INJURY CHARACTERISTICS AND SUB-ACUTE PHASE DISABILITIES AMONGST HOSPITALIZED AND NON-HOSPITALIZED ROAD TRAFFIC INJURED PATIENTS MANAGED AT WEBUYE COUNTY HOSPITAL, KENYA

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A research thesis submitted in partial fulfillment for the award of the degree of Master of Medicine in Family Medicine, Moi University

DECLARATION AND APPROVAL

Student:

This thesis is my original work, written in partial fulfillment for the degree of Master of Medicine in Family Medicine. It does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university and that to the best of my knowledge it does not contain any material previously published or written by another except where due, and reference has been made in the text. No part of this work may be reproduced without the permission of Moi University and or the author.

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DEDICATION

I dedicate this work, first to God, for making it possible through His grace. Secondly, to my wife Edna for her undying love and support, my son Jermaine and daughter Jasmine who have been a source of motivation. Lastly though not least, to my parents for their support and the faith they have had in me as well as my siblings and numerous other people in my life who have always been supportive and a source of encouragement as I put this work together.

ACKNOWLEDGEMENTS

I would like to acknowledge the following individuals for their contribution to the success of this study:

My supervisors Dr. James Akiruga Amisi and Dr. Jeremiah Laktabai for their commitment, guidance and support from proposal development to the write up of this dissertation.

My lecturers and colleagues in the department of Family Medicine for their valuable suggestions. Special thanks to Dr. Daria Szkwarko for her invaluable comments and taking time to read and correct.

Clinicians in Webuye County Hospital who helped in identification of patients.

Caleb Ondigo and Amos Nabibia for assistance in data collection.

Henry Mwangi from the Statistics Department of MTRH for his assistance in analyzing data.

ABBREVIATIONS AND ACRONYMS

ATLS	Advanced Trauma Life Support
DALY	Disability Adjusted Life Year
GAP	Glasgow Coma Score (GCS), Age and Pressure
GCS	Glasgow Coma Score
GPD	Gross Domestic Product
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome.
Hos	Hospitalized
ICC	Injury Surveillance System
ILO	International Labor Organization
IREC	Institutional Research and Ethics Committee
ISS	Injury Severity Score (ISS)
KNBS	Kenya National Bureau of Statistics
KNCHR	Kenya National Commission on Human Rights
KNSPD	Kenya National Survey for Persons with Disabilities
KTS	Kampala Trauma Score
LMCI	Low and Middle Income Countries
MGAP	Mechanism Glasgow coma score (GCS), Age and Pressure
MTRH	Moi Teaching and Referral Hospital

NCAPD National Coordinating Agency for Population and Development

NISS New Injury Severity Score

Non-Hos Non-hospitalized

RTCs Road Traffic Crashes

RTIs Road Traffic Injuries

RTS Revised Trauma Score

SAPDs Sub-acute Phase Disabilities

SD Standard deviation

SOPC Surgical Outpatient Clinic

TRISS Trauma and Injury Severity Score

WHO World Health Organization

WHODAS World Health Organization Disability Assessment Schedule

OPERATIONAL DEFINITIONS

Acute and chronic disability – Acute disability refers to disability less than 30 days post trauma and chronic refers to disability beyond 90 days post injury (Krause et al., 2001).

Boda boda - refers to bicycle and motorcycle taxis. A common term used in Kenya, Uganda and Tanzania. A suggestion has it that they started at the borders because of their apocryphal ability to transport people across a border without the need to complete the paperwork using a motor vehicle would necessitate; i.e. from border to border (Moraa & Nyachieo, 2015).

Developing country – A country with an annual per capita GNP less than US $ **7911** based on the 1991 figures from the World Bank (1993);(includes all countries of low-income and middle-income economies in Africa, Asia, Islands of Indian and Pacific Oceans, Middle-East, Central and South America, and the Caribbean (Nantulya & Reich, 2003).

Disability - is the umbrella term for impairments, activity limitations and participation restrictions, referring to the negative aspects of the interaction between an individual (with a health condition) and that individual's contextual factors (environmental and personal factors) (WHO, 2011)

Hospitalized – Patients with road traffic injuries admitted to hospital for treatment. In this study it is used to infer someone involved in a road traffic accident and admitted for 24 hours and above and have also been referred to as inpatients. (Derrett et al., 2012).

Matatus – refers to passenger service vehicles operated for commercial purposes (Kinuthia, 2013). The name is derived from a Swahili colloquialism meaning "three". One explanation is that the wagons originally pressed into service as

matatu could be fitted with three rows of bench seats. Other sources maintain that three coins were a typical fare in the 1960s.

Non-hospitalized – Patients involved in road traffic accidents assessed and found to have slight injuries that were managed and discharged home without being admitted. They have also been referred to as outpatients in this study (Derrett et al., 2012).

Road traffic crash (RTC) - is as an event occurring on a street, road or highway in which at least one motor vehicle in motion is involved by collision or losing control and which causes physical injury or damage of property and fatalities as deaths that occur within 30 days as a result of motor vehicle crash (Nantulya & Reich, 2003).

Road traffic injuries - defined as "fatal or non-fatal injuries incurred as a result of a road traffic crash (Toroyan , 2009).

Serious injuries: Fractures, concussions, internal lesions, crushing, severe cuts and laceration, severe general shock requiring medical treatment and any other serious lesions entailing detention in hospital (UNECE, 2018).

Significant injury - Any person who was not killed but sustained one or more serious or slight injuries as a result of the accident (UNECE, 2018)

Slight injuries - Secondary injuries such as sprains or bruises. Persons complaining of shock, but who have not sustained other injuries, should not be considered in the statistics as having been injured unless they show very clear symptoms of shock and have received medical treatment or appeared to require medical attention (UNECE, 2018).

Sub-acute phase disability – disability 4 to 12 weeks (30-90 days) post injury (Krause 2001)

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ABSTRACT

Background: Globally 20-50 million people suffer road traffic injuries (RTIs) and majority lead to disabilities. Outcomes of RTI amongst Inpatients (hospitalized patients) have been widely studied in Kenya whereas very few have followed up the outpatient (non-hospitalized) group whose injuries mostly have been considered minor. Studies have reported significant disability among the non-hospitalized victims. This study investigated sub-acute phase disabilities (SAPDs) that is disabilities between ten and twelve weeks post injury amongst hospitalized and non-hospitalized patients and factors associated with SAPDs.

Objective: To determine characteristics of Road Traffic Injuries and sub-acute phase disabilities amongst hospitalized and non-hospitalized patients managed at Webuye County Hospital

Methods: A prospective cohort study of 184 participants was done in the emergency department and surgical wards in Webuye County Hospital. RTIs were dichotomized into hospitalized (n=92) and non-hospitalized (n=92). Patients who met the inclusion criteria and consented were consecutively sampled. Interviewer-administered questionnaires were used to collect socio-demographics and injury details. Injury severity was assessed using the Kampala trauma score. SAPDs were assessed using the World Health Organization disability schedule (WHODAS) tool 8-10 weeks post injury. Categorical variables were summarized as frequencies and percentages and continuous variables as means and median. Chi-square and Fisher's exact tests were used to check for associated factors to SAPDs. A p value ≤ 0.05 was considered significant.

Results: The ages of the patients ranged from 16 to 63, mean age of 33.8 (SD 13.7) and a male:female ratio 3:1. Most of the victims (72.8%) were either unemployed or casual laborers. Some patients had multiple injuries but the most prevalent were lower limbs (69.5%), upper limbs (43.5%) and head/face (32.1%). On injury severity, 73.9 % of the hospitalized patients had mild injuries and 25% moderate injuries while 91.3% of the non-hospitalized were mild and 8.7% moderate. Most patients suffered severe SAPDs (hospitalized 92.4% , non-hospitalized 66.3%). Factors associated with with severity of SAPDs were hospitalization with an adjusted risk ratio (ARR) 1.406 ($p<0.001$) and multiple injuries ARR 1.298 ($p=0.001$).

Conclusions: Even though the hospitalized group had a higher proportion of severe SAPDs , more than half of the non-hospitalized group had severe SAPDs as well.

Recommendations: An assessment for SAPDs should be made for the non-hospitalized patients and prompt follow up made.

CHAPTER ONE: INTRODUCTION

1.1 Background

In the global status report on road safety by the World Health Organization (WHO), it was estimated that close to 1.2 million people worldwide die annually due to road traffic injuries and that between 20 and 50 million who suffer injuries, many of them incur disability. The road safety report also revealed that half of the people dying worldwide are what are referred to as the vulnerable road users who comprise of pedestrians, cyclists and motorcyclists(WHO, 2013).

Road injuries killed 231,000 people in sub-Saharan Africa in 2010 who accounted for one-fifth of the global road fatality toll. The road injury death rate in sub-Saharan Africa was found to be 40% higher than the global injury death rate, in addition to over 8 million non-fatal injuries out of which 885,000 were severe enough that they warranted hospital admission. Cumulatively, road injuries in sub-Saharan Africa exceeded 14 million healthy life years lost (Kavi et al., 2014).

Kenya has one of the highest road fatality rates in relation to vehicle ownership in the world and it is reported that annually there are over 3000 deaths recorded which translates to 68 deaths per 10,000 registered vehicles which is 30 to 40 percent higher than in developed countries that are more motorized than Kenya (Spectra & Atubi, 2010). Road traffic injuries are the third leading cause of death in Kenya only after malaria and HIV/AIDS and a major contributor to morbidity in terms of disability and associated health care costs (Odero, Khayesi, & Heda, 2003).

In Kenya there are considerable variations like geographical regions and road locations (rural or urban). During the period 1986-1994, Western region where Webuye is located contributed up to 10% of the country's road traffic crashes (Odero

et al., 2003). A more recent study that studied trauma related mortality in Western Kenya reported a 15% incidence of road traffic injury related deaths, the leading being assault (25%) (Odhiambo et al., 2013).

Abedzadeh et al., in their study reported that globally more than one billion (15%) live with disabilities and most of the disabilities are caused by injuries due to traffic accidents, violence, falls, burns and assault (Abedzadeh-Kalahroudi, Razi, Sehat, & Asadi Lari, 2015). The World Disability Report in 2017 by the Human Rights Watch, estimated that persons with disability constitute 10 % of the general population (Human Rights Watch, 2017).

A survey called the Kenya national survey for persons with disabilities carried out by the National Coordinating Agency for Population and Development (NCAPD) and Kenya National Bureau of Statistics (KNBS) estimated that the disability rate in Kenya was 4.6% which translated to 1.7 million Persons with disabilities (KNHCR, 2014).

Research into road safety in Lower and Middle Income Countries (LMICs) especially in Africa is scarce. This is inconsistent with the magnitude of the problem and Lagard in his study has predicted that by 2020, road traffic injuries will rank as high as third among causes of disability-adjusted life years (DALYs) lost in these regions (Lagarde, 2007).

