

**DEPARTMENT OF SOCIOLOGY AND SOCIAL WORK
UNIVERSITY OF NAIROBI**

**TRANSPORT DEMANDS AND ITS IMPACT ON ROAD SAFETY AND
EXPOSURE TO POST TRAUMATIC STRESS DISORDER (PTSD). THE CASE
OF *BODA BODA* OPERATIONS IN MURANG'A TOWN**

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**RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENT FOR THE DEGREE OF MASTER OF ARTS (M.A) IN
ADVANCED DISASTER MANAGEMENT**

2014

DECLARATION

This project is my original work and has not been presented for a degree or any other award in any other university or institution.

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DEDICATION

This project is dedicated to my dear parents the Late Mr G. King'ori and Mrs I. King'ori, my brothers; George and Harrison, sisters; Grace, Esther, Ann and Susan and my fiancé Emmanuel for their prayers, encouragement and moral support. God bless you all

ACKNOWLEDGEMENTS

This research has been completed with great assistance from several individuals and Institutions. I will mention just but a few of these.

I am greatly indebted to my supervisor Dr. Robinson Ocharo for his insight, intellectual stimulation and advice all through the study.

My sincere thanks to Murang'a *boda boda* operators, Murang'a Provincial Hospital and Murang'a Police Station for their great cooperation in getting in depth factual information on the subject of study.

I wish to express great gratitude to family and friends for the support, guidance and encouragement throughout this study.

Last but not the least; I thank God for His abundant grace that saw me through my studies and the completion of this project.

LIST OF ACRONYMS

APTA	Association for the promotion of Tourism
CBS	Central Bureau of Statistics
GFHR	Global Forum for Health Research
GNP	Gross National Product
IDR	Indonesian Rupiah
KNBS	Kenya National Bureau of Statistics
KRA	Kenya Revenue Authority
MVA	Motor Vehicle Accidents
NCC	Nairobi City Council
NHTSA	National Highway Traffic Safety Administration (NHTSA)
NASS	National Automotive Sampling System
PSV	Public Service Vehicles
PTSD	Post Traumatic Stress Disorder
RTA	Road Traffic Accidents
RTIs	Road Traffic Injuries
SLAM	Simultaneous Localization and Mapping
UNDP	United Nations Development Programme
USA	United States of America
US\$	United States dollar
WHO	World Health Organization

ABSTRACT

The purpose of the study was to analyze the impact of road safety in relation to Post Traumatic stress disorder (PTSD) among *boda boda* operators in Murang'a town. The study sought to answer the following questions: Which are the traffic laws and contingency measures that the government has put in place? How exactly do the *boda boda* operations comply with the existing laws and regulations? What are the challenges faced by law enforcers? How frequently and in what trend do motorcycle accidents happen? What are the pre-disposing variables to PTSD of *boda boda* accidents?

The study was undertaken in Murang'a town, Murang'a County. The study adopted a descriptive research design which utilized both probability (simple random) and non-probability (snow balling) sampling methods. Simple random sampling of 87 *boda boda* operators who had not been involved in any road accident was deployed. Snow balling was finally deployed to sample other 87 *boda boda* operators who had gotten involved in a road accident.

Data was collected using questionnaire for both operators who were not involved in road accident and operators who were involved in road accident. Key informants, who were OCPD and the traffic police on duty were interviewed in order to gain more insight on the phenomenon. Data collected were analyzed both qualitatively and quantitatively.

The study found that there are clearly defined traffic rules and regulations that regulate *boda boda* transport system under the new traffic (Amendment) Act 2012. This include, a person shall not ride on a motorcycle without wearing a helmet, a jacket and a reflector, Every motorcycle shall be insured, a person shall not ride a motorcycle unless that person has a valid driving license and anyone who fails to comply with the provision of this section is liable to a fine not exceeding ten thousand shillings or, in a default of payment, to imprisonment for a term not exceeding twelve months.

The study found that most (65.4%) of the respondents did not adhere to the traffic laws even to those they were familiar with and only 34.6 percent complied to the traffic laws.

The study found that the main challenges faced by law enforcers in their effort to enforce traffic laws in Murang'a town are: lack of harsh penalties, corruption and lack of capacity.

The study found that 25.9 percent of the total annual accidents were reported as fatal, 44.7

percent as serious injuries and 29.4 percent as slight injuries. This accounted for 100 percent of the accidents, thus implying that none of the accidents reported was non – injury, a situation that is not probable, casting doubts on the credibility of the data and lead to other questions as to whether the issue of under reporting is ever addressed by the authorities charged with accidents data reporting. In 2009 there were a total of 11,669 injuries, in 2010 there were 9771 injuries while in 2011 there were a total of 8876 injuries.

Finally, the study also investigated on the presence of predisposing variables to PTSD among *boda boda* operators. The study found a mean of 44 percent of respondents who were not involved in road traffic accident showed presence of pre-accident variables to PTSD while 50 percent of those respondents involved in road traffic accident had pre accident symptoms to PTSD. The accident related variable portrayed in *boda boda* accident victims were shock, pain, helplessness and confusion and physical injury. Out of 87 respondents who were involved in raod accident, most (41.4%) experienced shock in the time of accident. The victims suffered broken limb (96.6%), road rash (50.6%), Head injury (19.5%) and spinal injury (17.2%).The study found that 61.1 percent of road *boda boda* operators who survived road traffic accident had post-accident symptoms to PTSD. Finally, the study findings concluded that if pre accident variables to PTSD are not treated, the survivor will experience accident- related variables and then post-accident variables, thus they are prone to PTSD. This could be caused by risk factors that increase the trauma, such as; living through dangerous events and traumas, dealing with extra stress after the event, Pain, injury or loss of a job or home, seeing people hurt or killed and having a history of mental illness.

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CHAPTER ONE: INTRODUCTION

1.1 Background to the study

Transport can be perceived as an induced or latent demand, that is, a demand response to the addition of transport infrastructure results in traffic volume increases. In economic terms this is due to the reduction in the price of a commodity and in the transport context an increased mobility, results in the lower perceived cost of travel (reduced travel time or delay or improved reliability), hence increase in demand.

The demand for transport is a derived demand, an economic term, which refers to demand for one good or service in one sector occurring as a result of demand from another (Schreffler, 2010). Users of transport are primarily consuming transport service not because of its direct benefits, but because they wish to access other services. Transport demand is about movement of people and goods. We travel in order to satisfy a need (work, education, recreation) and we transport goods as part of the overall economic activity.

Transport demand refers to the amount and type of travel people would choose under specific conditions, taking account factors such as the quality of transport options available and their prices. Transport demand is generated by the economy. An economic system including numerous activities located in different areas generates movements that must be supported by the transport system (Jean and Theo, 1998).

In Kenya, there are several types of public transportation. These include buses, train, planes, matatus, bicycles, motorcycles and walking. In the recent past cycling and riding has become a common mode of transport in Kenya. Motorcycle taxis commonly known as *boda boda* have become significant in the largest cities and rural areas due to the increasingly traffic jams and poor road networks impassible by vehicles.

Increases in motorcycle travel are linked to a range of health problems including road injuries and fatalities, post-traumatic stress disorder (PTSD) and reduced physical activity. I am concerned that current patterns of transport, which are dominated by motorized road transport, have substantial adverse impacts on health.

Knowing traffic laws and rules helps to keep the road safe for riders, drivers and pedestrians and one can significantly reduce the above risks by following these basic road safety principles. Road users must always follow traffic rules, signs, and signals and they

must be considerate to other road users. Following simple safety reminders will greatly enhance road safety for motorists. Not only will they avoid accidents but will also reduce vulnerability to Post Traumatic Stress Disorder (PTSD).

Motorcycle transport demand in Kenya has contributed to this research. The researcher not only looked at its safety but also tried to examine whether *boda boda* operators are exposed to variables that make them vulnerable to Post Traumatic Stress Disorder.

1.1.1 Motorcycle (boda boda) in other countries

Motorcycle taxis (boda boda) are one of the most affordable types of mechanical transport in a lot of parts of the world and for a large amount of the world's population. Vietnam for instance, *boda boda* are known as xe om. This lightweight mode of transportation is one of the most popular in Vietnam (Schreffler, 2010).

Writing about the same in the United Kingdom, Elvik (2004) points out that the industry began in 1990 and has established itself as a niche market, never growing past a total of 12 bikes. The bikes are licensed by Transport for London and the Public Carriage Office, (PCO) who also license London's black cabs. There are currently three firms offering a taxi bike service based in London.

Charney (2004) pointed out that a motorcycle for hire service in California and New York City began in 2011. Experienced riders, many former police motorcyclists, carry clients on Honda Gold Wings. He says that in California an operator can bypass traffic congestion by lane splitting. Passengers are provided with helmets, airbag vests, and Bluetooth in-helmet cell phones.

In Indonesia, Sorensen (2009) says Motorcycle taxis or Ojek are a very common unlicensed form of transport. Commonly called ojek, they can be found in most areas of the country, from towns where traffic jams sometimes greatly hinder other forms of transport to rural areas where four-wheeled vehicles cannot travel.

Motorcycle taxis are a licensed form of transport in Goa, India. Yamaha, Harley Davidson, Hero Monocarp, Honda, TVS Motors, Bajaj Auto and Mahindra 2 Wheelers are the largest two-wheeler companies in terms of market-share (Haworth, 2010). They are much cheaper than other taxis, although the lone passenger can only carry a backpack as luggage. By law, in some parts of the state, the rider is expected to wear a helmet, but the pillion-rider is not.

In Nigeria, the use of motorcycles by private individuals had existed for a long time. The commercial use of motorcycles began in Calabar, the capital of Cross River State of Nigeria in the early 1970s. Its use for commercial services grew after the nationwide retrenchment of civil servants in 1975/76 (Orsillo, 1996). Apart from Calabar, documentary evidence also shows that motorcycles were first introduced for public transport in the northern Nigerian town of Yola in 1970 (Oladipo and Olubomehin, 2002). By the 1980s, the use of motorcycles for public transportation had gradually spread to other parts of Nigeria.

Away from the main roads, transport was still a problem in Uganda. In the 1960s bicycle taxis were used to take people and their bags between Uganda's border posts with Kenya, Tanzania and Rwanda (because they took people from "Border to Border" they became known as "Boda-Bodas". Their use gradually spread throughout Uganda. During the 1990s riders started to use motorbikes instead of bicycles, and the name "Boda-Boda" was used for them too (Naumann and Zaloshnja, 2010).

The *boda boda* are part of the Kenyan road transport system; they started in the 1960s and 1970s and are still spreading from their origin on the Kenyan - Ugandan border to other regions. The name originated from a need to transport people across the "no-man's-land" between the border posts without the paperwork involved with using motor vehicles crossing the international border. This started in the southern border crossing town of Busia (Kenya/Uganda), and quickly spread to the northern border town of Malaba (Kenya).

1.1.2 Road traffic accidents

Of the total traffic deaths reported in the following countries in 2007, global motorcycle mortality rates were highest in Thailand, Cambodia , Indonesia, Malaysia, France, USA and México at 70, 63, 61, 58, 25, 11, and 6% respectively (Odera, 2009). In the East African region, two-wheel automobiles have recently become a popular mode of public transport, and statistics have revealed that motor cycle accidents are claiming many lives. In 2007, 16 percent of Rwanda's total road accident deaths were due to motorcycles accidents, while in Uganda and Tanzania, 7 percent of the total deaths were attributed to motorcycle crashes (Odera, 2009).

The causes of motorcycle accidents are human, environmental errors and defective vehicles (Haworth, 2010; WHO, 2010). Motorcycle mortality rates in Kenya have been surging upwards with records showing that between 2005 and 2009, motor cycle deaths excluding passengers rose from 1.7 percent to 6.1 percent in the same period (Odera, 2009).

MVAs is a double tragedy, apart from injuries, fatalities and disabilities, it also causes trauma. Injury severity in general does not predict posttraumatic stress disorder. The development of post-traumatic stress symptoms is influenced by preexisting personality characteristics, the nature of the trauma, the person's reaction during the event and subsequent experiences. Among factors that predispose persons to PTSD are prior traumatic experiences and a history of psychiatric disorders (Moffic, et. al 1999).

Table 1: Risk Factors for Post-traumatic Stress Disorder Following a Motorcycle Accident

Severe accident
Fatalities or severe injury among those involved
Perceived life-threatening event
Intrusive memory immediately following the event (flashback)
Subsequent difficulty driving or traveling in vehicles
History of prior traumatic experiences
History of underlying psychiatric disorder
Ongoing litigation

Source: *National Center for PTS*

Other predisposing variables to PTSD among MVA victims include (Ehlers, 1998)

1. Pre-accident variables such as:
 - Poor ability to cope in reaction to previous traumatic events
 - Depression and poor social support
2. Accident- related variables such as:
 - Loss of relatives
 - Friends and physical injury
3. Post-accident variables such as:
 - Rate of physical recovery from injury
 - Poor social support from family and friends
 - Low level of active re-engagement in both work and social activities

Accident severity, fatalities and severe injuries contribute to the potential for development of PTSD. Patients who perceived a significant threat to their life, regardless of actual injury, should be carefully assessed. Horrific and intrusive memories immediately following a motor vehicle accident are a strong predictor of PTSD symptoms, regardless of severity.

1.2 Problem statement

It is clear that the *boda boda* industry has made a significant and unique contribution to the conduct of economic and social activities by providing services in circumstances where the main alternative is to walk, which is slow, expensive as a mean of load carriage and of limited capacity. The low- capacity of *boda boda* enables them to service demands that other forms of transport find uneconomic. They provide service coverage in previously inaccessible rural and urban areas.

The main dis- benefits associated with *boda boda* services are their poor safety record and the pollution created in urban areas by concentrations of motorcycles. It is reported that when motorcycle passengers are not in helmets, protective suits, gloves and boots, they are 27 times more likely to die in a crash and six times likely to be injured than a car passenger. Estimates indicated that a motorcyclist is two and half times more likely to be involved in an accident than a motor vehicle driver (Haworth, 2010).

Table 2: Kenya – trends in Motorcycle deaths, 2005-2009

Year	Total road Deaths	Motorcyclists (excl. passengers)
2005	2,531	44 (1.7%)
2006	2,714	34 (1.25%)
2007	2,893	35 (1.2%)
2008	3,633	152 (4.2%)
2009	2,669	164 (6.1%)

Source: Kenya Traffic Police Department (2009).

The safety of these motorcycles has time and again come under serious scrutiny. According to World Bank, among the pertinent issues includes drunk driving and lack of adequate safety measures such as proper maintenance of motorcycles. Motorcycle riders do not put on heavy clothes and helmets or even own one for their passengers thus prone to cold and serious injuries in case of accidents.

Not every victim however survive, some die while going to the hospital or while undergoing treatment at the hospital. The situation has worsened to an extent that major hospitals in principle towns in the country are now dedicating a whole Ward to motorcycle accident victims. Not only is this a drain on the resources of the Health Ministry, it also results in loss of income for operators/users, high insurance claims and robbing of families of their loved ones and livelihoods when fatalities occur (Mengot, 2010).

Large numbers of people who survive from road accidents are severely injured following injuries each year and these injuries place a large burden on health care resources. The majority of the severely injured are not fully recovered 12-18 months later. Psychological disorders are common post injury and are associated with poorer functional and occupational outcomes (Koren et al, 1999).

Initial acute symptoms include neck pain, restricted mobility in the cervical spine, headache, thoracic spine pain, radiating pain and paraesthesiae or weakness in the arms or legs (Sebit, 1992). These symptoms are however taken care of in the hospitals during treatment. Unfortunately, there are other symptoms that are never treated and are likely to develop; psychological symptoms such as initial shock, a dazed feeling, anxiety, anger, depression, difficulty concentrating, insomnia, lassitude, loss of libido, altered appetite and weight and, in some cases, feelings of helplessness, horror, despair and relieving experiences (Mayou & Radanov, 1996). Most people who suffer whiplash injuries make a complete recovery but a significant proportion suffer enduring somatic or psychological symptoms. Symptom complexes persisting for more than 6 months sometimes have been referred to as 'late whiplash syndromes' (Brewin, 2000).

It is estimated that 9 percent of survivors of serious accidents develop significant post-traumatic stress symptoms and that many other survivors have PTSD-like reactions (Scott et al, 1992). Motor vehicle accidents therefore are a recognized form of trauma and mental health difficulties may occur even in those who have not suffered physical injuries (Koren et al, 1999). PTSD is a pervasive anxiety disorder that is currently defined by the

existence of three clusters of symptoms (re-experiencing, avoidance and numbing, and hyper arousal) persisting for at least one month, following a traumatic event (Blanchard, 1995). The three types recognized are the acute (with symptom duration of 1-3 months), chronic (symptom duration of three or more months) and delayed onset if the onset of symptoms occurs at least six months after the traumatic event.

Risk factors which are related to the development of post-traumatic stress disorder among motorcycle accident survivors may be divided into 1. Pre- 2. Peri- and 3. Post- exposure factors. It is not clear, however, which of the above risk factors is the most significant predictor of PTSD and whether the pre-, peri- and post- exposure risk factors have cumulative effects in predicting the development of PTSD (Solomon, 1992). Therefore, this study sought to find out the extent to which the above variables are attended to among the motorcycle accident victims.

1.3 Research questions

1. Which are the traffic laws and contingency measures that the government has put in place?
2. How exactly do the *boda boda* operations comply with the existing laws and regulations?
3. What are the challenges faced by law enforcers?
4. How frequently and in what trend do motorcycle accidents happen?
5. What are the pre-disposing variables to PTSD of *boda boda* accidents?

1.4 Project objectives

Studies done so far show that motorcycle operators are exposed to variables that make them vulnerable to Post Traumatic Stress Disorder (Asmundson, 2002). PTSD is influenced by preexisting traumatic experience, experience during the accident and experience after the accident. Such variables are classified into three categories that is: Pre accident variables, accident related variables and post accident variables. Therefore, if operators possess any of the above variable / condition they are vulnerable to PTSD.

1.4.1 Main objective

The main objective of this study was to find out the existence of vulnerability variables to PTSD among the *boda boda* operators.

1.4.2 Specifics objectives

1. To establish the current traffic laws put in place by the Kenyan government to prevent and respond to *boda boda* operations.
2. To examine the extent to which *boda boda* operations comply with the existing laws and regulations.
3. To establish challenges faced by law enforcers.
4. To find out the frequency and trend of motorcycle accidents.
5. To investigate the presence of predisposing variables to PTSD.

1.5 Justification of the study

The streets in Kenya have long been congested with pedestrians, cars, three-wheeled tuk tuks and enormous city buses. But these days, as cars and buses sit in traffic jams, thousands of motorcycles can be seen weaving through traffic. The sudden gorge of motorcycles in Kenyan markets and city streets has drastically changed the dynamic of transportation.

Village markets and city streets from western Kenya to the Rift Valley were filled only with pedestrians and pickup trucks, owing to the rugged rural roads. Today, the roads are teeming with two-wheelers.

Newly affordable, thanks to increased import by Chinese and Indian traders and a waived import duty, *boda boda* are simultaneously changing the face of taxi transport and helping many of Kenya's unemployed earn some fast cash. The flood of cheap motorcycle imports into Kenya has created a boom in unregulated motorcycle taxi services.

This transport industry's vast growth has been accompanied by increasing road traffic accidents that have threatened safety of Kenyan travelers. Odero, Khayesi and Heda (2003) nearly 3,000 people are killed on Kenyan roads annually. This translates to

approximately 68 deaths per 1,000 registered vehicles, which is 30-40 times greater than in highly motorized countries. As motorcycles become the main cause of road accidents – a special wing in local hospitals are now reserved for motorcycle accidents. However, only primary health care is given in hospitals and no psychological care is offered to the survivors and their families.

These survivors of road accidents are at risk of suffering Post Traumatic Stress Disorder and especially if the survivor has been repeatedly exposed to other life-threatening situations. However, not all survivors develop PTSD (Schnurr, 1996). Many factors play a part in whether a person will get PTSD. Some of these are risk factors that make a person more likely to get PTSD. Other factors, called resilience factors, can help reduce the risk of the disorder. Some of these risk and resilience factors are present before the trauma and others become important during and after a traumatic event.

