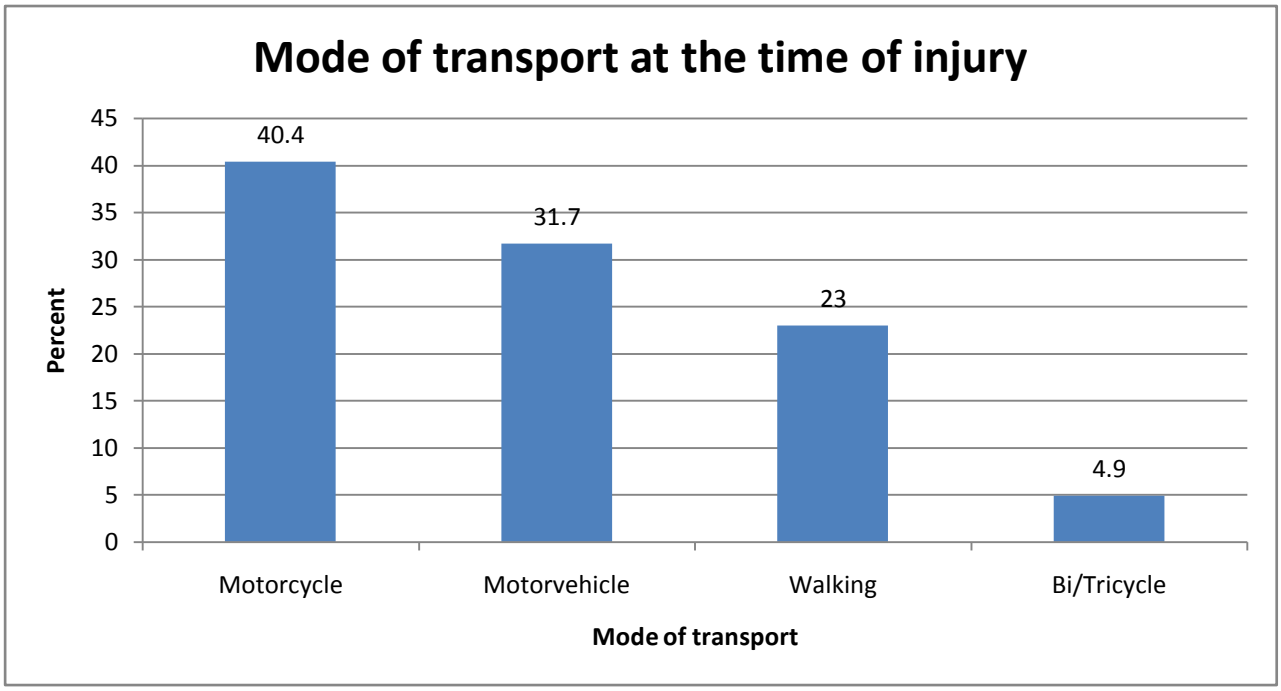

Figure 2: Mode of transport distribution at the time of injury among respondents (n=161)

Motorcyclists 65(40.4%) were mostly road traffic injured followed by motor vehicle users 51(31.7%). Pedestrians 37(23.0%) were the third most road traffic injured among respondents and bi/tri-cyclists were the least 8(4.9%)

4.6 Counterpart (Mechanism of injury)

Table 3: Shows the collision characteristics among respondents (n=161)

Category	Frequency	Percent
Motorized vehicle	84	52.2
Motorcycle/vehicle overturn	25	15.5
Motorcycle	25	15.5
Fixed objects	17	10.6
Pedestrian	2	1.2
Bicycle	2	1.2
Don't know/ remember	6	3.7
Total	**161**	**100**

Most respondents 84(52.2%) collided with motorized vehicles at the crash.

4.7 Seat belt use by the injured person in the past 30 days before injury

Table 4: Shows the respondent's responses on the use of seat belt in the past 30 days before injury (n=161).

Responses	**Frequency**	**Percent**
There was no seat belt in the car I usually drive or ride in	51	31.7
Sometimes	51	31.7
Never	23	14.3
All the time	18	11.2
Have not used a vehicle in the past 30 days	18	11.2
Total	**161**	**100**

For most respondents 51(31.7%) there was no seat belt in the car they usually drive or ride in, 51(31.7%) used seatbelt sometimes and 23(14.3%) never used seatbelt in the past 30 days before injury. However, 18(11.2%) used seat belt all the time in the past 30 days of using a vehicle before injury.

Table 5: Comparison between the background characteristic of respondents and the seatbelt use in the past 30 days.

Background characteristic	**Category**	**N**	**Seat belt use**					**P-value**
			No seat belt in the car n (%)	**Sometimes** n (%)	**Never** n (%)	**All the time** n (%)	**Not used a vehicle** n (%)	
Age	18 – 40 years	121	37(30.6)	43(35.5)	18(14.9)	11(9.1)	12(9.9)	
	41 – 63 years	37	13(35.1)	7(18.9)	4(10.8)	7(18.9)	6(16.2)	
	≥64 years	3	1(33.33)	1(33.33)	1(33.33)	0(0.0)	0(0.0)	**0.443**
Gender	Male	121	43(35.5)	36(29.8)	14(11.6)	13(10.7)	15(12.4)	
	Female	40	8(20)	15(37.5)	9(22.5)	5(12.5)	3(7.5)	**0.192**
Level of education	None	13	2(15.4)	5(38.5)	3(23.0)	1(7.7)	2(15.4)	
	Primary	107	38(35.5)	30(28.0)	16(15.0)	9(8.4)	14(13.1)	
	Secondary	31	11(35.5)	11(35.5)	4(12.9)	3(9.7)	2(6.4)	
	University/College	10	0(0.0)	5(50)	0(0.0)	5(50)	0(0.0)	**0.012**

Result shows that there was no significant difference between seatbelt use and age and gender among respondents (p value >0.05). The statistically significant difference was observed between the seatbelt use and the level of formal education among respondents. Respondents with lower level of formal education used seat belt less than those with higher level of education (X^2=25.648, df=12, p-value <0.05).

4.8 Helmet use among respondents

Table 6: Helmet use among respondents in the past 30 days before injury (n=161).

Responses	Frequency	Percent
Sometimes	74	46.0
Have not used a motorcycle in the past 30 days	35	21.7
All the time	27	16.8
Never	21	13.0
Do not own a helmet	4	2.5
Total	**161**	**100**

Most respondents 74(46.0%) sometimes used helmet in the past 30 days before injury and 35(21.7%) have not used motorcycle in the past 30 days before injury.