This study aimed to determine road traffic related injury characteristics seen in Webuye County Hospital and their severities. The Researcher also determined the burden of sub-acute disabilities (SAPDs) that the victims suffered at 8 to 10 weeks post injury in hospitalized and non-hospitalized groups of road traffic injuries.

1.2 Problem Statement

Road traffic injuries are a major cause of morbidity and mortality in Kenya and their incidence is set to rise with increasing motorization (Odero et al., 2003). Increase in road traffic injuries also increases the incidence of disability. Despite road trauma being identified as a looming problem, there is inadequacy of trauma documentations in Kenya and other low and middle income countries (Odhiambo et al., 2013).

A large number of studies have concentrated in the hospitalized patients with road traffic injuries and few investigated outcomes in non-hospitalized patients with road traffic injuries because of an assumption that non-hospitalized patients are likely to have short recovery periods (Langley & Cryer, 2012), whereas a study done in New Zealand actually showed that upto 10% of those considered to have minor injuries suffered permanent medical impairments (Derrett et al., 2012). Furthermore studies that have considered injuries have always tended to focus more on general health, functional and employment outcomes rather than disabilities (Polinder et al., 2010; Vles et al., 2005).

The number of road traffic trauma patients seen at Webuye County Hospital is notable. Information from the hospital records department show that out of 513 patients admitted to the surgical wards, 169 (33%) of the admissions in 2016 were due to road traffic trauma. A significant number of the road traffic injuries were managed as outpatients and discharged home. Despite a large number of road traffic injuries being seen at Webuye County Hospital, there are no published articles to demonstrate the magnitude of the problem and the levels of disabilities the road traffic victims suffer following the road traffic crashes.

Proper scoring and documentation of injuries ought to be done for a quick and accurate diagnosis to be made thus helping in patient management leading to improved outcomes. Follow up is vital as well for both groups to ascertain the level of disabilities suffered.

1.3 Justification

Globally road traffic injuries (RTIs) have been identified as one of the leading causes of morbidity and mortality and current literature show that RTIs are the third leading causes of deaths in Kenya after HIV/AIDS and Malaria (Oburu, 2015). Reports on road traffic crashes (RTCs) come from police records and so far they are the main source of information on RTIs. Police reports however present several limitations because in their current form they cannot be disaggregated by demographic characteristics and classification of injuries is subjective and lacks guidelines to classify severity of injuries (Bachani et al., 2012). Other studies in Kenya found that police records only capture severe injuries and only those that are reported to the police and these have been found out to underestimate the true burden of RTIs (Filipe et al., 2001).

Outcomes among hospitalized patients with RTIs have been extensively studied and very few studies have documented outcomes in the non-hospitalized patients with injuries since these are considered not serious, yet studies have reported up to 10% have suffered permanent physical impairments (Derrett et al., 2012). A study in Brazil showed that patients who suffered soft tissue damages, nerve damages or facial injuries showed odds ratios of 2 to 4 times of having a disability (Rocha et al., 2017).

Studies done in Kenya have shown that injuries are among the top ten causes of deaths with RTIs being the leading cause and that RTIs accounted for between 45%

and 60% of all admissions to surgical/orthopedic wards at Kenyatta National Hospital and approximately 75% inpatients at the National Spinal Hospital (Odero et al., 2003). Few studies have reported on disability of these victims of RTIs. Information from the hospital records office showed that in the second half of 2017 there were 207 patients admitted to the surgical wards 51% of them due to RTIs. Literature search found few studies that documented on prevalence of disability post RTIs but none was found that studied the prevalence of disability among the non-hospitalized RTIs; neither do people know about the factors associated with adverse disability among hospitalized and non-hospitalized RTIs. Despite the high burden of morbidity due to RTIs seen at WCH, there are no studies done to establish the outcomes of these patients.

This study provided an opportunity to follow up patients with RTIs, both the hospitalized and non-hospitalized and assess and quantify their sub-acute phase disabilities and also investigate factors associated with sub-acute phase disabilities.

Due to the scarce availability of information on outcomes following RTIs, this study therefore seeks to bridge the existing information gaps and inform on factors associated with disabilities in RTIs.

1.4 Research Question

What are the characteristics of road traffic Injuries and the associated sub-acute phase disabilities amongst hospitalized and non-hospitalized patients managed at Webuye County Hospital?

1.5 Research Objectives

1.5.1 Broad Objective

To determine the characteristics of road traffic injuries and the associated sub-acute phase disabilities amongst the hospitalized and non-hospitalized patients managed at Webuye County Hospital.

1.5.1 Specific Objectives

1. To assess socio-demographics and injury characteristics of patients with road traffic injuries seen at Webuye County Hospital.
2. To determine the severities of road traffic injuries and sub-acute phase disabilities amongst patients seen at Webuye County Hospital
3. To assess the factors associated with sub-acute phase disabilities in patients with RTIs.

CHAPTER TWO: LITERATURE REVIEW

2.1 Epidemiological Characteristics of Road Traffic Crashes

In a World Health Organization report titled Global Status Report on Road safety 2015, there were 1.25 million reported traffic accident deaths and road traffic crashes were reported to be the leading cause of injuries and death among the young people aged 15 to 29 years old (WHO, 2013) . Road traffic injuries have been reported to be among the leading causes of mortality and morbidity worldwide and are projected to rise to become the fifth leading cause of death by 2030 if not curbed (Chekijian et al., 2014).

Globally, studies have shown that the distribution of road traffic injuries is generally influenced by socioeconomic factors. The low income countries carry a disproportionate burden of morbidity and mortality and even within low and middle income countries, the poor population account for a bigger portion of ill-health caused by road traffic injuries. Within the low income countries, the very poor that are represented by pedestrians, passengers and cyclists (motorcyclists and bicycler riders) suffer a higher burden of morbidity and mortality. In the developed countries children from poor backgrounds suffer more injuries and deaths than their counterparts in the rich neighborhoods (Nantulya & Reich, 2003).

In Africa the vehicle population is still low and is estimated to be one licensed vehicle per 100 inhabitants compared to an average of 60 vehicles per 100 inhabitants in high income economies (Lagarde, 2007). Despite the lower vehicle population, road traffic deaths are highest in Africa at 26.6 deaths per 100000 populations; Europe however has the lowest rates at 9.3 deaths per 100000 populations whereas the world average stands at 17.4 deaths per 100000 populations (WHO, 2013).

Nigeria and South Africa are said to have the highest fatality rates (33.7 and 31.9 deaths per 100000 populations per year respectively). Studies have reported that approximately 25% of all road traffic deaths happen on Nigerian roads and 64% of the region's deaths happen in Ethiopia, Kenya, South Africa, Tanzania, and Uganda. In eastern Africa Ethiopia, Kenya and Tanzania are said to have relatively lower fatality rates than Uganda which has a higher fatality rate in the region (WHO, 2013).

The WHO report on road safety also reported that almost half of all deaths were among the least protected road user who include motorcyclists, bicyclists and pedestrians. Africa has the highest of these deaths at 43% (WHO, 2013).

RTCs are not only the cause of deaths but also injuries that lead to emergency and practitioner treatments as well as hospitalizations. All those who suffer RTIs have health consequences beyond their physical injuries; they suffer temporary or permanent disabilities (WHO, 2004).

In Kenya 12,000-26,000 vehicle crashes are reported annually which cause over 3000 deaths annually and over 9,000 serious injuries requiring admission. These figures translate to averagely 32 crashes every single day leading to 9 fatalities daily. A study done in Kenya placed road traffic injuries as the third main cause of deaths after Malaria and HIV/AIDS respectively (Oburu, 2015). Studies in Kenya have also shown that the most vulnerable groups are the low and middle income population as they largely use the popular *matatus* and other public transport means, two wheeled means of transport which consist of bicyclists and motorcyclists. Available publications in Kenya indicate that 46% of all road fatalities involve pedestrians, bicyclists, motorcyclists and their passengers. One study indicated that *bodaboda* accidents are an emerging disaster that accounts for 14-16% of all road fatalities.

These high accident rates can be attributed to lack of knowledge of highway codes, overloading, over speeding and failure to comply with road traffic rules (Huho, Mashara, & Musyimi, 2016).

Economically, worldwide WHO reported that road traffic injuries cost governments close to 3% of their Gross Domestic Product (GPD) every year (WHO, 2013). Kenya loses approximately 45 billion Kenya shillings excluding loss of life itself due to road traffic accidents annually (Huho et al., 2016).

2.2 Causes of Road Traffic Crashes

The causes of road traffic crashes in Africa are diverse according to one systemic review that looked at motor traffic injuries in Sub-Saharan Africa. They can be categorized into three main aspects: human factors, external factors and vehicle conditions. Human factors include reckless driving, excessive speed, overtaking errors and driving after beyond limit consumption of alcohol (exceeding blood levels of 0.05g/100ml). Other human factors are those beyond the driver and these include negligent pedestrians, overloaded passengers, cyclists and cart pushers. External factors entail bad road surfaces, poor road conditions and lack of road signs and markings. Vehicle and mechanical conditions include faulty brakes, loose body parts and poor body works (Tarimo, 2012).

A study in Kenya found out that the causes of road traffic crashes are multifactorial and include the road, vehicle and human factors (Odero, Garner, P., & Zwi, 1997). Other studies reported further that human error is estimated to account for between 64% and 95% of all causes of traffic crashes in low and middle income countries. Other causes contributing to the high burden of crashes in low and middle income countries include non-roadworthy vehicles, speeding, overloading, lack of safety

belts and helmets use, poor road maintenance and designs (Transport and Research Laboratories (TRL), 1990). A study that profiled disasters in Kenya reported that close to 85% of the road accidents are caused by human factors, 11% vehicle conditions while 4% are as a result of the environment. Speeding and drunken driving were found to be the major human factors that lead to road accidents (Huho et al., 2016).

Odero and his colleagues observed that despite the increase in road traffic crashes in Kenya and the reported causes, fewer efforts have been made to develop and implement interventions that would reduce RTCs. The barriers to road traffic injury preventions and control include the following; ineffective coordination, inadequate resources, inadequate qualified personnel along with limited capacity to implement and monitor interventions (Odero et al., 2003).

2.3 Injury Characteristics

The injury characteristics for road traffic crashes in developing countries differ in important ways from the profile seen in developed countries, and understanding these characteristics can provide guidance for making policies to improve prevention and control (Chalya et al., 2012) . Pedestrians are reported to be the most vulnerable group in developing countries. A study done in Tanzania reported that students and businessmen were the largest groups affected and that limb and head injuries were the most common type of injuries whereas another study in Ethiopia reported that limb injuries were most common (Seid, Azazh, Enquselassie, & Yisma, 2015). This study like the rest that have studied injuries sought to find out injury characteristics and identify the most vulnerable groups in Webuye and its environs.