Risk factors for PTSD include (Brewin, 2000):

- Living through dangerous events and traumas
- Having a history of mental illness
- Getting hurt
- Seeing people hurt or killed
- Feeling horror, helplessness, or extreme fear
- Having little or no social support after the event
- Dealing with extra stress after the event, such as loss of a loved one, pain and injury, or loss of a job or home.

Resilience factors that may reduce the risk of PTSD include (Charney, 2004):

- Seeking out support from other people, such as friends and family
- Finding a support group after a traumatic event
- Feeling good about one's own actions in the face of danger
- Having a coping strategy, or a way of getting through the bad event and learning from it
- Being able to act and respond effectively despite feeling fear.

Based on these facts, the researcher tried to study the various predisposing factors that expose the accident survivors to PTSD. With more study, it may be possible someday to predict who is likely to get PTSD and prevent it.

1.6 Scope and limitation of the study

The research limited to motorcycles used for commercial purposes (the famous *boda boda*). This therefore excluded bicycles and tuktuk taxis.

The research only focused on *boda boda* operators who were one; involved in road traffic accident and incurred serious injuries and two; operators who had totally not been involved in road traffic accident in Murang'a town.

The research specifically looked at the existing traffic laws and regulations put in place by the Kenyan Government under Traffic Police to regulate *boda boda* operations in the area.

The research also looked into details whether the *boda boda* operators complied with the existing laws and regulations put in place to reduce road accidents. For instance if the operators put on protective clothes and reflectors, if they observed road signs among many other terms and conditions such as carrying of passengers, parking and maintenance.

The research also tried to find out the challenges faced by law enforcers as they enforce this traffic rules.

The research looked at the frequency and trends of road traffic accidents and fatalities in Kenya. It analyzed if the number of deaths and injuries caused by *boda boda* decreased or increased in the last three years in Murang'a town. Using the health standardized classification of accidents the injuries were classified into slightly, serious and fatal injuries.

Lastly, the research tried to find out the presence and absence of predisposing variables to PTSD among *boda boda* operators. Specifically, the study looked at the pre- accident, accident- related and post- accident variables present.

1. pre-accident variables such as:
 - poor ability to cope in reaction to previous traumatic events
 - depression and poor social support
2. accident- related variables such as:
 - loss of relatives
 - friends and physical injury
3. post accident variables such as:
 - rate of physical recovery from injury
 - poor social support from family and friends
 - low level of active re-engagement in both work and social activities

1.7 Definition of Terms and Concepts

In this study, the following concepts have the following meaning:

Boda boda- a bicycle/motorcycle with a brightly coloured cushioned pad attached behind the seat, used for carrying one passenger at a time.

Bicycle- a device propelled solely by human power upon which a person or persons may ride, having two tandem wheels either of which is 16 inches or more in diameter, or three wheels, any one which is more than 20 inches in diameter(chapter 10 Traffic Regulation).

Accident- An unexpected and undesirable event, a mishap unforeseen and without cause (Joyce Kabigi, 2011). An accident is defined as a traffic accident if it occurs on a road or in a place to which the public have access. This can include footpaths and bridgeways.

Vulnerability- According to International Federation of Red Cross and Red Crescent vulnerability is defined as the diminished capacity of an individual or group to anticipate, cope with, resist and recover from the impact of a natural or man-made hazard (Bankoff, Greg et al, 2004)

Emergency- Any situation in which the life or well-being of a population will be threatened unless immediate and appropriate action is taken, and which demands an extraordinary response and exceptional measures.

Road safety- Refers to methods and measures that are issued to reduce risks of injury, death and harm to drivers, passengers and pedestrians.

Exposure-State or condition of being unprotected and open to damage, danger, risk of suffering a loss in a transaction, or uncertainty.

Disaster- An event of significant scale that is beyond the capacity of the local respondent.

Disaster Management- This is the continuous and integrated multi- sectoral, multi-disciplinary process of planning and implementing measures aimed at:

- Preventing or reducing the risk to hazards
- Mitigating the severity of hazards when they impact on vulnerability
- Emergency preparedness
- A rapid and effective response to disasters and
- Post- disaster recovery and rehabilitation

Post-traumatic stress disorder (PTSD) - is a disorder that can develop following a traumatic event that threatens your safety or makes you feel helpless.

Trauma- a catastrophic occurrence that has had an adverse effect on either the physiological or mental makeup of the human body. Trauma is more psychological in nature, usually stemming from very bad experiences.

Traumatic events- Those challenges that overwhelm our capacity to cope and to respond. Our mind and body become stuck in survival mode and we become unable to recover our sense of equilibrium.

Policy- The declared objectives that a government or party seeks to achieve and preserve in the interest of national community.

Intervention- a coordinated attempt by one, or often many people, to get someone to seek professional help with an addiction or some kind of traumatic event or crisis. The term intervention is most often used when the traumatic event involves addiction to drugs or other items. Intervention can also refer to the act of using a technique within a therapy session.

Laws- A rule of conduct or action prescribed or formally recognized as binding or enforced by a controlling authority.

Mitigation- Mitigation means those structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards.

Preparedness- all those activities and measures taken in advance to ensure effective response to the impact of disasters, including the issuance of timely and effective early warnings and the temporary removal of people and property from a threatened locations. Public education and training; the focus of a disaster preparedness plan should be to anticipate, to the extent possible, the type of requirements needed for action or response to warnings and a disaster relief operation.

Response- This includes the provision of assistance and/or intervention during or immediately after a disaster to meet the life preservation and basic subsistence needs of those people affected. It can be of immediate, short-term or protracted duration.

Recovery- Decisions and actions taken after a disaster with a view to restoring the living conditions of the stricken community, while encouraging and facilitating necessary adjustments to reduce disaster risk.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Trinca et al, (1988), reports that in developing countries the magnitude of RTAs are underreported for a variety of reasons. However, there has been relatively little study on RTAs and their consequences.

There appears to be little awareness of their contribution to the burden of disease so they are seriously neglected in both research and policy. This is ascertained at both national and international levels. The lack of scientifically based epidemiological; socio-economical and risk data factor from the national level most importantly from developing countries has inhibited the response of international agencies.

Evidence on the ground shows that RTIs are rapidly emerging as a leading cause of death and disability at rates far exceeding those in developed countries. To this end, the paper first describes the size of the problem at macro level. Secondly, it examines the Kenyan context. Third, it attempt to construct conceptual frameworks of responses and strategies to tackle the RTAs.

According to the Green Paper of South Africa (2011), adequate procedures to deal with disaster situations and relief measures must be planned prior to an event, with strong legislation to empower those responsible to carry out the tasks. It is not enough to assume a hospital is well equipped to handle casualties if no plan is in place to cover all the aspects of disaster management from the scene of the disaster to the hospital itself.

Fundamental development has taken place in disaster management. Disasters are no longer considered as fatalities, unavoidable but rather as foreseeable and preventable events. Those who provide assistance today do not do it as a gesture of sympathy or charity but as providing a right to the affected persons. Health is no longer perceived as a luxury but as a basic human right. The community no longer views disaster aid as an ad-hoc repair act but as an essential factor in long term development of any nation.

Throughout history disasters have inflicted a heavy cost in human, material and physical resources as well as damage to the environment.

They represent a potentially significant obstacle to economic growth and development. A community cannot achieve any meaningful development if it is vulnerable to disasters.

According to Drabek (1968) there is a marked difference in organizational planning for day- to- day emergencies and planning for post disaster community response. This is because many organizations handle miniature emergencies daily, they believe they are prepared for large scale events. This view fails to recognize important qualitative distinctions and changes in the task environment associated with large-scale disasters. Disasters do not constitute a simple straight line extension of an auto accident or house fire.

A reason why Road Traffic accidents (RTAs) have been neglected in developing countries as given by Jacob (1973) is that RTA rates have been considered to be low in comparison with countries in Europe and North America. Jacob and Hutchinson carried out an analysis for 32 developing countries for which 1968 figures were available. The number of vehicles per 10,000 persons and the number of fatalities per 10000 vehicles were calculated and compared. In order to develop a linear relationship the logarithmic values of the fatality rates were regressed against the logarithmic values of the vehicle ownership rates and the following equations developed:

$$F/P=V/P$$

F= Road fatalities

V= Number of vehicles

P= Population

Jacob and Hutchinson (1973) concludes that it is possible that improvement in the safety of the road system, the vehicle and the road-use are not taking place as rapidly in the developing countries as in the more developed. If this continues, the accident situation is likely to become very serious indeed in the developing world particularly in situations of rapid motorization.

2.1.1 An analysis of personal injury RTAs in Great Britain showed the following RTAS trends

A steady increase of the total number of casualties for the period 1939-1960s

- Motorcycles experiencing the greatest number of casualties , including children and adults
- A very large number of casualties to pedal cyclists, motorcyclists and drivers on week days during the hours of 5-6 p.m
- The total number of casualties tending to be greater in wet weather
- Lowest RTA rates occurring on motorways and rural roads in open country and the highest in the centres of large towns. Death rates were found to be low in towns but high on unrestricted roads leading into large towns.
- The motorcycles per kilometer ridden, was found to be the most dangerous from the viewpoint of risk to the driver. The pedal cycle was found to be the next most dangerous. Also from the viewpoint of injury to the pedestrian, the motorcycle per kilometer ridden was found to be the most dangerous. (Jacob and Hutchinson, 1973)

In the federal republic of Germany, Froboese gives the following trends in the period 1970-1982:

Excessive speed and driving under the influence of alcohol were found to be the main causes of serious RTAs

- The number of RTAs involving cyclists increased noticeably
- The RTA risk of the drivers of two-wheeled power- driven vehicles reached an alarming level
- The number of children involved in RTAs , in particular the number of those killed greatly decreased. As pedestrians they were found to be less endangered but as cyclists their risk increased
- Beginner drivers were found to be especially exposed to danger and of particular danger to other road users
- RTAs outside built-up areas were found to have particularly consequential effects, but the rate of RTAs within built-up areas was found to be higher. (Jacob and Hutchinson ,1973)

2.2 RTAs in the United States

Motor Vehicle Accidents (MVAs) are the leading cause of injury and death in the United States. Americans collectively drive almost 3trillion miles per year and 3million people were injured or killed in 2002. The National Highway Transportation Safety Administration (NHTSA) compiles statistics regarding MVAs and some of the results are alarming in 2001.

1. 3million people were injured in MVAs
2. 413000 died in MVAs
3. 40%of the fatalities were alcohol related
4. 2600 children under the age of 15 were killed in MVA
5. 7500 young drivers (16-20) were involved in fatal crashes
6. 3000 motor cyclists were killed
7. 4700 pedestrians were killed
8. Improper use of seat belts accounted for 63 percent of the fatalities.

Murray and Lopez (1997) observed that the number of RTAs and the number of fatalities have followed a similar pattern in most industrialized countries. For the developing countries, Blanchard and Hickling (1997) observed that death rates are very often 20 times greater than those of Western Europe or N. America.

For the period 1978-1980, for 35 developing countries he found a negative correlation between fatalities per vehicle and the number of vehicles per head of population, showing that the smaller the number of vehicles relative to the population, the worse the death rate relative to those vehicles.

In the same light, in Kenya, death by MVAs is one of the highest causes of death after Malaria, a disease common in Tropical Africa and one which international bodies are spending millions in resolving. This in effect reflects the relevance of this study, in addressing what has for a long time not received much focus in the national agenda, and yet is by far crucial in prevention of human life if appropriate measures are put in place.

2.3 RTAs Analysis in Kenya

Injuries are increasingly recognized as a global public health epidemic. Road Traffic Injuries (RTIs) alone accounted in 1998 for an estimated 1.171000 deaths, establishing this type of injuries as the ten leading cause of death worldwide (GFHR, 2000). RTI account for 2.2 percent of all deaths and involve people of all ages.

According the Global Burden of disease study, death from injuries is projected to account for most of this increase (GFHR, 2000). Fatality rates from RTIs vary across income groups, of those killed during 1998 1,029,000 people were from low or middle income countries and 142,000 people were from high income countries, corresponding to 20.7 and 15.6 per 100000 inhabitants respectively.

Although all age group are affected young adults, particular males are more at risk of death from RTIs. Children are also affected by RTIs, making a walk to school potentially life threatening of those killed in 1998, 844700 were aged 45 or younger. Since this age group corresponds to the most economically productive segment of the population, this has serious implications for national economies.

In low and middle income countries RTIs are between 1 percent and 2 percent of GNP (Gross National product) per annum (WHO, 2003). These are justified the most vulnerable groups: pedestrians, motor-cyclists, cyclists and passengers.

According to the limited number of studies available from developing countries, pedestrians account for 41 percent – 75 percent of all road deaths in most low income countries pedestrian fatalities are considerably lower at one-third to one –fifth that of passengers and drivers. In low and middle income countries, the high proportion of pedestrians among road fatalities is due to a variety of factors including the traffic mix on road and the lack of pedestrian facilities in road design.

In their study Mantulya & Muli-Muisiime (2001), from 1977 to 1996 there was a substantial upward trends in the number of RTAs in Kenya together with the associated fatalities and injuries. In their research, based on policy reports, the total number of road traffic accidents for the ten years period (1987-1996) was 114,741,these accidents

resulting 23,124 deaths and 125, 907 injuries. Thirty-nine percent of injuries were reported to have been severe.

Information from follow ups of the injuries to determine eventual health outcome was not readily available. In the ten year interval from 1987 to 1996 the number of RTAs had risen by 65 percent. The routine police statistics from 1992 to 1996 identify two major causes of RTAs; driver error, and strains with passengers, pedal cyclists and vehicles defects accounting for a small number of RTAs.

Hardly any day goes by without at least five lives, on the average, being “sacrificed” on the increasingly dangerous Kenyan roads. The rampant trend of RTAs in Kenya has caught the grim concern of many citizens. As a result, local RTAs have and still do demand a lot of research if a successful attempt is to be made in understanding them.

Agoki (1998) discusses the fundamental characteristics and causal factors related to local RTA occurrence. He also develops predictive models for Kenya at both the macro and micro levels. This is hopefully expected to be used in the monitoring of RTAs and the performance of road safety improvement programmes and also to facilitate a proper understanding of the behaviour of RTA in relation to road design elements. Various other researchers have also studied local RTA trends and implications (e.g. Kwamina et.al; Miyanji, 1976; Maina, 1978; Mang’oli, 1979 etc).

In order to solve any particular problem, one needs to have an in-depth understanding of it, and then one is tempted to relate the high RTA trend prevalent in Kenya to the lack of respect for this observation. Seemingly, on a local framework we have not yet fully understood RTAs. Methods used for RTA analysis seem to attest to this. Local police officers still pace distances and measure with tapes in recording evidence at RTA scenes much as was done elsewhere seventy years ago (Salley,1964)

In Kenya the mandate to investigate into road traffic accidents falls wholly on the of the Kenya police. They are the personal charged with the responsibility of establishing the

cause of any RTA and prosecuting appropriate persons, if need be. The objectives of RTA analysis from the perspective of the police includes:

- I. To ascertain the cause
- II. To prevent re-occurrence
- III. To prosecute persons who are primarily responsible

In order to address these objectives adequately, it is necessary that the investigating officers make certain measurements at the scene of RTAs. Often, it is on the strength of these measurements that relevant persons are charged in the law courts. Therefore, in order for proper and correct court verdicts to be arrived at, it is imperative that the concerned police officers make an impartial recording and analysis at any one RTA scene.

An RTA results when there is lack of harmony in one, two or even all of the following; road user, vehicle and environment. The common types of bodaboda and motorcycle accidents are:

- I. Collision with another
- II. Accidents due to mechanical failure
- III. Negligence
- IV. Collision with a motor vehicle

Like other carriers, boda boda and motorcycles companies must maintain strict safety standards and are ultimately responsible for passenger safety.

2.3.1 Major Road accidents in the recent past in Kenya

July 23, 2009- 22 killed when two buses collide at Siapei on Narok-Maai Mahiu

August 10, 2009- Six are killed in road crash on the Kendu Bay- Katito road as 30 other
Sustain injuries

August 25, 2009- 16 people die when a bus rams a trailer and two tankers on the Nairobi-
Nakuru highway

October 5, 2009- 21 people perish in two road accidents. In one of them, all the
Passengers of a matatu die in a 9am road crash on a Kisumu-Kericho
road

August 17, 2011- 5 school girls are killed when a lorry taking them home from a church

Festival in Makueni County crashes at Kateta area on the Kilome-Salama road in Mukaa district.

August 20, 2011- 23 relatives and friends died after the bus they were travelling in
Plugged into a river

February 4, 2012 - 26 people are killed in a road accident involving two mini buses
along
the Kisumu-Kakamega highway.

July 18, 2013- 10 dead following a road accident at Githurai 45 roundabout

August 29, 2013 - Forty two people perish and 44 other are injured at the notorious
Ntulele black spot on the Maai Mahiu – Narok road.

November 24, 2013- 13 dead and 31 injured in a road accident involving a bus and a truck
on Mombasa road near Quarry area

December 24, 2013- 18 dead and 67 injured when Horizon and Springs buses collided at
3 a.m at Mtito Andei, on the Nairobi- Mombasa highway

2.4 RTA reporting and classification

From the Kenya Police RTA statistics, 2010, during the period under review, the total traffic accidents increased by 0.4 percent with a total of 7,895 accidents recorded in 2010 as compared to 7,862 in 2009. Among these were 2213 fatal accidents which resulted in 2570 fatalities. In the same period, motorists were fined a total of Kshs 434,727,590.

RTA national statistics though alarming do not reveal the full extent of the problem; in the year 1991, 2216 RTA fatal cases were reported. These are based on details of personal injury RTAs reported to the police and recorded on the Traffic Department Accident Report form known as FP41. This form seeks to establish details pertinent to the circumstances, the vehicles involved and the casualties.

A comparison in the U.K hospitals and police records Atkinson (1990), estimated that one-third of slight and one-sixth of serious injuries had risen in unreported RTAs. The extent of under-reporting was found to depend on the category of road user involved. Injuries to car occupants were under-reported by 14 percent, pedestrians by about 27 percent and pedal cyclists by about 60 percent. From these figures it seems probable that

there is greater under-reporting of RTAs involving slight injury. The position of Kenya could not be any different.

Furthermore, the information available for those RTAs that are reported is, for various reasons, incomplete. Often, the police rely on the goodwill of eye-witnesses. Unfortunately, most of the eye-witnesses often do not want to volunteer complete evidence for fear of resultant legal complications. Moreover, the investigating officer may not have visited the scene and may not have details of vehicles or other involved, and might be vague about the RTA location. The accuracy that may be needed to specify location of RTAs is often false in many cases. Inaccuracies are more likely to occur in rural areas where the number of identifying features available to assist the description of the accident unambiguously will generally be far, fewer than in built-up regions.

Classification of the severity of the RTA is also recorded by the police on the FP41 form. This is logically determined by the severity of the most seriously injured casualty involved, either slight, serious or fatal, using the following criteria:

- a) Slight injury- an injury of a minor character such as a sprain, bruise, cut or laceration not judged to be severe or slight shock requiring roadside attention.
- b) Serious injury- an injury for which a person is detained in hospital as an 'in-patient', or any of the following injuries whether or not detention results: Fractures, concussion, inter injuries, crushing, severe cuts and lacerations. Severe general shocks requiring medical treatment, injuries causing death 30 or more days after the RTA.
- c) Fatal- death from injuries sustained, resulting less than 30 days after the RTA

An injured casualty is coded by the police as 'seriously' or 'slightly' injured on the basis of information available within a short time after the RTA. This generally will not include the results of a medical examination, but may include the fact of being detained in hospital. Death within 30 days should subsequently be notified to the police and the FP41 record amended as necessary. However, awareness of changes between 'slight' and 'serious' classification is much less likely, in which case, if a case is suspected as being 'serious' though it appears 'slight', then it should be recorded as 'serious'.