Table 7: Socio-demographic characteristics of respondents and helmet use in the past 30 days before injury (n=161)

Characteristics	Category	N	Use of helmet					P-value
			Do not own a helmet n (%)	**Sometimes** n (%)	**Never** n (%)	**All the time** n (%)	**Not used a motor cycle** n (%)	
Age	18 – 40 years	121	3(2.5)	61(50.4)	16(13.2)	19(15.7)	22(18.2)	
	41 – 63 years	37	0(0.0)	13(35.1)	5(13.5)	8(21.6)	11(29.7)	
	≥64 years	3	1(33.3)	0(0.0)	0(0.0)	0(0.0)	2(66.7)	**0.006**
Gender	Male	121	4(3.3)	56(46.3)	11(9.0)	25(20.7)	25(20.7)	
	Female	40	0(0.0)	18(45.0)	10(25.0)	2(5.0)	10(25.0)	**0.019**
Level of education	None	13	2(15.4)	4(30.8)	3(23.0)	2(15.4)	2(15.4)	
	Primary	107	2(1.9)	52(48.6)	14(13.0)	20(18.7)	19(17.8)	
	Secondary	31	0(0.0)	15(48.4)	3(9.7)	5(16.1)	8(25.8)	
	University/ College	10	0(0.0)	3(30.0)	1(10.0)	0(0.0)	6(60.0)	**0.032**

According to table (7) by holding other factors constant, socio-demographic characteristics of respondents (age, gender and level of education) were significant predictors of helmet use. It was found that respondents aged 41 – 63 years old tended to use helmet more than those with other age groups (X^2=21.336, df=8, p-value <0.05). Males were more likely to use helmet than females (X^2=11.823, df=4, p-value <0.05) and those with primary education were more likely to wear helmet than those with no formal education (X^2=22.569, df=12, p-value <0.05).

4.9 Respondent's physical injury sustained

Table 8: Physical injuries the respondents sustained during road traffic crash (n=161).

Nature of injury	Frequency	Percent
Multiple injuries	89	55.3
Fractures	53	32.9
Head injuries	6	3.7
Internal injuries	4	2.5
Dislocations	3	1.9
Cut or other open wounds	3	1.9
Sprains or strains	2	1.2
Burn	1	0.6

Most respondents 89(55.3%) sustained multiple injuries after road traffic crash, 53(32.9%) had fractures, 6(3.7%) had head injuries, and 4(2.5%) had internal injuries. Others were sustained dislocations, cut or other open wounds, sprains or strains and burn injuries.

4.10 Pre-hospital care provision to the injured

Table 9: Pre-hospital care provided to the victims at the scene of accident

Variable	Frequency	Percentage
Care given (n=161)		
Yes	157	97.5
No	4	2.5
Person provided care(n=157)		
Bystander	103	65.6
Friend/family	36	22.9
Police	16	10.2
Ambulance personnel	2	1.3

Most respondents 157(97.5%) were provided with some pre-hospital care. However, 4(2.4%) of them did not receive any pre-hospital care. Bystanders were the most providers of pre-hospital care, 103(65.6%).

4.11 Nature of pre-hospital care received

Table 10: Details the Nature of pre-hospital care provided to the respondents after crash (n=157)

Variable	Frequency	Percentage
Removed from wreck	137	87.3
Removed from wreck and immobilized fracture	9	5.7
Removed from wreck, immobilized fracture and stopped bleeding/covered wound	5	3.2
Removed from wreck and stopped bleeding/covered wound	6	3.8
Removed from wreck Provided resuscitation	0	0.0

Regarding the nature of pre-hospital care received by respondents after crash most of them 137(87.3%) were removed from wreck only and sent to health facility. Very few received other types of pre-hospital care and no respondents who reported to receive resuscitation (Table 10).

4.12 Mode of transportation of casualty to the health facility

Table 11: Mode of transport used by respondents from scene after injury to the first health facility (n=161).

Mode of transport to health facility	Frequency	Percent
Private car	72	44.7
3-wheeled motorcycle	47	29.2
Taxi	23	14.3
Public transport	14	8.7
Ambulance	2	1.2
Bicycle	1	0.6
Foot	1	0.6
Don't know	1	0.6

Results above shows that most of respondents 72(44.7%) reported to be transported from scene to the first heath facility after injury by private cars, 47(29.2%) by three wheeled motorcycles, 23(14.3%) by taxi, 14(8.7%) by public transport and only 2(1.2%) by ambulance.

4.13 Time taken to reach the first health facility

Table 12: Time taken from scene after injury for respondents to reach the first health facility (n=161)

Time	Frequency	Percent
< 1 hour	76	47.2
1-2 hours	70	43.5
3-6 hours	8	5.0
Don't know	5	3.1
7-9 hours	1	0.6
Did not go to health facility	1	0.6

The above table shows results that almost a half 76(47.2%) of respondents reached the first health facility less than one hour after injury and 70(43.5%) between 1 to 2 hours.

4.14 Injury related disabilities

Table 13: Nature and disabilities caused by injury after crash (n=161)

Injured disability	Frequency	Percent
Disabled		
Yes	149	92.5
No	12	7.5
Nature of disability		
Inability/difficult to use upper limb	21	14.1
Inability/difficult to use lower limb	92	61.7
Visual impairment	2	1.3
Breathing impairment	3	2.0
Mental impairment	6	4.0
Inability/difficult to chew food	3	2.0
Multiple disabilities	22	14.8

According to table (13) most respondents 149(92.5%) reported to have disability following the current road traffic injury and 12(7.5%) reported to have no disability. Regarding the nature of disability most respondents 92(61.7%) had inability/difficult to use lower limb and 21(14.1%) had inability/difficult to use upper limb. Multiple disabilities was reported by 22(14.8%) of respondents.

Table 14: Association between natures of disabilities sustained after injury and first aid given to the victims.

Characteristic	Category	N	First aid		P-value
			Yes	No	
Nature of disability	Inability to use upper limb	21	20(95%)	1(5.0%)	
	Inability to use lower limb	92	91(99%)	1(1.0%)	
	Visual impairment	2	2(100%)	0(0.0%)	
	Breathing impairment	3	3(100%)	0(0.0%)	
	Mental impairment	6	6(100%	0(0.0%)	
	Inability/difficult to chew food	3	3(100%)	0(0.0%)	
	Multiple disabilities	22	20(91%)	2(9.0%)	
	Total	**149**	**145**	**4**	**0.533**

The above table showed respondents who had first aid were more likely to have lower limb disability than those with other kinds of disabilities. However the observed difference is not statistically significant (p-value >0.05)

Table 15: Table shows the comparison between injury sustained by respondents and the Seat belt use in the past 30 days before injury.

Characteristic	Category	N	Seat belt use					p-value
			No belt in the car n (%)	**Sometimes** n (%)	**Never** n (%)	**All the time** n (%)	**Not used a motor cycle** n (%)	
Physical injury	Multiple injuries	89	24(27.0)	28(31.5)	11(12.3)	14(15.7)	12(13.5)	
	Fractures	53	19(35.8)	18 (34.0)	10(18.9)	2(3.8)	4(7.5)	
	Head injuries	6	4(66.7)	2(33.3)	0(0.0)	0(0.0)	0(0.0)	
	Internal injuries	4	0(0.0)	1(25.0)	0(0.0)	2(50.0)	1(25.0)	
	Dislocations	3	1(33.3)	1(33.3)	1(33.3)	0(0.0)	0(0.0)	
	Cut or open wounds	3	1(33.3)	1(33.3)	1(33.3)	0(0.0)	0(0.0)	
	Sprains or strains	2	2(100.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	
	Burns	1	0(0.0)	0(0.0)	0(0.0)	0(0.0)	1(100.0)	
	Total	**161**	**51(31.7)**	**51(31.7)**	**23(14.2)**	**18(11.2)**	**18(11.2)**	**0.172**

There was no significant difference between injury sustained and the Seat belt use among respondents (p-value >0.05).