Injury Subjects

A study in Kenya reported that 75% of road traffic casualties are young adults who are economically productive (Odero et al., 2003) and that the most affected age group was between 15 to 49 years (Gichuhi, 2007). Passengers and pedestrians are the most vulnerable accounting for 80% of all road traffic deaths. Characteristics of crashes vary considerably between urban and rural regions and pedestrians are more vulnerable to injuries and death in urban areas, whereas passengers die and suffer injuries in highways that transverse through rural areas mostly. Poor road networks contribute adversely to road traffic accidents as well (Odero et al., 2003). The huge numbers of RTIs has varied outcomes ranging from short term disabilities, long term or permanent disabilities and death (Hailemichael, Suleiman, & Pauolos, 2015).

From previous studies done on road traffic injuries, males were 3 to 4 times more likely to be involved in road traffic accidents. The studies found out that the age group 1 to 49 years old were the most vulnerable age group. In a big study that was carried out in Kenya and involved 53 large and medium size private, faith-based and public hospitals, it was found out that most of the casualties were young and from poor or middle aged backgrounds. Passengers made the biggest bulk of all casualties at 42% followed by pedestrians at 33%. In the same study it was found out that males were 3 more times likely to be involved in road accidents than females. Use of safety belts was only reported by only 1.3% of all casualties, while 51.9% reported they were in vehicles that were speeding and 10.3 suspected the drivers were under the influence of alcohol (Macharia, V; Njeru M; Muli, 2009).

Injury Types and Severities

The severity, nature and outcome of road traffic injuries are all influenced by a multiple factors and information about these in low and middle income countries are very limited because trauma registries along with hospital based researches are not developed or are poorly developed (Gururaj, 2008). From previous studies, severity is likely to be much greater in Africa because many of the casualties are the vulnerable groups of road users, poor road networks and other conditions like lack of safety devices like helmets and seat belts, overcrowding and hazardous vehicle environments (Lagarde, 2007).

Studies done in India, Tanzania, Ethiopia and Kenya all showed that musculoskeletal injuries to the extremities and the head were the commonest of all road traffic injuries (Jha et al., 2003; Gichuhi et al., 2007; Chalya et al., 2012 and Seid et al., 2015). A study done in Nairobi that looked at patterns of pedestrian injuries found that most of the injuries (67.7%) involved limbs and cars were the most common cause of the injuries(39.4%) followed by *matatus* (35.5%) (Ogendi, Odero, Mitullah, & Khayesi, 2013). A study by Gichuhi and colleagues done at a tertiary institution in Nairobi reported that fractures were the most common type of injuries and accounted for 69.0% of all injuries followed by head injuries (25.6%). The most common type of fractures seen were tibial fractures (30.3%) followed by femoral fractures (12.4%) (Gichuhi, 2007). A similar observation was made by a study on motorcycle injuries in Karachi Pakistan and found that the most common fractures in motorcyclists and their passengers were tibial fractures (Mustafa et al., 2013).

Head injuries are the commonest form of internal injuries seen in road traffic crashes and affects close to 34.1% of all casualties while injuries to the chest and pelvis are seen at an almost equal proportion (Jha et al., 2003). Contusions constitute the majority of all intracranial bleeding cases (54.0 %) while subarachnoid bleeding account for a lesser percentage of all intracranial bleeds (5.8 %) (Seid et al., 2015). Head injuries were reported more common amongst bicycle riders who had the highest proportion (22.9%), followed by pedestrians and motorcyclists 22.6% however compared to pedestrians, cyclists and motorcyclists had a higher proportion of head injuries (Jha et al., 2003).

2.4 Disabilities

Disability has been defined as an alteration of an individual's capacity to meet personal, social or occupational demands or statutory or regulatory requirements because of an impairment (Zevin et al., 2007). Disability is dynamic, complex and multidimensional and almost everyone will be temporarily or permanently impaired at some point in life. Those advanced in age experience increasing activity limitations (WHO, 2011).

Injuries from road traffic crashes have a major impact on mortality, morbidity and disability. According to WHO annually worldwide, 20-50 million persons sustain injuries each year and more than 5 million remain disabled for life. It is reported that RTIs cause both temporary and permanent disabilities and ranked 9th leading cause in the world of disability adjusted life years (DALYs) and cumulatively generate up to 41.2 million years of healthy life lost and thus accounting for 2.7% of the total DALYs worldwide (Palmera-Suárez et al., 2015). A study in India reported that 100% of severe ,50% of moderate and 10% of the mildly injured need long term

rehabilitation with a few hospital based studies suggesting that disabilities persist for a long time after being discharged from hospital in 20-40% of the injuries (Gururaj, 2008).

A study in Ethiopia reported that a significant proportion who sustain road traffic injuries incur permanent disability through amputations, head injuries or spinal cord injuries; however data in developing countries are not well documented (Seid et al., 2015).

According to the Kenya National Survey for Persons with Disabilities (KNSPD) conducted in 2007 by the National Coordinating Agency for Population and Development (NCAPD) done with the collaboration of Kenya National Bureau of Statistics (KNBS), the overall disability rate in Kenya was estimated to be 4.6% which translated to 1.7 million Persons with disabilities countrywide (KNHCR, 2014).

A study done in Western Kenya reported that prevalence of disability in Western Kenya is not known and that rehabilitation providers in Kenya assume that it could be similar to the global average of 10% reported by WHO (ILO, 2009). The available data from KNHCR puts it at 4.6% of general population (KNHCR, 2014) and this could be an underestimate possibly due to under detection as 80% of people with disabilities worldwide reside in low income countries (ILO, 2009). A report by the International Labor Organization (ILO) also noted that there are several numbers available and that they do not give an accurate picture of the true number of people living with disability in Kenya (ILO, 2009). Applying the WHO recommended 10 percent prevalence (WHO, 2011) to today's Kenyan population of over 40 million one would postulate that there may be over 4 million disabled people in Kenya.

Higher prevalence rates were seen in rural areas at 6.9% as opposed to urban areas 3.0%. Prevalence in women is almost double that of men at 6.9% versus 3.7% respectively (Mitra et al., 2013). It has been established that RTIs contribute significantly to the burden of diseases in Kenya but data defining burden of injuries, outcomes and risk factors of RTIs remain limited in Low and Middle income Countries (LMCIs) (Botchey et al., 2016).

In studies previously done on injury outcomes, few have investigated outcomes for the non-hospitalized group because assumptions are made that people with injuries that do not require admission are likely to have shorter recovery periods and unlikely to suffer any form of disability (Derrett et al., 2012). However data from meta-analysis studies that looked at functioning after injuries in several countries, found poor outcomes associated with injuries among the non-hospitalized group with conditions like sprains and strains (Black et al., 2011). And in the United Kingdom, a prospective injury study recruited hospitalized and non-hospitalized patients with injuries and found out that disability was greater among the hospitalized but also a considerable disability burden existed among the non-hospitalized as well (Lyons et al., 2011). Another study that looked at outcomes from what was termed "minor" injuries which are handled as outpatients, reported as many as 10% of them had permanent medical impairments (Malm et al., 2008).

Disability phases can be defined by duration of work disability along a temporal continuum since the date of injury and several different cut points between phases, the differentiation of an acute phase (up to 30 days of work disability), sub-acute (30-90 days) and chronic disability (more than 90 days) have become the widely used (Krause et al., 2001). Krause et al., also noted that the concept of phase-specificity was originally developed for low back pain disorders but its importance has since

been empirically demonstrated for other disorders namely spinal cord disorders, several other injuries and illnesses.

The sub-acute phase of disability is important in this study because from previous studies majority of the cases recover within the acute phase (3 to 4 weeks) whereas in the sub-acute phase recovery slows down considerably and rehabilitation experts warn that if there has been no significant recovery, then the third stage which is the early chronic phase begins (Brooker et al., 1998). The study intended to demonstrate the importance of disability arising from road traffic crashes and more importantly the sub-acute phase disabilities. This was mainly because the disability tool WHODAS 2.0 required that victims try and recall 30 days from the day of the interview the difficulties experienced.

2.5 Injury and Disability Instruments

2.5.1 The Injury Instrument

Scoring systems are considered cornerstones of epidemiology in trauma and the severity grading was found necessary in management and follow up of traumatic injuries and research (Köksal et al., 2009).Trauma scores have been used for over 30 years and they are used for assigning numerical values to anatomical and physiological changes following trauma (Beuran et al., 2012). Since the introduction of scoring systems, there have been over 50 scoring tools/systems that have been developed to evaluate and quantify injury severity and only a few have proved effective in clinical practice (Oestern, 1994). Oestern et al., in their study noted that in the development of new scoring systems, there has been a tendency to aim at higher predictive accuracies forfeiting their practicability.

Despite the extensive development of numerous trauma scores, none of them has been adopted as a gold standard in trauma registry, especially in developing countries

where resources are limited. However in the industrialized countries Revised Trauma Score (RTS) and Injury Severity Score (ISS) have been widely used (Jana et al., 2003).

In a study done in Romania that looked at literature about trauma scores, and reported that physiologic scores describe changes caused by trauma and are evident in change of vital signs and levels of consciousness. Physiological scores are used to triage and monitor patient progress. Anatomic scores are used after diagnosis is complete at discharge or even in postmortem (Beuran et al., 2012).

In a study by Orhon et al., the benefits of trauma scores were highlighted and they included objectively determining levels of injuries which would enable patients to be classified depending on their needs. The physiological data obtained would be used to follow up, to monitor and ascertain risk. The other benefit highlighted was that the scores can be used to make decisions like transferring patients to appropriate facilities. The scores can also be used to determine patients who might benefit from treatment and also determine the kind of health facilities that might be needed in a region. It is documented too that trauma scores can be used to create epidemiological databases about local injuries and that from the results obtained, the effectiveness of a facility can be determined (Orhon et al., 2014).

A study was undertaken in India to determine the feasibility of five injury scoring systems namely Injury Severity Score (ISS), Revised Trauma Score (RTS), Kampala trauma Score (KTS), Mechanism Glasgow coma score (GCS), Age and Pressure (MGAP) and GSC, Age and Pressure (GAP). In this study ISS was the weakest predictor of in hospital mortality whereas RTS, KTS, MGAP and GAP were found to correlate well with in hospital mortality (Laytin et al., 2015).

RTS, ISS and Trauma and Injury Severity Score (TRISS) perform well in developed nations and their calculations complex and might require diagnostic tools not readily available in resource limited settings (Jana et al., 2003).

In this study the Kampala Trauma Score was used to assess and document the severity of injuries. The Kampala Trauma Score was developed in 1996 to address difficulties highlighted above and like its predecessors it combines both physiologic and anatomic data to create scores similar to TRISS (Weeks et al., 2014). Two scores (RTS and ISS)were widely used initially in industrialized countries, Champion and his colleagues later combined the two scores plus age to develop a prognostic score which estimated the probability of survival as well called the Trauma and Injury Severity Score (TRISS). These severity score were found to be complex to use in developing countries as they often required extensive retrospective review of completed patients' records which were a challenge in limited resource countries. Therefore the Injury Surveillance System (ICC) was implemented in Uganda and mandated to develop a new severity score. Kampala Trauma Score was developed as a simplified composite of RTS and ISS scores (Jana et al., 2003).