There is little that one can do to rectify these shortcomings in existing data. It is therefore only cautious that the shortcomings and limitations in RTA data be clearly borne in mind and allowance made for them wherever possible.

2.5 The origin of *boda boda*

The origin and growth of motorcycle can fundamentally be traced to the collapse of bus transport services either directly provided by the state or contracted for, and the deregulation of the market leading to a growth in informal operators. Fares were fixed and insufficient to recover the full capital and operating costs, and subsidies were not released in a planned way. As a result, viability of buses continued to erode (Howe, 1996).

The failure of the public provision of transport services led to the emergence of a par transit system operated by the private sector. The main mode of transport shifted from high capacity buses to minibuses, operated by individual private operators and managed by an association. However, private buses were not able to meet the growing demand and substantial unmet demand remained, particularly in the outlying areas and during off-peak periods. This has led to a growth in non-conventional means of transport, the most dominant being the motorcycle, which today is the most common form of informal public transport system on most secondary roads in the city. The number of commercial motorcycles increased from about 5,000 in 1995 to over 40,000 in 2007 (Rutto, 2011).

The *boda boda* are part of the African bicycle culture; they started in the 1960s and 1970s and are still spreading from their origin on the Kenyan - Ugandan border to other regions. The name originated from a need to transport people across the "no-man's-land" between the border posts without the paperwork involved with using motor vehicles crossing the international border. This started in the southern border crossing town of Busia (Kenya/Uganda), where there is over half a mile between the gates, and quickly spread to the northern border town of Malaba (Kenya). The bicycle owners would shout out *boda boda* (border-to-border) to potential customers - not to be confused with *poda-poda*, which is a form of shared taxi in Sierra Leone.

While the *boda boda* bicycle is still spreading to other areas, in its area of origin, especially in cities in Kenya and Uganda, the bicycles are more and more replaced by motorbikes. The motorbike-taxis have taken the name *boda boda* as well. Other local names have been coined for the motorbikes; they are known as peng' in the Nyanza province of Kenya (Schuster, 1994).

The transport sector in Kenya comprises a road network with 150,000 km of roads, a single-track railway running from Mombasa to Uganda, a major seaport at Mombasa, small ports at Lamu and Malindi, a ferry service to Uganda, an oil pipeline from Mombasa to Kisumu via Nairobi and Eldoret, four international and many small airports, and three inland container depots (IEA 1998). With a 34 percent share in the total transport sector in 1998, road transport has the highest contribution to national output among the transport systems. It is followed by air transport, with 25 percent, and water transport, with 16 percent (Iga, 2001).

A decline in organized public transport systems has led to rapid growth in non-conventional means of public transport, initially provided by minibuses and shared taxi/vans, and more recently by commercial motorcycles. Unlike cities in South and East Asia, ownership and use of motorized two-wheelers as a personalized vehicle is very small in sub-Saharan cities. However, over the past decade there has been a significant growth in the use of motorcycles as a commercial public transport mode. Motorcycles have offered certain transport advantages in the form of easy maneuverability, ability to travel on poor roads, and demand responsiveness.

In the absence of vehicles and good road networks in the rural areas of Western Kenya, young entrepreneurs have started up the environmentally-friendly *boda boda* bicycle business that ferries clients from main roads to villages off the beaten track. In the rural areas of Kenya, some opportunistic youth have capitalized on poor road networks and lack of vehicles to earn their daily bread. They now offer transportation on a *boda boda*, a bicycle with a brightly coloured cushioned pad attached behind the seat, used for carrying

one passenger at a time. Bicycle shuttle services are, in some areas, the only way of getting around (Leyland, 1999).

The expansion of the road network in Kenya and the increase in the number of motor vehicles without adequate quality control has led to a rapid rise in the number of road traffic accidents. For instance, in 1963, there were 4,784 casualties with 548 deaths while in 1998 there were 33,924 casualties with 3,127 deaths (Central Bureau of Statistics, 2001).

In Kenya, *boda boda* operation started in the 1960s and 1970s and is still spreading from their origin on the Kenyan - Ugandan border to other regions. The name originated from a need to transport people across the "no-mans-land" between the border posts without the paperwork involved with using motor vehicles crossing the international border. In fact, *Boda boda* transport services are a Ugandan innovation that has grown from small beginnings in the border region with Kenya (Malmberg-Calvo, 1994). This started in southern border crossing town of Busia (Kenya/Uganda), where there is over half a mile between the gates, and quickly spread to the northern border town of Malaba –Kenya (Howe, 2002). The term itself is a corruption of the English ‘border border’.

The original services were provided on a man’s bicycle, equipped with a padded cushion fitted over the rear carrier. Starting in the early 1990s the bicycle-based carriers have been complemented by, and compete with, light motorcycles that have greatly extended the range and load carriage of services (Ambuli, 2007),

When the government of Kenya removed the tax on motorcycles in 2008 to promote job creation in the transport sector, a significant number of young people enthusiastically joined the transport business. *Boda bodas* have been around since, when young people in Busia, a town that shares a border with Uganda, used bicycles to smuggle goods across the border. These youth quickly realized that the same bicycles they used to carry goods from Kenya to Uganda and back could also ferry people in the transportation-poor villages of Western Kenya. The mania spread its wings to neglected rural villages in the

west and beyond. The use of bicycles has spread towards the central, eastern and coastal regions of Kenya.

However things are changing and motorcycles are taking over the place of bicycles. The only place that is known to most of us where motorcycles are used for taxi purposes is in Nigeria where they are called okada. Kenyans too seem to be switching to the use of motorcycles for the same purposes. In Kericho town for example, the motorcycles have taken over the business from the bicycles and more and more people are joining the business. Currently it is on the tea estates routes that they get more customers than the rest of the routes in the town.

The motorcycle transport, now commonly known as *boda boda* leaped from 3,759 units in 2005 to 91,151 in 2009. In recent years, the number of motorcycles has increased exponentially. According to an economic survey conducted in Nairobi in 2009, the numbers of registered *boda boda* motorcycles shoot by an overwhelming value of 400 percent within duration of three years, 2000-2007.

The commercial motorcycle business has grown into a major business concern in Kenya and it is a fairly well organized business with considerable patronage. Motorcycles ply virtually every route including the highways. They cover distances ranging from a few metres to a distance as far as 20 kilometres. They are as effective in the urban centres as well as in the rural suburbs. The availability and flexible pricing makes the motorcycle affordable to the vast majority of the people that utilize it as a means of commuter transportation. It could reach any nook and cranny of the towns and cities at a price often considered reasonable by the commuters. It is relatively cheaper and faster than conventional taxi cabs. (Oladipo, 2012; 234)

In Kenya, in the past, motorcycles were very expensive to buy and maintain and there very few people owned them. However, the coming of the new makes of motorcycles has changed things upside down completely. In the past, the Honda and the Yamaha makes dominated the markets but nowadays, there are new makes like the Focus and others.

The brands of motorcycle used in Kenya for public transportation include the following: TVS, Suzuki, Bajaj, TVS, Fascine, Honda, Yamaha DT &AG, Jialing, Adtech, Meulin GY, KTM, Watco CG, Tornado, Shine Ray. The most common motorcycle being used for public transportation is TVS. It is said to be affordable and consumes low fuel (100cc to 160cc and cost from Sh70, 000 to Sh162, 000). It is suited to smooth terrain and city runaround, thanks to their limited power. For rougher off-road biking, operators have more powerful 125cc to 200cc Suzuki brand motorcycles costing from Sh320, 000 to Sh424, 000. Most of the brands of motorcycles mentioned above are imported into Kenya from China (Karuga, 2011).

The secrets behind the turning of things upside down so abruptly is not yet clearly known but it is strongly believed that it must be because of the prices. The new makes must be cheaper in prices and maintenance costs. If that is how this will work, then everyone in Kenya will soon be riding on a motorcycle, (Ambuli, 2011).

2.5.1 Motorcycle use in East Africa

The *boda boda* business originated in 1960s – as bicycle taxis for transportation of people and smuggled goods across Kenya-Uganda border (border –to-border), hence named ‘boda boda’. From 1990s – light engine motorcycles (50-80cc) gradually replaced bicycles as taxis. Some of the advantages of Motorcycles (MCs) are: inexpensive, quick and evades traffic jams can use narrow paths in peri-urban areas, available day & night can also be fun to ride (people, tourists). This industry has become a source of income to many youths - over 100,000 youths in Uganda are involved in the business. After the Kenya government waived importation tax on motorcycles, it encouraged use as taxis.

A brief analysis of motorcycle taxis (*boda boda*) and motorcycle accidents

Of the 1.2 million road deaths occurring each year worldwide, nearly half (46%) are vulnerable road users – comprising pedestrians, pedal cyclists and motorcycle riders. Motorcycle and bicycle taxis are emerging as important means of public transportation in many African cities - but their operation is characterized by:

- non-helmet use

- passenger overload
- poor regulation

However, little is being done to make their use safer.

Lack of training for *Boda boda* riders and sensitization of both riders and the passengers to use protective gears has caused the increase of road accidents. According to statistics from traffic police headquarters in Nairobi, the number of road accidents in the past four years went up 36 per cent to 12,360 with the number of death doubling to 4,072 in 2009. This has been blamed on reckless *boda boda* drivers who have little regard to the traffic rules. Riders train themselves for a day or two in an open field and the next day they are in business carrying passengers. They are not exposed to skills tests which consist of observing speed limit, maneuvering around corner, swerving and adhering to all road sign. World Bank road safety specialist said most injuries and deaths followed legal transgressions of regulations like helmets, gloves, reflectors e.t.c (Odero, 2009).

Motorcyclists have little protection other than their clothing; this difference is reflected in the casualty statistics, where they are more than twice as likely to suffer severely after a collision. Road traffic injuries cause emotional, physical and economic harm. Road crash survivors, their families, friends and other caregivers often suffer adverse social, physical and psychological effects (Tylor, 2011). Moreover, they sometimes carry more than one passenger which is against the insurance policy.

2.5.2 Global motorcycle injuries and deaths

How big is the motorcycle injury problem?

- Mortality figures show huge differences between countries, highest in South East Asia (WHO report)
 - Thailand (70%), Cambodia (63%), Indonesia (61%), Malaysia (58%), France (25%), USA (11%), México (6%), Kenya (1%)
- Surveillance data: mortality, morbidity, disability, helmet use, trends in motorcycle ownership and legislation by country/region

Motorcycle deaths (2007 data)

MC is responsible for 50 percent of road traffic crashes in Kampala, there are 5 deaths per month at Mulago Hospital attributed to MC Injuries. In Kenya 5-fold increase in MC 2004 to 152 in 2008.

Table 3: Motorcycle deaths in East Africa

	Total road deaths	Proportion to MC
RWANDA	308	16%
UGANDA	2.838	7%
TANZANIA	2595	7%
KENYA	2893	1%

Source: Kenyan police data, 2007

Table 4: Motorcycle deaths in Kenya

Year	Total road death	Motorcyclist (excl passengers)
2005	2531	44 (17%)
2006	2714	34 (1.25%)
2007	2893	35 (1.2)
2008	3633	152 (4.2%)
2009	2669	164 (6.1%)

Source: Kenyan police data, 2009

The annual road deaths in Kenya are approximated to be 2,893 (72% male). Of this, Motorcycle-related deaths represent 1 percent. This mostly is caused by lack of helmet, law and Poor regulation of MC use.

2.6. Causes of road accidents

Most traffic accidents are caused by multiplicity of factors. This may be a combination of human errors and failings, poor road standards and conditions and vehicle defects. Traditionally, RTAs are divided into three groups; thus the Man; the Vehicle and the Traffic Environment.

These three components are the major factors which significantly contribute to RTIs leading to either death or disability. Gekonge (1990) found that 85 percent of causes were attributed to man; while 6% percent to the vehicle and 9 percent to the traffic environment. The environmental factors include: thus road defects, animals, various obstruction and the weather.

He found that road defects such as potholes do not seem to be a major cause of road accidents against the belief, those potholes and other road defects have been thought to be the main causes of road safety problems in the country. Running or walking into the road was found to be the most common cause of accidents where pedestrians are involved. Losing control, excessive speed, misjudging and overtaking improperly are the next in order.

1 Human error

Human error consists of and not limited; overloading, over speeding, non-observance of the general rules on the control and working of motorcycles. The specific attributes to human error include indiscipline arising from non-adherence to rules and regulation, non-adherence to maintenance standards.

Kenya police records from 1977 to 1996 identified two major causes of RTAs as driver error and pedestrians. Passengers, pedal cyclists and vehicle defects accounted for a small number of road traffic accidents.

Nantulya and Muli-Musiime (1996) observed driver error was the common cause of RTAs accounting for 41 percent of the accidents on record. The other causes recorded include passengers, pedestrians, motor cyclists, pedal cyclists. The human factor was highlighted as primary cause of RTAs, forming 77 percent. In addition, 39 percent of vehicles involved in the accidents were driven by young men aged 18 to 24 years, meaning young drivers were reckless drivers and behaved in a manner that threatens road safety.

Whilting (2004) describes how disasters and serious accidents result from recurring, but potentially avoidable, human errors. He argues that such errors are preventable because they result from defective system within a company. From real incidents you will be able to identify common causes of human error and typical system deficiencies that have led to these errors. On a large scale, you will be able to see where, in the organizational or management systems failure occurred so that you can avoid them.

11 Mechanical defects or equipment factor

Most of the rolling stock, wagons, and locomotives as well as electronical, signaling equipment are absolute and therefore posing special challenges ranging from high maintenance costs to non- availability of replacement parts.

111 Vehicle factors

The government issued policy statements about the use of seat belts, in mid-1990s but motorists were not bothered to use them. However the government did not provide adequate follow-up or implementation strategies. Seatbelts has not become part of the culture in Kenya.

Lore (1990) presenting a scientific paper in 1990 to Kenya medical association members stated that causes of RTAs are of multi factional origin. Most of these causes can be traced to the motor vehicle; the road; to the weather; to the other

road users; to the traffic signs to the driver, a motor vehicle has to be mechanically sound and roadworthy for optimal functioning.

1V Physical factor

The physical state of the road its self is a crucial factors in road traffic accidents prevention. Very narrow roads which are wet and meandering with uneven surfaces occasioned by the potholes are reliable to cause RTAs; diversion; bumps steep slopes are also not conducive for safe motoring.

With an estimated 90 percent of Kenyan roads not being paved, according to the 2001 budget report on rural development, and many roads being impassable by vehicles, the boda boda has become a versatile, quick, and reliable form of transportation. However, when the operator is forced to ride in hilly places and meandering paths it becomes hard and is as perilous as going through a jungle; you have to be smart lest you fall down with your customer. To make the ride easier, most operators have fixed a small transistor radio onto their bicycles, cushioned the carrier, and put an alarm bell on their bars.

Generally speaking; visibility is a vital determinant to safe motoring. Visibility is greatly affected by foggy weather. Other weather conditions such as floods, storms also adversely affect motoring. A careful driver may be involved in a road traffic accident because of faults created by other road users – thus other drivers and pedestrians. Occasionally the traffic signs are absent, obscured, faulty or misleading. Such a situation may cause a road traffic accident involving drivers not familiar with the local geography. In the U.S. between 1979 and 1983 it was observed that young male drivers have a high risk of crashing their vehicles.

The motor vehicle crash for young drivers is 15 to 19 years is always higher than that of older drivers. A young driver for a truck is therefore a special risk group of road users to watch.

Alcohol was also noticed to greatly increase the risk of motor vehicle crashes. Truck drives are prone to the use of other drugs for various reasons. Drivers who have been involved in fatal crashes; have records of previous offences in excess of

that expected for drivers. In generally truck driving is characterized by long travels and often is accompanied by fatigue.

2.7 Measures to enhance emergency preparedness

Pirry and Lindell (2003) defines emergency preparedness to be readiness of a political jurisdiction to react constructively to the threat from the environment in a way that

According to Heide (1999), “Preparedness for moderately sized disasters may be more realistic and achieve greater acceptance by those who must pay for and carry out the preparedness.” The advantage of a focus on moderate disasters is that the procedures involved are more likely to be used and therefore learned. They are also more likely to be funded. Furthermore, the skills, training, procedures and supplies developed for moderate disasters are a logical step towards preparedness for large events. It is therefore easier to sell planning for a multiple vehicle accident than for an earthquake.

Some of the measures to be put in place include;

- **Enforcement of safety regulations**

Recently, the Government of Kenya has amended the Section 100 of June 1993 Traffic Act related to overloading of public service vehicles with passengers by introducing seatbelts and reduction of speed at 80 km per hour for public service vehicles (PSV). The measures are considerably contributed to the reduction of RTAs in February, March, April 2004. Upto now the trend is favourable. However we have to wait at least one year to confirm the train.

- **Improving the design of roads**

Roads are elements of environment. They are also called contributory factors for RTAs and RTIs. Attention must be given to design and construction of roads, as they interfere with urban and rural environment. Bad roads will contribute to defection of vehicles and road accidents.

- **Establishing and strengthening the network of partners committed to road traffic injuries: community participation**

Through a memo of understanding, the partners will formalize their agreement to cooperate on research and project in the developing world relating to RTIS.

- **Emergency responses**

State must put in place elements of preparedness and emergency responses in case of road accidents. Most of deaths are due to lack of emergency measure and structure.

- **Research**

Stakeholders both at national and international must conduct research on specific topics related to road injuries and design test and evaluate measures which can be taken to prevent the problem.

Also, communities need to identify their individual needs and resources, develop funding mechanism and become involved at all levels in structuring the system. A governing body or council should be established to organize, direct and coordinate all system components. Consensus from all involved should be ensured in developing policies and settling disputes.

I will argue that road accident prevention is a problematic as a strategy for reducing rates. The complexity of road traffic accident is due to many contributory factors: socio-behavioural factors, technological factors, physical environment, regulation and safety policy. By amending the section 100 of the 1993 Traffic Act related to overloading of the public vehicle service with passenger, the Government wants to enforce regulation on road safety in Kenya.

For effective solution, there is need to call all stakeholders dealing with RTAs and RTIs both at local, national, regional and international for consultation. Multi-sectional approach by integrating all stakeholders will strengthen efforts to implement national regulations and safety policies on road traffic accidents.

2.8 Road user characteristics

2.8.1 Driver

The driver's part in RTAs is a question of the adequacy of his response to the road environment (Sorensen, 2009). Driver characteristics result from the influence of psychological characteristics on the performance of the driving task and the interaction of the driver with other road users and the road environment. Drivers, like other road users

are causal and recipients of RTAs (Naumann, 2005). Various studies concerning driver characteristics are summarized below:

In the Great Britain in 1959 car drivers, commercial and passenger vehicles comprised 11.2 percent out of a total of all persons killed on the roads. Using data from Belgium, Denmark, Great Britain, Italy and Sweden, Norman found that the number of deaths of motor vehicles drivers is not closely related to traffic density or to the number of registered vehicles. The age distribution of drivers killed showed a peak in Great Britain below the age of 30. Serious injuries to car and taxi drivers in Great Britain were found to be about 13 times, and slight injuries about 44 times, the number of RTA deaths amongst drivers.

In the United States in 1959 drivers under the age of 25 were found to have considerably worse RTA ratio than that of all drivers. The lowest fatal RTA ratios were found to be for those aged 50-60 (less than half those for drivers under the age of 25). (Oglesby, 1975) findings states that in the United States persons identified as suffering from epilepsy, heart disease, diabetes and mental illness were found to have RTA rate roughly twice that of the general public whereas 0.6 percent of drivers fell into this category.

Drivers with physical defect in sight, hearing and similar impairments were found to be involved in only 1.3 percent of deaths and 0.6percent of all RTAs. It was concluded that physical defects are not a major contributor to RTAs. Rates in fatal RTAs begin to rise at about the age of 65 (Naumann, 2005).

Epidemiological studies (Naumann, Oglesby, Moskowitz, 2005) show that driving occur during periods when drivers are under the active influence of alcohol and drugs.