Table 16: Comparison between Physical injuries sustained by victims and the type of vehicle collided (n=161)

Characteristic	**Category**	**N**	**Counterpart**							**P-value**
			Pedestrian n (%)	**Bicycle** n (%)	**Motorcycle** n (%)	**Motorized vehicle** n (%)	**Fixed objects** n (%)	**Overturn** n(%)	**Don't know** n(%)	
Physical injury	Multiple injuries	89	1(1.1)	2(2.2)	14(15,7)	50(56.2)	6(6.7)	11(12.4)	5(5.6)	
	Fractures	53	0(0.0)	0(0.0)	9(17.0)	24(45.3)	8(15.1)	12(22.6)	0(0.0)	
	Head injuries	6	1(16.7)	0(0.0)	1(16.7)	3(50.0)	0(0.0)	0(0.0)	1(16.7)	
	Internal injuries	4	0(0.0)	0(0.0)	0(0.0)	1(25.0)	2(50.0)	1(25.0)	0(0.0)	
	Dislocations	3	0(0.0)	0(0.0)	0(0.0)	2(66.7)	1(33.3)	0(0.0)	0(0.0)	
	Cut/ open wounds	3	0(0.0)	0(0.0)	0(0.0)	2(66.7)	0(0.0)	1(33.3)	0(0.0)	
	Sprains/ strains	2	0(0.0)	0(0.0)	1(50.0)	1(50.0)	0(0.0)	0(0.0)	0(0.0)	
	Burns	1	0(0.0)	0(0.0)	0(0.0)	1(100.0)	0(0.0)	0(0.0)	0(0.0)	
	Total	**161**	**2(1.2)**	**2(1.2)**	**25(15.5)**	**84(52.2)**	**17(10.6)**	**25(15.5)**	**6(3.7)**	**0.507**

There was no significant difference between Physical injuries sustained and the type of vehicle collided (p-value >0.05) among victims.

Table 17: Nature of disability and Time taken to reach first health facility

Characteristic	Category	N	Time taken to reach the first health facility					P - value
			Less than hour	1-2 hours	3-6 hours	7-9 hours	Don't go to health facility	
Nature of disability	Inability to use upper limbs	21	12(16.7)	5(7.5)	3(37.5)	0(0.0)	1(100.0)	
	Inability to use lower limbs	92	43(59.7)	46(68.7)	3(37.5)	0(0.0)	0(0.0)	
	Visual impairment	2	1(1.4)	0(0.0)	1(12.5)	0(0.0)	0(0.0)	
	Breathing impairment	3	2(2.8)	1(1.5)	0(0.0)	0(0.0)	0(0.0)	
	Mental impairment	6	0(0.0)	6(9.0)	0(0.0)	0(0.0)	0(0.0	
	Inability to Chew food	3	2(2.8)	1(1.5)	0(0.0)	0(0.0)	0(0.0)	
	Multiple disabilities	22	12(16.7)	8(11.9)	1(12.5)	1(100.0)	0(0.0)	
Total		**149**	**72(48.3)**	**67(45.0)**	**8(5.3)**	**1(0.7)**	**1(0.7)**	**0.057**

There is no significant difference in nature of disability and the time taken to reach first health facility among respondents (p value >0.05)

CHAPTER FIVE

5.0 Discussion

5.1 Socio-demographic characteristics of respondents

Majority of the road traffic injured patients in this study were aged between 18 to 40 years. This age predominance is consistent with finding of studies conducted in India and Tanzania (Honnungar, Aramani, Kumar, Kumar, Jirli**,** 2011; Chalya, Mabula, Dass, Mbelenge, Ngayomela, Chandika, Gilyoma, 2012). The high incidence of Road Traffic Crash (RTC) in this age group may reflect their high activity levels and their participation in high risk activities such as recklessness driving/riding, over-speeding, driving/riding under influence of alcohol, driving/riding while listening on a cell phone, and driving/riding without wearing or putting on any protective gears such as seatbelt and helmet.

This indicates that many road traffic injured patients are young, and are within their most reproductive and productive age groups when they are highly needed by their families and nation. Since they are in their most active and productive phase of their life, they are therefore the most road users than any other age groups. Their involvement in RTIs portrays economic loss to both the family and nation. Therefore, road traffic crash may have an important economic impact at the national, community and family levels that call for urgent preventive measures targeting at these high-risk groups to reduce the incidence of severe phase of RTC. The most important preventive measure is to increase community awareness through education. The education should target things like the importance of consistent use of protective gears. i.e. putting on seat belt and wearing helmet when driving/riding, avoiding reckless driving/riding, avoiding over-speeding, avoid driving/riding under influence of alcohol. This can best be done by well trained Police and pre-hospital care team including critical care nurses and community nurses. Also it demands urgent response public policy

which addresses preventive measures of RTC in order to reduce young age mortality and morbidity rates and serve the lives of this economically important group.

Most road traffic injured people in this study (75.2%) were males. This male predominance found in this study is consistent with findings of other studies done elsewhere (Oluwadiya, Olakulehin, Olatoke, Kolawole., Solagberu, Olasinde et al., 2005; Roy et al., 2010; Honnungar et al., 2011; Chalya et al., 2012; Saadat & Soori, 2011). This may be due to the fact that males have greater exposure on urban streets than female gender. Furthermore, it is a common observed phenomenon and customary in African culture to see males engages in high risk bread weaning activities which makes them to engage in more risky ventures than their females counterparts do such as commercial motorcycle riding (bodaboda), public transport services (daladala), long truck driving and majority of employed drivers are males etc. This may require gender oriented preventive measures to reduce the number of RTIs in the male group.

However, a big number of RTI patients were lowly educated with primary school education or less. A similar observation was done by Chalya et al., (2012) who did a study to describe characteristics and outcome of road traffic crash victims at Bugando Medical centre in Northern Tanzania and found that most of them (57.9%) had either primary or no formal education.

A big number of RTI patients 95(59.1%) with regard to their occupational status were self-employed. A similar observation was made by Chalya et al., (2012) who found that 59.5% of road traffic crash victims at Bugando Medical Centre North Tanzania were self-employed. This group of RTI patients is probably formed mostly by businessmen because they are busy and hurry rushing through heavy traffics to get to and from their business. Businessmen are mostly involved in buying and selling goods which make them to become busy and therefore, frequently move from one place to another with their purchased goods. And in order for them

to make maximum profit and to arrive faster at business place they usually opt to use the cheapest, easier and fastest means of transport available such as motorcycles.

5.2 Circumstance of the road traffic crash

In this study a maximum number of road traffic crash 90(55.9%) occurred along the highways. However, an identifiable number 71(44.1%) occurred along the street roads. This finding is quite not different from that reported by Honnungar et al, (2011) in a study conducted in India that 56.6% of road traffic crash occurred along the highways and 43.4% occurred in lane roads. A lower proportion of road traffic accidents along the highways (46.3%) were reported by Oluwadiya et al., [2005] in a hospital based study conducted in four tertiary level hospitals in three states of Nigeria.

Highways in Dar es Salaam city where this study was done are always busy with many cars passing at high speed in all directions. It then becomes difficult for pedestrians and cyclists to cross over these roads where you find many were knocked by the fast moving cars. This is highly contributed by poor infrastructure of roads where there are no safe areas for pedestrians and cyclists to walk or ride or cross the road. Prevention of these kinds of accidents will require construction of roads that have safe place for pedestrians to walk and cyclists to ride in. Also all road users should be educated about the importance of being careful when using roads and abide to the laws, rules and regulation governing road use. Car or motorcycle speed reduction is the cornerstone for reduction of all kinds of road traffic crash of which all drivers and riders should be aware of. Therefore, police, health workers and other responsible stakeholders have a big role to play in the creation of awareness in the community about safe road use. Also law enforcement by responsible stakeholders such as police and judiciary personnel is also important in the reduction of road traffic crashes. Also a policy addressing construction of roads which are safe to all road users needs to be put in place.

