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(MUHAS)

PRE-HOSPITAL TRAUMA CARE FOR ROAD TRAFFIC CRASH VICTIMS IN DAR ES SALAAM

BY

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CERTIFICATION

The undersigned certifies that she has read and hereby recommends for acceptance by Muhimbili University of Health Allied Sciences a dissertation titled **Pre-hospital Trauma Care for Road Traffic Crash victims in Dar-es-Salaam, Tanzania** in partial fulfillment of the requirements for the degree of Master of Arts in Health Policy and Management.

Signature .....

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(Supervisor)

DATE.....10/12/2009.....

DECLARATION AND COPYRIGHT

I Petronilla Joseph Ngiloi, declare that this dissertation is my own original work and that it has not been presented to any University for similar or any other degree award

Signature.....

Date.....10th DECEMBER 2009

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ABSTRACT

Road traffic injuries have been noted to be on the increase in Tanzania. Data from the Police records show that between 1990 and 2000, road traffic accidents rose by 44%. A population-based study revealed that road traffic injuries were the commonest cause of injury-related mortality in Dar-es-Salaam, Hai and Morgoro Rural Districts. Dar-es-Salaam is the largest City and the smallest region in Tanzania but records six times the number of road traffic injuries compared to the second highest region.

The objectives of the study were to determine the pattern of pre-hospital trauma care among road traffic crash victims attending the five public hospitals in Dar-es-Salaam.

A structured questionnaire was used for interviewing all road traffic crashed victims / relatives / witnesses/ police patrol attending the five hospitals in Dar-es-Salaam namely Muhimbili Orthopaedic Institute, Muhimbili National Hospital, Mwanayamala, Amana and Temeke municipal Hospitals. An assessment of the pre-hospital trauma care was done by interviewing all the patients who were attended at the above five named hospitals. Where a patient was unable to communicate then the accompanied person was interviewed.

A total of 629 road traffic crashes and fatalities were attended at five hospitals in Dar-es-Salaam, namely Muhimbili Orthopaedic Institute, Muhimbili National Hospital, Mwananyamala Hospital, Amana Hospitala and Temeka Hospitals in the month of June 2009. The results showed that Muhimbili Orhopaedic Institute was the largest recipient of road traffic crash vicitms by 317 (50.4%) and Temeke Hospital 48 (7.6%) the least recipient. The largest number of the crashed vicitms were pedestrians 239 (42%), followed by passengers 169 (29.8%) and drivers 160 (28.2%). Out of the 629 vicitms only 248 (43.2%) admitted to have received some form of first aid which entailed splinting of fractured limb 158(63.8%) and dressing of bleeding wounds 90(32.2%). A number of patients admitted to have called a pre-hospital help from relatives mainly 187 (29.7%), police 77 (12.2%) including friends 27 (4.3%). No ambulance services were called to the site of crash.

From the findings of this study pre-hospital trauma care in Dar-es-Salaam is not yet well structured it has been left to the discretion of public and relatives. This silent massive loss of lives due to road traffic crashes on daily basis could be saved with appropriate measures in place.

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ABBREVIATIONS

AIDS	Acquired Immuodeficiency Syndrome
ALS	Advance Life Support
ALS EMS	Advance Life Support Emergency Medical Service
BLS	Basic Life Support
CEREPRI	Centre for Research and Prevention of Injuries
DALYS	Disability adjusted life years
Doc-ALS EMS	Doctor-Advance Life Support Emergency Medical Service
EDISS	Emergency Department Injury Surveillance System
EMS	Emergency Medical Services
EMTs	Emergency Medical Technicians
EOP	Emergency Operations Plan
ESS	Emergency Service System
HIV	Human Immunodeficiency Virus
MNH	Muhimbili National Hospital
MOI	Muhimbili Orthopaedic Institute
NOMA	Norads Programme for Masters Studies
NRSC	National Road Safety Council
TANROADS	Tanzania National Roads Agency
TIE	Tanzania Institute of Education
TB	Tuberculosis
WHO	World Health Organization

CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND

Worldwide road traffic injuries account for 2.1% of global mortality and 2.6% of all disability adjusted life years (DALYS) lost in the year 2002 (Peden, 2005). In a recent report, the World Health Organization (WHO) acknowledges that road traffic injuries is a neglected epidemic which has not received the attention it deserves in relation to its magnitude (WHO, 2009). It has been estimated that about 1.2 million people die annually due to road traffic injuries, and more than 50 million people are injured annually on the Worlds' roads. These projections show that if this trend is not arrested, then the figures will increase by 65% in the next 20 years (WHO, 2009). The International Federation of Red Cross and Red Crescent Societies have expressed concern of the worsening global disaster destroying lives and livelihoods (Ameratunga et al, 2006). If no appropriate measures are taken then road traffic injuries will escalate from the ninth leading contributor to the global burden of disease in 1990 to the third position by 2020 (Ameratunga et al, 2006).

In recent decades, developed countries have recorded a decrease in mortality in road traffic injuries. This decline has been attributed to combination of preventive measures and improvement of trauma care. A well organized pre hospital trauma care is thought to decrease trauma mortality during the first few hours and also improve the outcome of critically injured patients (Roudsari et al, 2007).

The rapid developing economies like India where there is an increase in motor vehicles on the road has also recorded an increase in road traffic injuries. According to WHO report India records the second highest mortality rate from road traffic crashes 29.2 per 100 000 people (Garg, 2005). Evidence has shown that the death rate from road traffic injuries is higher in Africa than in any other region in the world. In Africa, road traffic fatality rate is 28.3/100 000 population when corrected for under-reporting compared with 11.0/100 000 in Europe (Lagarde, 2007).

Developing countries including Tanzania are overwhelmed by communicable diseases, masking the rising fatalities of road traffic injuries. Whereas communicable diseases like

malaria creates a great burden on vulnerable groups like under fives and pregnant mothers; road traffic injuries is taking toll on the healthy, young and productive group of the population, leaving behind young families with no economic support. Road traffic injuries have an enormous economic impact at family and community level. At government level it has been documented to take up to 3% of their gross domestic product. Health facilities are overwhelmed by road traffic injuries patients, over-stretching their already meager health budgets (Abantanga et al, 1998; Forjuoh et al, 1998, Jacobs et al, 2000; Mcharo, 2005).

Studies have shown that road traffic crashes have a disproportionate impact on the poor and vulnerable in society. In developing countries, poorer people comprise the majority of victims and lack ongoing support in the event of long term treatment. They also lack access to post emergency care and in the event that the injured individual is the family breadwinner, then the loss of income due to prolonged medical care and disability can push families into poverty (Nantulya, 2003; Balogun et al, 1992).