It has been found that tranquilizers, barbiturates and cannabis lead to impairment of driving skills. Drinking drivers are one of the most serious causes of all RTAs problems. Physically and mentally the drinking driver is RTA- susceptible.

In a London transport study of professional bus drivers for the period 1957-59, it was found that there was a relatively high RTA rate in young and inexperienced drivers. Those under 30 with less than four years of service had nearly four times as many RTAs

as the best group, those that were aged 60-64 with about 14 years of service. In the United States it was found that driver.

2.8.2 Pedestrian

The pedestrian as a factor carries much of the responsibility for RTAs mainly for his own safety. The main findings with respect to pedestrian's characteristics according to Naumann, (2005) are as follows:

- In Great Britain RTAs to pedestrians account for about 40% of the fatal RTAs and about 20 percent in the United States and mostly occurring in urban areas.
- The age distribution of fatally injured pedestrians is uneven. From the walking age to the age 10 and from age 65 pedestrians upward are at special risk. In Great Britain comparing the number of pedestrians casualties with the population in each age group the maximum risk occurred for 5-9 year old with risk increasing with age for those over 40. Children under 10 were found to be likely victims of the light commercial vehicles while persons over 70 years of age were more frequently involved with motorcycles and pedal cycles as compared with other age groups.
- The total number of pedestrians injured is about 25 times the number killed. Pedestrian deaths increase at periods of peak travelling, in cities particularly, during working days.
- In the United States pedestrians fatally injured consisted of the elderly who had been drinking alcohol or not at all and a group of the middle-aged who had been drinking heavily. Further studies in the United States showed that alcohol was causally involved in more than 30 percent Of all fatal pedestrian RTAs.

Further findings in Great Britain by Sorensen (2009) indicate that:

- The number of pedestrian casualties increases at a lower rate than the traffic flow
- About 67percent of pedestrians RTAs are because the pedestrian was crossing the road
- The relative frequencies with which different types of vehicle collide with pedestrians varies with the crossing place

- The proportion of pedestrian casualties whose injuries were due to being hit by motorcyclists was higher on uncontrolled crossing than elsewhere.

2.8.3 Pedal cyclists

The pedal cyclist is unprotected unless cycling on cycle tracks. Findings from Great Britain by Norman (1962) show that pedal cyclist killed annually form about 11 percent of the total RTA deaths. Those aged 7-15 and the elderly form the higher proportion of pedal cyclist deaths. For each cyclist death, there are 75 injuries. The proportion of those killed to the injured pedal cyclist was observed to rise with increasing age.

2.8.4 Motorcyclist

The motorcyclist like the pedal is also unprotected. Moreover, the motorcycle is capable of very high speeds implying greater risk and severe injury. In the U.S out of RTA deaths, 17.3 percent have been observed to be motorcyclists. The motorcycle fatalities affect the younger age groups heavily. In the Great Britain, about 70 percent of motorcycle deaths affected the age group 18-40, the majority being male. Thus the length of experience and power of motorcycle were found to be the two most important factors in RTAs to young motorcyclists.

In the U.S, Norman, have shown that about 1 percent of registered vehicles are motorcycles which are responsible for 1.3 percent of the RTAs, showing that the degree of risk to motorcycles riders increases.

Studies in Great Britain (Oglesby, 1975) indicate that the death rate per kilometer for motorcycle was over 20 times that for motor vehicles while the personal injury rate is 3 times as great. In the U.S the corresponding figure was found to be 4.1 percent.

2.9 R.T.As and Post Traumatic Stress Disorder (PTSD)

According to Asmundson (2002), Post-traumatic stress disorder (PTSD) is a disorder that can develop following a traumatic event that threatens your safety or makes you feel helpless.

PTSD was first recognized as a serious problem among veterans returning from war. These men suffered cold sweats, panic attacks, nightmares, and compulsive behavior as a result of near death experiences and the mental anguish of war. Some doctors are now claiming that this same level of shock is regularly induced in car accidents, they cite numbers as high as 9 percent of car accident victims suffer “significant post-traumatic stress symptom (Asmundson, 2002).

PTSD can occur at any age. It can follow a natural disaster such as a flood or fire, or events such as:

- Assault
- Domestic abuse
- Prison stay
- Rape
- Terrorism
- War
- Accident

For example, the terrorist attacks of August 7, 1998 may have caused PTSD in some people who were involved, in people who saw the disaster, and in people who lost relatives and friends.

The cause of PTSD is unknown. Roberts (2003) says that psychological, genetic, physical, and social factors are involved. PTSD changes the body's response to stress. It affects the stress hormones and chemicals that carry information between the nerves (neurotransmitters).

It is not known why traumatic events cause PTSD in some people but not others. Having a history of trauma may increase your risk for getting PTSD after a recent traumatic event. Issues that tend to put people at higher risk for developing PTSD include increased duration of a traumatic event, higher number of traumatic events endured, higher severity of the trauma experienced, having an emotional condition prior to the event, or having little social support in the form of family or friends (Roth et al, 2008).

For individuals who may be wondering if they should seek evaluation for PTSD by their medical or mental-health professional, self-tests may be useful. The assessment of PTSD can be difficult for practitioners to make since sufferers often come to the professional's office complaining of symptoms other than anxiety associated with a traumatic experience. Those symptoms tend to include body symptoms (somatization), depression, or drug addiction. Studies of Iraq war veterans indicate that these individuals tend to show more physical symptoms of PTSD as opposed to describing the associated emotional problems.

Symptoms of PTSD fall into three main categories:

1. "Reliving" the event, this disturbs day-to-day activity

- Flashback episodes, where the event seems to be happening again and again
- Repeated upsetting memories of the event
- Repeated nightmares of the event
- Strong, uncomfortable reactions to situations that remind you of the event

2. Avoidance

- Emotional "numbing," or feeling as though you don't care about anything
- Feeling detached
- Being unable to remember important aspects of the trauma
- Having a lack of interest in normal activities
- Showing less of your moods
- Avoiding places, people, or thoughts that remind you of the event
- Feeling like you have no future

3. Arousal

- Difficulty concentrating
- Startling easily
- Having an exaggerated response to things that startle you
- Feeling more aware (hyper vigilance)
- Feeling irritable or having outbursts of anger
- Having trouble falling or staying asleep

You might feel guilt about the event (including "survivor guilt"). You might also have some of the following symptoms, which are typical of anxiety, stress, and tension:

- Agitation or excitability
- Dizziness
- Fainting
- Feeling your heart beat in your chest
- Headache

Symptoms of PTSD are clearly defined. To be diagnosed with PTSD, you must have been in a situation in which you were afraid for your safety or your life, or you must have experienced something that made you feel fear, helplessness, or horror. The worse the trauma, the more likely a person will develop PTSD and the worse the symptoms. The most severely affected are unable to work, have trouble with relationships, and have great difficulty parenting their children (Perkonigg et al, 2000).

It's only natural to want to avoid painful memories and feelings. But if you try to numb yourself and push your memories away, post-traumatic stress disorder (PTSD) will only get worse. You can't escape your emotions completely – they emerge under stress or whenever you let down your guard – and trying to do so is exhausting. The avoidance will ultimately harm your relationships, your ability to function, and the quality of your life.

It is therefore important for MVAs survivors to seek treatment for PTSD because of the following various reasons (*National Center for PTS*):

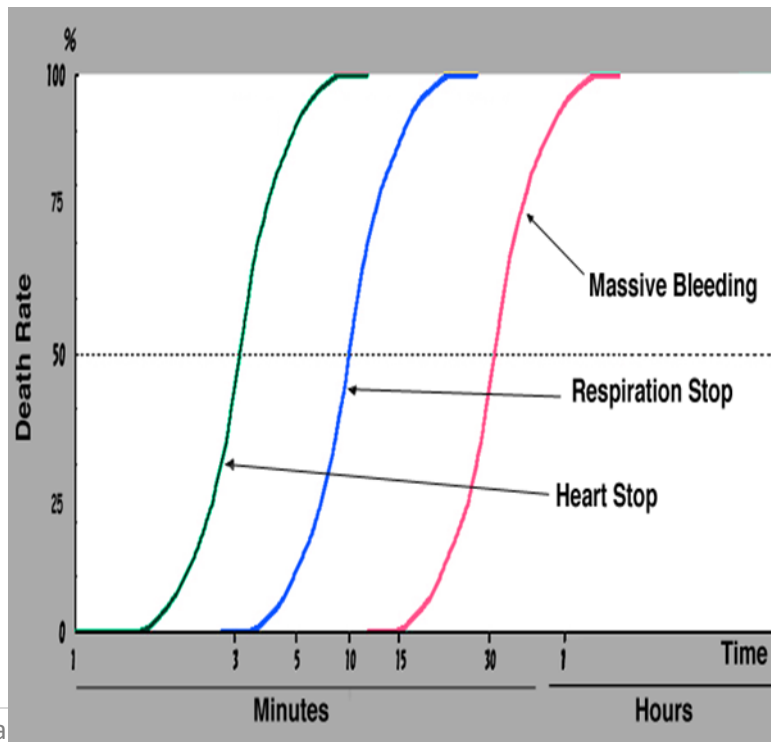
- **Early treatment is better.** Symptoms of PTSD may get worse. Dealing with them now might help stop them from getting worse in the future. Finding out more about what treatments work, where to look for help, and what kind of questions to ask can make it easier to get help and lead to better outcomes.
- **PTSD symptoms can change family life.** PTSD symptoms can get in the way of your family life. You may find that you pull away from loved ones, are not able to get along with people, or that you are angry or even violent. Getting help for your PTSD can help improve your family life.

- **PTSD can be related to other health problems.** PTSD symptoms can worsen physical health problems. For example, a few studies have shown a relationship between PTSD and heart trouble. By getting help for your PTSD you could also improve your physical health.

According to Fiander (2001), there is a wealth of medical evidence to suggest a ‘golden hour’ exists for casualties after an accident. Within this time, road accident victims stand a greater chance of survival and a reduction in the severity of their injuries, if first aid and medical (paramedic or ambulance) assistance can be immediately administered.

One may be presented with all kinds of scenario when considering road accidents - delays to receiving hospital treatment may be caused, for example, by a casualty being trapped in the wreckage. In such circumstances, immediate on-the-scene assistance is vital. Bernes (2000) said, “Imagine that a victim has a haemorrhage following a road accident: if nobody applies pressure to the wound to stop the bleeding, even the most sophisticated or the quickest emergency service in the world will only arrive on the scene in time to certify death.” The importance of the ‘golden hour’ - the first hour after a road crash - has been well established for increasing the patient's chances of survival.

Figure 1: Golden Hour Principle Graph (Cisco 2012)



2.10 Types of treatments for post-traumatic stress disorder (PTSD) according to Melinda (2011)

- **Trauma-focused cognitive-behavioral therapy.** Cognitive-behavioral therapy for PTSD and trauma involves carefully and gradually “exposing” yourself to thoughts, feelings, and situations that remind you of the trauma. Therapy also involves identifying upsetting thoughts about the traumatic event—particularly thoughts that are distorted and irrational—and replacing them with more balanced picture.
- **Family therapy.** Since PTSD affects both you and those close to you, family therapy can be especially productive. Family therapy can help your loved ones understand what you’re going through. It can also help everyone in the family communicate better and work through relationship problems.
- **Medication.** Medication is sometimes prescribed to people with PTSD to relieve secondary symptoms of depression or anxiety. Antidepressants such as Prozac and Zoloft are the medications most commonly used for PTSD. While antidepressants may help you feel less sad, worried, or on edge, they do not treat the causes of PTSD.

2.11 Theoretical framework

The term *theory* is used with surprising frequency in everyday language. It is often used to mean a guess, hunch or supposition. You may even hear people dismiss certain information because it is "only a theory." It is important to note as you study psychology and other scientific topics, that a theory in science is not the same as the colloquial use of the term.

A theory is based upon a hypothesis and backed by evidence. A theory presents a concept or idea that is testable. In science, a theory is not merely a guess. A theory is a fact-based framework for describing a phenomenon. In psychology, theories are used to provide a model for understanding human thoughts, emotions and behaviors.

Theory is the main pivot of all sociological research. The social contract that a government has with the citizen compels it to perform certain duties and to provide certain services to the citizens.

2.11.1 System theory

This theory, profounded by Talcott Parsons (1973), recognizes the main functions of a system, namely, maintenance, adaptation, goal attainment and integration. This theory can be applied in any social system ranging from the family to the state. The Nairobi City Council (NCC), the Kenyan Government, the Kenya Police e.t.c falls in this category.

This theory assumes structural functionality and concentrates on the structures or societies and their relationship with each other. It assumes that structures are mutually supportive and lean toward a dynamic equilibrium. Emphasis is placed on maintaining order amongst the various elements of the society. Parson's basic view on inter-systematic relation was essentially the same as his view of intra-system relations, that is, that they were defined by cohesion, consensus and order. In other words, the various social structures performed a variety of functions for each other (Ritzer, 1987).

The four functional imperatives for all action system, is the Talcott Parsons' famous AGIL scheme. A function is 'a complex of activities directed towards meeting a need or needs of the system.' Parsons believe that there are four functional imperatives that are necessary and characteristics of all systems:

A- **Adaption**- Every society has to feed, clothe and shelter its member and so it needs and economic system to produce and distribute its resources and adapt to the external environment.

G- **Goal Attainment**- Every society has to set goals for itself, make decisions and create organizations and so needs a political system.

I- **Integration**- Every society has to create a sense of belonging, of community and common identity. It has to prevent the development of social divisions and conflict or it will disintegrate.

L- **Latency**- Every society seeks to perpetuate itself even though individual members are constantly dying and being born. It seeks to pass on its rules, customs and culture

from one generation to the next and such pattern maintenance, in Parsons' theory, depends primarily on the kinship system, on the family socializing its offspring. This process is reinforced by such other social institutions such as schools, the media, the church and the law.

In order to survive, a system must perform these four functions. If conflict becomes sufficiently disruptive, it must be controlled. It requires a language in order to survive. Actors in an organized system, while pursuing their own interests, the actors are in fact serving the interests of the system as a whole (Parsons, 1951).

The idea in action

In this study the government, the boda boda operators, passengers and the law enforcers such as the Kenya Police form a society that requires rules and regulations to put all in order and deal with the conflicts that might be among them. *Boda boda* businesses play a big role in Kenyan economy.

It has created employment for many youth, cutting down on social problems such as crime, promiscuity, and drug abuse. A conflict arises when the *boda boda* operators fail to comply with the rules and regulations put in place such as wearing protective garments, getting licences e.t.c. In such a case, the police arrest them thus causing more conflict between the police and the boda boda operator's family.

In addition, this business has been a health risk to the operators and passengers. In the first place, these people don't get a proper diet, thus their health deteriorates acutely. Due to the dusty roads and cold weather, they contract pneumonia, bronchitis, and acute flu. Some develop kidney stones as a result of the body emptying a lot of acid." Most people have fallen victims of these operations, most have lost their lives and many have been disabled. As a result, many families have been economically deprived off their financial resources because of hospital bills and also human resources especially the young men who are mainly involved in the business. Therefore the law makers should always ensure there is a smooth running of the business. This would include: legislating laws and regulations that ensure road safety for both the passenger and operator;

implementing and enforcing the existing as well as the new ones and to ensure the concerned comply with them.

2.11.2 Radical Interpretation of disaster

In an article by Dr Ben Wisner (2001), he asks, “What does political theory tell us about a state that is incapable or unwilling to apply a body of established knowledge, at low cost, that would protect its citizens from disasters? Is it good governance? Is that a legitimate state?”

The most challenging question focuses on whether human beings have a right to security from disasters triggered either by extreme events in nature or by failure of human technologies. He further asks, “Does an acculturated species that shapes its own ‘second nature’ move towards a shared belief that the authorities responsible for social order have a responsibility to provide minimum, internationally agreed safeguards against catastrophic events?”

On this basis, it is a fundamental human right to preserve life, hence the responsibility of those mandated with the task to fulfill their obligation in this respect.

The idea in action

In the June budget he delivered in 2001, then Minister of Finance Chris Okemo exempted the purchase of bicycles from being taxed, a gesture that received an overwhelmingly positive reception by boda boda operators. Okemo, noted in his speech that bicycles are essential in rural areas, and should be made accessible to the average person.

The government waived import duties on motorcycles in 2001 which was aimed at making them affordable to a majority of rural and urban population who relies largely on non-motorised means of transport. However, duty on spare parts remains high with the result that motorcycle maintenance and repairs are costly. In Busia, the operators and repairers are able to smuggle spares from Uganda where the duty is low.

There are a number of challenges that need to be tackled for successful integration of boda boda countrywide. Nonetheless, be it social, business or other functions, moving people at low cost together with offering an alternative source of rural livelihoods, is the

drive behind *boda boda* business. Many rural areas in Kenya remain remote and cut off from the mainstream activities. Other areas exhibit gaps between transport needs and requirements of communities and the ability of the existing transport systems to meet these wants. In an attempt to bridge this gap and open remote areas, it is imperative that the government and other relevant stakeholders transfer a means that would not only be dependable, affordable and available, but that which will also seek to sustainably improve livelihoods of those communities, in consultations with them.

The present transport crisis has therefore drawn the country's attention to alternative systems, and *boda boda* may at present and in future amount to a reliable and cost-effective means of transport for many rural and peri-urban and even urban communities.

2.11.3 Structural functionalism theory

Talcott Parsons was heavily influenced by Durkheim and Max Weber, synthesizing much of their work into his action theory, which he based on the system-theoretical concept and the methodological principle of voluntary action. He held that "the social system is made up of the actions of individuals." His starting point, accordingly, is the interaction between two individuals faced with a variety of choices about how they might act, choices that are influenced and constrained by a number of physical and social factors.

Parsons determined that each individual has expectations of the other's action and reaction to his own behavior, and that these expectations would (if successful) be "derived" from the accepted norms and values of the society they inhabit.

As behaviors are repeated in more interactions, and these expectations are entrenched or institutionalized, a role is created. Parsons defines a "role" as the normatively-regulated participation "of a person in a concrete process of social interaction with specific, concrete role-partners." Although any individual, theoretically, can fulfill any role, the individual is expected to conform to the norms governing the nature of the role they fulfill.

Parsons later developed the idea of roles into collectivities of roles that complement each other in fulfilling functions for society. Some roles are bound up in institutions and social structures (economic, educational, legal and even gender-based). These are functional in the sense that they assist society in operating and fulfill its functional needs so that society runs smoothly.

A society where there is no conflict, where everyone knows what is expected of him, and where these expectations are consistently met, is in a perfect state of equilibrium. The key processes for Parsons in attaining this equilibrium are socialization and social control. Socialization is important because it is the mechanism for transferring the accepted norms and values of society to the individuals within the system. Perfect socialization occurs when these norms and values are completely internalized, when they become part of the individual's personality.

Parson states that "this point is independent of the sense in which the individual is concretely autonomous or creative rather than 'passive' or 'conforming', for individuality and creativity, are to a considerable extent, phenomena of the institutionalization of expectations"; they are culturally constructed.

Socialization is supported by the positive and negative sanctioning of role behaviours that do or do not meet these expectations. A punishment could be informal, like a snigger or gossip, or more formalized, through institutions such as prisons and mental homes. If these two processes were perfect, society would become static and unchanging, and in reality this is unlikely to occur for long.

Parsons recognizes this, stating that he treats "the structure of the system as problematic and subject to change," and that his concept of the tendency towards equilibrium "does not imply the empirical dominance of stability over change." He does, however, believe that these changes occur in a relatively smooth way.