The Kampala Trauma Score (KTS) is an injury severity instrument whose validity and reliability has been described in different parts of the world. The scoring system has been shown to perform as well as the Injury Severity Score (ISS) and Revised Trauma Score (RTS) which all include all elements of the Trauma Score and Injury Severity Score (TRISS). KTS is simplified so that it can be determined in outpatient and casualty settings of hospitals with limited resources in developing nations (Kobusingye et al., 2002). Kobusingye et al., in their study also found out that KTS was highly predictive of two variables; the need for admission and death. Another study in Mbarara Uganda sought to compare the reliability of KTS II and New Injury

Severity Score (NISS) which had earlier been preferred by most, found that KTS II (sensitivity 87% and specificity of 81%) was as reliable as NISS (Sensitivity 96% and Specificity 78.4**%**) (Mutooro S.M, Mutakooha E, 2010).

Table 1: The Kampala Trauma Score

Description	**Scores**
a) Age (in years)	
5-55	2
<5 or > 55	1
b) Systolic blood pressure (mmHg)	
>89	4
50-89	3
1-49	2
Undetectable	1
c) Respiratory rate (breaths per minute)	
10-29	3
≥30	2
≤9	1
d) Neurological status (AVPU)	
Alert	4
Responds to verbal stimuli	3
Responds to painful stimuli	2
Unresponsive	1
e) Number of serious injuries	
None	3
One	2
Two or more	2
KTS total (a+b+c+d+e)	

AVPU is a simplified version of the Glasgow Coma Score.

Possible range is 5-16; 5 is the most severely injured while 16 is the least severely injured.

For this study the Kampala Trauma Score was classified as mild (scores 14-16), moderate (11-13) and severe (<11) as was used by other studies (Kobusingye et al., 2002) and (Clarkson et al., 2012).

2.5.2 The Disability Instrument

The measure of disability in this study was assessed by the brief World Health Organization Disability Assessment schedule II (WHODAS II) (Appendix 2). This is a 12 item instrument WHODAS 2.0 that assessed activity limitations and participation restrictions over the past 30 days along six dimensions namely understanding and communications, self-care, mobility, interpersonal relationships, work and household responsibilities and community roles. The instrument used 12 questions concerning standing, household responsibilities, learning, community activities, emotionally affected by health problems, concentrating , walking a long distance, washing the whole body , getting dressed, dealing with unknown people, friendships and day to day work. Each of the 12 questions had a difficulty level response options: None=0, Mild=1, Moderate=2, Severe=3 or Extreme/cannot do=4. The 12 response scores were summed using a simple summation approach to give a score between 0 to 48, where 0 denotes no disability and 48 maximum disability (Üstün et al., 2010).

Studies have been done to validate the use of WHODAS; in one study done in Australia, it was concluded that the 12 item version of WHODAS 2.0 was found to provide a brief but reliable and valid measure of global disability and was considered useful in epidemiological and health services research (Andrews et al., 2009).

WHODAS 2.0 was developed on a basis of extensive cross cultural studies in 19 countries and after its development it was tested in a variety of different cultural settings and was found to be sensitive regardless of the socio-demographic profiles of the study groups. Validation studies have shown that WHODAS 2.0 compared well with other measures of disability or health status. The instrument has been translated to many languages and it has addressed the need for a standardized cross cultural measurement of disability. Among the many advantages of WHODAS 2.0, is that it is easy to use and it can be self-administered and can be filled in minutes or interviewer administered and can be filled less than 20 minutes. The instrument is easy to score and is easily available in the WHO website and in more than 30 different languages (Üstün et al., 2010).

WHODAS scores in this study were classified as Mild sub-acute phase disabilities (0-23) and severe sub-acute phase disabilities (24-48).

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

3.1 Study Design

The study design was a prospective cohort study.

3.2 Study Site

The study was carried out at Webuye County Hospital situated within Webuye town in Webuye East sub-County within Bungoma County. Bungoma County is about 380km west of Nairobi and covers an area of 3032 sq.km. The population in the county is estimated to be 1.37million people according to the 2009 national census. According to Kenya National Bureau of Statistics during 2009 census, Webuye constituency had a population of 230, 253 and coverer an area approximately 404.0 square kilometers (KNBS, 2013) .

Webuye County Hospital has a catchment population of about 250,000 people due to its strategic location. The hospital serves patients from Bungoma County, parts of Kakamega, Busia and Trans Nzoia Counties plus patients from Eastern parts of Uganda. The hospital has a bed capacity of 217 with approximately 150% to 200% bed occupancy. The hospital attends to between 150-200 patients on a daily basis. The theatre operates on between 125 to 150 patients every month majority who are trauma patients (Obala et al., 2013).

3.3 Study Population

Patients managed at Webuye County Hospital with road traffic injuries who met the inclusion criteria of the study.

3.4 Eligibility Criteria

3.4.1 Inclusion Criteria

Hospitalized and non-hospitalized patients with RTIs aged between 16 years to 65 years who sought treatment at Webuye County Hospital.

3.4.2 Exclusion criteria

i. Anyone with pre-existing forms of physical impairments or disabilities before the road traffic injury.
ii. Fatal injuries as a result of RTIs. Both immediate deaths and those happening later before an assessment of their SAPDs.

3.5 Sampling Techniques

Sampling method

Consecutive sampling technique was employed in the recruitment of the study participants.

Patients seen at the emergency department with RTIs were first attended to then consent/assent sought. The questionnaire was filled and injury severity was assessed by the Kampala Trauma Score (KTS). All who met the inclusion criteria were then recruited into the study until the desired sample size was attained in both groups.

Follow up was done at eight to ten weeks post trauma on both the hospitalized and non-hospitalized groups and the WHODAS 2.0 tool was filled and used to ascertain the levels of sub-acute phase disabilities.

3.6 Sample Size Determination

The aim of the study was to compare proportions of those with sub-acute disability at two months post trauma amongst the hospitalized patients and non-hospitalized patients. The sample size was estimated using sample size calculation formula for comparison between two groups by Fleiss (Fleiss, 1981).

$$n \geq \frac{(1+r)}{r}\frac{\bar{p}(1-\bar{p})(Z_{\beta}+Z_{\frac{\alpha}{2}})^2}{(p_1-p_2)^2}$$

Where:

n = minimum sample size for one group

r = ratio

$\bar{p}$ = pooled prevalence

Z_{β}= critical value corresponding to 80% power

$Z_{\frac{\alpha}{2}}$ = critical value corresponding to 0.05 type I error

p_1 = prevalence of sub-acute disability among hospitalized patients

p_2= prevalence of sub-acute disability among non-hospitalized patients

Using the Fleiss formula, with disability prevalence of 72.4% (P1) among hospitalized patients in a Kenyan tertiary institution (Macharia et al., 2009) and a smaller proportion of about 52.4% among non-hospitalized patients, the minimum sample size was 184 (92 hospitalized and 92 non-hospitalized).

The New Zealand Prospective Outcomes of Injury Study (POIS) showed that disability was experienced by 53.6% of the hospitalized group 3 months after injury,

while 39.4% of the people non-hospitalized were also experiencing disability at this time. There was a difference of 14.2%. Since no local studies exist, the researcher postulated a higher proportion in Kenya as it would be in other LMICs and assumed a 20% difference hence coming up with the 52.4% prevalence among the non-hospitalized group.

3.7 Study Procedure

Recruitment into the study was done mostly in the emergency department where all patients with RTIs were first seen and triaged and some were recruited in Surgical Wards. All patients received emergency treatment as per the Webuye County Hospital trauma protocol. Consent was sought from the patients 18 years and above who were conscious, informed assent was sought for anyone who was less than 18, and for those who were unconscious, consent was sought from relatives and caretakers. A data collection form was filled by the Researcher or the trained research assistants which included the patients' demographics. The Kampala Trauma Score was used to assess the severity of injuries. Hospitalized patients with RTIs in this study was any patient who was seen in Emergency Department and admitted to the wards or admitted for observation in the Emergency Department for 24 hours or more with serious injuries. Non-hospitalized were those managed and discharged home and were thought to have slight injuries. Slight injuries were sprains, bruises, cuts and dislocations that were judged not severe and did warrant inpatient management. Patients who were seen and allowed home but detained in the emergency department for 24 hours or more due to other reasons like billing or financial reasons or for accommodation until relatives came to pick them were recruited into the study as outpatients. The assignments of the patients into any group was not influenced by severity of the injuries.

Patients were then followed up at the Surgical/Orthopedic outpatient clinics when they came for reviews and cast removals. Some were still in the wards and were evaluated there. Patients who did not have further appointments were called and the questionnaire administered via phone and those who had difficulties were visited at places of their convenience. Sub-acute phase disabilities (SAPDs) were assessed from the eighth to tenth weeks post injury using the WHODAS 2.0 instrument.

3.8 Data Collection and Management

3.8.1 Data Collection

Data was collected between July 2018 and December 2018, both months included. Data was collected by the Researcher with the assistance of two trained and tested research assistants. Questionnaires were filled and details entered into a computer database.

3.8.2 Quality Control

The research assistants were trained and tested on how to collect data. They were then posted to the Emergency Department to capture all consecutive RTI cases and worked in shifts. The Research Assistants were clinicians working in the emergency department day and night. They documented the physical addresses and phone numbers of all the RTI cases in detail to ensure that follow-up was possible. Data as highlighted above was collected by a data collection form designed for this study after obtaining informed and signed consent for the patients or their caretakers (Appendix 3). The data collection forms were checked for completeness and any inconsistencies. Data from the data collection forms was coded and entered into a data base in the investigators personal computer.

3.8.3 Data Analysis and Presentation

Data analysis was done using the software Stata/MP. Categorical variables such as gender, severity of injury, presence and severity of disability, road user category, among others were summarized as frequencies and the corresponding percentages.

Continuous variables such as age were summarized using measures of central tendency (mean/median) and dispersion (Standard Deviation/Interquartile Range) where appropriate based on the distribution. Gaussian assumptions were assessed using Shapiro-Wilk test.

Pearson's Chi Square and Fisher's exact tests were used to check for association between the severity of the injuries and the disabilities, and also the association between the severities of disabilities and non-hospitalization/hospitalization. The associated p-values were reported where a p-value <0.05 was considered statistically significant. Results were presented using tables and graphs.

3.9 Bias Minimization

Sampling Bias

The study involved any patient who met the inclusion criteria at the Emergency Department of Webuye County Hospital, thus each patient seen with RTIs had an equal chance of being recruited into the study.

Measurements Bias

These were minimized by using well coded and standardized data collection forms and well defined scoring systems that have been validated for use in Low and Middle Income Countries and had been pretested (Anderson et al., 1980).

Attrition Bias

To reduce attrition, the Researcher employed several strategies. One was communication where we called patients and reminded them of their clinic

appointments most that fell on the 8th to 10th weeks after trauma. For patients who would not come the Researcher administered the questionnaire over the phone and when they could not answer questions on phone the Researcher offered visits to physically score them. Research assistants were assigned to manage participant follow up as well.