Several studies done in sub-Saharan African countries shows that road traffic injuries are on the increase (Barengo, 2006; Museru et al, 2002; Olukoga, 2007; Nordberg 2000). A ten years study done in Tanzania from 1990 to 2000 based on police records showed an increase of motor traffic crashes, number of associated injuries and fatalities by 44%, 42% and 64% respectively (Museru et al ,2002). Another study done in Dar-es-Salaam, the largest city in Tanzania, recorded an increase of road traffic crashes by 15% from 1999 to 2001 (Barengo et al, 2006). Some obvious factors which contribute to road traffic crashes include poor infrastructure, defective vehicles, reckless driving, non adherence to road safety regulatory rules, lack of road safety education among road users and alcohol consumption (Museru et al, 1999; Lagarde, 2007 and Museru, 2002).

Reporting of road traffic crashes and fatalities in Dar-es-Salaam is almost becoming weekly news in the media. Despite efforts done by the law enforcers, there is almost an endless and preventable loss of human lives. The problem in developing countries like Tanzania is that there is a rapid increase of the number of vehicles on a poor infrastructure and it has not been seen as an epidemic both internationally and nationally. Therefore, it lacks the necessary intervention and public policy formulation to deal with this epidemic just like the other epidemics of malaria and HIV/AIDS (Nantulya and Reich, 2002).

It has been shown that there is a relationship between traffic accidents and the vehicle density hence there are more cases of road traffic injuries in urban than rural areas (Nordberg, 2000). According to WHO analysis of a study group in 1978, Tanzania was categorized as a low motorization country with a relatively low risk of road fatalities with less than 12 road fatalities per 100,000 population per year, with fewer than 45 vehicles per 1,000 population (Nordberg, 2000). Probably this scenario has now changed.

In Africa, very little efforts are being done to improve road safety. WHO through partnership with governments and nongovernmental organizations around the world has been trying to raise awareness of the magnitude of the problem and campaign for prevention by promoting road safety behavior for all road users. The WHO has suggested a kind of "System approach" to road safety which takes into consideration the key aspects of 'Road users, 'Infrastructure and Vehicles (WHO 2004). In many low and middle income countries road traffic injuries accounts between 30 to 86% of all trauma related admissions (Nguyen Thi Lien Huong et al, 2008). Globally it has been noted that traumatic brain injury is the main cause of mortality and morbidity with the aftermath disability.

Several road safety efforts have been done in Tanzania (Museru, 2002). This includes the introduction of speed governors in 1997, limiting the speed to 80 km per hour for public buses as a way of controlling the speed of buses plying between the major cities and towns (Museru, 2002), increase of zebra crossings, road bumps, deployment of more traffic police on the roads and one week campaigns usually conducted by the National Road Safety Council (NRSC) on road safety every year. Tanzania National Roads Agency (TANROADS) was established in July 2000 to deal with the infrastructure which was at a dire state at the same time to regulate and monitor the loading of the trucks and public buses (Bishanga, 2007).

The Road Act, 2007 was established on the 28th August 2007. Among its functions is to ensure installation of the necessary road furniture on public roads in accordance to the regulations of road safety as stipulated in the law. They have responsibility of ensuring safety all road users this includes pedestrians, motorized and non-motorized vehicles so that each one is well protected against any hazards. For example in consideration of pedestrians the road design provides side walk, overhead bridges, zebra crossings and other matters related to pedestrians. All the vehicles, both motorized and non-motorized need to

ensure that there are adequate road signs regulating and guiding the drivers and pedestrians. The Road Traffic Act (CAP 168 R.E. 2002) established the Highway Code as the official guide to all road users. It provides a simple language in interpreting the rules and advice for all road users (Ministry of Infrastructure and Development, 2008).

Currently, in developed countries, there is a decrease in mortality rate following road traffic crashes. This has been attributed to a combination of prevention regulations, enforcement of road safety by-laws and improvement in post trauma care. It is generally believed that pre-hospital care might decrease mortality during the first few hours of injury by preventing irreversible changes that could otherwise lead to death (Roudsari et al ,2007). Important aspects which need to be considered with a well structured system, starts from the accident scene, there should be an immediate protection of the scene by blocking the road, this is a traffic police task. As for the Emergency Service Team (EMS), personal safety of the rescuer this include; self protection gadgets and medical kit at the same time liaising with fire service to protect the accident scene as the rescue is ongoing. Communication with EMS is important to provide more resources on the scene. Triage where there are multiple trauma patients ability to prioritize the order in which you plan to assess and treat the various patients. This includes interventions which should be performed on the scene before transporting the patient to hospital. These are interventions which are performed to improve the patients' clinical state or facilitate safe transfer.

In Africa, few countries have emergency medical care to provide pre-hospital medical care and transport of road traffic crash victims (Forjuoh et al, 1999, Mock et al 2002, Tiska et al, 2004, Mock et al, 2004). A study done in Ghana found that about 51% of all severely crashed victims died in the pre-hospital setting (Tiska et al, 2004).

Pre-hospital trauma care in most developing countries is not well established, patients are transported to medical care facilities by law enforcement personnel, public vehicles, motorcycles, tricycles, wheelbarrows or other means. In a well established system like those in middle income countries such as Emergency Medical Service (EMS) and Basic Life Support (BLS) systems they provide non-invasive basic care to trauma patients, including rapid transport of trauma patients to a medical facility. In developed countries a more Advanced Life Support (ALS) system is applied where a more sophisticated and invasive therapy such as intravenous fluid therapy and endotracheal intubation is provided

on the scene. In some cases physicians go to the scene and are responsible for providing advanced care to trauma victims at the scene and during transport (Roudsari et al, 2007). Efficiency of pre-hospital trauma care is graded in terms time interval between notification and response time to the scene, then activities conducted including time spent on the scene and transportation time to a health care facility. Transportation include road transport or air ambulance. Studies have shown that early, effective resuscitation and rapid transportation from the scene of accident to appropriate hospital where they can provide effective management and care can reduce mortality and morbidity. The pre-hospital trauma care is viewed as the start of continuum of care.

Pre-hospital trauma care must include the first responders. These can be interested community members who are taught basic first aid techniques, how to recognize an emergency, call for help and provide treatment until formally trained health care personnel arrive to give additional care. It has been recommended by WHO that governments should identify well motivated community members or well-placed workers, such as public servants, taxi drivers, community leaders and the public at large train them to provide a more comprehensive level of pre hospital trauma care (WHO, 2005. Kobusingye et al, 2005).

Well motivated community members could act as the first tier in pre-hospital trauma care, These will be involved with initial first aid, and rapid transportation of the serious victims to appropriate health facilities. Then followed by Basic Life Support providers (second-tier care providers include; paramedicals, and advanced trauma Life support (third-tier care providers) include trained assistant medical officers, medical officers trained in emergency care and specialists trauma medicine. There must be a well structured trauma information, transport and communication systems (Nguyen et al, 2008).

Despite some improvement of the infrastructure in Tanzania, road traffic crashes have not been reduced. Instead, it could be a good catalyst for the increased frequency of accidents as it encourages over speeding (Barengo et al, 2006).