The idea in action

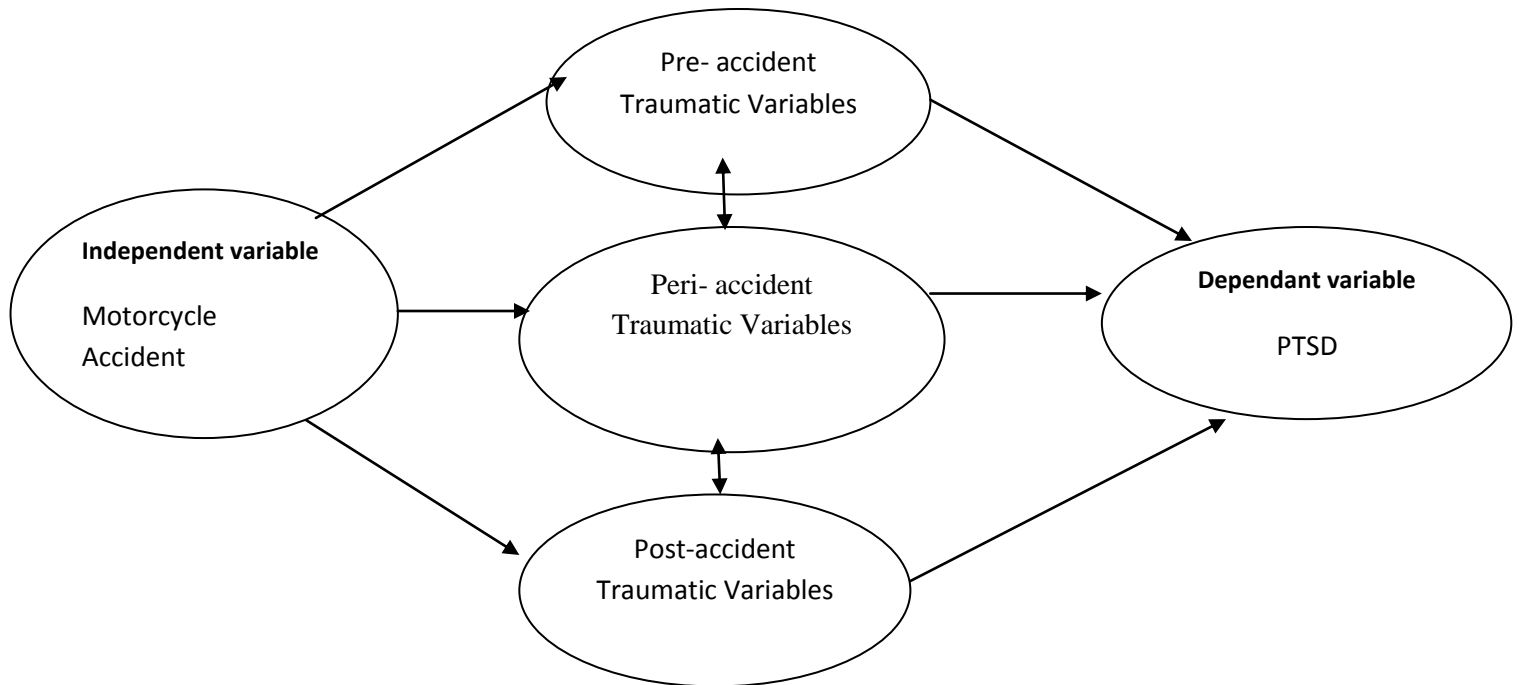
Generally, women are the main customers of the *boda boda* industry, yet very few women are actually operating *boda boda* as drivers.

The majority of *boda boda* operators are primary and secondary school dropouts. With *boda boda* associations formed to instil operational discipline, entry into *boda boda* is being regulated to allow only adults at the age of 18 and above. *Boda boda* trade is older and well organised in some areas unlike others for example *boda boda* operations in Busia are better organized than Murang'a and as such a number of old people in their 40s are operating in this business.

Generally, operators work for longer hours (14 hours a day) at minimum. Operators are expected to wear uniforms for identification while on the other hand; *boda boda* identification is confined to bicycles which have number plates.

Boda bodas are designed to carry only one passenger at a time but some carry two passengers especially when the other passenger is a younger person, with him or her sitting on the crossbar. Goods weighing 200 kg have been seen on *boda boda*, in which case the operators can only push the bicycles. Therefore, there should be penalties, fines and punishment for any operator who goes against the expected norms.

2.12 Conceptual framework



Motorcycle accident in itself cannot cause PTSD among the survivors. Prior traumatic variables/ conditions, accident related variables and Post accident variables trigger PTSD.

The development of post-traumatic stress symptoms is influenced by preexisting personality characteristics, the nature of the trauma, and the person's reaction during the event and subsequent experiences. Among factors that predispose persons to PTSD are prior traumatic experiences. In reality anyone can develop PTSD. As long as you have been in a situation in which you were afraid for your safety or your life, or you must have experienced something that made you feel fear, helplessness, or horror.

Pre-accident traumatic factors such as; poor ability to cope in reaction to previous traumatic event, having a history of mental illness, living through dangerous events and traumas; may make PTSD process worse. These conditions could apply to anyone at certain points in their lives making PTSD an unpredictably common source of distress.

A road accident is more likely to traumatize the victim. A victim's vulnerability to PTSD increases if the traumatic event is sudden, unpredicted, enduring or recurring. In addition,

the risk of developing PTSD rises if the accident poses a real threat of harm to the victim, if the trauma is multidimensional for instance be involved in a terrifying road accident and incur spine injury. Fatal accidents usually result into disability. Disability can be a physical ailment, mental, intellectual or sensory malfunctioning which inhibits one from performing the daily living activities in persons who were once independent. Facial disfigurement is usually expected once an accident occurs; muscle tears at the elbows, shoulders, hips, knees and wrists, fingers, spine and neck if the rider had not put on the riding protective clothing. The trauma here has a more profound effect on a developing personality. It is estimated that 17 percent of people who have been involved in serious road accident are likely to develop PTSD (Kessler et al, 1995)

Post-traumatic reactions by others and by the self may also play a role in influencing whether such symptoms persist. Lack of social support, secondary victimization, lack of proper treatment, self blame, self pity or guilt are post traumatic symptoms that make accident survivors prone to PTSD. When a person is unable or unwilling to discuss a traumatic event, accurate diagnosis is difficult. Additionally, persons with PTSD often have other disorders, such as substance abuse or depression. These other disorders share some of the symptoms of PTSD and can also make diagnosis more difficult.

2.12.1 Research Variables

A variable can be defined as a characteristic that is being measured. Variables can either be dependent or independent. A dependent variable is one that depends upon or is a consequence of the other variable. Dodge (2003) defines the dependent variable as one that the researcher is interested in explaining and predicting. The independent variable is the one that influences and explains the dependent variable.

Dependent Variable: In this study, the dependent variable is Post Traumatic Stress Disorder.

Independent Variable: The independent variable is motorcycle accident.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research approach which arose from a desire to fill the gaps identified in chapter 2 and, in particular, the evolution of a methodology that would meet the outcomes set out in chapter 1. This chapter aims to build on that introduction and to provide a rationale for the choice of methods.

The methodology set out investigated actual user experience of the *boba boda* and motorcycle transport system and measured the extent to which the government ensures road safety within Muranga town and measure operators' exposure to PTSD. In particular, the chapter has discussed in details the methodology adopted for this research, that is, research design, data collection procedures, sampling design, units of analysis and data analysis. This includes a discussion of why other approaches would not have been suitable, consideration of the advantages of qualitative research. It has also discussed the area of study population.

3.2 Area of study

Murang'a county is one of the seven counties of central province. It is bordered by Nyeri County to the North, Kiambu County to the South, Embu county to the East, Nyandarua County to the West, Kirinyaga county to the North East, Machakos county to the south East. It lies between 0°34'South and 1° 07'South and longitudes 36°East and 37°27°East.

The county's total area is 2,558.82 Km² in the central part of Kenya and a population density of 374 per Km². It has four administrative Divisions, namely, Kiharu, Kahuro, Kangema and Mathioya. There are 17 Locations and 70 Sub-locations. It has three Local Authorities, namely; Murang'a Municipal Council headed by a mayor, Murang'a County Council and Kangema Town Council. There are three constituencies namely, Mathioya, Kiharu and Kangema. It has however four (4) Members of Parliament.

The land rises gradually from an altitude of 900m in the East to 3,300m above sea level along the slopes of the Aberdares. The highest areas to the West have deeply dissected

topography and are well drained by several rivers, which include Mathioya North, Mathioya South and Maragwa flowing eastwards to join the Tana River. More than 95 percent of the land is generally mountainous landscape.

Temperatures vary with altitude. In the Eastern lower areas the maximum annual temperatures range between 26° C and 30° C while the minimum annual temperatures range between 14° C and 18° C. In the western area, which is mostly high altitudes, the minimum temperatures can be as low as 6° C. Temperatures are moderate in the medium potential areas. Variations in altitude, rainfall and temperature between the highland and lowland coupled with the differences in the underlying geology of both volcanic and basement system rocks give rise to a variety of soil types. Highland areas have rich brown loamy soils suitable especially for tea. Coffee, maize and dairy farming are practiced. Soils in the lower areas are predominantly black cotton clay soils with seasonal impeded drainage. The district has a combination of both natural and artificial forests all forming the expansive Aberdares forest, which occupy an eighth (174KM²) of the district total area. This excluding the dry land forest, Kiambicho. Most (80%) of the population relies on agriculture, informal sector, tourism and manufacturing.

Murang'a County is among the top highly underdeveloped districts among others in Kenya. According to District environmental action plan 2006 – 2011 murang'a district, absolute poverty is quite high covering 29 percent. Thus many people are earning less than a Dollar per day of the District population.

Muranga town is located within Kiharu constituency in Kiharu division. Kiharu constituency comprises of Mbiri , Gatari ,Murang'a municipality and Gikindu locations of Kiharu division ,Mukirandia , Weithaga , Mugoiri and Kahuhia locations of Kahuro division of Murang'a district.Kiharu Division falls under the lowland areas. The constituency covers a total area of 410 km² (40,000ha) with 204km² in Kiharu Division and 206km² in Kahuro Division. Most of the land in Kiharu Division is classified as Arid and Semi Arid Land (ASAL). Farms are relatively bigger in size ranging between 2-7 acres of land. The terrain is generally flat and the climate is unsuitable for cash crop production of tea and coffee though the area has a high potential for food crops

production. Human settlements are evenly distributed across the division but with a majority of the people concentrated in the peripheral areas of Murang'a town. Majority of the people are living below the poverty line (UNDP, 2006). Most vulnerable include the unemployed who are mainly the youth. The farmers engage mainly in subsistence production and therefore realize little incomes to support modest livelihood.

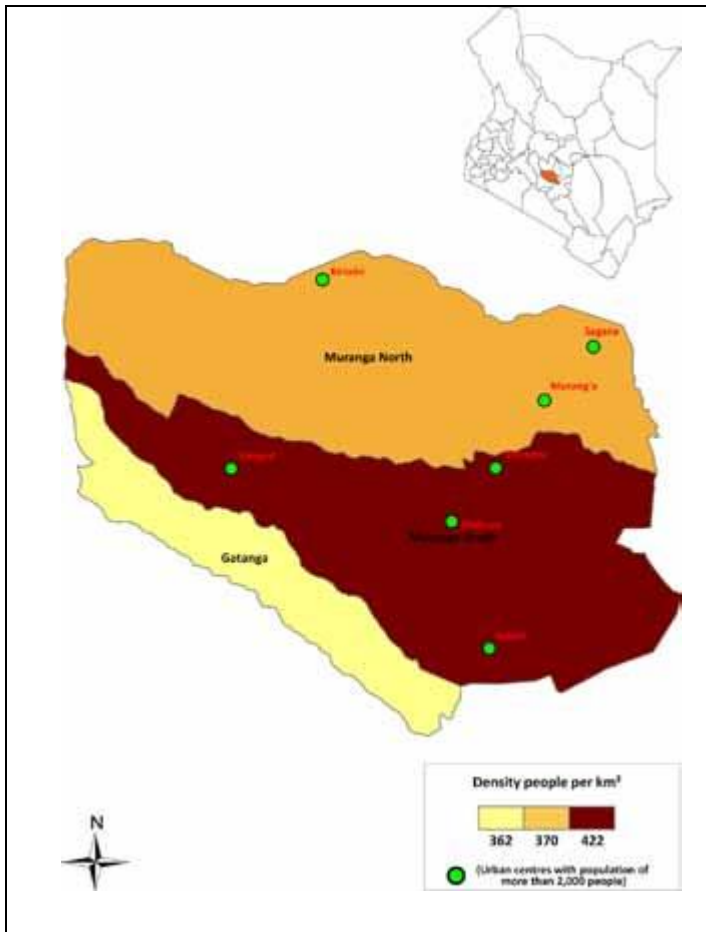
Murang'a town is classified into four clusters. Central Business District consists of district headquarters offices and its department. There are also main business premises housing commercial activities. Various matatu terminals, seen as the major cause of congestion, are at the heart of the town next to Murang'a General Hospital. Also at the heart of the town is the Kenya Medical Training Centre and the Law courts.

The second cluster consists of high- density residential areas where key estates include Mumbi, Mjini and Kiharu. These estates harbor light industries and minimal commercial activities. Mjini estate is classified a semi- slum, housing the town's poorest, while Milimani is the affluent zone, which houses the who is who in the town.

The third cluster consists of peri- urban zones, which were originally rural but now have urban characteristics. These areas including Mukuyu Centre and St Mary are the basis of rapid expansion as investors scramble for space. As a result, the areas are undergoing chaotic land subdivisions and are a nightmare to the area Land Board dispute settlements.

The fourth cluster is the agricultural zone, which is fast diminishing as urban sprawl hits the town environs. The town got its urban council in 1963, which was later upgraded to Town Council in 1973. In 1982, it received Municipal Council status. The town has a jurisdiction of 25 square kilometres and a population of 11,021, this according to the 1999 census. The figure is estimated to have since hit 35,000 owing to rural urban migration (Kenya Bureau of Statistics, 2009 census). The town is the one-stop centre for the area Kiharu, Kangema and Mathioya constituencies. The town has in the recent past been under security scrutiny owing to numerous incidents of insecurity that spilled from the rural areas, specifically Kahuro, Mathioya, Mugoiri and Iyego being the hot zones for Mungiki adherents.

Figure 2: Murang’a District Map



3.3 Study population and distribution

A population is a group of individuals, objects or items from which samples are taken for measurement. It is the entire group or elements that have at least one thing in common (Kombo & Tromp, 2006). According to 1999 census projections, Murang’a district has a total population of 348,304 and according to 2009 census; the population has gone higher to 942,581. The larger population of Murang’a is rural based; only 16.3 percent of the total population lives in the urban. This is depicted by the district social economic activities. Murang’a town has a jurisdiction of 25 square kilometres and a population of 35,000 this is according to the 2009 census much higher than the 11,021 population in 1999.

3.3.1 Population Distribution by Gender and age

The gender distribution of population has been more females than males. This is reflected in the 1999 and 2009 census.

This has also been replicated by the rising number of female-headed households in the district.

Table 5: Population Distribution by Gender

Year Gender	1999	2009
Male	160,659	457,860
Female	179,779	484721
Total	340438	942581

Source: Kenya National Bureau of Statistics 1999 and 2009 National Census report.

Table 6: Population Distribution by Age

Age group	Population	Percentage
0-14 years	282774	30%
15-64 years	556123	59%
Over 65 years	103684	11%

Source: Kenya National Bureau of Statistics

3.4 Research Design

This study was qualitative in nature and adopted a descriptive research design. Qualitative research design is concerned with qualitative phenomenon i.e phenomenon relating to or involving quality or kind. In this study the researcher was interested in examining the current traffic laws put in place to prevent and respond to road traffic accidents in Kenya by the relevant management especially the government. The research was also more specific on how the *boda boda* survivors exposed to PTSD.

Mugenda and Mugenda (2003) defines descriptive research design as an attempt to collect data from members of the public in order to determine the current status of that population with respect to one or more variables. Qualitative and quantitative methods were used to collect data. Qualitative methods help in understanding of the phenomena more broadly, to expand on issues and back up information that may have been difficult to convey quantitatively.

Data was collected from a sample or subset of the entire population and from which findings will be generalized. Results were interpreted to determine the probability that the

conclusions found among the sample can be replicated within the larger population. This study sought to collect data on vulnerability variables to PTSD among *boda boda* accident victims and the extent to which the government has ensured road safety in Murang'a town.

3.5 Data collection procedures

The researcher collected data from both primary and secondary in relation to space and time. Primary source is the first hand information. This was obtained from questionnaires- open ended- which were filled by the help of the researcher; interviews and general observation. This involved *boda boda* operators, those seriously involved in a road accident and those who were not involved in a road accident; traffic police on duty in time of data collection and Head of accident department in Murang'a General Hospital. Primary data helped in filling the identified gaps and supplemented the secondary data in order to arrive at the expected results.

Secondary data includes both published and non-published data. In this study, this included and not limited to reports, documents and records from the police station and Murang'a General Hospital.

The following techniques were employed;

a) Interviews

Interviews were used in collecting data from the sampled population such as *boda boda* operators, traffic police and Head of accident department in Murang'a General Hospital. Interviews were a good approach to probe and explore questions. Interviewing involved asking respondents a series of open-ended questions. These generated both standardized quantifiable data and more in-depth qualitative data. In conducting interviews therefore, the researcher needed to: question, prompt and probe in ways that helped in gathering rich data, actively listen and make sense of what was being said and manage the overall process. This however took a lot of time.

b) Questionnaire for *boda boda* operators

The open-ended questionnaires were used to collect data relating to the five stated objectives. The researcher asked the questions herself and so questionnaires were not self-administered.

Two pulls of questionnaires were employed. One pull of questionnaire targeted *boda boda* operators who had not been involved in road accidents while the other pull targeted operators who had survived fatal accidents and have suffered serious injuries. Due to the fact that questionnaires guaranteed privacy, more information was easily collected by use of this too. The researcher adopted in-depth interview which was unstructured and was descriptive, the informal conversation interview where no guide was used and/or for the purposes of capturing all the relevant topics.

c) Key informant guide for Traffic police and Head of accident department

The researcher purposively selected informants who in her opinion are thought to be relevant to the research topic. The interviewer gave a brief introduction to the project and explained the role of the informant, including how the data will be used and the time commitment to complete the interview. This included traffic police on duty as well as Murang'a General Hospital Head of accident department. Purposive selection of key informants was based on the limitation on the number of persons likely to have had responsibility in interventions as far as road safety in the area is concerned, operating individuals who have seen the unfolding business among others.

d) Direct Observation

Observation in field research is where the researcher observes the participants in the context of their natural setting. The researcher observed *boda boda* operators, their behavior such as parking *boda bodas* and condition of the motorcycles during the interviews.

3.6 Sampling Design

A sample is a subset of the target population to which the researcher intends to generalize the results (Wiersma, 1986). According to Best and Kahn (1998) the ideal sample should be large enough to serve as adequate presentation of the population about which the

researcher wishes to generalize and small enough to be selected economically in terms of subject availability, expenses in both time and money and complexity of the data analysis. The census report (2009) stated that there were about 4,666 motor cycles in Murang'a County. Murang'a town is approxiamated to have 500 boda boda operators; this is according to Murang'a Kenya Revenue Authority. This number however, has an error of plus or minus since not all boda boda registered in Murang'a operate in that county. The researcher was to interview 174 boda boda operators; of which 87 were to be those operators involved in road accident and incurred serious injuries and another 87 operators who had not been involved in any kind of accident.

Non probability sampling technique was used.

a) Snow balling

Snowball sampling is a non-probability sampling technique that is used by researchers to identify potential subjects in studies where subjects are hard to locate (Castillo, 2009). Researchers use this sampling method if the sample for the study is very rare or is limited to a very small subgroup of the population. This type of sampling technique works like chain referral. After observing the initial subject, the researcher asks for assistance from the subject to help identify people with a similar trait of interest.

The advantage of this sampling technique is that it is cheap, simple and cost- efficient . This sampling technique also needs little planning and fewer workforce compared to other sampling techniques.

However the researcher has little control over the sampling method. The subjects that the researcher can obtain rely mainly on the previous subjects that were observed. Representativeness of the sample is not guaranteed. The researcher has no idea of the true distribution of the population and of the sample.