3.10 Ethical Considerations

Approval to conduct the study was sought and obtained from the Institutional Research and Ethics Committee (IREC) (Approval number 0003063) and the management of Webuye County Hospital. Informed consent was sought from stable patients and informed assent from those younger than 18 years of age. All patients received medical attention as required, unmindful of their willingness/unwillingness to participate in the study. No incentives or an inducement was used to convince patients and caretakers to give consent. Confidentiality was a priority and was upheld throughout the study. The data collection forms used neither contained the names of the patients nor their personal identification numbers. During the study period, data collecting material was kept under lock and key.

Findings of this study have been presented to the Moi University's Department of Family Medicine as well as the Hospital's management for use as necessary. They are also available for academic reference at the College of Health Sciences Resource Centre. The results of this research shall be made presentable for publication in a reputable peer reviewed Journal of Medicine for use by the wider population in the universal advancement of patient management and as a reference for future studies.

CHAPTER FOUR: RESULTS

4.0 INTRODUCTION

A total of 184 patients who sought treatment at Webuye County Hospital due to road traffic injuries were recruited into the study. The recruitment of patients was done to equal numbers (92 patients) for the two comparative groups (hospitalized vs non-hospitalized).

4.1 Demographics and injury characteristics of hospitalized and non-hospitalized patients with RTIs

4.1.1 Demographics

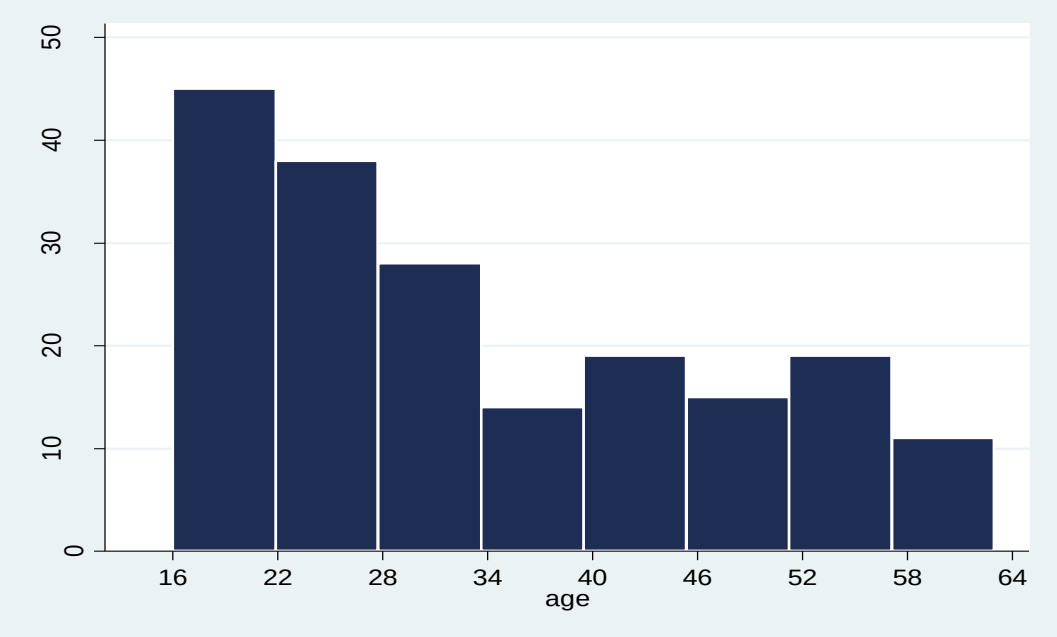

Figure 1: Age distribution

The age of the patients was slightly skewed to the right and did not assume a normal distribution ($W = 0.922$, $p<0.001$).

Table 2: Demographic characteristics

Variable	Category	Frequency	Percentage (%)
Age	Median(IQR), min-max	30(22, 45)	16-63
Sex	Male	126	68.5
	Female	58	31.5
Education level	No formal education	8	4.4
	Primary	81	44.0
	Secondary	74	40.2
	College	16	8.7
	University	5	2.7
Occupation	Unemployed	80	43.4
	Casual laborer	54	29.4
	Business	29	15.8
	Formal employment	19	10.3
	Farmer	2	1.1
Category of read user	Motorcycle passenger	55	29.9
	Motorcyclist	48	26.1
	Pedestrian	41	22.3
	Cyclist	14	7.6
	Motor vehicle passenger	14	7.6
	Driver	6	3.3
	Non-motorized (cart pusher)	6	3.3

The age of the patients ranged from 16 to 63 years with a mean of 33.8(SD 13.7) years (table 2). The median age was 30(IQR 22, 45). Majority 126(68.5%) were males with secondary level of education or lower (88.6%), unemployed or casual laborers (72.8%). By Category of road users, majority were motorcycle users constituting over 50% of the patients (Table 2).

4.1.2: Injury characteristics

Table 3: Site of injury

Variable	Frequency	Percentage (%)
Lower limb	128	69.5
Upper limb	80	43.5
Head and face	59	32.1
Chest	24	13.0
Abdomen/pelvis	8	4.4
Back and spine	7	3.8
Neck	3	1.6

Some patients had multiple injuries and hence the sum total on the table exceeds the total number of patients recruited. Most sustained injuries were on the lower limbs reported by 128(69.5%) followed by upper limbs 80(43.5%) and head/face 59(32.1%). Few sustained back/spine (3.8%) or neck injuries (1.63%) (Table 3).

Table 4: Association between Hospitalized and Non-hospitalized and demographic characteristics

Variable	Category	Hosp. n (%)	Non-hosp. n (%)	p-value
Age	Median(IQR)	30.5(24, 45.5)	28(21, 44)	0.198†
Sex	Male	67 (72.8)	59 (64.1)	0.204*
	Female	25 (27.2)	33 (35.9)	
Education level	Primary	53 (57.6)	36 (39.1)	0.019*
	Secondary	33 (35.9)	41 (44.6)	
	College/University	6 (6.5)	15 (16.3)	
Occupation	Unemployed/farmer	41 (44.6)	41 (44.6)	0.853*
	Casual laborer	27 (29.3)	27 (29.3)	
	Business	8 (8.7)	11 (12.0)	
	Formal employment	16 (17.4)	13 (14.1)	
Category of road user	Motorcyclist/Motorcycle passenger	51 (55.4)	52 (56.5)	0.931**
	Pedestrian	21 (22.8)	20 (21.7)	
	Cyclist	6 (6.5)	8 (8.7)	
	Motor vehicle passenger/Driver	10 (10.9)	10 (10.9)	
	Non-motorized (cart pusher)	4 (4.3)	2 (2.2)	

†Mann Whitney U test; * Chi Square; **Fisher's Exact test

The proportions of sex, occupation and categories of road users were equal among those managed at outpatient and those managed at inpatient. The levels of education of the patients were significantly associated with the management points in that people with low education levels were more likely to be severely injured and hospitalized (P<0.05).

On average those who were managed as inpatients were slightly older (30.5 years, IQR: 24, 45) compared to those who were treated at the outpatient (28 years, IQR: 21, 44). However the difference in median age was not statistically significant. The proportions of sex, occupation and categories of road users were equal among those managed at outpatient and those managed at inpatient (Table 4).

Table 5: Association between Hospitalized and Non-hospitalized patients and injuries sustained

Variable	Category	Hosp. n (%)	Non-hosp. n (%)	p-value
Head and face	No	65(52.0)	60(48.0)	0.430†
	Yes	27(45.8)	32(54.2)	
Neck	No	89(49.2)	92(50.8)	0.246*
	Yes	3(100)	0(0.0)	
Chest	No	80(50.0)	80(50.0)	>0.999†
	Yes	12(50.0)	12(50.0)	
Abdomen/pelvis	No	89(50.6)	87(49.4)	0.720*
	Yes	3(37.5)	5(62.5)	
Back and spine	No	90(50.8)	87(49.2)	0.444*
	Yes	2(28.6)	5(71.4)	
Upper limb	No	60(57.7)	44(42.3)	0.017†
	Yes	32(40.0)	48(60.0)	
Lower limb	No	15(26.8)	41(73.2)	<0.001†
	Yes	77(60.2)	51(39.8)	

†Chi Square; *Fisher's Exact test

There was a significant association between upper limb injuries and point of management (p=0.017) and also between lower limb and management point (p<0.001). Where higher proportion (60.2%) of those with lower limb injuries were managed as inpatients, a higher proportion (57.7%) of those who had upper limb injuries were managed as outpatients (Table 5).

The results in Table 4 and Table 5 show that the two groups (Hospitalized and non-hospitalized) were comparable in almost all the parameters that were considered.

4.2 Severity of road traffic injuries and sub-acute phase disabilities

4.2.1: Severity of road traffic injuries

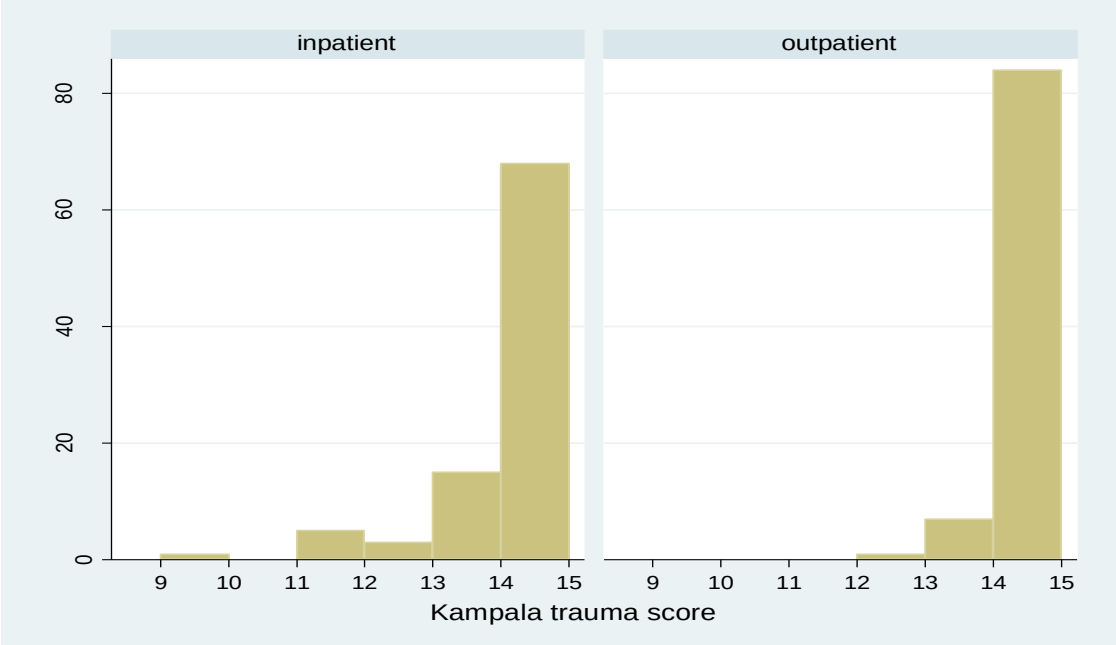

Figure 2: Injury severities by management point

The KTS scores for those managed as inpatients ranged from 9 – 15 with a mean score of 13.93 (SD 1.20) and a median of 14(IQR 13, 15). While those managed as out-patients ranged from 12-15 and had KTS mean score of 14.39(SD 0.67) and a median of 14 (IQR 14, 15). Majority of patients managed as outpatients had higher KTS scores compared to inpatients as seen in the diagram above. The difference in

KTS scores between the groups was small, the difference between them was statistically significant (p=0.001) (Figure 3).