In Tanzania the pre hospital trauma care as stipulated in the Highway Code is mainly practiced by the public and also elaborated in the Ministry of Health and Social Welfare Emergency Operations Mannual (EOP). The Health Sector Emergency Operations Plan

(EOP). The (Highway Code 2008) Prepared by the Ministry of Infrastructure Development United Republic of Tanzania October 2008. This provides a simple First Aid guideline for any person. Once an crash has occured one has to ensure the safety of the scene to avoid a second tragedy, then followed by triage using the ABC a logarithm, this runs concurrently by calling help from the Police using the free toll number 112. The ABC stands for Airway, Breathing and Circulation. In the Airway check if the throat is clear no foreign bodies or blood clots. Breathing this can be checked by putting your ear close to the mouth of the victim for ten seconds to hear or feel the breath, absence of breathing then the guideline teaches how to do mouth to mouth resuscitation. It provides a simple first aid guide on how to arrest bleeding and how to deal with compression or penetrating injuries to prevent further injuries. Also reminds us to check for any continuing danger of the injured victim (The Highway Code 2008). The Highway Code also explain the need for calling for help while doing cardiopulmonary support, the code also provides a toll free help line 112.

Transporting the road traffic injured victims is discouraged unless the victims are in obvious danger. The highway code encourages to deal with aspects which are of immediate danger, by ensuring the victim is breathing, this include prevention of shock by arresting bleeding and splinting fractured limbs.

The Ministry of Health and Social Welfare draft is preparing a manual on "THE HEALTH SECTOR EMERGENCY OPERATIONS PLAN (EOP) " The manual provides guideline when an road traffic crash occurs, what is the responsibility of the Ministry of health. When a crash occurs there will be an immediate deployment of advance response team. The team will conduct a rapid needs assessment and evaluation what is required in terms of equipment, pharmaceuticals and personnel. There should be provision of transport for the advance team, establishing a link between the scene of accident and communication centre. The first tier will conduct triage, stabilizing and treating the injured victims and transferring the victims to health facilities according to the triage system (Ministry of Health and Social Welfare, Emergency Operations Plan (EOP) 2008).

1.2 STATEMENT OF THE PROBLEM

Road traffic crashes have been noted to be on the increase in Tanzania. Data from police records show that between 1990 and 2000, road traffic accidents rose by 44% (Museru et al

2002). A study done in the department of Orthopaedics and Trauma at Muhimbili National Hospital, the national referral hospital, found that road traffic injuries was the commonest cause of admission due to injuries accounting for 56% of the admissions (Museru et al, 1998). Furthermore, findings from a population-based study have revealed that road traffic injuries were the commonest cause of injury-related mortality in Dar es Salaam, Hai and Morogoro Rural districts (Moshiro et al, 2001).

Dar es Salaam, the largest city in Tanzania, has a high prevalence of road traffic injuries. A previous study has shown that about 35% of all road accidents in Tanzania occur in Dar es Salaam region (Mbembati 1999, Rwebangira 1999). Although it is the smallest region in Tanzania geographically, it had six times the number of road traffic injuries compared to the second highest region (Museru 2002). Most injured people are the most active group in the population hence causing a significant loss of manpower in the production sector (Museru 1999). Pedestrians and passengers account for the majority who are injured or killed, a typical characteristic of developing countries.

Pre-hospital care comprise simple knowledge of Triage, First Aid like arresting bleeding, splitting a fractured limb and transportation of a head injured patient and understanding the importance of prioritizing patients who require urgent transportation to the nearest health facility. Information systems for pre-hospital trauma care in Tanzania are insufficient and complete pre-hospital mortality records are scarce therefore provides no reliable data on which one can plan for emergency services.

There is no hospital based study that has ever been done in Dar-es-Salaam to provide information on the patterns of pre-hospital care among road crash victims.

Previous facility-based studies lacked some important information like what was the patient doing when the accident happened, how long it took the patient to get any assistance at the crash site and any First Aid provided at the scene and by whom and mode of transport used to reach a health facility. Other important factors like how long the patient took to reach a hospital are also added information which will be useful for planning. Moreover, detailed information on circumstances surrounding the road traffic crash and protective device usage among crash victims is also limited.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Magnitude of road traffic injuries

Road traffic injury is a public health concern in all countries in the world. Worldwide, road traffic injuries kill more than 1.2 million persons a year. It ranks 9th in terms of disease burden and projected to rank 3rd in the year 2020 Worldwide (Ganveer et al, 2005). Developing countries account for more than 85% of all deaths due to road traffic injuries and 96% of all children fatalities (Kharusi et al, 2008; Hazen, 2006). Ninety percent of road traffic fatalities occur in low-income and middle-income countries especially young males and vulnerable road users (WHO ,2004). In the African region, road traffic crashes ranked third as the cause of injury burden after war injuries and interpersonal violence (Moshiro, 2005). The WHO regions in Western pacific and South-East Asia account for 50% of all road traffic fatalities in the World. More than 50% of all road fatalities occur among young adults between 15 to 44 years of age and 73% of all deaths are males (WHO, 2004). It is a largely neglected public health concern (Murray 1999). Many view road traffic crashes as events which are beyond our control. Yet the risks are known: speeding, alcohol, non-use of helmets, seat belt and other restraints, poor enforcement of road safety regulations, unsafe vehicle design, poor infrastructure design and poor emergency health services (WHO, 2004).

In Tanzania TANROADS reported that from 1993 to 2003, there were 160 000 casualties with 20 000 fatalities and in 2003 alone there were 2250 fatalities, a growth of 9% from 1993 (Tanzania Institute of Education, 2009). Similarly, police data showed an increase in road traffic crashes of 44% between 1990 and 2000. This increase was attributed to reckless driving by 51.6%, defective vehicles accounted for 15% and 7% to careless pedestrians. In other words the trend has been increasing as the population on the road increase and the number of vehicles on the road increase (Museru et al, 2002). In Dar-es-Salaam, the number of road traffic accidents between 1973 to 1978 was twelve times higher than 1958 to 1962 (Rutta et al ,2001) and it accounted for 56% of all patients admitted to Muhimbili Medical Centre (Museru et al ,1998). A more recent study based on police data in Dar-es-Salaam recorded an increase of road traffic injuries by 15% from 1999 to 2001 (Barengo et al, 2006). Similarly, a hospital-based study was done in Mwanza, the second largest city in Tanzania in 1997. Records of demographic data, nature of injury

and outcome were recorded. In this area falls was the leading cause of injury (32%) followed by assaults 30% and the third most frequent being road traffic injuries (18%) (Rutta, 2001).

2.2 Pattern of road traffic injuries

In low-income and middle-income countries, the most vulnerable road users are pedestrians, cyclists, motorized two wheelers, and passengers on public transport. Road traffic fatalities exacerbate poverty, besides creating psychological trauma and physical sufferings; they also create orphans and permanent disabilities to some victims as young as infants who spend the rest of their lives in hospitals (WHO, 2004).