The researcher therefore used this method of sampling to interview 87 *boda boda* operators who were involved in road traffic accidents. The researcher approached one bodaboda accident victim (operator); the first one was directed to her by one nurse in the hospital. The first respondent in this group was admitted in the hospital. After the interview, the respondent directed the researcher to another victim he knew and the cycle continued. Respondents who were engaged in road accident were chosen according to

how the researcher was directed by the previous respondent who in this case was a *boda boda* operator involved in a road accident.

b) Systematic random sampling

Systematic random sampling is a type of probability sampling technique. The sampling starts by selecting an element from the list at random and then every k^{th} element in the frame is selected, where k , the sampling interval (sometimes known as the *skip*): this is calculated as (Black, 2004):

$$k = \frac{N}{n}$$

where n is the sample size, and N is the population size.

Using this procedure each element in the population has a known and equal probability of selection. This makes systematic sampling functionally similar to simple random sampling. It is however, much more efficient (if variance within systematic sample is more than variance of population). Systematic sampling is to be applied only if the given population is logically homogeneous, because systematic sample units are uniformly distributed over the population. The researcher must ensure that the chosen sampling interval does not hide a pattern. Any pattern would threaten randomness.

The researcher used this sampling technique to interview 87 *boda boda* operators who had not been involved in road traffic accident.

$500/87=5.746$, so the random starting point was chosen between 0 and 5.746 (inclusive of one endpoint only). To ensure that every operator had equal chance of being selected; the interval were non-integral (5.746); and each non-integral selected was rounded up to the next integral. If the random starting point is 3.7, then the operators selected are 4, 10, 16, 22, 28, 40, 46, 52, 58, (previous integral+ 5.746) and so on till 500.

3.7. Site selection and description

Murang'a town was purposively selected due to its fast growing rates. It is the administrative centre of Murang'a County. It has businesses, markets and residential estates. It has a busy bus and matatu transport terminals congested with *boda boda* operators. *Boda bodas* have become household name in the town. They have become

school vans for transporting pupils and teachers, buses for staff. The *boda boda* also carry goods from the rural areas and ferry people to the market. They have greatly been used in the rural areas where road networks are poor. Most youths in this region have capitalized on lack of vehicles to earn their daily bread. In addition, Murang'a town was within the researcher's proximity thus it was economical.

3.8 Unit of Analysis

According to Singleton (1995), a unit of analysis is what is to be described or analyzed. It is what the research seeks to explain or understand and can therefore be individuals, social roles, positions or even relationships. Chava and Nachmias (1996) describe unit of analysis as the most elementary part of the phenomenon to be studied. The unit of analysis in this study was establishing the current traffic laws and contingency measures put in place by the Kenyan government to prevent and respond to *boda boda* operations and the predisposing variables to PTSD.

3.9 Unit of Observation

Mugenda and Mugenda (2003) describe unit of observation as subject, object, item or entity from which we measure the characters of, or obtain the data required in the research study. In this case, the unit of observation has been what the researcher can observe; the behavior of *boda boda* operators who have not been involved in a road accident, *boda boda* operators who have incurred serious injuries as a result of a road accident and the law enforcers i.e traffic police in Murang'a town.

3.10 Data Analysis

After the data was collected, the researcher turned to the task of analyzing it. The analysis of data required a number of closely related operations such as establishment of categories, the application of these categories to raw data through coding, tabulation and then drawing statistical inferences.

In this study, both quantitative and qualitative data were analyzed but separately. Descriptive statistics were employed and broadly involved describing, exploring and

summarizing of data to establish patterns in the data by using measures that could help compress the data. In this study, it facilitated generating variables by summarizing patterns in response given by individuals in the sample. Descriptive statistics were used to analyze and present the quantitative data which contains numerical information. This was through the use of percentages which are used to show variations on the outcomes from the findings. Statistical Package for Social Scientists (Version 17) was used for the Quantitative data.

As such, this reduced the data masses to forms that could be clearly understood and acceptable. It was also used to analyze and present the quantitative data which contains numerical information. This was through the use of percentages which were used to show variations on the outcomes from the findings.

Data collected through the key informant guide and the open ended question from questionnaire tool were analyzed qualitatively in order to compress the data to a more manageable and understandable observation that can be appreciated.

3.11 Problems Encountered

Time consuming; The researcher used two pulls of questionnaires where one of them was targeting *boda boda* operators who have never been involved in road accidents. The researcher did not have a problem to get these respondents. However, to get the respondents of the other pull of questionnaires was hectic. These questionnaires targeted *boda boda* operators who have been involved in a road accident and have incurred serious injuries. Though snow balling was used, it was difficult to get the 87 population of these respondents since those referring the researcher to them did not have the where about of all the victims. This consumed a lot of time searching for these respondents but all in all the researcher managed to capture them.

Language barrier; Despite the researcher coming from the area of study, she found it difficult to translate the questionnaire from English to Kikuyu/ Kiswahili. However, the researcher tried her best to interpret to the native language of the respondents for easier understanding since she assisted in filling in the questionnaires.

Suspicion and mistrust; The police were suspicious about the researcher's motive despite explaining the objective of the study clearly to them and assuring them of confidentiality. They seemed reluctant to share some information suspecting that the researcher would disclose some of the secrets given to their seniors.

Adverse climatic conditions; the research was undertaken during the wet and cold season. Being a sloppy terrain, the researcher would at times walk on a slippery road. Therefore, moving from one place to another was quite difficult.

CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION OF FINDINGS

4.1 Introduction

This chapter discusses the manner in which the data collected was analyzed and presented. The findings have been analyzed tabulated and recorded as frequencies and percentages where appropriate. The study targeted traffic police, bodaboda operators who have been involved in road accidents and those who have not. The interpretation of the findings is in accordance with the research objectives which were:

1. To establish the current traffic laws and contingency measures put in place by the Kenyan government to prevent and respond to boda boda operations
2. To examine the extent to which *boda boda* operations comply with the existing laws and regulations.
3. To establish challenges faced by law enforcers
4. To find out the frequency and trend of motorcycle accidents.
5. To investigate the presence of predisposing variables to PTSD in *boda boda* operators.

4.2 Demographic characteristics of respondents

In this part, general information about the respondents is analyzed by the use of frequencies and percentages. The data obtained is presented in the following sections. The study sought to measure the demographic attributes of the respondents including gender, age and level of education.

4.2.1 Gender of respondents

The respondents were requested to provide data on the gender of *boda boda* operators who were involved in road accident and those who were not. The data obtained is as presented in table 4.1 below

Table 4.1 Gender of respondents

Respondents' Characteristic	Gender	Frequency	Percentage
Those involved in road accident	Male	87	100.0
Those not involved in road accident	Male	87	100.0

The study covered a total of 174 respondents. Results of the study indicated all the respondents were males. This could be due to the patriarchal system of the community where bodaboda business is a male-dominated field. Due to cultural ethics, women have been regarded as the submissive sex particularly in the disadvantaged communities. The motor industry has been regarded as a mechanical/ technical one where women simply are not 'qualified' to be active participants. In addition, boda boda business tends to be risky as operators go until late night, up to midnight when the pick is very high. Operating at night comes with its disadvantages such as kidnapping, hijacking and theft.

Below is a table demonstrating some of the challenges facing *boda boda* operators as mentioned by the respondents and which can be adverse to women.

Table 4.2: Challenges faced by *boda boda* operators

Challenge	Yes	No	Total
Police harassment	67 (77%)	20 (23%)	87
Robbery	53 (60.9%)	34 (39.1%)	87
Hijacking	41 (47.1%)	46 (52.9%)	87
Carelessness by other road user	47 (54%)	40 (46%)	87
Lack of training	57 (65.5%)	30 (34.5%)	87
Total	265 (60.9%)	170 (39.1%)	435 (100%)

Police harassment was mentioned to be the biggest challenge *boda boda* operators face at 77 percent, followed by lack of training at 65.5 percent and robbery at 60.9 percent. When arrested, women can be highly affected since they have children looking up to them at home. Robbery and kidnapping put women at risk of rape and molestation compared to men thus making them vulnerable and instills them fear of engaging in *boda boda* business. In most society, the level of participation in training continues to remain lower for women than men. This can contribute to gender inequality with regard to employment and career opportunities. Therefore, women often do not have access to certain sectors or field of occupation such as *boda boda* business (Leach, 1998).

4.2.2 Age of respondents

The respondents were asked to provide data on their age. The data obtained is presented on table 4.3 and 4.4

Table 4.3: Age of respondents who were involved in road accident

Age in years	Frequency	Percent
21-25	30	34.5
26-30	27	31.0
31-35	19	21.8
36-40	10	11.5
Above 40	1	1.1
Total	87	100.0

Most (65.5%) of the *boda boda* operators who were involved in road accident were below 30 years. The majority of the respondents, who represented 34.5 percent of the total respondents, fell in the 21-25 years age bracket while only 31 percent fell under the age bracket of 26-30 years. The possible reason why the youth aged between 21-25 years are more affected in road accidents is that, this is the age involved mostly in unhealthy road riding competition.

Table 4.4: Age of respondents who were not involved in road accident

Age in years	Frequency	Percent
21-25	35	40.2
26-30	36	41.4
31-35	11	12.6
36-40	4	4.6
Above 40	1	1.1
Total	87	100.0

Among the respondents who were not involved in accidents, a majority of them (41.4%) representing 36 out of the 87 respondents were aged between 26-30 years as illustrated by the table above (Table 4.4) and 81.6 percent of the respondents were below 30 years. The above tables indicate that the respondents were of mature age and possibly had the necessary experience required for been a *boda boda* operator.

The often-alleged ‘youth’ of *boda boda* operators is partially borne out by the SLAM survey data (2001). Motorcycle operators none are less than 19 years, only 23 percent less than 24, and 31 percent more than 34 years old. About 14 percent were 31 or more years old. From the above finding, most operators (34.5%) range between 21- 25 years old. Though from the SLAM survey, none were found over 40 years of age, the above finding shows that 1.1 percent operators were above 40 years of age. An average of 73.6 percent of *boda boda* operators were found to be below 30 years.

According to the 2009 population and housing census, 34 percent of the Kenyan population is aged between 15 and 34. This is a substantial workforce that could contribute significantly to economic growth. However, much of this labor force is unutilized.

The Kenyan Household Integrated Budget Survey (KIHBS) of 2005/06 indicated that unemployment stood at 25 percent for the age group 15-19, 24.2 percent for 20–24-year-olds, 15.7 percent for those aged 25-29 and 7.5 percent for the age group 30-34.

The problem of youth unemployment has long been recognized in Kenya. The 1972 International Labor Organization (ILO) report on employment in Kenya acknowledged that the formal sector had limited capacity to generate enough jobs to absorb the existing labor force. Since then this problem has remained high on the government's policy 18 agenda but, with rapid population and labor force growth as well as economic decline, it continues to be a pressing problem.

There are approximately 1.8 million unemployed people aged between 15 and 64 in Kenya, resulting in a national unemployment rate of 14.6 percent. Sixty percent of all unemployed people are under the age of 30, and 45 percent are under 24 years of age. In effect, unemployment is not just due to a lack of jobs, but it is also due to the workforce lacking the skills needed to support a growing economy

Kenya's economy is currently dependent on agriculture, but youth are moving to urban areas in large numbers. Therefore most new entrants to the labour force must choose between working in small scale enterprises and being self-employed. Many youths in Kenya have sought for other ways of improving their living standards like venturing into 'boda boda' industry as a business. It's quite encouraging that this sector has employed quite a large number of youths regardless of their education level. Among other benefits of this sector are as follows:

Employment- it has reduced the number of idle minds through direct and indirect employment thus reducing the danger of gangs and drug abuse among youth.

Income generation- it is a source of income to most people and thus improves the living standard of an individual.

Megot (2010) says that in Kenya, road accidents account for the loss of more than 3,000 lives annually, a significant proportion of these are young and productive men and women in the 15-45 years age bracket. The economic cost of such road accidents and fatalities has estimated to be in excess of 4 billion shillings. In addition according to

Kigera, Naddumba et.al (2010), road traffic crashes and in particular bodaboda ones commonly affect the young adults in the 20 – 29 years age group.

I quote from their journal, “The motorcyclists were mainly youths with an average age of 24 years.” This is because the *boda bodas* business is dominated by youths as a means to a livelihood.

4.2.3 Respondents’ Level of education

The respondents were asked to provide data on the level of education. Education is a right of every member of the society as stipulated under the education Act of Kenya (Gondi, 2003). The study therefore sought to establish the respondent’s education level. The data obtained is presented on table 4.5 and 4.6

Table 4.5: Level of education of respondents who were involved in road accident

Level of Education	Frequency	Percent
Never	2	2.4
Primary Incomplete	3	3.5
Primary Complete	19	22.4
Secondary Incomplete	25	29.4
Secondary Complete	26	30.5
Post Secondary Education	10	11.8
Total	85	100.0

Data presented on table 4.3 show that most (58.6%) of the respondents under this study had acquired secondary education .The percentage of the respondents who had completed secondary education is 29.9 percent; on average 60 percent of respondents acquired

secondary education but never proceeded to post secondary education. However; only 11.5 percent have acquired post secondary education and 2.3 percent had not attended school.

According to Howe’s SLAM survey report, a *boda boda* operator has the popular image of a poor person’s ‘school dropout’ job. Some 56 percent had only primary and 40 percent secondary education to O level, with just 4 percent at A and Diploma levels – there were no graduates. From the above finding, those who had access to only primary education were lower than that of Howe’s with 30.8 percent. Those who accessed secondary education were 58.6 percent with only 29.9 completing O level; lower than that of Howe’s 40 percent.

Only 1.5 percent of the unemployed have any formal education beyond the secondary school level. In addition, the vast majority of unemployed people (92%) have no vocational or professional skills training.

Most of the respondents had just finished secondary school and they have not proceeded to further studies. They are therefore not well experienced and their behaviors towards road safety are wanting.

Table 4.6: Level of education of respondents who were not involved in road accident

Level of education	Frequency	Percent
Primary Complete	7	8.0
Secondary Incomplete	7	8.0
Secondary Complete	29	33.3
Post Secondary Education	44	50.6
Total	87	100.0

The study findings revealed that a majority of the respondents had at least a minimum of secondary education, post secondary education being the highest attended with 50.6 percent respondents. It is therefore an indication that majority of the respondents were

literate and therefore they are expected to be well knowledgeable in traffic rules and regulations which they are expected to comply.

4.3 Current traffic laws and contingency measures

Under this objective the researcher sorts to understand and review if *boda boda* operators are aware of road traffic laws and contingency measures taken failure to compliance. The respondents were supposed to indicate if they were aware of the traffic rules. There were a number of indicators which were used to inquire the respondents' awareness on road traffic laws. These include; observing road signs, wearing safety gears, not over speeding and not overloading. The respondents were supposed to indicate on the statements based on a Yes or No opinion. The data is represented in table 4.7 below

Table 4.7: Traffic laws recalled by respondents

Traffic rules		Number of respondents who did not Recall	Number of respondents who Recalled	Total
Observing road signs	a) Motorcycle parking	65 (74.7%)	22 (25.3%)	87
	b) No overtaking sign	75 (86.2%)	12 (13.8%)	87
	c) No entry sign	45 (51.7%)	42 (48.3%)	87
	d) One way sign	50 (57.5%)	37 (42.5%)	87
	e) Road traffic lights	83 (95.4%)	4 (4.6%)	87
	f) No U-turn sign	65 (74.7%)	22 25.3%	87
	g) Stop sign	70 (80.5%)	17 (19.5%)	87
	h) Zebra crossing	30 (34.5%)	57 (65.5%)	87

	i) Entry and End of speed limit signs	64 (73.6%)	23 (26.4%)	87
	j) Roundabout sign	56 (64.4%)	31 (35.6%)	87
Wearing safety gears	a) Helmets	46 (52.9%)	41 (47.1%)	87
	b) Gloves	72 (82.8%)	15 (17.2%)	87
	c) Riding jackets	45 (57.7%)	42 (48.3%)	87
	d) Riding suits	65 (74.7%)	22 (25.3%)	87
	e) Reflectors	47 (54.0%)	40 (46.0%)	87
Not over speeding		45 (51.7%)	42 (48.3%)	87
Not overloading		44 (50.6%)	43 (49.4%)	87
Total		967	512	1479
Mean of recall		65.4%	34.6%	100%

Each cell has a chance of scoring a 100 percent. The measurement of recall of the respondents towards traffic rules is based on the cell representative which is the actual score or total score over the expected/ probable cell times a hundred.

The distribution in the table above shows the level of recall of respondents towards traffic laws was low (34.6%) compared to those unrecalled at 65.4 percent.

On average 65.4 percent of *boda boda* operators did not recall traffic rules while as those who recalled traffic rules on average are 34.6 percent. Most *boda boda* operators recalled the following traffic rules; stopping at zebra crossing for pedestrian crossing (65.5%); no overloading (49.4%); no entry sign, wearing riding jackets, no over speeding at 48.3 percent; wearing helmets (47.1%) and wearing reflectors (46%).

One respondent had this to say,

“The government has not implemented traffic rules that govern only boda boda transport system.”

According to Murang’a traffic police, *boda boda* operators should follow the Kenya Traffic Laws which are;

- a) Every motorcycle shall have fixed thereon one reflective plate at the rear in the horizontal position at the right angles to the longitudinal axis of the cycle for identification;
- b) Every motorcycle and bicycle shall be equipped with one lamp at the front and shall show one such light when the motorcycle is in motion on a road in daylight hours and also at night;
- c) In addition to the lamps, the bicycles and motorcycles, reflectors and warning signs shall also be followed. Bicycles and motorcycles should have one red reflector fitted at the rear;
- d) A person shall not ride on a motorcycle without wearing a helmet and a jacket that has reflectors;
- e) A person who rides a motor cycle shall provide a helmet and a jacket that has reflectors to be worn by the passenger, and shall carry only one passenger at a time;
- f) A passenger shall wear a helmet and a jacket which has reflectors;
- g) A person shall not ride a motor cycle unless that person has a valid driving license issued in accordance with the provisions of the Act. Anyone who contravenes or fails to comply with the provisions of this rule commits an offence and is liable to a fine of five thousand shillings or, in default of payment, to imprisonment for a term not exceeding three months;
- h) Every bicycle and motorcycle shall be fitted with an instrument capable of giving sufficient warning of its approach or position;

(Source: Kenyan Law Report Cap 403)

In the new traffic (Amendment) Act, 2012, the motorcycle operators are to adhere to the following laws:

103B. (1) A person, including a passenger, shall not ride on a motor cycle of any kind, class or description without wearing a helmet and a jacket that has reflectors.

(2) A person who rides a motor cycle shall provide a helmet and a jacket that has reflectors to be worn by the passenger, and shall carry only one passenger at a time.

(3) Every motor cycle shall be insured against third party risks in accordance with the Insurance (Motor Vehicles Third Party Risks) Act. Cap. 405

(4) For the purposes of this section, a helmet shall be of such shape, construction and quality as may, from time to time, be prescribed by the Minister by notice in the gazette.

(5) A person shall not ride a motorcycle unless that person has a valid driving license issued in accordance with the provisions of the Act.

(6) For the purpose of this section, “ride” means to operate, manage or to be in control of a motor cycle.

(7) A person who contravenes or fails to comply with the provisions of this section commits an offence and is liable to a fine not exceeding ten thousand shillings or, in default of payment, to imprisonment for a term not exceeding twelve months.

(Source: Traffic (Amendment) Bill Cap 103)

The rules require that driving licenses be renewed after every three years. In addition, the traffic rules now require that Officer Commanding Police Divisions be responsible for traffic matters while all police officers will deal with traffic offences.

Offenders of the above new traffic rules will be punished for violations such as over speeding, overlapping, careless driving and riding under the influence of alcohol. Other punishable breaches include exceeding the one- passenger requirement. Riders are also obligated to have reflective vests and helmets, including one for the passenger.