Driving under the influence of alcohol has long been documented to be associated with occurrence of road traffic crashes. In the present study 20(12.4%) of road traffic injured victims had used alcohol 6 hours before injury. Chalya et al., [2012] reported a higher proportion (17.2%) of alcohol consumption prior to the accident of patients in a study conducted in Northernwest part of Tanzania. Alcohol consumption is known to impair driving ability of an individual. Alcohol use also causes carelessness and loss of concentration as well as over-speeding and neglecting the use of safety equipments such as seat belt and helmet. A statistically significant association was found between alcohol consumption 6 hours before injury and age of patients where alcohol use increased significantly with increasing age ($p=0.014$). This means that prevention of road traffic accidents may require age specific approach where for elder ages emphasis should address on impeding alcohol consumption prior driving or riding. Regarding seat belt and helmet use in this study most respondents 51(31.7%) reported there was no seat belt in the car they usually drive or ride, 51(31.7%) used seatbelt sometimes in the past 30 days before injury and Majority of respondents 74(46.0%) reported to have used helmet sometimes, 21(13%) have never used helmet in the past 30 days before injury. This trend found out of the questionnaire reflects that the trend of seatbelt and helmet use 30 days before crash could most likely be the same during crash.

5.3 The role of victim at the time of injury

Passengers (43.5%) accounted for the majority of road traffic injured victims in our study. This finding is in contrast with other studies [Saadat & Soori, 2011; Chalya et al., 2012; & Honnungar et al., 2011] which reported pedestrians as the majority of cases while in that study pedestrians accounted to 23.0% of the cases.

The high incidence of passenger's involvement in road traffic crash in this study reflects driver's low awareness on driving and safe road use. However, this may be characterized by non-helmet and non-seat belt use by riders and drivers and their passengers, passenger

overload, lack of certified driver training and valid licensing, over-speed and reckless driving, poor regulation and law enforcement, possible use of alcohol and drugs and poor road infrastructure. The 23.0% involvement of pedestrians in road traffic crash in this study probably reflect public low awareness on road use and may be pedestrians are less likely to use walking pavements even if they are available. In addition the absence of pedestrian walkways in most of the roads in developing countries like Tanzania has increased the vulnerability of pedestrians to all motorized vehicles [Oluwadiya et al., 2005; Chalya et al., 2012].

Motorcycle is becoming popular in Tanzania as it has become cheaper and easier means of transportation in most urban and rural areas. In this study motorcycles were responsible for the majority of road traffic crashes accounting for 40.4% of cases. The prevalence of motorcycle injuries observed in this study is lower than that reported years earlier in Iran (47.1%) [Saadat & Soori, 2011] and Tanzania (58.8%) [Chalya et al., 2012] probably reflecting the decrease in the magnitude of the problem in our country. However, the low prevalence of motorcycle injuries found in this study may be attributed by small sample size. This low incidence of motorcycle injuries may also reflect motorcycle rider's becoming increasingly aware of driving and safe road use characterized by increase in helmet use by riders and their passengers, decrease in passenger overload, procession of certified driver training and valid licensing, reduction of over-speed and reckless driving, regulations and law enforcement, possible reduction in the use of alcohol and drugs and improved road infrastructure.

All motorized cars should possess seat belts and motorcycles should possess helmet for safety of the drivers and passengers. It is well documented that appropriate seat belt and helmet use is associated with significant reduction of the severity of motor traffic injuries related traumas and head injuries. For road traffic injured victims in this study 51(31.7%) and 4(2.5%) there was no seat belt in the cars they usually drive or ride in and did not have helmets respectively

in the past 30 days before injury. In addition, 23(14.3%) and 21(13%) have never used seatbelt or helmet respectively in the past 30 days before injury. The same trend of non-usage of seatbelts of non-usage of seat belt and helmet among drivers and motorcyclists was demonstrated in other studies [Chalya et al., 2012]. The low incidence of seat belt use or helmet use among drivers and motorcyclist in this study reflects increased risks of severe trauma and head injuries in this region which is accommodating the capital city of the country. This observation calls for preventive measures focusing on safety belt and crash helmet use.

5.4 Physical injury sustained

Most RTI patients (55.3%) sustained multiple injuries after road traffic crash. This finding contradicts with that observed by Honnungar et al., (2011) in India who reported that the most commonly injury was to the head (50.4%) followed by head and chest (29.2%). Head injury in this study occurred only in 3.7% of cases. The observed proportion of multiple injuries **%** in our study means that road traffic crashes is very severe which involved injuries to more than one organ in the body of victims. And this may be associated with non-usage of seat belts and helmet and over-speeding. This observation indicates that there is a need to strengthen preventive measures focusing on safety belt, helmet use and speed reduction. Also as it shows that multiple injuries remain the most common and serious type of trauma seen in emergency department of our hospital therefore there is a need to strengthen multidisciplinary approach in caring these patients including availability of good neurosurgical, orthopedic care, general surgery and nursing care.

The second most common physical injury to these patients was fractures 53(32.9%). In this study also Chalya et al [2012] observed that musculoskeletal injuries were the most common body region injured. This may probably be attributed to low use of motorcycle helmets in this study, a common observed situation in developing countries. This proportion of musculoskeletal injuries affecting mainly the lower limbs (61.7% of all disabilities) is due to

the fact that pedestrians and cyclist/motorcycle users are unprotected road users and therefore they are highly exposed to high risk of limb injuries involving bones

5.5 Pre-hospital care provided

Pre-hospital care involves helping injured victims in those life threatening problems involving airway, breathing, circulation or disability [Hormis and Sambridge, 2010]. Findings in this study show that a bigger proportion of RTI patients 97.5% received some form of pre-hospital care with some first aid before reaching the health facility. However, only 1.3% of these patients had pre-hospital care been provided by trained ambulance personnel. The pre-hospital care was unsatisfactory that most road traffic injured victims received informal pre-hospital care provided by unskilled personnel. In contrast, a study conducted in Northern Tanzania by Chalya et al., [2012] reported that none of the patients had pre-hospital care. In Nigeria a study conducted by Oluwadiya et al., [2005] showed that 8.6% of patients were given some form of pre-hospital care by bystanders. In addition 51.7% of cases received no pre-hospital care and 48.3% received some first aid according to a study conducted in India [Roy et al., 2010].

This shows that Dar es Salaam city lacks an organized formal pre-hospital Emergency Medical Services (EMS) system. What is operating currently is an informal individual's initiative where victims are provided some form of pre-hospital care and transported to health facility by untrained people. In Tanzania in general and Dar es Salaam in specific, something good should be done by ensuring that victims of RTC receive life-sustaining care within a few minutes of injury. Even in countries with limited resources like Tanzania, many lives may be saved and disabilities prevented by teaching motivated people what to do at the scene. Also the foundations of an effective pre-hospital system may be laid by recruiting carefully selected volunteers and non-medical professionals and giving them special training as well as the basic supplies and equipment they need to provide effective pre-hospital care.