A review article of several studies done in India on road traffic injuries showed that the majority of deaths (43.6%) occurred within the first 6 hours post injury with almost 80% of those dying in the first 3 hours from injury (Garg et al, 2005). A similar scenario was reported in a another study done in Los Angeles in US according to the trauma registry there were two peaks of deaths; the first peak in the first hour (50.6%) and the second peak occurred in the first 1-6 hours after admission (18.3%) (Demetriades et al , 2005). In this review article, it was shown that half of the victims were young with an average age of 33 years, a similar scenario seen in other studies (Garg et al, 2005; Odero et al, 2003; Zargar et al, 2005; Mutasingwa, 2001). Another review paper on global road traffic injuries and their disparities in health reported a significant loss of young life between age 15 to 44 years (Ameratunga et al, 2006). Furthermore, there was male predominance with a male:female ratio ranging from 3:1 to 9:1, a scenario seen in other middle income countries (Garg et al, 2005 and Zargar et al, 2003). It was also noted that half the crashes occurred during the day time or week days with two distinct time 9 am to noon and 6 to 9pm (Garg et al, 2005).

In Kenya, more than 75% of road traffic victims are young adults. They accounted for 80% of the deaths. Matatus (public commuter buses) are the most common vehicles involved in fatal crashes. The characteristics of crashes vary according to the locality in Kenya just like any developing country. Pedestrians are more likely to be killed in urban areas, and passengers are the majority killed on intercity highways that traverse rural settings (Odero, 2003).

2.3 Road safety efforts in Tanzania

Many countries have tried different approaches of dealing with problem of road traffic injuries. In Australia between 2000 and 2005 the child road death rate declined by 4.5% per annum following the introduction of road safety initiatives such as road condition improvements, enforcement of restraint use and public education campaigns, as well as improvement of trauma care services (Wei Du et al, 2005; Durbin, 1999).

Road safety efforts in Tanzania do exist. The National Road Safety Council (NRSC) arranges the National Road Safety Week each year. However, an evaluation of the impact on road safety in Tanzania has not been assessed yet. Amendments to improve road safety have been added to the Road Traffic Act 1973. In 1997, all public buses were required to install speed limiter to 80 km/hour and only travel during the day time. However, this was short lived because the human factors were left out (Museru et al, 2002). Road improvements have been made to remove dangerous sections - black spots. Speed reducing facilities in the form of speed bumps and rumble strips have been put up on numerous places. New roads have been constructed and extensive rehabilitation works carried out on some parts of the road network with the main objective to improve mobility. However, road safety on these improved roads is often not satisfactory due to high speed, low public awareness and insufficient law enforcement, combined with inadequate considerations to local transport needs and the conditions in built-up areas.

The Tanzania Institute of Education (TIE) has developed a curriculum on road safety education to be taught in schools. It is unclear whether the Ministry of Education has introduced the programme. Efforts in the area of medical and rescue (ambulances, rescue vehicles, etc) are almost zero, except initiatives by some private companies. However, their services are too expensive for most of the citizens in Tanzania. Studies of evaluation of the effects of performed road safety efforts in Dar es Salaam are very few. Some of the studies are based on police records (Barengo, 2006) while recent hospital-based data on road traffic injuries are lacking.

2.4 Pre-hospital transport and care

Addressing deficiencies in pre-hospital care represents one mechanism to improve the outcome of critically injured patients. Provision of Basic Life Support (BLS), Emergency

Medical Service (EMS), Emergency Medical Technicians (EMT) focusing on rapid transportation of trauma patients to a medical facility, has shown to have improved the outcome of trauma patients in both low and middle income countries Roudsari et al ,2007). This type of non-invasive pre-hospital care is suitable in small cities and rural areas.

For example, in India a middle income country were reported that the post traumatic pre-hospital care was widely lacking. There was a difference on opinion on how emergency medical services were conducted in developed and developing countries. There was a concern of victims receiving neither first aid nor transportation on time by ambulances/emergency responders to hospitals. In developing countries it was noted that an injured victim could be rushed to a health care facility which cannot handle the patient creating a negative implication of in-hospital mortality (Roudsari et al, 2007). This is the same phenomenon in many other developing countries (Garg et al, 2005; Mock et al 2002). The authors recommended for a need of developing an international minimum standard of pre-hospital care with standardized definitions, which will facilitate future collaborative research projects in measuring the outcome of pre-hospital care for trauma patients (Roudsari et al, 2007).

A study done in 11 countries both high and middle income countries reported a significant variation in pre hospital trauma care even among the developed countries.

The eleven countries whose pre hospital trauma care system was studied include Austria, Canada, Greece, Germany, Mexico, Iran, New Zealand, United Kingdom, United States Of America and Australia (Roudsari et al ,2007).

These countries were classified by the highest level of pre hospital trauma care that is BLS, ALS, Doc-ALS, Trained local EMTs.

Assessment was conducted in terms of types of pre-hospital trauma care interventions including intravenous access and endotracheal intubation. The time interval between injury to EMS notification, response time to scene of injury, time spent on the scene and transportation time to appropriate health facility.

In Australia the EMS is provided by paramedics provide BLS and ALS doctors don't provide pre hospital trauma care. In Canada pre hospital trauma care is provided by Emergency Medical Technicians (EMTs) and only physicians are allowed to provide ALS procedures. Germany, Austria and Netherlands have a similar system of pre hospital trauma care. In Austria and Germany the system can be classified as Doc-ALS EMS systems. In Netherlands they have ALS EMS system and trained nurses are responsible for providing ALS to trauma patients. There are 10 helicopters which cover the whole country but they only fly during the daylight and less than 20% of trauma victims are transported via air-ambulances (Roudsari et al, 2007; ten Duis et al; 2003).

In Greece they have the Doc-ALS EMS system and physicians are part of the air ambulance team. They have approximately 100 mobile Intensive Care Units that provide pre hospital trauma care to more seriously injured victims. Emergency Department Injury Surveillance System (EDISS), was developed by Center for Research and Prevention of Injuries (CEREPRI) at Athens University Medical School . In Greece emergency services are coordinated from four hospitals under the Ministry of Health and Welfare, Center for Research and Prevention of Injuries (CEREPRI), with one coordinating centre which triages the reported crashes to Department of Hygiene and Epidemiology, Athens University Medical School; 2003).

In Mexico 58% of the patients received intravenous fluids in pre hospital care whereas, 11% of patients in Iran received intravenous fluids. They had modified their EMS system in order to improve pre-hospital trauma care. In Iran intravenous fluid therapy is part of their EMTs training curriculum and a small proportion of EMTs' were trained for intubating patients in pre-hospital setting (Roudsari et al, 2007).