Below is a table showing of the penalties on traffic offences before the amendment of the traffic penalties in 2011

Table 4.8: Offences and penalties available in the traffic Act 2011

Offence	Penalty
Overspeeding	Fine not less than two hundred shillings and not exceeding two thousand shillings.
Driving under the influence of alcohol	Fine not exceeding ten thousand shillings or imprisonment for a term not exceeding eighteen months He / she will also be disqualified for a period of twelve months from holding a driving license
Causing death by dangerous driving	Imprisonment for a term not exceeding ten years and cancellation of license for three years
Reckless driving	Fine not exceeding five thousand or to imprisonment for a term not exceeding six months
Careless driving	First offence to a fine not exceeding five thousand shillings and for a second or subsequent offender to a fine thousand shilling or imprisonment for a term not exceeding three years
Driving without having a driving license	On a first conviction to a fine not exceeding two thousand shillings or imprisonment for a term not exceeding three months, on each subsequent conviction to a fine not exceeding five thousand shillings or imprisonment for a term not exceeding six months or both.

Source; Traffic Act

The ministry of transport said that the amended traffic laws will be a deterrent to those bent on breaking traffic regulations. In addition, the ministry said stiffer fines, increased education for road users and road safety facilities will restore order on Kenyan roads. In a statement, the ministry said it had commenced an intense awareness campaign targeting road users countrywide.

4.4 Boda boda compliance to traffic laws and regulation

Under this objective the researcher sort to understand the extent to which boda boda operators comply to existing traffic laws and regulations.

The assumption from table 4.7 above is that recall will facilitate compliance, meaning that 65.4 percent of *boda boda* operators did not comply with the traffic rules since their recall levels were low and only 34.6 percent of the *boda boda* operators complied to the traffic rules.

4.4.1 Major traffic offences that *boda boda* operators have been charged with and resulted to RTAs

The researcher requested the respondents to state offences that they have been charged with and had resulted to RTAs. Traffic offences in which *boda boda* operators have been charged with are summarized in the table 4.9

Table 4.9: Traffic offences committed by *boda boda* operators and resulted to RTAs

Responses	Frequency	Percent
Over loading	24	27.6
Not wearing safety gears	45	51.7
Careless driving	12	13.8
Over speeding	6	6.9
Total	87	100.0

The finding revealed that a high percentage (51.7%) of the respondents indicated that the main offence they were charged with is as a result of not wearing safety gears. Overloading was ranked second at 27.6 percent, careless driving third at 13.8 percent and over speeding was last at 6.9 percent. The main reason for over speeding and overloading

can be attributed to the fact that the operators are after quick money, and so the more the trips made the more the earning

It is reported that when motorcycle passengers are not in helmets, protective suits, gloves and boots, they are 27 times more likely to die in a crash and six times likely to be injured than a car passenger. According to an article by Malachi (2012), wearing helmets while riding *boda boda* is extremely important; this based on clear facts about what happens in the case of a crash. We all know there is a jump in deaths, brain injuries, broken jaws, broken ribs, lungs and legs from motorcycle crashes. Helmets reduce deaths by 37 per cent and brain injuries by 67 per cent, according to statistics from the National Highway Traffic Safety Administration.

The reporting officer at the time told the researcher that in Murang'a town all the *boda boda* operators should wear a helmet, reflective jackets and riding boots. It is also a rule for the operator to have a valid driving license, certificate of good conduct and a permit to operate a public service motorcycle. Several *boda boda* motorbike operators in Murang'a have been arrested and charged in court for flouting traffic rules.

One respondent said how they appeared before the Murang'a court and fined between Sh10, 000 and 25,000 for offences ranging from expired licenses, insurance cover to failure to put on helmets.

This can be attributed to the fact that most riders feared head injuries and that they want to be visible by other road users on the road to avoid collision. It is also due to the presence of the city councils and traffic police men on the road and so fear arrest. Most respondents did not see the need of wearing gloves and riding jackets as long as their heads were protected. Out of observation however, almost all of the respondents did not have extra safety gears for their passengers and those who had, had these to say; *"Passengers decline to wear helmets for fear of being infected with communicable diseases."* This as a result has attributed to major injuries *boda boda* operators and their passengers incur in case of accidents. Most (60.9%) and (52.9%) of respondents overspend and overloaded despite being aware it is a crime to over speed and overload.

The main reason for over speeding and overloading can be attributed to the fact that the operators are after quick money, and so the more the trips made the more the earning. The findings also show that few *boda boda* operators observed road signs and indeed practiced proper parking. It is therefore evident that a large number (62%) of *boda boda* operators did not comply with the traffic rules and regulations.

One of the responses from the traffic police was;

“Though the majority of boda boda operators comply with the traffic laws, there are a good number of them who do not obey the law. We are conducting crackdowns to ensure those flouting traffic rules leading to deaths and disabilities are brought to book,”

4.5 Challenges faced by law enforcers during their operation

Traffic law enforcement has been defined as the area of activity aimed at controlling road user’s behavior by preventative, persuasive and punitive measures in order to effect the safe and efficient movement of traffic. It has also been defined as a function that includes all police activities relating to the observation of traffic violations and the police actions to be taken, such as warning, reporting, summoning and arresting. The specific components of the actual process of traffic law enforcement are; (i) legislation which specifies the laws and regulations governing the safe use of traffic systems by road users,(ii) traffic policing which ensures compliance to the legislations by road users and (iii) legal sanctions which imposes punishment on the road users who violate the legislation

The traffic police with permission from Murang’a OCPD was requested to provide challenges they faced in their effort to carry out their duties. The challenges that hinder full enforcement of traffic law as stated by the police in Murang’a town include:

A statement from the traffic police

“The law is at times not harsh enough to the offenders. For instance, if an operator contravenes the law, s/he will be fined two thousand shillings or serve three months imprisonment. This, to be frank, is a very lenient sentence. It is not worth life of a human being put at risk. Laws should be amended and made harsher to compel people to obey them. The law directs a driver to pay Ksh30,000 as a fine; but the fine should be

Ksh50,000 so that a person could be impinged and as a result, will never breach the law again, this will help in reducing accidents..”

Penalties have an important role to play in enforcement of any law. Stiff penalties not only serve as a punishment to traffic offenders but are also important in deterring those intending to commit traffic offences. Limited penalties on the other hand have no impact on offenders as offenders have no problem paying such penalties

One of the challenges to enforcement of traffic laws in Kenya is the fact that penalties spelt out to be met by traffic offenders do not correspond to the type of traffic offences committed. Most of them are minimal. This has resulted in motorist continuing to commit traffic offences with impunity.

It is evident from the table 4.8 above that the penalties are very minimal compared to the offence committed. For example, it is common knowledge that over speeding is one of the main contributors to road traffic crashes. Yet the penalty for such serious offence is not less than two hundred shillings and not more than two thousand shillings.

Recently the Government reviewed traffic laws with a view of enhancing stiff penalties. Offenders of the above new traffic rules will be punished for violations such as over speeding, overlapping, careless driving and riding under the influence of alcohol. Other punishable breaches include exceeding the one- passenger requirement. Riders are also obligated to have reflective vests and helmets, including one for the passenger.

Failure to comply with this rule will attract Ksh 10,000 fine or 12 months in prison in default. Overlapping which include obstruction, driving on pavement or through a petrol station to avoid traffic will cost Ksh 100,000- Ksh 300,000 fine or one year in jail or both. Over speeding will cost one Ksh 10,000 fine or three months in jail or both. You risk a fine of Ksh 500,000 or ten years imprisonment or both if you drive carelessly. Careless driving causing death will lead to life imprisonment. Driving under the control of alcohol will cost one Ksh 500,000 fine or ten years in jail or both. The driving license of a person who has been convicted for violation of speed limit shall be invalidated for a period not less than three years.

Related to limited penalties is frustration from courts. Reports indicate that many courts in Kenya issue very minimal fines to traffic offenders. This has encouraged continued violation of traffic laws as offenders have no problem of paying the fines and proceeding to commit other offences. This has encouraged continued violation of traffic laws as offenders have no problem paying the fines and proceeding to commit other offences. The penalties are not only minimal but are also spelt out in a manner that gives judicial officers the discretion of issuing fines as they wish. Almost all the penalties give the maximum figure. They provide for, 'not exceeding' without providing minimum 'not less than'. This kind of provision is open to abuse leading to people with similar offences being charged different penalties.

The other challenge related to fines is that traffic officers have not been able to use payment of on the spot fines even though this is provided for in the Second Schedule of the Traffic Act. The Schedule allows a traffic offender who admits committing a minor traffic offence to sign a notification form confirming admission of the offence and send the form together with the amount of the statutory maximum penalty for the offence by registered mail or by post to the traffic court so as to reach the court within seven days from the date of issue of the notification. The offender is also allowed to submit with the remittance any mitigating circumstances which he/she desires the magistrate to take note of. This system can help to minimize the number of cases that go to court. It is not clear why the police have not been using it.

Corruption has been defined as, 'an act or omission perpetrated by an individual or group of individuals which goes against the legitimate expectations and hence the interest of the society' (Tilman, 2007). Corruption is one of the leading causes of laxity in enforcement of traffic laws in Kenya. Two institutions have been identified to be contributing to this practice. These are the traffic police and the judiciary. Several reports including Transparency International Corruption Index reports have over the years listed the judiciary and the police among the most corrupt institutions in Kenya.

Corruption within the judiciary manifests itself in bribery, fraud, abuse of judicial office and receiving favors among others. In terms of impact on enforcement of traffic laws,

corruption in the judiciary takes the form of colluding with traffic offenders to charge minimal fees, or colluding with traffic offenders to release the offenders at agreed fees. The result of such practices has been that such offenders once released or charged minimal fines proceed to commit traffic offences with impunity leading to more road traffic accidents.

The traffic police department is the other institution where corruption has led to inability to effectively enforce traffic laws. Over the years, Kenya Police has been listed as one of the most corrupt institutions. A recent report that appreciates the magnitude of corruption in the department is the Report of the National Task Force on Police Reforms chaired by the Justice (Rtd) Ransley (Barton, 1996). The report indicates that one of the complaints they obtained regarding the traffic police is corruption.

Corruption within the traffic police is manifested in taking of bribes from vehicle operators who have not complied with the law. Kenya is one of the countries with many police road blocks within the East African Region. While road blocks are supposed to be erected to perform specific duties, in Kenya, road blocks are used by traffic officers as toll stations for collecting money from motorists. This has resulted in existence of many unroadworthy vehicles along Kenya's roads leading to road traffic accidents. Cases abound where vehicles that were either overloaded or over speeding or in pathetic mechanical conditions got involved in road accidents even when such vehicles had just passed a police road block. This can only be interpreted to mean that the police who stopped the vehicle collected bribes and then allowed the vehicles to proceed.

“Traffic police officers currently get trained at Kiganjo and Ngong hills. The content of the training is not elaborate enough to enable them cope with the modern methods of traffic law enforcement.” said Murang'a OCPD. This is aggravated by the fact that in many instances, police officers who have no background in traffic law enforcement are at times deployed to carry out traffic duties thus leading to compromise in performance of duties.

The other aspect of lack of capacity is with regard to facilities needed to enable traffic police officers discharge their duties effectively. Lack of these important facilities has to some extent hampered the effective enforcement of traffic laws. For example, lack of a

vehicle to be used means that traffic police are not able to respond to emergencies because they have to rely on vehicles that belong to other departments. Lack of automation of the department has made it difficult for the traffic police in Kenya to use modern technology to enforce traffic laws. Availability of these facilities is important in enforcement of traffic laws. Use of speed recording devices for example has been instrumental in helping to reduce crashes in many countries.

The government must focus on educational campaigns for good driving practices and enforcement of road traffic laws.

4.6 Frequency and trend of motorcycle accidents and fatalities

The study further sought to analyze the number of accidents, deaths and injuries that have happened since 2009. This data was gotten from Murang’a police records and Murang’a provincial hospital. The data is presented in the table 4.10

4.6.1 Road traffic accidents trend according to standardized classification of accidents

The study sought to analyze the trend of accidents that have occurred in during the period of 2009-2011. The table is presented in the table 4.10

Table 4.10 Road traffic accidents trend according to standardized classification of accidents

Accidents	2009	2010	2011	Total
Fatal accidents	2537	2648	2663	7848
Serious accidents	4527	4482	4550	13559
Slight accidents	4605	2641	1663	8909
Total	11,669	9771	8876	30316

Source; Kenya Police Traffic Department

It is observed that the rate of accident has reduced during this period. Year 2011 register the lowest, with 8876 accidents. At least 90 percent of the global fatalities from traffic accidents occur in low and middle income countries even though, only 46 percent of global vehicles are in these countries. By 2015, WHO predicts the increase of road deaths to rise from 1.2 to 1.8 million, and 2.4 million by 2030. Therefore, this fall of

accident rates could be caused by under reporting. However, police have reported that the use of speed recording and alco-blow devices have been instrumental in reducing crashes.

4.6.2 Road traffic accident fatality trend according to health standardization classification of injuries

The table below is the road accident fatality trend according to the Traffic department headquarters.

Table 4.11: Road traffic accidents fatality trend according to health standardization classification of injuries (2009 to 2011)

TYPES	FATAL INJURIES			SERIOUS INJURIES			SLIGHT INJURIES			Total
	2009	2010	2011	2009	2010	2011	2009	2010	2011	
DRIVERS	47	48	68	41	61	70	19	47	36	437
MOTOR CYCLE	20	27	37	19	31	64	13	27	10	248
PEDAL CYCLIST	17	11	27	16	21	30	14	57	48	241
PASSENGERS	82	91	84	224	123	217	147	101	240	1309
PEDESTRIANS	155	117	190	137	141	148	104	263	223	1478
TOTAL	321	294	406	437	377	529	297	495	557	3713

(Traffic department headquarters, 2012)

Total fatal injuries: 1,021 (27.5%)

Total serious injuries: 1,343 (36.2%)

Total slight injuries; 1,349 (36.3%)

Total injuries 3,713

It was observed that 27.5 percent of the total annual accidents were reported as fatal, 36.2 percent as serious injuries and 36.3 percent as slight injuries. It was also observed that the biggest (39.8%) share of road injuries is taken by the pedestrians followed by passengers (35.3%).

Table 4.12: Reasons why respondents involved in road accidents did not report to police

The study sought to analyze reasons why motorcycle operators in particular did not report accident cases to police. The summaries are illustrated in 4.12

Reason	Frequency	Percent
Solved on the spot	18	20.7
Lack of confidence in police	44	50.6
Lack of license	16	18.4
Unroadworthy <i>bodabodas</i>	9	10.3
Total	87	100.0

Most (50.6%) of the respondents said that they lacked confidence in police, 20.7 percent of the respondents said that the case was solved on the spot between the culprits and 28.7 feared being arrested because of lack of licenses and operating unroadworthy boda bodas. This raises a situation that is not probable, casting doubts on the credibility of the data and lead to other questions as to whether the issue of under reporting is ever addressed by the authorities charged with accidents data reporting.

Police data in Kenya are currently the most complete source of RTI data available in Kenya. The strengths of this source are that it provides information on the number of RTIs and fatalities at the national level and also disaggregated at the provincial level in Kenya. Police data in Kenya also provide information on the type of road users involved in road traffic crashes and fatalities. Kenya police define road traffic fatalities as those that occur immediately after a crash. It is important to note, however, that according to several studies that compared the effects of using different definitions of road traffic fatalities, the manner in which road traffic fatalities are defined has a minimal effect on the results (Bhalla et al. 2010). The data also present several limitations, because in their current form they cannot be disaggregated by demographic characteristics or beyond the provincial level. Therefore, it is not possible to determine the age distribution or sex of

the victims. Though the data contain information on the severity of the injuries, consultations with the Kenya traffic police revealed that this classification is subjective and no guidelines exist to classify the severity of injuries in police records. Additionally, previous studies in other settings similar to Kenya have shown that police data often captures more severe injuries and only those that are reported to the police. As such, police data are known to often underestimate the true burden of RTIs (Peden, 2001).

Injury severity is often used as a measure of health consequences of road traffic crashes. Injuries are classified as fatal, serious or slight on the basis of information available to the police within a short time after the crash. Classifications may not reflect results of a medical examination and are largely influenced by whether a casualty is hospitalized or not. Injury is reported as fatal if death occurs on the spot or any time after hospitalization. There is no defined time interval, though the police mostly report only deaths that occur on the spot, which represent an undercount of the actual numbers of road fatalities. On average, 10.3% of crash victims die, 32.5% are seriously injured, and 57.2% slightly injured each year.

4.7 Predisposing variables to PTSD

Depending on the severity of the accident and the injuries suffered, a traffic crash can be a very traumatic and stressful event. In fact, one study by the National Center for PTSD revealed that road accidents were shown to be the most traumatic event experienced by 25 percent of males and 13 percent of females in the United States. As about 1 percent of the U.S. population will be injured in a road accident in any given year, this means there a lot of people who experience symptoms of posttraumatic stress disorder (PTSD) as a result of road accidents, which include feelings of emotional distress, anxiety, depression, and stress. Some people are more prone to experiencing symptoms of PTSD due to certain pre-accident variables such as pre-existing mental health issues. Others may develop symptoms of PTSD long after the accident (Garrett, 1998).

This research focusing on identifying at-risk individuals has been directed at three sets of variables: characteristics about the individual that were present prior to the MVA (pre-accident variables), accident-related variables, and post-accident variables.

4.7.1 Pre-accident variables present in accident involved *boda boda* operators and those not involved in road traffic accident

Prior trauma, especially child negligence, road accident, rape, domestic violence, makes an individual susceptible to repeated bouts of PTSD in case of another traumatic event.

The researcher requested the respondents to state any other life threatening event they had experienced prior to the accident. This was to determine if there was a history of trauma in the past life of the *boda boda* operators. The data, below, in table 4.13 shows the presence and absence of pre accident variables to PTSD among *boda boda* operators who were not involved in road traffic accident.

Table 4.13: Presence of pre accident symptoms in *boda boda* operators not involved in road traffic accident

History of pre accident symptoms in the past	Present Percentage	Absent Percentage	Total
If <i>boda boda</i> operator was/ felt neglected at childhood before the accident	54 (62%)	33 (38%)	87
If the <i>boda boda</i> operator had ever gone through any form of domestic violence in family e.g battering, verbal abuse or unfaithfulness before the accident happened	60 (69%)	27 (31%)	87
If <i>boda boda</i> operator had ever been sexually abused before the accident happened	7 (8%)	80 (92%)	87
If <i>boda boda</i> operator had been involved in another road accident happened	55 (63%)	32 (37%)	87
If <i>boda boda</i> operator had lost a close relative or friend before the accident happened	65 (75%)	22 (25%)	87
If <i>boda boda</i> operator had ever been Kidnapped before the accident happened	10 (11%)	77 (89%)	87
If <i>boda boda</i> operator had ever been robbed happened	55 (63%)	32 (37%)	87
Total	306 (50%)	303 (50%)	609 (100%)

Most (75%) respondents had lost a loved one, 69 percent of respondents had gone through battering, verbal abuse or unfaithfulness from their families, those involved in a prior road accident and robbed were 63 percent and 62 percent of the respondents had been neglected at childhood.

Looking at the mean of respondents who had both presence and absence of pre accident variable to PTSD, the researcher found that 44 percent of respondents experienced presence of pre accident variable to PTSD and 43 percent absence of pre accident variables to PTSD. Therefore, presence of pre-accident variables exposes *boda boda* operators not involved in road accident to PTSD if no proper counseling is done to them. Among factors that predispose persons to PTSD are prior traumatic experiences and a history of psychiatric disorders (Blanchard, 1997).

Table 4.14 shows the presence and absence of pre accident variables to PTSD among *boda boda* operators who were involved in road traffic accident.