Bystanders were responsible to rescue most patients (65.6%) by providing pre-hospital care. Regarding the nature of pre-hospital care received by respondents after crash most of them 137(87.3%) were removed from wreck only and sent to health facility. Very few victims received first aid. No victim reported to have received resuscitation. This is due to the reason that bystanders are not trained to offer pre-hospital care or first aid. Therefore they just provided very simple interventions like removing victims from the area of accident and transporting them. Most of them (44.7%) were transported to hospital by private cars and only 1.2% by an ambulance. This finding agrees with that reported by Roy et al., [2010] who found that the most common responders to road traffic injured victims were unrelated Good Samaritan. In addition Chalya et al., [2012] found that most road traffic injured victims were transported by relatives, tax drivers, police and other motorists who are usually unrelated.

Generally, the best way to reduce rates of death or disability from life-threatening injuries is to prevent them. However, it is often possible to minimize the consequences of serious injury, including long-term morbidity or mortality, by promptly providing effective pre-hospital care [WHO, 2005]. In Tanzania many patients who need critical care in the ‘golden hour’ die due to the absence of formal pre-hospital services. Road traffic victims are brought in by private transport or sometimes the police. Some of the regional hospitals have ambulances, but these must be paid for by the recipient [Cox1 and Shao, 2007]. The lack of formal pre-hospital care and ineffective ambulance system for transportation of patients to hospitals in Dar es Salaam are a major challenges in providing care for trauma patients in our environment and have contributed significantly to poor outcome of these patients. In most of developing countries like Rapid arrival of the emergency medical services (EMS) at the crash scene and proper victim transportation by trained personnel may reduce injury severity and reduce the number of preventable deaths.

As observed in other studies bystanders are often present when an injury occurs or they quickly reach the scene. The first minutes after a serious injury occurs represent a window of

time during which potentially life-saving measures can be initiated, such as opening an obstructed airway, assisting breathing and applying direct pressure to a wound to reduce external bleeding, the likelihood that an injured individual will live or die depends on the timeliness of these actions. The chances of survival may be greatly enhanced if bystanders promptly initiate first aid. Once an emergency situation is recognized, bystanders need to call for help. They may need: help from more highly trained providers who can treat the injured person, help transporting the injured person by the most appropriate available means, help giving first aid and calling for more assistance.

Once an emergency situation is recognized those providing basic first aid need to know in advance how to call for help and how to secure transport if needed. Depending on local circumstances and the circumstances of the injury, they may need to call an ambulance, taxi driver, a private medical practitioner, the local fire or rescue service, a police officer or someone else. To facilitate this task, many countries have adopted a nationwide telephone number that connects the caller to the nearest health-care facility or ambulance dispatch centre. However, help should be called for using whatever methods are available.

Advantages of bystander rescuer are immediate care at the scene and immediate transportation of the victims, although there are disadvantages by untrained bystander to conduct rescue. First responders must be taught the basic skills of assessment. Failing to recognize a medical condition or injury as a true emergency may lead to an increased risk of death or permanent disability. After completing an initial assessment and calling for help, trained first responders should attempt to give immediate assistance within the limits of their skills. This will require them to be trained the necessary knowledge and skills for providing pre-hospital care.

According to the culture, people in Dar es Salaam do not hesitate to help accident victims; they provide much needed informal pre-hospital care despite the lack of knowledge and equipments. Our findings indicate the need of a first aid course to be developed to provide

basic training in pre-hospital care for this population to set the initial formal pre-hospital care. Our findings have several major implications for policymakers and donor organizations financing health care in Tanzania. There is a clear need for a more organized pre-hospital emergency medical system (EMS) in Dar es Salaam and Tanzania at large based on the numbers of emergencies and deaths encountered by untrained people.

5.6 Injury related disabilities

Majority of the motor traffic injured victims in this study (92.5%) reported to have disability following the current road traffic injury and most of them (61.7%) had inability or difficult to use lower limbs and 14.1% had inability or difficult to use upper limbs. Multiple disabilities were reported in 14.8% of victims. This means that upper and lower limbs are most likely to be injured in most road traffic crashes.

The proportion of motor traffic injured victims with upper and lower limb disabilities may be attributed to the low use of motorcycle helmets and car seat belts [Chalya et al., 2012]. This might have contributed to the big number of victims with major traumas, fractures and multiple injuries. This may lead to the victims unable to use limbs in meeting their daily body needs such as dressing, eating, sleep, washing and locomotion. As a result they become totally or partially dependent on caretakers including nurses. Therefore, this will require large number of scarce trained nurses to take care of them in hospital where they are admitted.

The length of hospital stay in injured patients impacts on the victims and his or her family's economy as these patients are no longer productive and their treatment are expensive and this drains the family's economy. Prolonged hospitalization is common to these kinds of patients and is associated with an unacceptable burden on resources for health and undermines the productive capacity of the population through time lost during hospitalization and disability. Prolonged hospital stay is attributable to presence of major trauma patients and large number

of patients with long bone fractures which took time to heal as majority of them was treated with either skeletal or skin traction and only few patients were been treated with open reduction and internal fixation. Preventive measures of road traffic crashes is advocated through law enforcement in order to prevent trauma associated morbidities and mortalities

5.7 Utilization and dissemination of the study findings

It is intended that the results of this Dissertation reach many readers and stakeholders; hence the results will be submitted to; The School Of Nursing and 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, Muhimbili Orthopedic Institute, Ministry Of Health and Social Welfare 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 at local and international conferences.

5.8 Limitations of the study

The sample size for this study was expected to be 323 participants. However the study ended up with 161 participants. The small sample size in this study makes low power of the study and hence biased due to less external validity for the whole study.

Data collection was done by researcher and research assistant, data collected by two different data collectors may vary in the administration of interview leading to information bias. The researcher reduced such bias by use of structured questionnaire where participants were given groups of responses to choose, doing close follow up of the research assistant during data collection process and daily checkup of information collected.

Data was collected to the participants who may had not followed what was happening after the crash due to distress and loss of attention, Overcoming retrospective recall bias was achieved by not including in the study those who didn't remember some of the events, also those who were in pain were given time and interviewed later when they were comfortable.

Participants may have under reported the use of alcohol before crash, or over reported the use of seatbelt and helmet by considering that they will be regarded as responsible for the crash. This was achieved by providing enough information about the researcher or research assistant during introduction from ward in charge, given enough explanation about aim, objectives of the study and they were allowed to ask questions and given appropriate answers.

Translation of the WHO adopted instrument didn't follow the recommended process of translation of the adopted instrument which may have lowered the validity and reliability of this study

During data analysis the researcher changed the grouping of answers which is different from groupings of responses in the questionnaire which may have introduced error in the study.

This study did not capture information on unconscious cases and patients with amnesia. This can lower the power of this study and hence validity.

Information about RTC victims collected through MNH database was incomplete and this may affect the reliability and validity of this study.

5.9 Conclusion and recommendations

5.9.1 Conclusion

Road traffic crashes constitute a major public health problem in Tanzania in general and Dar es Salaam in specific and the young adult (75.2%) in their economically productive age-group are mostly involved. Self employed people were the largest groups of road traffic crash victims. Most road traffic crashes occurred along the highways and passengers were the most injured followed by drivers and pedestrians. Almost 12.4% of the respondents had used alcohol 6 hours before injury.