In Africa, few countries have emergency medical care to provide pre-hospital medical care and transport to road traffic crash victims (Tiska et al ,2004). A study done in Ghana found that about 51% of all severely injured persons died in the pre-hospital setting, whereas in Seattle in the US accounts for 21% . In Ghana, just like any other African countries, majority of traumatic casualties are transported to hospital in taxis, minibuses, or private transport (Tiska et al ,2004). A pilot project was launched in Ghana in 1998 to train 300 commercial drivers on the basics of rescue, first aid and transport of injured persons. A

follow up study showed a comparative significance difference between drivers who received the training and those who did not (Tiska et al ,2004).

A study done in Tehran revealed that despite enforcement of road safety law and mandate for every passenger to use seat belt, there is very little on seat belt use (3%) at the time of road traffic injury (Zargar et al ,2003). In the Tehran study they also found that nearly 54% of road traffic crashes were among pedestrians. It was noted that a higher proportion older patients utilized the ESS (Emergency Service System) compared with only 12.5% of the younger patients (Zargar et al, 2003).

To the researcher's knowledge, there are no published reports on the pattern of pre-hospital transport and care among road crash victims in Tanzania. There is a need of understanding the situation so as to plan for effective strategies.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study area

The study was conducted in Dar-es-Salaam at five hospitals. Dar-es-Salaam is the largest city in Tanzania with a population of more than 2.5 million (2002 Population and Housing census). Dar-es-Salaam is leading in rapid urbanization in the country and has accommodated over one third of the urban dwellers for the last three decades (Lugalla, 1995). It has the largest road networks and has the highest number of vehicles in Tanzania. Data were collected at the two national referral hospitals namely Muhimbili Orthopaedic Institute (MOI) and Muhimbili National Hospital (MNH) and the three Dar-es-Salaam municipal hospitals namely Mwananyamala, Amana and Temeke.

3.2 Study population

This study included all patients (outpatients and inpatients) attending the five hospitals namely Muhimbili National Hospital, Muhimbili Orthopaedic Institute and the three Municipal Hospitals of Mwananyamala, Amana and Temeke. All patients who presented to these hospitals following road traffic injuries during the period of 1st to 30th June 2009 were included.

3.3 Study design

This was a cross sectional hospital-based study whereby all patients attending the five hospitals due to road traffic injury in June 2009 were included. This study design was considered in view of the magnitude of the road traffic injury victims and the short duration of the study.

3.4 Sample size

A total of 629 patients involved in road traffic injuries during the month of June 2009, who were attended at Muhimbili Orthopaedic Institute and Muhimbili National Hospital and the 3 Municipal hospitals namely Mwananyamala, Temeke and Amana hospitals were included.

3.5 Sampling procedure

A convenience sampling procedure was employed in recruiting the patients to the study. All patients who were attended at the five hospitals following road traffic injuries during the study period were included.

3.6 Data collection

Data were collected using a structured questionnaire. Information regarding the circumstances surrounding the road traffic crash was obtained by interviewing crash victims, accompanying relatives/witnesses or police. Deaths were also recorded either for live patients dying in hospitals or for dead bodies brought to the hospitals following motor vehicle injuries during the study period. The English questionnaire was translated to Kiswahili as it is the most spoken and well understood language.

Two Registrars and two nursing officers were recruited at each hospital to assist with data collection. Prior to the actual work they were trained for half a day. The training focused on familiarization with the research tools and how to administer them. The research tools were pre-tested before the actual field work commenced. The following variables were included in the study: Socio-demographic characteristics (sex, age, education, occupation, place of residence), circumstances surrounding event type of road user, activity at time of crash), nature of injuries was categorized as fractures, bruises, head injury, sprain, blunt internal injury and lacerations following the initial assessment of the receiving the doctor. This was among the limitations of the study as there was no further evaluation of the patients as to their definitive diagnosis and treatment outcome. Evaluation also included use of protective devices at time of crash (helmets, seat belts) and type of pre-hospital trauma care provided on site.

3.7 Data entry and analysis

Questionnaires were checked and edited for any inconsistencies or discrepancies. Data was then entered into the computer and cleaned using EPIINFO software programme. Data analysis was performed using SPSS software programme. Results were summarized using frequency tables and cross tabulations where appropriate.

3.8 Ethical considerations

Ethical clearance was sought and obtained from the Research and Publication Committee of the Muhimbili University of Health and Allied Sciences prior to the study. Permission to collect data was sought from Muhimbili National Hospital, Muhimbili Orthopaedic Institute, Mwananyamala hospital, Amana hospital and Temeke hospital. Informed consent was sought and obtained from the participants or relatives. Participants were informed about the objectives of the study and that their participation was voluntary. Participants were informed that they were free to decline and that it would not interfere or affect their care. Patients were assured that the information provided will be treated with utmost confidentiality.

3.9 Limitations of the study

It was not possible to obtain information on patients or dead bodies brought to the hospitals by individuals who did not witness the event. Some patients were brought semiconscious hence were unable to respond to the interview.

Patients were only assessed on arrival at hospital. No further evaluation was done for those admitted or discharge. Alcohol consumption was only detected by asking the victim questions otherwise there were no laboratory tests done to determine the levels of alcohol concentration in the blood.

CHAPTER FOUR

4.0 RESULTS

4.1 Socio-demographic characteristics of the respondents.

The study sample consisted of 629 road traffic crash victims and fatalities who were attended at the 5 hospitals in Dar-es-Salaam namely Muhimbili Orthopaedic Institute, Muhimbili National hospital, Mwananyamala , Temeke and Amana Hospitals in the month of June 2009 as noted in Table 1. Temeke Hospital recorded the least number of patients whereas Muhimbili Orthopaedic Institute recorded the largest number of subjects. Table 2 shows the demographic pattern of the crash victims. The age groups 20 - 29 and 30 - 39 recorded the highest frequency of crash vicitms respectively. The 1- 9 year age group had the least number of road traffic injuries with a total of 5.4% patients were seen.

Minority of the road traffic crash victims 7.5% were illiterate and 44.7% had at least completed primary school education. There were more male victims (71%) than females (29%). Out of the 149 female victims only 8 (5.4%) had college or University education while out of 421 males, 27 (6.4%) had college or University education. A large proportion of the victims were non-alcoholic 51.5% whereas 31.2% were occasional drinkers and 4.8% admitted to be drinking daily.

Table 1: The number of road traffic crash victims attended at the five Hospitals in Dar-es-Salaam.