The KTS was further classified into three categories as shown in the table below.

Table 6: Categories of severity of road traffic injuries

Category	Hospitalized n (%)	Non-hospitalized n (%)	Total
Mild	68(73.9)	84(91.3)	152
Moderate	23(25.0)	8(8.7)	31
Severe	1(1.1)	0(0.0)	1

The proportion of those who were classified as having mild KTS among the inpatients was lower (73.9%) compared to that among the outpatients (91.3%). In total only one patient was classified as having a severe form of KTS and was treated through inpatient (Table 6).

4.2.2: Sub-acute phase disabilities

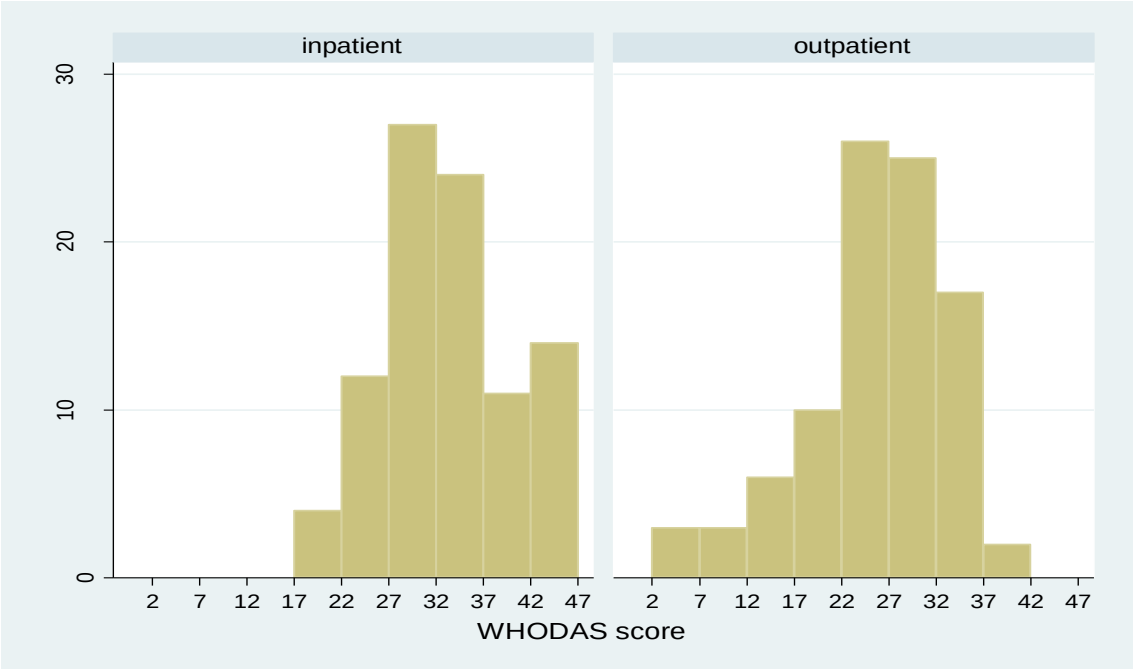

Figure 3: WHODAS Scores by management point

Patients with RTIs who were non-hospitalized had WHODAS scores ranging from 2 – 40 with a mean of 25.29 (SD 7.72) and median of 26 (IQR 22, 30.5). The distribution of WHODAS scores of non-hospitalized patients seemed to be slightly skewed to the left (Figure 4).

For those managed as inpatients, WHODAS scores ranged from 20 – 47 with a mean of 32.84 (SD6.76) and a median of 32 (IQR 28, 37.5). The distribution of inpatient WHODAS scores assumed a normal distribution. On average those managed as inpatients had higher WHODAS scores 32.83 (SD 6.76) compared to outpatients 25.29(SD 7.72). The difference between the average WHODAS scores was statistically significant ($p<0.001$).

The WHODAS scores were categorized into two major categories where a score of less than 24 was classified as less severe sub-acute phase disability and severe sub-acute phase disability. The results as per this classification are given in table 7.

Table 7: Categories of sub-acute phase disabilities

Category	**Hospitalized** **N (%)**	**Non-Hospitalized** **N (%)**	**Total**
Mild Disability	7(7.6)	31(33.7)	38
Severe Disability	85(92.4)	61(66.3)	146

There was a higher proportion (92.4%) of severe disability among those who were hospitalized compared to those who were non-hospitalized (66.3%). The difference in these proportions was statistically significant ($p<0.001$).

Table 8: Sub-acute phase disabilities scores per different body parts for non-hospitalized Patients

Variable	Category	Mild n (%)	Severe n (%)	p-value
Head and face	No	20	40	0.920[c]
	Yes	11	21	
Neck	No	31	61	-
	Yes	0	0	
Chest	No	25	55	0.210[f]
	Yes	6	6	
Abdomen/pelvis	No	30	57	0.660[f]
	Yes	1	4	
Back and spine	No	30	57	0.660[f]
	Yes	1	4	
Upper limb	No	15	29	0.939[c]
	Yes	16	32	
Lower limb	No	25	16	<0.001[c]
	Yes	6	45	

[c] Chi Square; [f] Fisher's Exact test

Only lower limb injuries were significantly associated with WHODAS score ($p<0.001$), where majority (88.2%) of those with lower limb injuries had severe disability compared to those who did not have lower limb injuries (39.0%).

Table 9: Sub-acute phase disabilities scores per different body parts for hospitalized patients

Variable	Category	Mild n(%)	Severe n(%)	p-value
Head and face	No	7	58	-
	Yes	0	27	
Neck	No	6	83	0.213[f]
	Yes	1	2	
Chest	No	6	74	>0.999[f]
	Yes	1	11	
Abdomen/pelvis	No	7	82	-
	Yes	0	3	
Back and spine	No	7	83	-
	Yes	0	2	
Upper limb	No	5	55	>0.999[f]
	Yes	2	30	
Lower limb	No	2	13	0.320[f]
	Yes	5	72	

[c] Chi Square; [f] Fisher's Exact test

Among the inpatients, only 7 patients ended up with mild disability hence it was difficult to compare the two variables as shown in the Table 9 above as many cells had inadequate numbers.

Table 10: Sub-acute phase disabilities scores per different body parts for Hospitalized and Non-hospitalized patients Combined

Variable	Category	Mild n (%)	Severe n (%)	p-value
Head and face	No	27	98	0.644[c]
	Yes	11	48	
Neck	No	37	144	0.584[f]
	Yes	1	2	
Chest	No	31	129	0.269[c]
	Yes	7	17	
Abdomen/pelvis	No	37	139	>0.999[f]
	Yes	1	7	
Back and spine	No	37	140	>0.999[f]
	Yes	1	6	
Upper limb	No	20	84	0.587[c]
	Yes	18	62	
Lower limb	No	27	29	<0.001[c]
	Yes	11	117	

[c] Chi Square; [f] Fisher's Exact test

Lower limbs were significantly associated with severe sub-acute phase disabilities ($p<0.001$), where majority (117) of those with lower limb injuries had severe disability compared to those who did not have lower limb injuries. No other part of the body which showed any significant association with disability status.

4.3: Factors associated with sub-acute phase disabilities

Table 11: Multivariable analyses of factors associated with sub-acute phase disabilities

Variable	Category	Mild n(%)	Severe n(%)	p-value
Body parts	Single site	29	66	0.001[c]
	Multiple sites	9	80	
Sex	Male	22	104	0.115[c]
	Female	16	42	
Management point	Hospitalized	7	85	<0.001[c]
	Non-hospitalized	31	61	
Education level	None/primary	20	69	0.555[c]
	Secondary/tertiary	18	77	
Age	Median(IQR)	28(21, 41)	30(23, 46)	0.235[w]

[c] Chi Square; [f] Fisher's Exact test; [w] Wilcoxon rank-sum test

Table 12: Unadjusted relative risk associated with WHODAS severe scores

Variable	Category	RR	95%CI	p-value
Age	Median(IQR)	1.002	0.997-1.008	0.301
Management point	Non-Hospitalized	1		
	Hospitalized	1.393	1.190-1.631	<0.001
Sex	Female	1		
	Male	1.139	0.953-1.362	0.151
Education level	None/primary	1		
	Secondary/tertiary	1.045	0.901-1.212	0.558
Body parts	Single site	1		
	Multiple sites	1.293	1.112-1.504	0.001
KTS	Mild	1		
	Moderate	1.177	1.021-1.356	0.024

Having been treated at inpatient department was significantly associated with severe SAPDs (p<0.001) with a 39% increase risk of severe SAPDs scores compared to being treated at outpatient department. A person with multiple sites injuries had a 29% increased risk of developing severe disability compared to a person with a single site injury (p=0.001) (Table 12).

Table 13: Adjusted relative risk associated with WHODAS severe scores

Variable	Category	ARR	95%CI	p-value
Age	Median(IQR)	1.003	0.998-1.008	0.212
Management point	Non-hospitalized	1		
	Hospitalized	1.406	1.206-1.639	<0.001
Sex	Female	1		
	Male	1.085	0.921-1.278	0.327
Education level	None/primary	1		
	Secondary/tertiary	1.102	0.957-1.269	0.174
Body parts	Single site	1		
	Multiple sites	1.298	1.120-1.505	0.001
KTS	Mild	1		
	Moderate	0.949	0.824-1.093	0.474

Adjusting for age, sex, education level, body parts and KTS score, having been treated at inpatient department was associated with a significant ($p<0.001$) 40% increase risk of severe disability score compared to being treated at outpatient department. Adjusting for age, management point, sex, education level, and KTS score, a patient with multiple sites injuries had an almost 30% increased risk of developing severe disability compared to a patient with a single site injury ($p=0.001$) (Table 13).

CHAPTER FIVE: DISCUSSION

5.1 Demographic Characteristics

Of the 184 patients who were recruited and analyzed with road traffic injuries (RTIs), males were predominant with a male to female ratio of 3:1. A study done at Kenyatta National Hospital (KNH) showed a similar trend with a male to female ratio of 3:1 (Gichuhi, 2007). The World Health Organization (WHO) reports that worldwide young age males are more likely (prevalence 73%) to suffer RTIs than women (WHO, 2018).