Motorcycles were responsible for the most road traffic crashes followed by motor vehicles. Most cars (31.7%) did not have seat belt. Few victims (31.7%) sometimes used seatbelt and 14.3% never used seatbelt in the past 30 days before injury. Regarding helmet use most road traffic injured victims (46.0%) reported to have used helmet sometimes and 21(13%) have never used helmet in the past 30 days before injury.

Most respondents (55.3%) sustained multiple injuries followed by fractures (32.9%) and most of them were transported to health facility by private cars. Immediately after rescue, most injured victims were transported by private cars and reached health facility within one hour. A bigger proportion of RTI patients 97.5% received some form of pre-hospital care with some first aid before reaching the health facility. However, only 1.3% of these patients had pre-hospital care been provided by trained ambulance personnel. The pre-hospital care was unsatisfactory in the sense that most road traffic injured victims received informal pre-hospital care provided by untrained and unskilled bystanders and most were arrived to the health facility by a private car.

5.9.2 Recommendations

This study shows that road traffic injuries remain a critical public health concern in Tanzania, since a number of deaths and disabilities occurs due to RTC. Many countries have reduced road traffic deaths and disabilities and this has occurred where political will has been translated into concerted and coordinated multisectoral actions that are based on evidence. In reducing the number of road traffic deaths and disabilities needs more actions particularly in the following areas and levels:

For future practice:

At Individual Level**,**

- The drivers should be aware of all the road traffic signs before they drive and follow the road safety rules.
- Passengers should wear their seatbelts while in vehicles or helmets for motorcycles.
- Pedestrians should be aware of all the road traffic signs and follow the road safety rules.

At Family Level**,**

- The parents should take time to educate their children about road safety rules and provide necessary supervision.

At National and community Level**,**

- The government needs to increase adoption of comprehensive legislation relating to key risk factors for road traffic. The minimum elements needed in national laws related to the key risk factors (speed, drink–driving, motorcycle helmets, seat-belts and child restraints).
- Government must actively address the safety and mobility needs of more vulnerable road users, and consider how non-motorized forms of transport can be safely integrated into more sustainable and safer transport systems.

- In addition, there are other areas the government needs to address to ensure road traffic injury prevention like incorporating road safety rules into education program to school children and first aid for improving post-crash care.

For policy implication:

There is urgent need for the government to establish Emergence Medical Care System and shift informal pre-hospital care provided by untrained society to formal one rendered by trained and skilled health care professionals. However, there is a need to improve and reinforce the existing system of informal pre-hospital care provided by bystanders, friends/family and police with adequate and skillful training. Also the foundations of an effective pre-hospital system may be laid by recruiting carefully selected volunteers and non-medical professionals and giving them special training as well as the basic supplies and equipment they need to provide effective pre-hospital care.

For future research:

This research is not conclusive with all areas regarding road traffic crashes and pre-hospital care. Therefore, further research is recommended to be undertaken in various areas similar to and different from this study. Studies are recommended which incorporate larger and more diverse samples of road traffic injured victims in order to have a wider understanding about this phenomenon under study to foster crash prevention and pre-hospital care provision.

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Appendices

Appendix 1: Informed consent (English version)

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

DIRECTORATE OF RESEARCH AND PUBLICATIONS, MUHAS

CONSENT FORM

ID NO | | | | | | | | | | |

Consent to participate in a study: entitled "ASSESSMENT OF PRE-HOSPITAL CARE OF ROAD TRAFFIC INJURED PATIENTS ADMITTED AT MUHIMBILI NATIONAL HOSPITAL AND MUHIMBILI ORTHOPEDIC INSTITUTE DAR ES SALAAM, TANZANIA"

Greetings! My name is Amon Nathan Kingu, 2nd year student MSc, critical care and trauma at Muhimbili University of Health and Allied Sciences (MUHAS), working on this research project with the objective of assessing the situation of pre-hospital care to road traffic injured patients in Dar es Salaam, Tanzania.

Purpose of the study:

The study will involve patients admitted to MNH surgical wards and MOI orthopedic and trauma wards. Conducting the study will enable to describe the prevalence of provision of pre-hospital care for surviving RTI patients, the nature of care received by surviving RTI at scene and en route to healthcare facility, the magnitude of disability experienced by surviving road traffic injured.

Participation in this study:

The study will involve patients who sustained injuries following road traffic accident admitted to Muhimbili National hospital and Muhimbili Orthopedic Institute. If you agree to participate in the study, participants will be required to answer interview questions from questionnaires.

Confidentiality:

All information collected during this study will be kept strictly confidential and will not be revealed to anybody outside the research team.

Risks:

We do not expect that any harm will happen to you because of joining this study. Sometimes you may feel tired / exhausted, due to the nature of the illness, but you will be able to stop the interview temporarily or decline at any time if you feel too uncomfortable.

Rights to withdraw and alternatives:

Taking part in this study is completely your choice. If you choose not to participate in the study or if you decide to stop participating in the study you will continue to receive all services that you would normally get from hospital. You can stop participating in this study at any time even if you have already given your consent.

Benefits:

There will be no direct benefit to you from participating in this study. However, the information that you provide may help health care teams and others of the nature of the pre-hospital care to better understand the baseline pre-hospital care package that is likely to work in our settings after classification of the nature of pre-hospital care that is found to be effective

in saving lives/prevent further injury to RTI patients and thus create awareness of the hazards of deficit in injury prevention.

In case of injury:

We do not anticipate that any harm will occur to you as a result of participation in this study. However if any physical injury resulting from participation in this study should occur, we will provide you with medical treatment according to the current standards of care in Tanzania. There will be no additional compensations to you.

Who to contact:

If you ever have questions about this study, you should contact the study coordinator or principal investigator Mr, Amon Nathan Kingu, Tel- 0713-420-300 Muhimbili University of Health and Allied Sciences, P.O. Box 65001 Dar es Salaam. If you ever have questions about your rights as a participant, you may call Prof. Mainen J. Moshi, Chairman of the Senate Research and Publications Committee. P.O. Box 65001, Dar es Salaam. Tel 2150302-6 2152489

Signature:

Participant agrees…….. Participant does NOT agree ……

I _____ have read the contents in this form. My questions have been answered. I agree to participate in this study.

Signature of participant _____

Signature of witness (if mother/ caretaker cannot read) _____

Signature of research assistant _____

Date of signature _____

Appendix 2: Informed consent (Swahili version)

CHUO KIKUU CHA AFYA NA SAYANSI SHIRIKISHI MUHIMBILI
IDARA YA UTAFITI NA USAMBAZAJI WA TAARIFA ZA UTAFITI

FOMU YA IDHINI YA KUSHIRIKI UTAFITI

Namba ya Utambulisho

Idhini ya kushiriki katika utafiti unaohusu; "MATIBABU YA AWALI YA MAJERUHI WA AJALI ZA VYOMBO VYA MOTO BARABARANI WANAYOPATA KABLA YA KUFIKA HOSPITALINI AU KWENYE KITUO CHA AFYA WALIOLAZWA HOSPITALI YA TAIFA MUHIMBILI NA KITENGO CHA MIFUPA MUHIMBILI DAR-ES-SALAAM, TANZANIA"

Salaam! Jina langu ni Amon Nathan Kingu, mwanafunzi wa mwaka wa pili wa shahada ya Uzamili (MSc, critical care and trauma) katika Chuo Kikuu cha Afya na Sayansi Shirikishi Muhimbili, ninafanya kazi ya utafiti huu nikiwa na dhumuni la kugundua/kubaini na kuthibitisha huduma za matibabu ya awali ya majeruhi wa ajali za vyombo vya moto barabarani wanayopata kabla ya kufika hospitalini au kwenye kituo cha afya hapa Dar-es-salaam, Tanzania.