Name of hospital	Frequency	Percentage
Amana	60	9.5
Muhimbili National hospital	148	23.5
Muhimbili Orthopaedic Institute	317	50.4
Mwananyamala	56	9.0
Temeke	48	7.6
TOTAL	**629**	**100.0**

Table 2: Socio demographic characteristics of road crash victims

Variable	Male		Female		Total	
Age (in yrs)	**No**	**Percent**	**No**	**Percent**	**No**	**Percent**
1-9	19	4.2	14	8.5	33	5.4
10-19	35	7.7	24	14.6	59	9.6
20-29	140	31.0	54	32.9	194	31.5
30-39	146	32.3	30	18.3	176	28.6
40-49	81	17.9	22	13.4	103	16.7
50+	31	6.9	20	12.2	51	8.3
Total	**452**	**100**	**164**	**100**	**616**	**100**
Level of education						
Illiterate	26	6.2	17	11.4	43	7.5
Incomplete primary school	38	9.0	25	16.8	63	11.1
Completed primary school	203	48.2	52	34.9	255	44.7
Secondary school	127	30.2	47	31.5	174	30.5
College / university	27	6.4	8	5.4	35	6.1
Total	**421**	**100**	**149**	**100**	**570**	**100**

Note: Total numbers vary due to missing data on age (13 cases) and education level (59 cases)

4.2 Injury patterns

Private cars had the highest toll of motor vehicle injuries by 30.8% followed by motorbikes 20.4% while commuter buses ranked third 17.8%, trucks also recorded a significant number 8.5% and the train being the least with only one victim being recorded (Table 3).

Data in Table 4 shows most pedestrian had largest proportion of road traffic injuries 42.0% and the drivers and passengers differed by a small margin 28.2% and 29.8% respectively. Among drivers motorbike had the highest rate of casualties 48.3%, among

pedestrian most of them were injured by private cars 57.5% and passengers were mainly injured in a commuter buses 45.5% followed by private car 19.0%.

Table 3: Type of vehicle involved by sex

Type of vehicle	Male		Female		Total	
	No	Percent	No	Percent	No	Percent
Private	125	29.9	50	33.3	175	30.8
Motorbike	90	21.5	26	17.3	116	20.4
Commuter bus	68	16.3	33	22.0	101	17.8
Bicycle	44	10.5	10	6.7	55	9.5
Truck / lorry	41	9.8	7	4.7	48	8.5
Up country bus	6	1.4	10	6.7	16	2.8
Tricycle	16	3.8	5	3.3	21	3.7
Pickup	17	4.1	3	2.0	20	3.5
Cart	4	1.0	3	2.0	7	1.2
Train	1	0.2	0	.0	1	0.2
Other	6	1.4	3	2.0	9	1.6
TOTAL	**418**	**100**	**150**	**100**	**569**	**100**

Note: Missing data on type of vehicles for 60 cases.

Table 4: Type of vehicle involved by class of road user

Type of vehicles	Type of road users						Total
	Drivers		Passengers		Pedestrians		
	No	%	No	%	No	%	No
Private car	41	25.5	33	19.5	100	41.8	175
Motorbike	56	34.8	21	12.4	39	16.3	116
Commuter bus	14	8.7	46	27.2	41	17.2	101
Bicycle	26	16.1	10	5.9	19	7.9	55
Truck / Lorry	7	4.3	26	15.4	15	6.3	48
Big bus/ upcountry	1	0.6	11	6.5	4	1.7	16
Tricycle	10	6.2	7	4.1	4	1.7	21
Pick/up	4	2.5	9	5.3	8	3.3	20
Cart	0	.0	1	0.1	6	2.5	7
Other	1	0.6	5	3.0	3	1.3	9
Total	**160**	**100**	**169**	**100**	**239**	**100**	**569**

Note: Missing data on type of vehicle for 60 cases.



Table 5: Nature of injury and their severity among crash victims

Variable	Frequency	Percent (%)
Nature of injury		
Fracture	307	51.0
Bruises	238	39.5
Head injury	122	20.3
Sprain	59	9.8
Blunt internal injury	42	7.0
Lacerations	33	5.5
Severity of injury		
Not injured	2	0.3
Minor bruises	134	21.3
Moderately injured	424	67.4
Seriously injured	28	4.5
Unknown	41	6.5
TOTAL	**629**	**100.0**

Table 5 shows the nature of injury among the road crash victims. The commonest form of injury were fractures 51% followed by bruises 39.5%. In terms of injury severity 424 were moderately injured requiring hospitalization with 3.5% recorded as seriously injured. Head injury ranked third 20.3% among the cases recorded and blunt internal injuries had the least number of patients 1.0%. Table 6 shows that most injuries occur during the evening and night 26.6% and 25.0% respectively. There are two peaks the Morning and Afternoon recording 20.0% and 20.3% respectively, and the evening –night peaks as shown in Table 6. Weekdays recorded a higher number of road traffic injuries 53.1% as compared to weekends 38.8%.

The rate of alcohol consumption to the crash victims was low. About 15% of victims admitted to have consumed alcohol within 6 hours prior to the crash as shown in Table 7.

Table 6: Time of injury and day of the week

Variable	Frequency	%
Time of injury		
Morning	126	20.0
Afternoon	128	20.3
Evening	167	26.6
Night	157	25.0
Unknown	51	8.1
Day of the week		
Week day	334	53.1
Weekend	244	38.8
Unknown	51	8.1
TOTAL	**629**	**100.0**

Table 7: Alcohol consumption among road traffic victims

Variable	Frequency	%
Frequency of alcohol consumption		
Non-alcoholic	324	51.5
Occasional drinker	196	31.2
At least twice a week	30	4.8
Everyday	30	4.8
Alcohol consumption within 6 hours before accident		
Yes	94	14.9
No	460	73.1
Unknown	75	11.9

4.3 Events before the road traffic crash

Table 8 shows that most pedestrians (14.9%), were injured while crossing the road. A number of motorists / cyclists (17%) were injured while riding or these vehicles. A small fraction of casualties were injured while alighting from a commuter bus (15.3%). Another large proportion of crash victims were passengers, accounting for 18.1%, whereas another small group were injured while on public grounds or premises.

Table 8: Type of activity during the road crash

Action	Frequency	%
Riding tricycle/motorbike/bicycle	107	17.0
Driving car/bus/ lorry	45	7.2
Passenger	114	18.1
Crossing a road	5	0.8
Alighting from a bus	96	15.3
Standing away from the road on/veranda/playground	15	2.4
Head on collision/Rear collision	13	2.1
Walking beside the road	94	14.9
Crossing against / traffic lights	3	0.5
Missing data	136	21.7
Total	**629**	**100**

Note: 136 cases were missing data.

4.4 Pre-hospital care practice among road crash victims

As regards to where the injured patients were sent first, a larger proportion of the patients 339 (53.9%) were first sent to the police station compared to (36.1%) who were first sent to a hospital. On arriving at the health facility majority of the patients (58.5%) were first attended by a nurse. Only a quarter of the victims were first attended by a doctor and a small fraction (8.4%) were first attended by a ward attendant. Ambulance services were provided only to (2.0%) these were used only to transfer the victims from one hospital to another.

A significant proportion (43.2%) of road traffic casualties admitted to have received some form of first aid (Table 9). Passers-by or good Samaritans were the majority of first Aid providers (37.9%) followed by family members (16.1%). Taxi drivers appear to be among the least first providers. Only 5 victims reported to have been assisted by ambulance and the same number by taxi drivers.