The ages of the participants ranged from 16 years to 63 years old with a mean age of 33.8 (SD 13.7). Majority of our patients were the economically productive age groups aged between 16 – 46 years old in both genders. These findings are in agreement with studies carried out in Eldoret, Kenya by Odero et al., 2003. which showed 75% of their participants were aged between 15 – 49 years and another by Bachani et al which found a male predominance in RTIs with a mean age of 35 year as well.

Majority (88.6%) of the patients had lower levels of education that is they did not have post-secondary education. Patients who were illiterate or with lower levels of education in this study were more likely to be involved in road traffic accidents incurring injuries. A study in Iran similarly found that uneducated people including children under seven years who did not have any formal education were more likely to be involved in RTAs and their mortality rates were up to 3 times higher than that of victims with a university degree (Sami et al., 2013). A study across nine European centers that included RTIs over 30 years of age found that victims with low levels of education associated with higher mortalities and that the most involved were males aged 30-49 years (Borrell et al., 2005).

By occupation, people of low socioeconomic status that is; those who were unemployed and those doing menial jobs (casual laborers) were more likely to be involved in RTIs. In this study they constituted 72.8%. A study done across Europe showed that people belonging to disadvantaged social classes or those residing or working in socioeconomically deprived regions were at a higher risk of RTIs (Borrell et al., 2005). Another study in the United States of America (USA) also reported that despite a decline in RTI associated mortalities, fatalities and RTIs were more common in poorer regions and this were defined by aggregate measures of income, poverty and low education (Harper, Charters, & Strumpf, 2015).

In this study the most vulnerable groups were pillion (motorcycle) passengers (30%), motorcyclists (26.1%) and pedestrians (22.2%). A study conducted at KNH in 2004 found their most vulnerable groups were pedestrians (62%), passengers (24%) and drivers (13%) (Okemwa, 2004). Closer to Webuye, in Eldoret, a study by Odhiambo et al., in 2013 showed that the most vulnerable group were Pedestrians (42%), passengers (38%), drivers 12 and cyclists (8%). Findings in these studies contrast those from findings in our study because they were carried out in 2003 and 2004 before the exponential increase of motorcycles in Kenya. In 2011 the Ministry of Public Health and Sanitation in Kenya reported that between 2005 and 2011, motorcycle registration increased by almost 40-fold. In 2011, motorcycles made up 70% of all newly registered vehicles (WHO and Ministry of Public Health & Sanitation, 2011).

5.2 Injury Characteristics

All injuries sustained were described either singly or in combinations by the body parts affected. The body part most affected by RTIs in this study were the lower limbs (69.5%) followed by upper limbs (43.5%) and head/face (32.1%). A study in Nairobi, Kenya that studied pedestrian injuries recorded the findings which were in agreement with what this study found, 67.7% of their participants had lower limb injuries, 10.4% head and neck, abdomen, lumbar spine and pelvis 5.2% (Ogendi et al., 2013). Another study reported lower limbs as the highest in their study at 42%, 35.4% head injuries, 10.8% Chest, 6.2 % Upper limbs (Matheka, Kitonyi, & Alkizim, 2015).

A higher proportion, 60.2% of our patients with lower limb injuries were managed as inpatients whereas a higher proportion with upper limb injuries 57.7% were managed as outpatients.

5.3 Injury Severity

Researcher used the Kampala Trauma Score (KTS) to assess the severity of injuries in this study. The KTS has been found to perform comparably to Injury Severity Score (ISS) and Revised Trauma Score (RTS) scores and has been described as a severity instrument that can help differentiate between severe and non-severe injuries (Macleod et al., 2007).

The mean KTS score for outpatient was 14.39(SD 0.67) and inpatient was 13.93(SD 1.20). Though the average KTS score seemed almost equal among the two groups, the difference between the two was statistically significant (p=0.001). A study by Macleod and his colleagues in Uganda reported higher KTS scores of 15-16 in 87.5% of their patients with KTS score of 15 showing a much higher frequency of occurrence. The need for admission in their study amongst patients who truly needed admission was detected for a cut off of 15, where 15 and below was considered severe

and a perfect score of 16 non-severe with a sensitivity of 93% and specificity of 85% (Macleod et al., 2007). Another study found that the mean admission KTS scores were 14.5 ± 0.6 and that KTS was not only a good predictor of mortality but a good predictor for the need for admission (Haac et al., 2015).

In this study, the Researcher adopted a classification that had been used in other studies for KTS scores and were classified as mild (14-16), moderate (11-13) and severe (<11) (Clarkson et al., 2012);Kobusingye et al., 2002).

This study found that KTS scores in non-hospitalized patients were higher compared to the hospitalized cohort. The proportion of those who were classified as having mild KTS among the inpatient was lower 73.9%) compared to that among the outpatient (91.3%). In total only one patient was classified as having a severe form of KTS and was treated as an inpatient. These findings are in agreement with those in a study in Uganda that looked at all kinds of injuries in a tertiary institution and found that majority of their patients suffered minor injuries (97%), 2% had moderate injuries and 1% severe. They also found that scores of <14 were more associated with mortality (Kobusingye et al., 2002).

5.4 Disability Severity

The measure of disability was the brief World Health Organization Disability Assessment Schedule (WHODAS) II, a 12 item tool. The tool assessed activity limitations and participations over the past 30 days along six dimensions. These included self-care, understanding and communication, mobility, interpersonal relationship, work and household chores and community involvement.

Patients managed as outpatients had WHODAS that ranged from 2 – 40 with a mean of 25.29 (SD 7.72) and median of 26 (IQR 22, 30.5). For those treated as inpatients their WHODAS score ranged from 20 – 47 with a mean of 32.84 (SD6.76) and a

median of 32 (IQR 28, 37.5).A follow up study done in Iran and reviewed patients at 1 and 3 months found WHODAS mean scores of 30.3 (SD 9.2) at one month and 18.8 (SD 8.3) at 3 months post injury (Abedzadeh-Kalahroudi et al., 2015). At one and three months they too measured sub-acute disability which the Researcher did at 8 to 10 weeks. On average those treated at the inpatients had higher WHODAS scores 32.83 (SD 6.76) compared to outpatients 25.29(SD 7.72). The difference between the average WHODAS scores was statistically significant ($p<0.001$). These findings concurred with studies done in New Zealand that found that disability was more prevalent among patients who were hospitalized after trauma (53.6%), than the non-hospitalized (39.4%) three months post trauma (Derrett et al., 2012).

When the Researcher analyzed disability scores by body parts, lower limb injuries were significantly associated with severe sub-acute phase disabilities ($p<0.001$), where majority (88.2%) of those with lower limb injuries had severe disability compared to those who did not have lower limb injuries (39.0%). This was in agreement with another study in New Zealand that also recorded that lower extremity injuries had high prevalence of morbidity (pain, mobility issues and discomfort) (Langley et al., 2011).

5.5 Factors Associated With Sub-Acute Phase Disabilities (SAPD)

The study also sought to establish factors that were associated with SAPD. Multivariate analysis was used to determine how multiple variables were associated with severity of SAPDs. The number of body parts injured and the management point was significantly associated with SAPDs ($P=0.001$ and $P<0.001$ respectively). Majority (80%) of patients with multiple injuries had severe forms of SAPDs while 85% of the hospitalized group had severe SADPs.

For multivariable analysis of the factors the Researcher dichotomized sub-acute phase disability into two; Mild and severe based on whether WHODAS scores were ≤24 or 25-48 respectively. Variables were age, sex management point, education levels and body parts affected. Body parts affected and management point were significantly associated with SAPDs ($p \leq 0.001$). The proportions of severe disabilities were higher in the hospitalized group (85%) as opposed to the non-hospitalized group (61%). A study in New Zealand by Derrett et al., in 2012 that looked at all manner of injuries and compared hospitalized versus non-hospitalized found SAPDs more prevalent in the hospitalized group 53.6% versus 39.4% in non-hospitalized.

When the Researcher calculated the crude relative risk, two factors were still associated with severe SAPDs namely body parts affected and point of management (hospitalized) ($p \leq 0.001$). When the Researcher adjusted for confounders it was found that again number of body parts injured and hospitalization were factors that predicted severe SAPD. The Researcher adjusted for age, education level, body parts and KTS score. Patients who had been hospitalized carried a 40% increased risk of severe disability ($p<0.001$) and having more than one injured body parts carried a 29% increased risk of disability ($p=0.001$).

Hospitalization in this study was an important predictor of severe SAPD. Other studies too reported that not only did hospitalization predict disability but also the duration of hospitalization (Abedzadeh-Kalaroudi et al .,2015;Holbrook et al., 2001).

In this study multiple injuries have been significantly associated with severe SAPD and this was in agreement with a study in Iran that found out that patients who had been transferred to ICU and those who had multiple injuries had severe forms of disability at 3 months (SAPD) post trauma(Abedzadeh-Kalahroudi et al., 2015).

In this study there were no significant differences between the male and female in term of sub-acute phase disabilities, which is in agreement with results from several other studies (Vles et al ., 2005;Holbrook et al 2001).

In this study the KTS was not a good predictor of SAPDs. The Researcher did not find any studies that have compared severity scores using KTS to any form of disability. However a study that used ISS did not also find any association as well (Richmond et al., 1998).

5.6 Strengths and Limitations

5.6.1 Study Strengths

One of the strengths of this study was that the included patients who were managed as outpatients as opposed to most studies that have always concentrated on inpatients with trauma. The study too looked at all body parts as opposed to most that have studied specific body parts like limb injuries and head injuries.

5.6.2 Study Limitations

The disability tool used required patients to recall the difficulties they had encountered over the past 30 days prior to the day of disability scoring. This might have introduced the possibility of recall bias.

The Researcher classified injuries by body parts affected and not by nature of the injuries and this might have introduced confounding bias by downplaying some serious injuries like fractures in some body parts.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The most vulnerable groups were the motorcycle users. Majority of the RTIs seen in Webuye were of mild severities and the body part most injured were the lower limbs.

Severe sub-acute phase disabilities were more prevalent amongst the hospitalized patients however more than half (66.3%) of the non-hospitalized group had severe sub-acute phase disabilities.

Patients with lower limb injuries and those with multiple injuries suffered severe sub-acute phase disabilities.

The factors associated with severe sub-acute phase disabilities were hospitalization and multiple injuries.

6.2 Recommendations

All patients involved in road traffic accidents should be followed up and screened for sub-acute phase disabilities and other forms of disabilities.

Special attention should be given to patients with lower limb injuries, multiple injuries, hospitalized and non-hospitalized patients as they all suffer severe forms of SAPDs.

Since this study had a short follow-up period we recommend a longer period of follow up to fully appreciate the outcome of disability from RTIs and also establish the trajectory to recovery.

A larger study that can be generalizable needs to be carried out in multiple sites to highlight the magnitude of road traffic injuries and the resultant disabilities in different settings.