Lengo la Utafiti:

Utafiti huu utahusisha wagonjwa waliolazwa katika hospitali ya taifa Muhimbili wodi za upasuaji na Taasisi ya mifupa Muhimbili wodi za mifupa na majeruhi ili kubaini ni kwa kiasi gani huduma za matibabu ya awali ya majeruhi wa ajali za vyombo vya moto barabarani zinatolewa kabla ya kufika hospitalini au kwenye kituo cha afya, ni huduma zipi ambazo wanapata majeruhi hao, na ni ulemavu wa kiasi gani walioupata kutokana na majeraha hayo.

Ushiriki katika Utafiti huu:

Utafiti huu utahusisha wagonjwa waliopata majeraha kutokana na ajali za barabarani na kulazwa kwenye Hospitali ya taifa Muhimbili na Taasisi ya mifupa Muhimbili. Ukikubali kushiriki; utahitajika kujibu maswali ya usaili yatakayotolewa na mtafiti.

Usiri:

Taarifa zote zitakazotolewa/kupatikana katika utafiti huu zitahifadhiwa na kulindwa kwa siri na hazitaonyeshwa wala kutolewa kwa mtu yeyote asiye miongoni mwa watafiti.

Madhara:

Hatutarajii kuwa madhara yeyote yanaweza kukupata iwapo utashiriki katika utafiti huu. Wakati mwingine unaweza kujisikia kuchoka/kuugua, lakini kulingana na hali utakayokuwa nayo utaweza kusimamisha usaili dhidi yako kwa muda au kueleza kufanya usaili huo kwa wakati mwingine wowote kama hali yako si nzuri kabisa.

Haki ya Kujiondoa katika Utafiti/Vinginevyo:

Kuhusika kwako hakika ni uchaguzi wako. Kama hautataka kushiriki katika utafiti huu, au kama utaamua kusimamisha ushiriki wako katika utafiti huu, utaendelea kupata huduma zote kama kawaida ulizokuwa ukizipata awali katika wodi/kitengo ulicholazwa. Unaweza kuacha kushiriki katika utafiti huu muda wowote hata kama umeshapatiwa fomu ya idhini ya kushiriki.

Faida:

Hakutakuwa na faida ya moja kwa moja kwako kutokana na kushiriki katika utafiti huu, ingawa taarifa utakazotoa zinaweza kuwasaidia wataalam kada ya afya na wale wanaohusika katika utoaji wa huduma hizi kuelewa msingi unaoweza kufanya kazi katika utoaji wa huduma

hizi katika mazingira yetu baada ya kuzipanga kwenye madaraja na huduma ambayo itaonekana inafanya kazi vizuri katika kuokoa maisha au kupunguza majeraha zaidi na kutoa mwanga wa madhara ya mapungufu katika kuzuia majeraha.

Endapo Madhara yatatokea:

Hatutarajii kuwa madhara yeyote yatatokea kukupata iwapo utashiriki katika utafiti huu. Iwapo kama madhara/majeraha yeyote yatatokea kutokana na kushiriki kwako katika utafiti huu, tutakupatia matibabu kulingana na Mwongozo wa Utoaji huduma kwa Wagonjwa nchini Tanzania. Hakutakuwa na fidia nyingine dhidi yako.

Kwa Mawasiliano:

Kama una maswali kuhusu utafiti huu, wasiliana na Mtafiti; Bwana, Amon Kingu, simu-0713-420300, kutoka Chuo Kikuu cha Afya na Sayansi Shirikishi Muhimbili, S.L.P. 65001 Dar es Salaam. Kama una maswali zaidi kuhusu haki zako za kushiriki katika utafiti huu, wasiliana na Prof. Mainen J. Moshi; Mwenyekiti wa Baraza la Tafiti na Machapisho, S.L.P. 65001, Dar es Salaam. Simu- 2150302-6 2152489.

Sahihi:

Kukubali kwa Mshiriki……Kukataa kwa Mshiriki ……

Mimi _____ nimeisoma na kuielewa fomu hii ya idhini ya kushiriki. Maswali yangu yamejibiwa na nakubali kushiriki katika utafiti huu.

Sahihi ya Mshiriki _____

Sahihi ya Shahidi (kama mama/mhudumu hawezi kusoma) _____

Sahihi ya Mtafiti _____

Tarehe _____

Appendix 3: Questionnaire (English version)

QUESTIONNAIRE FOR ASSESSMENT OF PRE-HOSPITAL CARE OF ROAD TRAFFIC INJURED PATIENTS.

Instructions:

The aim of this questionnaire is to ascertain the currently existing pre hospital emergency care provided to road traffic injured patients. The researcher will ask the questions written in the questionnaire and fill in the participants response. The questionnaire is confidential.

Thank you for your cooperation.

1.	ID number	
2.	Sex	1. Female 2. Male
3.	Current Age (in years)	
4.	Education In total, how many years have you /did the RTI spent in school?	00 No formal education 01 Primary school education 02 Secondary school education 03 University/ College education

5.	Occupation What is your current occupation? / the injured person's current occupation?	01 Farmer 02 Civil servant 03 Self-employed 04 Street vendor 05 Professional 06 Student 07 Homemaker 08 Non-paid worker/volunteer 09 Retired 10 Unemployed (able to work) 11 Unemployed (unable to work) 12 Other (specify) 13 Unknown
6.	Injury event factors. Place. Where were you when you were injured/was the injured person when the injury occurred?	01 Highway 02 Street
7.	Activity. What were you doing when you were	01 Paid work (including travel to and from work)

	injured/was the injured person doing when he/she was injured?	02 Unpaid work (including travel to and from work) 03 Education 04 Sports 05 Travelling 06 Unspecified activities (hanging around, doing nothing) 07 Other (specify)
8.	Use of alcohol. In the 6 hours before you were injured, did you have any alcohol to drink (even one drink)/ the injured person was hurt, did he/she have any alcohol to drink (even one drink)?	01Yes 02 No
9.	**Traffic-related injuries;** Mode of transport. How were you travelling at the time you were injured/How was the injured person travelling at the time the traffic injury occurred?	01 Walking 02 Non-motorized vehicle 03 Bicycle 04 Motorcycle 05 Car 06 Pickup, van, jeep or minibus (vehicle that seats less than 10 people) 07 Truck /lorry

		08 Bus 09 Three-wheel motorized vehicle 10 Other (specify) 11 Don't know/can't remember
10	Victim role. What was your role in the traffic crash/was the injured person's role in the traffic crash?	01 Pedestrian 02 Driver 03 Passenger 04 Other (specify) _____
11	Counterpart. What did you (or your vehicle) collide with/ did the injured person (or his/her vehicle) collide with?	01 Pedestrian 02 Bicycle 03 Motorcycle 04 Motorized vehicle 05 Fixed object 06 Other (specify)
12	Seat belt use In the past 30 days how often did you use a seat-belt when you were the driver or a passenger of a motor vehicle?	01 All the time 02 Sometimes 03 Never 04 Have not been in a vehicle in the past 30 days