Table 9: Pre-hospital trauma care practice among crash victims

Variables	Frequency	Percent
Received First Aid at site		
No	326	56.8
Yes	248	43.2
Unknown	55	8.7
First aid provider at site (n=247)		
Passers-by	94	37.9
Family members	40	16.1
Driver who caused the injury	38	15.3
Patrol police	28	11.3
Fellow passengers	26	10.5
Taxi drivers	5	2.0
Ambulance	5	2.0
Others	11	3.2
Type of first Aid (n=248)		
Fracture splinted	158	63.8
Arrest bleeding	90	32.2
Arrival time (hrs) at first health facility		
0 -1	424	67.4
>1 -24	73	11.6
Unknown	132	21.0
Calling pre-hospital help		

Yes	314	49.9
No	315	50.1
Who was called		
Family member	187	59.6
Police	77	12.2
Friends	27	4.3
Others	23	3.7
Referred to another hospital		
Yes	378	60.1
No	196	31.2
Unknown	55	8.7
Referral vehicles		
Ambulance	181	28.8
Private car	104	16.5
Taxi	62	9.9
My employers' car	9	1.4
Tricycle	6	1.0
Motorbike	5	0.8
Unknown	262	41.6

Majority 67.4% the of patients were able to reach a health facility within an hour of injury and 11.6% took more than an hour but less than 24 hours to reach the health care facility (Table 9). 34.5% patients admitted that there was some form of communication particularly phone call, a significant number called family members by 29.7%, 12.2% reported to have called the police. Ambulances 28.8% were the commonest means of transport used for referred patients followed by private cars 16.7%, taxis account only for 9.9%. The only two types of first aid provided at injury site was splinting of fractures 63.8% and arrest of bleeding wounds 32.2%.

Table 10: Use of protective gears in relation to demographic characteristics

Variable	Restrained	%	Not restrained	%	Total	%	p-value
Sex							
Male	79	28.7	196	71.3	275	100	Chisquare =7.72, p= 0.005
Female	8	12.1	58	87.9	66	100	
TOTAL	**87**	**25.5**	**254**	**75.5**	**341**	**100**	
Level of education							
Not formal	1	5.8	16	94.2	17	100	Chisquare = 31.8 p<0.0001
Primary	29	15.8	154	84.2	183	100	
Secondary	40	36.6	69	63.4	109	100	
College/University	15	55.6	12	44.4	27	100	
TOTAL	**85**	**25.3**	**251**	**74.7**	**336**	**100**	

4.5 Use of protective gears

Overall usage of protective gears was 25.5% . Assessment of usage of protective gears was done by sex and level of literacy. Those who were illiterate only one (5.8%) out of 17 respondents used protective gear whereas 94.2% did not use. For those with primary education they were slightly better as 15.8% reported usage of protective gears as shown in Table 10. At college or university the picture is different. Out of the total 27 crash victims, 55.6% that is more than fifty percent utilized protective gears as opposed to 44.4% who did not use.

Assessment of usage of protective gears was also done by sex. Among males, 28.7% used protective gears whereas for females, 12.1% used protective gears. This difference was statistically significant (Chisquare =7.72, p= 0.005)

Table 11 shows the outcome of assessment of crash victims. A total of 49 (8.2%) crash victims died at various points, 36.7% victims died on the crash scene, 30.6% died on the way to hospital, 28.6% died at the hospital and one victim died at the police reception.

Table 11: Outcome of initial assessment among road traffic crash victims

Outcome of treatment	**Frequency**	**%**
Treated and discharged	271	40.2
Admitted/ referral	309	51.6
Died	49	8.2
Place of death		
Crash site	18	36.7
On the way to hospital	15	30.6
At hospital reception	14	28.6
At police reception	1	2.0
TOTAL	**49**	**100**

Opinion was gathered from the road traffic injury casualties as to the possible cause of the crash (Table 12). Majority (81.3%) sited reckless driving as the cause of the crash. Minority reported influence of alcohol (10.4%), defective vehicle (4.9%) and poor infrastructure (12.1%) as the main cause of traffic crash.

Table 12: Casualties' opinion as to the cause of the crash

Opinion	**Frequency**	**%**
Reckless driving	449	81.3
Drunkard /careless pedestrian	43	7.5
Defective vehicle	28	4.9
Drunkard driver	16	2.9
Poor infrastructure	15	2.1
TOTAL	**551**	**100**

Note: 78 were missing data

CHAPTER FIVE

5.0 DISCUSSION

The main objective of this study was to determine the pattern of pre-hospital care including the type of first aid provided on the site of crash and mode of transport to the nearest facility for road traffic crash victims attending the national referral hospitals in Dar-es-Salaam during the month of June 2009.

To the best of my knowledge this is the first study done on pre hospital trauma care and transport system in Dar-es-Salaam. This study highlights the kind of response when there is a road crash at any point in Dar-es-Salaam, what is happening on a daily basis and what should have been an ideal response, by utilizing the available resources. The current trend of road traffic injuries in Dar-es-Salaam is more worrisome than in the past few years, the reason being the rapidly increasing number of vehicles and the growing population on the road as noted previously that the trend on the road traffic crashes has been rising (Rutta et al, 2001.; Museru et al, 2002.; Barengo et al, 2006).

Road traffic injuries as a non-communicable disease need to be appreciated as a public health concern. It is an undisputed fact that adequate pre-hospital trauma care or an efficient emergency medical services (EMS) system has a critical role to play in prevention of secondary injuries in an acutely injured patient. Such a system will reduce the burden of health care costs to individuals and improve overall wellness of the community (Forjuoh et al ,1999, Roudsari et al 2007). We need to find solutions to ensure road safety is a reality and it is possible if we are determined to end the unnecessary loss of human life (Kobusingye, 2004; Murray, 1999). There are many low cost pre hospital trauma care that can save lives of injured persons. There is a need of setting guidelines of achievable standards for pre hospital trauma care which could realistically be made available to almost any injured person in the world.

In this study Muhimbili Orthopaedic Institute recorded the highest frequency of road crash victims by over fifty percent among all the five hospitals where the study was conducted. The reason being a trauma hospital there is a tendency of rushing all road crash victims occurring in Dar-es-Salaam to Muhimbili Orthopaedic Institute. Secondly it is the only tertiary trauma hospital in Dar-es-Salaam.

In this study the level of education of the road traffic crashed victims played a major role in terms of estimating the understanding capacity of the population being studied. Majority of the road traffic crash victims had primary school education only. This could also depict the socio-demographic appearance of the population of Dar-Es-Salaam, in the sense that this is an urban population whereby majority of them had received at least a primary school education which is universal in Tanzania Ministry of Planning ,Economy and Empowerment (Report. Dec 2006).