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APPENDICES

Appendix 1: IREC Approval

MU/MTRH-INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE (IREC)

MOI TEACHING AND REFERRAL HOSPITAL
P.O. BOX 3
ELDORET
Tel: 33471/2/3

MOI UNIVERSITY
COLLEGE OF HEALTH SCIENCES
P.O. BOX 4606
ELDORET

Reference: IREC/2018/115
Approval Number: 0003063

27th July, 2018

Dr. Sameul Ateya,
Moi University,
School of Medicine,
P.O. Box 4606-30100,
ELDORET-KENYA.

INSTITUTIONAL RESEARCH & ETHICS COMMITTEE
27 JUL 2018
APPROVED
P.O. BOX 4606 - 30100 ELDORET

Dear Dr. Ateya,

RE: FORMAL APPROVAL

The MU/MTRH- Institutional Research and Ethics Committee has reviewed your research proposal titled: -

"Sub-Acute Phase Disabilities amongst Hospitalized and Non-Hospitalized Road Traffic Injuries Managed at Webuye Hospital, Kenya".

Your proposal has been granted a Formal Approval Number: ***FAN: IREC 3063*** on 27th July, 2018. You are therefore permitted to begin your investigations.

Note that this approval is for 1 year; hence will expire on 26th July, 2019. If it is necessary to continue with this research beyond the expiry date, a request for continuation should be made in writing to IREC Secretariat two months prior to the expiry date. You will be required to submit progress report(s) on application for continuation, at the end of the study and any other times as may be recommended by the Committee.

Furthermore, you must notify the Committee of any proposal change (s) or amendment (s), serious or unexpected outcomes related to the conduct of the study, or study termination for any reason. You will also be required to seek further clearance from any other regulatory body/authority that may be appropriate and applicable to the conduct of this study.

Sincerely,

DR. S. NYABERA
DEPUTY-CHAIRMAN
INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE

cc CEO - MTRH Dean - SOP Dean - SOM
Principal - CHS Dean - SON Dean - SOD

Appendix 2: Consent Form

CONSENT FORM

ENGLISH VERSION

Investigator: My name is Dr. Ateya Samuel. I am a qualified doctor, registered by the Kenya Medical and Dentists Practitioners Council. At the moment am pursuing a Master's degree in Family Medicine at Moi University. I would like to seek your consent in participating in this research that will be looking at severity of road traffic crashes and their associated sub-acute disabilities measured at after one month post injury at Webuye Hospital.

Purpose: This study will seek to study severities of injuries and measure disabilities suffered that would have been caused by Road Traffic Injuries at Webuye Hospital.

Procedure: Patients presenting to Webuye Hospital with injuries as a result of Road Traffic Crashes with be attended to as per the Advanced Trauma Life Support (ATLS) protocol and injuries will be assessed using a locally validated trauma score known as the Kampala Trauma Score. Consent will then be sought to recruit into the study. Data collection will be done by interviewing and filing of questionnaires. Data collecting material will not be shared with any other persons and will be kept in a locked cabinet in the office of the principal investigator during the study period. A follow up will be done by me and patients will be asked questions on their limitations that are from a WHO disability instrument called WHODAS that will help us assess the level of limitations suffered, which here in this research referred to as sub-acute disabilities

Benefits: There will be no direct benefits of participating in this study. Study subjects will be accorded same quality of management as non-study subjects

Risks: There are no anticipated risks to the participants attributable to this study.

Confidentiality: All information obtained in this study will be treated with utmost confidentiality and shall not be divulged to any unauthorized person

Rights to Refuse: Participation in this study is voluntary, there is freedom to refuse to take part or withdraw at any time. This study has been approved by the Institutional Research and Ethics Committee (IREC) of Moi University/Moi Teaching and Referral Hospital.

Sign or make a mark if you agree to take part in the study

Patient: …… Investigator: …….. Date…….

IDHINI

Mpelelezi: Jina langu ni Dkt. Ateya Samuel. Mimi ni daktari aliyehitimu, nimesajiliwa na bodi ya Kenya ya Madaktari na Madaktari wa meno. Mimi sasa nasomea shahada ya uzamili katika Family Medicine katika Chuo Kikuu cha Moi. Ningependa kukuajiri wewe katika utafiti wangu ambao ni wa kujifunza mielekeo na ukali wa majeraha yanayosababishwa na ajali za barabarani na ulemavu wao katika Hospitali ya Webuye.

Madhumuni: Utafiti huu utajaribu kepeleleza mielekeo na makali ya majeraha ya ajali za barabarani na ulemavu unaotokana na hizo ajali.

Utaratibu: Wagonjwa wanaowasili hospitalini Webuye na majeraha ya ajali za barabara, watapata huduma za matibabu kulingana na itifaki za Hospitali ya Webuye, kifaa cha Kampala Trauma Score kitatumika kunakili makali na athari za majeraha. kufuataliwa kutafanyika baada ya mwezi kutathmini kiwango cha ulemavu. Data zitakusanywa kwenye fomu za ukusanyaji data. Hifadhi zitakazo tumika katika ukusanyaji wa data zitawekwa katika kabati iliyofungwa katika nyumba ya mpelelezi mkuu katika kipindi cha utafiti.

Faida: Hakutakuwa na malipo yeyote ya kushiriki katika utafiti huu. Wanaofanyiwa utafiti watakuwa nahaki nakupewa ubora sawa na wale ambao hawatofanyiwa utafiti huo.

Hatari: Hakuna hatari ya kutarajia kwa washiriki inatokana na utafiti huu.

Usiri: Habari zote zilizopatikana katika utafiti huu wa kutibiwa zitawekwa kwa usiri mkubwa na wala haitaolewa kwa mtu yeyote asiye husika na utafiti.

Haki ya kukataa: Kushiriki katika utafiti huu ni hiari yako, kuna uhuru wa kukataa kuchukua sehemu au kutoka wakati wowote. Utafiti huu imekuwa kupitishwa na Utafiti wa Taasisi na Kamati ya Maadili (IREC) ya Chuo Kikuu cha kufundishia Moi na Hospitali ya Rufaa.

Kusaini au kufanya alama kama unakubali kushiriki katika utafiti

Mgonjwa: ..... Mpelelezi:

.....

Tarehe: .....

Appendix 3: Questionnaire
Socio-Demographic Questionnaire and Kampala Trauma Score

SOCIO-DEMOGRAPHIC DATA

CODE: _____ FIRST NAME_____

CONTACTS (PHONE) _____

PHYSICAL

ADDRESS_____

AGE: _____

Any pre-existing known mental illness or physical impairment prior this road traffic injury(RTI)?

Yes ☐ No ☐

POINT OF MANAGEMENT: ☐ INPATIENT ☐OUTPATIENT

GENDER: Male☐ Female☐

EDUCATION: ☐ Illiterate ☐ Primary ☐ secondary ☐ College ☐ University

EMPLOYMENT: ☐ Not Employed ☐ Casual laborer ☐ Formal Employment ☐ Business

CATEGORY OF ROAD USER: ☐ Pedestrian ☐ Driver ☐ Cyclist ☐ Motorcyclist

☐ Motorcycle passenger ☐ Motor vehicle passenger

☐ Non-motorized (cart pusher)

INJURIES SUSTAINED AMONG CASUALTIES: (If multiple tick all applicable)

☐ Head and Face ☐ Neck ☐ Chest ☐ Abdomen/Pelvis ☐ Back/Spine ☐ Upper Limbs

☐ Lower Limb

The Kampala Trauma Score

Description	Scores
f) Age (in years)	
5-55	2
<5 or > 55	1
g) Systolic blood pressure (mmHg)	
>89	4
50-89	3
1-49	2
Undetectable	1
h) Respiratory rate (breaths per minute)	
10-29	3
≥30	2
≤9	1
i) Neurological status (AVPU)	
Alert	4
Responds to verbal stimuli	3
Responds to painful stimuli	2
Unresponsive	1
j) Number of serious injuries	
None	3
One	2
Two or more	2
KTS total (a+b+c+d+e)	

Appendix 4: WHODAS

DISABILITY TOOL: WORLD **H**EALTH **O**RGANIZATION **D**ISABILITY **A**SSESSMENT **S**CHEDULE 2.0 (**WHODAS 2.0)**

1**2-item version self-administered**

CODE: _____

This questionnaire asks about difficulties due to health conditions.

Think back over the past 30 days and answer these questions, thinking about how much difficulty you had doing the following activities. For each question, please circle only one response.

IN THE PAST 30 DAYS HOW MUCH DIFFICULTY DID YOU HAVE IN….? ***Circle the Appropriate answer***		**None**	**Mild**	**Moderate**	**Severe**	**Extremely/ Cannot**
1	Standing for long periods such as 30 minutes?	0	1	2	3	4
2	Taking care of your household responsibilities?	0	1	2	3	4
3	Learning a new task for example getting to a new place?	0	1	2	3	4
4	How much of a problem did you have joining in community activities (for example going to church, chamas or events) in the same way as anyone	0	1	2	3	4

	else can?					
5	How much have you been emotionally affected by your health problems?	0	1	2	3	4
6	Concentrating on doing something for Ten minutes?	0	1	2	3	4
7	Walking a long distance such as a kilometre [or equivalent]?	0	1	2	3	4
8	Washing your whole body?	0	1	2	3	4
9	Getting dressed?	0	1	2	3	4
10	Dealing with people you do not know?	0	1	2	3	4
11	Maintaining a friendship?	0	1	2	3	4
12	Your day-to-day work?	0	1	2	3	4
WHODAS DISABILITY SCORE (Sum of above)						

Appendix 5 APPENDIX I: WORK PLAN

Year	2017-2018	2018	2018	2019	2019	2019	2019	2019
Month		July	July - Dec	Jan-Feb	March-Apr	April	Sept	October
Proposal development with supervisors	X							
Approval by IREC		X						
Data collection			X	X				
Data Analysis								
Report writing					X			
Findings Presentation and Mock Defenses (Departmental)						X		
Thesis Defense							X	
Manuscript for publication								X

APPENDIX 6: ESTIMATED BUDGET

NO.	STATIONARY AND EQUIPMENT	QUANTITY	COST PER UNIT (KSHS)	TOTAL (KSHS)
1	Printing papers	4 reams	500	2,000
2	Ball points	1 Packet	20	400
3	Pencils	5	20	100
4	Erasers	5 pieces	5	25
5	Pocket files	5	100	500
6	Staples	1	200	200
7	Printing of draft proposals	7 copies	500/copy	3,500
8	Printing final proposal	5 copies	500/copy	2,500
9	binding research Proposal thesis Development	5 copies	200/copy	1,000
10	Printing of draft thesis	5 copies	1000/copy	5,000
11	Binding Thesis (hard cover)	5 copies	500/copy	2,500
12	Lunch allowances for research assistants	2	500x2x5 x6	30,000
13	Travelling expenses			40,000
14	Phone calls, internet costs			10,000
15	Data handling and analysis			30,000
	GRAND TOTAL			127, 725