		05 There is not seat belt in the car I usually drive or ride in 06 Refused 07 Don't know/unsure
13	Helmet use In the past 30 days how often did you wear a helmet When you drove or rode as a passenger on a motorcycle or motor-scooter?	01 All the time 02 Sometimes 03 Never 04 Have not been on a motorcycle or motor-scooter in the past 30 days 05 Do not own a helmet 06 Refused 07 Don't know /unsure
14.	Nature of injury. What physical injuries did you sustain/ physical injuries did the injured person sustain?	01 Fracture (broken bone) 02 Sprain or strain 03 Dislocation 04 Cut, or other open wound 05 Bruise or superficial injury 06 Burn 07 Concussion/head injury

		08 Internal injury/internal organ injury 09 Other (specify) 10 Unknown
15.	**Medical care and treatment of injury;** First aid at scene. Did anyone try to help you by giving you first aid/ anyone try to help the injured person by giving first aid?	01 No 02 Yes
16	Person who provided first aid Who gave you first aid after you were injured/ gave first aid to the injured person?	01 Bystander 02 Friend/family 03 Teacher 04 Police 05 Ambulance personnel 06 Doctor 07 Nurse 08 Fire brigade personnel 09 Refused (to answer) 10 Other (specify) 11 Don't know

17	What life saving intervention(s) did you receive? /What life saving intervention(s) did the injured received?	01Removed from wreck 02 Immobilised my fracture 03 Stopped bleeding/covered wound 04 Provided resuscitation 05 Other (specify)
18	Transport to health facility. How did you get to the health facility for treatment of your injuries/ How did the injured person get to the health facility for treatment of his/her injuries?	01 By foot 02 By private car 03 By taxi 04 By public transport 05 By ambulance 06 By bicycle 07 By animal cart 08 Did not go to a health facility 09 Refused (to answer) 10 Other (specify) 11 Don't know
19	Transport time. How long did it take you to get to the health facility/ How long did it take for the injured	01 Less than 1 hour 02 1–2 hours 03 2–6 hours

	person to get to the health facility?	04 6–9 hours 05 9–12 hours 06 12–24 hours 07 More than 24 hours 08 Did not go to health facility 09 Refused (to answer) 10 Don't know
20	Place of medical care; Where did you first seek medical treatment for your injury/ did the injured person first seek medical treatment for his/her injury?	01 Hospital 02 Health clinic 03 Health centre or health post 04 General medical practitioner 05 Community health worker 06 Traditional practitioner/healer/bone setter 07 Pharmacy/drug store 08 Refused 09 Other (specify) 10 Don't know/can't remember
	Injury related disability;	

21.	Physical disability. Did you suffer a physical disability as a result of being injured/ the injured person suffers a physical disability as a result of being injured?	01 No 02 Yes
22	Nature of disability In what ways were you physically disabled/in what ways were the injured person physically disabled?	01 Inability/difficulty using upper limb 02 Inability/difficulty using lower limb 03 Visual impairment 04 Breathing impairment 05 Mental impairment 06 Inability/difficulty to chew food 07 Other (specify)

Appendix 4:

Approval of Ethical cclearance letter.

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

Directorate of Postgraduate Studies

P.O. BOX 65001
DAR ES SALAAM
TANZANIA.

Website: http://www.muhas.ac.tz

Tel: +255-(0)22-2150302 Ext 207.
Tel (Direct): +255-(0)22-2151378
Telefax:255-(0)22-2150465
E-mail: *dpgs@muhas.ac.tz*

Ref. No. MU/PGS/SAEC/Vol. VI/

28th May, 2013

Mr. Amon N. Kingu,
MSc. Nursing Critical Care and Trauma
MUHAS.

RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED "ASSESSMENT OF PRE-HOSPITAL CARE OF ROAD TRAFFIC INJURED PATIENTS ADMITTED AT MUHIMBILI NATIONAL HOSPITAL AND MUHIMBILI ORTHOPEDIC INSTITUTE, DA ES SALAAM, TANZANIA"

Reference is made to the above heading.

I am pleased to inform you that, the Chairman has on behalf of the Senate approved ethical clearance for the above-mentioned study.

Thus ethical clearance is granted and you may proceed with the planned study.

Please liaise with bursar's office to get your research fund.

Prof. O. Ngassapa
DIRECTOR, POSTGRADUATE STUDIES

/emm

cc Vice Chancellor, MUHAS
cc Deputy Vice Chancellor – ARC, MUHAS
cc Dean, School of Nursing, MUHAS

Appendix 5:

Permission letter from MOI

P.O. Box 65474; DAR ES SALAAM, TANZANIA, MUHIMBILI COMPLEX
Executive Director: +255-022-2153359
General lines: +255-022-2151298/2152937/2152938
FAX: +255-022-2151744
E-Mail: info@moi.ac.tz
Website: www.moi.ac.tz
OFFERING SERVICES IN ORTHOPAEDICS, NEUROSURGERY AND TRAUMATOLOGY

AB.145/292/01/76 **06TH June, 2013**

Dean,
Director of Postgraduate Studies.
MUHAS
P.O.BOX 65004
DAR ES SALAAM

Dear Sir/Madam
RE: APPROVAL FOR PERMISSION TO CONDUCT RESEARCH AT – MOI.
Reference is made to your letter dated 6TH May, 2013 with reference No.HD/MUH/T.I79/2011 captioned the above subject matter.

I am pleased to officially inform you that, your request for Amon N.Kingu to conduct research at MOI, has been approved. Therefore very kindly you're requested to inform him to start his research as requested.

On the arrival the student should come and see undersigned person For more information.

It's our hope that you will extend enough cooperation.

.....
Abdallah Mbuguni
For: Executive Director

Cc: DNS-MOI

Appendix 6

Permission letter from MNH.

MUHIMBILI NATIONAL HOSPITAL

Cables: "MUHIMBILI"
Telephones: 255-22-2151367-9
FAX: 255-22-2150234
Web: www.mnh.or.tz

Postal Address:
P.O. Box 65000
DAR ES SALAAM
Tanzania

In reply please quote:
Ref:

31ST MAY 2013

TO WHOM IT MAY CONCERN
MUHIMBILI NATIONAL HOSPITAL

RE: RESEARCH CLEARANCE NO 352 2013/2014

Name of Researcher	**AMON NATHAN KINGU**
Research Title	ASSESSMENT OF PRE-HOSPITAL CAREOF ROAD TRAFIC INJURED PATIENTS ADMITTED AT MUHIMBILI NATIONAL HOSPITAL AND MUHIMBILI ORTHOPEDIC INSTITUTE DAR-ES-SALAAM, TANZANIA
Type of Research	DESCRIPTIVE CROSSSECTIONAL STUDY
Valid Between	**JUNE 2013 AND AUGUST 2013**

The above named has been allowed to conduct the stated research.

Please accord him/her and his/her assistants the necessary assistance/cooperation.

Sincerely,

DIRECTOR OF CLINICAL SERVICES
P.O. Box 65000
DAR ES SALAAM
MUHIMBILI NATIONAL HOSPITAL

Dr. H.F. SWAI
DIRECTOR OF MEDICAL SERVICES