In this study like other previous studies males showed a higher preponderance of road traffic victims than females. They accounted for about three quarters of the road traffic crashes. This could be explained by the fact that male do most outdoor activities entailing movement from one area to another. It has an economic impact as this is the most productive age creating family burden particularly if the injured person is the bread winner (Moshiro et al, 2005; Barengo et al, 2001; Odero et al, 2003; Zagar et al, 2003; Mcharo et al, 2005; Garg et al, 2005). A significant number of drivers whether private or public transport are males hence putting them at a higher risk of sustaining road traffic crashes. This evidence can be supported by results for this study where there is a higher number of males in relation to females in each mode of transport.

Studies in many developing countries have shown that pedestrians are the most vulnerable group as they are exposed to road traffic crashes more frequently due to a compounded mixture of pedestrians, non-motorized, motorized transport on the roads, including poor infrastructure . This study showed a similar scenario where the pedestrian and passengers accounted for over 50% of the road traffic crash victims. Physical separation of pedestrian from vehicles, by provision of pedestrians pathways, more zebra crossings and public education to obey traffic rules would the most important strategies that can lessen the magnitude of the pedestrian-related injuries (Museru et al, 2003; Zagar et al, 2003; Odero et 2003).

Fractures had the highest frequency by over fifty percent whereas head injury ranked third by over 20% this means a significant number of patients were incapacitated for a certain period of time, healing time for fracture before they could resume their routine work.

Only a small fraction 14.9% of the victims admitted to have taken alcohol six hours before the crash. A similar study in Kenya records from Police data showed causes of road traffic cashes alcohol intoxication by drivers 40% and pedestrians intoxication was 20.2% (Odero et al, 2003).Whereas a similar study in Dar-es-Salaam alcohol intoxication as attribute to the road traffic crash was recorded as 1% (Museru et al, 2002). Therefore the record obtained from this study could be a gross underestimate as there was no scientific assessment of the victims like use of alcohol meter, testing the concentration of alcohol in the expiration air or testing for alcohol blood levels in order to obtain accurate data.

Use of road traffic safety protective gears has not been adequately reinforced, the reasons are not known. It was also noted that majority of the crashed victims were mainly passengers on private cars, motorists, commuter buses or cyclists. The result of this study implies that there has not been adequate promotion of usage of safety gears for motorists, drivers and passengers. In Tanzania the laws are well stipulated but not reinforced. Many cyclists don't wear helmets and many passengers don't use seat belts even in situations where they are available. No scientific study done on this particular aspect but has been noted strongly in the Highway Code 2008. (Ministry of Infrastructure 2008).

A formal pre-hospital care system in Dar-Es-Salaam is almost non-existent. In this study it was found that slightly more than one half of the road crash victims did not receive first aid at site. Injured victims were first sent to the police station for documentation, before being sent to a health care facility. This is an outdated policy which required any injured victim to produce a Police form 3 before receiving treatment. Though this kind of policy has been revoked but the revocation has not been reinforced even to the health care personnel. There are health staff who still demand police the form 3 before treating an injured patient. All ambulances in Dar-Es-Salaam belong to hospitals or private companies and are mainly used for transferring patients from one hospital to another. The privately owned ambulances are hired at expensive rates for an ordinary person to afford. The privately owned ambulances account only for a small volume, another large proportion of the victims are transferred to another hospital by private cars.

In this study, the only type of first aid provided on site included splinting of fractures (11.3%) of the victims and arrest of bleeding (7.6%) of the casualties. None of the road traffic victims received intravenous medication neither support of airway. In the one

month period of study there were 49 deaths recorded due to road traffic crashes accounting for 7.8% of all the interviewed victims. The deaths either occurred on site, on the way to hospital, at hospital reception and one case at the reception of police station. This data could be a tip of an iceberg in terms of the true reality on the ground, taking into consideration the study period and the number of hospitals covered. In addition, patients were not followed to the end as some could have died later in the ward or in the intensive care unit. The high rate of pre-hospital deaths among crash victims has also been noted in other developing countries often they neither receive any first aid nor transport in time by ambulance/emergency responders to hospitals (Gard et al ,2005).

Opinion on what was the cause of the road traffic crash was gathered from the crash victims. Over eighty percent of the respondents attributed the accident to reckless driving, alcohol consumption was rated at 7.5% and defective vehicles 4.9%, poor infrastructure was rated the least with only 2.1% as the cause. Studies done previously showed a similar picture (Museru et al, 2002; Barengo et al, 2006).

Lack of pre-hospital trauma care and pre-hospital transport system in Dar-Es-Salaam has a role to play as to the outcome of the road traffic crashes. There are low cost ways which can be deployed using the available resources to take care of the injured persons that will lower the death toll from road traffic crashes (Mock et al, 2003).

Tanzania could design pre hospital trauma care using available resources. We could take example of Ghana which is a developing country like Tanzania, whereby taxi drivers were trained and given identities so that the community can easily identify them when the need arise. There should be a well structured follow up so that those who perform well can be rewarded. Tanzania has an added advantage that we could also utilize the Rural Medical Aid or Clinical Officers as the paramedicals managing the ambulances and attending road traffic crash victims on site. These can make appropriate triage on the scene before transporting patient to the various health care facilities.

Tanzania will take a long way before we could establish air ambulance services but the current ambulance services could be restructured to serve the public rather than the current situation whereby they are involved in transferring patients from one hospital to another. Communication is very important. The public should be educated which number to call

whenever there is a road crash victim, and the receiving health care facility must also be informed before hand for appropriate preparation to receive the crash victims. Specialists need not necessarily go to the crash site as has been shown in other developed countries but should be reached for telephonic advices and directing on how the crash victims should be handled.

CHAPTER SIX

6.0 CONCLUSION

Pre hospital trauma care to road traffic crash victims is very rudimentary, mainly conducted by the public and not well structured. Beside arresting bleeding and splitting of fractured limb, no other first aid measure was provided to the road traffic crash victim. There was no appropriate triage at the scene as several crash victims were again referred to a higher level hospital from the initial health care facility hence delaying appropriate treatment at earliest time.

RECOMMENDATIONS

1. The government need to recognize that road traffic crashes are critical component of the national health system. The government should be committed in designing a road infrastructure which caters for all road users.

2. The government should have a well structured pre hospital trauma care of road traffic crash victims. The system of pre hospital trauma care should not only take care of mass crash victims but also of single or few road traffic crashes occurring on daily basis.

3. First Aid training programs should be developed for community members like taxi drivers.

4. The government should ensure reinforcement of traffic safety regulations are adhered to by all road users. Punitive measures to be taken against persons not observing safety measures like fastening of safety belts, use of helmets, defective cars and reckless driving.

5. Further prospective studies are required to look into the outcome of treatment of each crash victim to get more accurate data on the morbidity and mortality.

6. The ministry concern with infrastructure in road construction should separate pedestrians, cyclists and vehicles. Provision of pedestrian side walk or pathways, pedestrians crossing junctions where there is traffic lights. Increase the number of zebra crossings and provision of overhead crossing bridges.

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