Table 4.14: Presence/ absence of pre accident variables to PTSD among *boda boda* operators involved in road traffic accident

History of pre accident symptoms in the past	Present Percentage	Absent Percentage	Total
If <i>boda boda</i> operator was/ felt neglected at childhood before the accident happened	55 (63%)	32 (37%)	87
If the <i>boda boda</i> operator had ever gone through any form of domestic violence in family e.g battering, verbal abuse or unfaithfulness before the accident happened	57 (66%)	30 (34%)	87
If <i>boda boda</i> operator had ever been sexually abused before the accident happened	15 (17%)	72 (83%)	87
If <i>boda boda</i> operator had been involved in another road accident happened	54 (62%)	33 (38%)	87
If <i>boda boda</i> operator had lost a close relative or friend before the accident happened	59 (68%)	28 (32%)	87
If <i>boda boda</i> operator had ever been Kidnapped happened	12 (14%)	75 (86%)	87
If <i>boda boda</i> operator had ever been robbed happened	53 (61%)	34 (39%)	87
Total	305 (50%)	304 (50%)	609 (100%)

Most (68%) respondents had lost a loved one, 66 percent of respondents had gone through battering, verbal abuse or unfaithfulness from their families, those involved in a prior road accident were 62 percent and 63 percent of the respondents had been neglected at childhood.

Looking at the mean of *boda boda* who had been involved in road accident and had both presence and absence of pre accident variable to PTSD, the researcher found that 50.1 percent of respondents experienced presence of pre accident variable to PTSD and 49.9 percent absence of pre accident variables to PTSD.

Pre-accident variables such as poor ability to cope in reaction to previous traumatic events, the presence of a pre-accident mental health problem (e.g. depression), and poor social support have all been linked to the development of PTSD following severe MVAs (Kessler, 2008).

It is important to recognize those certain PTSD symptoms are more common in individuals who have experienced specific past traumas. For example, adult survivors of physical, psychological, or sexual abuse, child negligence and prior involvement in another road accident tend to be more at risk for developing certain types of PTSD symptom later in their lives.

According to Schiraldi (2000) certain out-standing traits such as pessimism and introversion, deny a person the tools needed to deal with a challenging affliction. Nutt (2000) continues to say that hippocampus, which plays a role in learning and memory, has been shown to be damaged in traumatic victims. The brain structure contains two amino acids (GABA and glutamate) which work with tandem to translate experience and stimuli into memory. Decreased hippocampal volume results when excessive stress alters the chemical regulation in the brain, which harms the functionality of systems such as learning and memory. Extreme stress can adversely affect these pathways, eventually causing long-term synaptic changes that lead to abnormal, excessive encoding of memory. In essence, memories can become deeply ingrained when these pathways are over stimulated by stress. This mechanism helps to explain the re-experiencing (e.g., flashbacks) symptoms of PTSD. These flashbacks serve as *retraumatization*, submitting

the victim of the initial trauma to repeated experiences that can be just as distressing as the original (McFarlane, 2000).

A healthy family setting can provide a child with good protection from PTSD. In family dynamics, the child can learn effective coping strategies, develop self-confidence, and most importantly, establish a solid, loving support system to protect them. Often learning through role modeling, a child of a divorced family may witness behaviors and thoughts that are detrimental to their mental health for instance, mistrust and blaming others. On the same, a family history of anxiety can predispose an individual to PTSD, which itself is an anxiety disorder (Durand, 2006). Likewise, a family history of PTSD and trauma may predispose family members to the disorder. Often, parents who have been trauma victims will teach their children maladaptive methods of coping with these stressors. These parents might also be emotionally unsupportive as a result of their distressing experiences, leaving their children with a lack of support which predisposes them to PTSD.

Some of the theories as to why this relationship occurs relate to personality development, neurobiology or neurophysiology, memory, behavior, and personal coping styles (Perry et.al, 1995). In order to increase our understanding of the relationships between certain traumas and personal background, it is essential that health care providers ask patients with about their childhood experiences. It is particularly important to gather this information for those patients where the source or basis for their trauma conditions is unknown. In order to manage the PTSD condition, it is necessary that it is determined early using the symptoms. Addressing the pre accident symptoms at this stage would prevent boda boda operators starting the business with pre trauma factors.

4.7.2 Accident- related variable present in boda boda operators involved in road accident

A person's proximity to a trauma has been found to be directly related to their degree of distress and PTSD development (Pynoos et.al, 2006). A victim's vulnerability to PTSD depends on the type of trauma, nature of trauma in relation to other various factors such

as age, gender and trauma severity. PTSD increases if the trauma is sudden, unpredicted, enduring or recurring. It also rises if the event poses a real threat of harm to the victim if the trauma is multidimensional and if the trauma occurs early in life. With respect to accident-related variables, the amount of physical injury, potential life-threat, and loss of significant others have been predictive of the development of mental health problems such as PTSD. That is, as the amount of physical injury and fear of dying increase, the chance of developing PTSD also increases.

During a road traffic accident, we all know that victims can have serious consequences: fractures, amputation, disfigurement, spinal cord injury, head injury, chronic pain and even death.

Respondents were requested to state the effect they felt during the accident. The respondents were to identify the state they were in the time of the accident occurred. The states provided by the researcher were; shock, pain, confusion, helplessness and they were also to state the physical injury sustained from the accident

Table 4.15 and Figure 4.1 below present the data obtained.

Table 4.15: State of response during the accident

State	Frequency	Percentage
Shock	36	41.4
Pain	16	18.4
Confusion	11	12.6
Helplessness	24	27.6
Total	87	100

Most (41.4%) respondents were in a state of shock, 27.6 percent felt helpless, 18.4 percent of the respondents were in pain while 12.6 percent become confused and wonder what to do at that moment.

Shock, confusion and helplessness can be categorized as examples of symptoms of peri-traumatic dissociation. Others are reduced awareness, time distortion, derealisation, amnesia or emotional numbing (Marmar 1997). It has been suggested that such symptoms reflect a defensive response related to immobilization (freezing) in animals (Nijenhuis,

1998). High levels of peri-traumatic dissociation in adults during a stressful event may also predict symptoms of psychopathology, such as anxiety and depression (Taal and Faber, 1997).

Peri-traumatic dissociation is a state of limited or distorted awareness during and immediately after the stressful event. Peri-traumatic dissociation is characterized by distortions in time perception, bodily awareness and spatial awareness during and immediately after exposure to a traumatic event (Marmar, Weiss and Metzler 1997) and peri-traumatic dissociation is reported to be common among MVA victims. According to (Barton et al. 1996) 34 percent to 57 percent of MVA victims report symptoms associated with peri traumatic dissociation.

Studies conducted with MVA victims show that peri-traumatic dissociation predicts PTSD (Looney et al, 2006). However, a recent systematic review found that peri-traumatic dissociation does not always predict PTSD (Ozel et al 2003).

Many authors have argued that the immediate effects of peri accident dissociation are adaptive (e.g. it would reduce pain and humiliation), but that its long-term consequences would be pathogenic. Thus, these authors assume that peri accident symptoms increase the risk of psychopathology in general and of post-traumatic stress disorder (PTSD) in particular. For example, Fullerton et al (2000) say that “dissociation at the time of a traumatic event increases the risk of acute and chronic stress disorder.

According to Jagannadha (2006) many victims of road accidents go into shock moments after an accident. Symptoms of shock include pale, moist, clammy and cool skin; a weak and rapid pulse; dilated pupils; weakness; thirst; nausea and vomiting; and rapid breathing. Shock occurs when the victim’s circulatory system fails to provide enough blood to the body, especially the brains. Any serious injury can throw a person into shock and shock can kill even when the injury is not life- threatening. Gentleness, kindness and understanding play an important role in the treatment of shock. Some victims said that

they felt the pain and knew they were physically injured after they had been taken to hospital.

Individuals with physical pain are less able to function in daily life than those who do not suffer from pain. Patients with severe pain and limited mobility oftentimes are unable to perform activities of daily living, such as walking, standing, sitting, lifting light objects, doing paperwork, standing in line at a grocery store, going shopping, or working. Numerous studies have indicated that many patients who experience chronic pain (up to 100%) tend also to be clinically depressed. In fact, depression is the most common psychiatric diagnosis in patients with chronic pain. The experience of progressive, consistent pain and disability also translates for many individuals into having thoughts of suicide as a means of ending their pain and frustration (Turk, 1994).

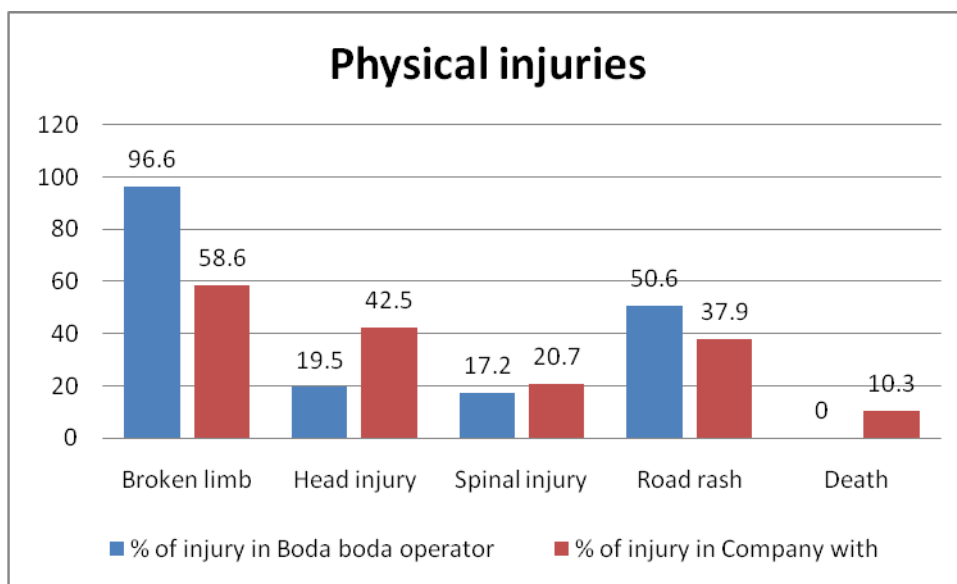
According to Asmundson (2002), pain is one of the most regularly reported physical problems reported by people with PTSD. One study of volunteer firefighters with PTSD found that approximately 50 percent were experiencing pain (mostly in the form of back pain) as compared with only about 20 percent of firefighters without PTSD. Two other studies found that 20 to 30 percent of patients with PTSD experience frequent and persistent pain symptoms. It has also been found that many patients with chronic pain problems have PTSD. Anywhere between 10 to 50 percent of people getting treatment for chronic pain have PTSD.

Physical pain can contribute to emotional conditions such as PTSD via two pathways. First, poorly controlled acute pain may serve as the traumatic event that fuels PTSD symptoms (Schreiber, 1993). Theoretically, this explanation should be supported by evidence showing that quantified severe physical injuries are more likely to produce PTSD. According to Koch (2002), the severity of whiplash pain complaints in motor vehicle collision survivors is highly related to PTSD symptoms, and post-traumatic headache patients have a very high incidence of PTSD. Individuals with accident-related chronic pain conditions and high levels of PTSD symptoms report more severe pain and more depressive symptoms than chronic pain patients without PTSD.

However, no study has examined the possibility that pain and PTSD are associated. Exploring this possibility would add to our understanding about how pain and PTSD separately interfere with functioning and would help to inform treatments for trauma survivors.

Figure 4.1: Type of Physical injuries

Respondents were requested to state the type of injury they sustained as a result of the accident. Figure 4.1 below present the data obtained.



Most boda boda operators and passengers suffered broken limbs, 96.6 percent and 58.6 percent respectively. Most (50.6%) operators and 37.9 percent of passengers suffered road rash. Most (42.5%) of passengers suffered head injury compared to the boda boda operators. Almost all operators did not have extra helmet for their passengers and it is therefore evident that most passengers do not wear helmets when riding on boda boda. For those who had extra helmets said that the passengers declined to wear them for fear of being infected with communicable diseases. Some (10.3%) of passengers lost their lives and the operators carrying them had to witness them die. A mean of 36.8 percent of operators underwent physical injuries.

From literature, the commonest motorcycle injuries involved the lower extremity, legs, followed by head injuries and soft tissues (Abrasions, lacerations and contusion).

Naumann (2010) found out that most (40.3%) *boda boda* victims severed leg injuries, 10.3 percent had head injuries, 19.5 percent had multiple injuries and 16.1 percent sustained soft tissue injuries. Knowing what parts of the body are more susceptible to injury during a crash can help you protect those areas before an accident happens.

During a motorcycle crash, there are certain parts of the body that are more likely to sustain injury. Knowing what parts of the body are more susceptible to injury during a crash can help you protect those areas before an accident happens (Ouellet et al, 2008).

The most likely part of your body to be injured in a motorcycle crash is your head. Not only is your head susceptible to impact during the crash, but road rash of the face and neck are also serious concerns. Most of the fatalities that occur during motorcycle crashes are a direct result of head injuries. Wearing a helmet significantly reduces the risk of a life-threatening head injury during an accident, and may save you from extensive facial damage during a crash. The use of helmets reduces the risk of fatal head injury about one third, and the risk of facial injury by two thirds. Helmets have been shown to reduce the risk of brain injury by 88 percent.

Motorcyclists involved in a crash also frequently suffer from fractures of the legs. The weight of the bike compresses the legs between the motorcycle and the pavement during a crash, resulting in fractures of the long bones in the thigh and lower leg. Colliding with stationary objects and attempting to “catch yourself” during a crash by putting your feet down when the motorcycle becomes unstable can also account for many of these injuries. If a motorcyclist suffers a femur fracture during a crash, he runs the risk of severe bleeding if he injures the major artery located in the upper leg. This is a very common injury in a motorcycle crash and can be life threatening. Wearing riding boots would be a great saviour for *boda boda* operators.

In addition, motorcyclists often receive injuries caused by sliding along the pavement at high speeds. This type of injury, commonly called road rash, can appear to be less important than other injuries, but can lead to infection and medical complications later as the motorcyclist attempts to recover from the crash. Without gloves, a rider may experience a type of road rash known as de-gloving, where the skin and tissues of the

hands are completely removed during the crash. This type of injury can require extensive surgeries and skin grafting to repair.

Next to head injuries, the leading cause of death following a motorcycle accident is chest trauma. Many motorcyclists are pinned beneath another vehicle, run over by another vehicle, or thrown from the bike and strike stationary objects such as trees, telephone poles, or guard rails. The impact of the crash can also force the rider into the handlebars of the motorcycle, causing severe chest trauma. Some riding jackets have reinforced panels that are intended to absorb some of the energy from an impact, and help protect vital organs like the heart and lungs from excessive injury.

Riders are especially susceptible to burns during an accident as they are likely to come in contact with hot exhaust pipes of the motorcycle or other vehicles. Leather riding gear and synthetic personal protective suits are intended to protect the rider from excessive burns in the event of a crash.

Protecting the major crash-susceptible areas of the body from injury every time you ride can help you limit your injuries drastically should you become involved in a motorcycle accident.

Road accident may lead to serious injuries that could cause chronic pain. In addition, the more severe a traumatic event, the more likely it is that a person will experience some kind of physical injury as well as developing PTSD. According to Farlane, Hunter and Griggs (1993), accident severity, fatalities and severe injuries contribute to the potential for development of PTSD. Therefore, from this research 46 percent of *boda boda* operators were prone to development of PTSD.

The severity of injuries as assessed by the Abbreviated Injury Scale has been shown to predict the onset of PTSD in motor vehicle collision survivors (Blanchard et al, 1995). Frommberger et al (1998) also noted that collision victims with PTSD symptoms had suffered more severe physical injuries. However, other studies failed to find such a relationship between injury severity (measured in diverse ways) and PTSD symptoms (Ursano et al 1999). The presence of fears of death at the time of the collision was as

good a predictor of subsequent PTSD symptoms, as was injury severity. Thus, the severity of the collision victim's initial physical injuries is only a modest predictor of PTSD status.

4.7.3 Post – accident variable to PTSD among boda boda operators

A traumatic event is more likely to adversely affect the victim if, in the initial period following the event, s/he either dissociates, believes that they are responsible in some way or did not do all they could to control the situation as it occurred, or feels alone or isolated (Schiraldi,2000). In addition, recent events in a person's life that are not of traumatic magnitude such as job loss, divorce or financial problems can weaken the person's defense against trauma-induced stress (Schiraldi, 2000). Deficits such as low self-esteem, emotionality and resilience can increase a person's chance of developing PTSD. These set of vulnerability factors can actually promote symptoms of PTSD if not coped with.

A stressful reaction can occur at any time following a traumatic event including weeks to months although it usually happens within a short period of time following the event. Symptoms may last days to weeks but if severe and left untreated it may persist for months or years. Post- accident variables that are predictive of PTSD following MVAs are: the rate of physical recovery from injury, the level of social support from friends and family, and the level of active reengagement in both work and social activities.

The tables and figures below show different post- accident variables present in *boda boda* accident victims that may expose them to PTSD.

4.7.3.1 Financial constrains

Financial problems become an additional stress and may be a contributory factor leading to extreme hardship. The respondents were supposed to indicate on the level of financial effect on the three statements based on a simple opinion rating of either 1 or 2 where 1 represented affected and 2 represented not affected. The three composite indicators used to measure the level of financial effect of accident include; unemployment, hospital cost and *boda boda* repair. The data obtained is presented in the table 4.16 below

Table 4.16: Causes of financial constrain

	Affected	Not affected	Total
Unemployment	52 (59.8%)	35 (40.2%)	87
Hospital cost	84 (96.6%)	3 (3.4%)	87
Boda boda repairs	58 (66.7%)	29 (33.3%)	87
TOTAL	194 (74.3%)	67 (25.7%)	261 (100%)

Study findings revealed that most (96.6%) of the respondents spent most of their finances on hospital bills, 66.7 percent on *boda boda* repair and 59.8 percent of the respondents were cut off their daily earning by being unemployed. A 74.3 percent of *boda boda* operators suffer financial constrains which can lead them to be exposed to PTSD especially if they suffered depression.

One respondent said that, his type of injury required frequent physiotherapies which were quite expensive. He, at one time skipped going to the clinic because of lack of money.

Some victims have to undergo surgery, others have to constantly follow a treatment programme else incur permanent disability. Therefore, health care for these patients become an enormous burden on the victim, their family and the society as a whole. Such accident survivors lose their jobs because of concentration problems they encounter at work. This may lead to the victims turn to alcoholism to ‘avoid’ re-experiencing symptoms and reminders of the traumatic event.

Other research shows that road traffic injuries are one of the leading causes of death and disability worldwide. RTIs and fatalities mostly affect males between the economically productive ages of 15 to 45 years. These individuals are also often the heads of households, and their mortality could have potentially long-term implications on not only the financial sustainability of the family but also their social well-being. Furthermore, this analysis reveals that RTIs (and related fatalities) continue to increase in Kenya, with

motorcyclists (both drivers and passengers) as well as pedestrians among the most affected (Kenya Department of Civil Registration, 2006).

The cost of road crashes in Kenya has increased considerably over the years. In 1984, the estimated annual economic cost of road traffic injuries, using the human capital approach that comprises health care costs, administrative expenses, vehicle and property damage, was 1.5 billion Kenyan shillings 19 (approximately U.S.\$19 million), an equivalent of 1.6 percent of the country's GNP for that year. This rose to Kenyan shilling 2.9 billion (\$37 million) or 3.6 percent of the GNP in 1988 20, 21, 22 and to 3.8 billion or 5 percent of the GNP by 199. In 1996, the costs were estimated to be between 5 and 10 billion Kenyan shillings¹⁷. This translates into a loss of 26–52 percent of the total earnings from road transport. In 1995, the insurance industry was reported by the local press to have spent the huge sum of Kenyan shilling 20 billion (an equivalent of 5.5 percent of the year's GNP or U.S. \$343 million) on road accident–related payments, including costs of vehicle damage, medical care, and compensation for injuries and fatalities. Such payments have led to large financial losses by this industry, causing many insurance firms to go out of business, and at the same time, necessitating steep increases in motor vehicle insurance premiums.

Burden on hospital services Casualties affected by road traffic injuries account for between 45 percent and 60 percent of all admissions in surgical wards in Kenya, and up to 75 percent of inpatients at the National Spinal Injury Hospital 16, thereby placing high demands on hospital resources. In fact most hospitals including Murang'a General Hospital have a separate ward for *boda boda* victims. A recent survey of 310 hospitalized road traffic injury victims showed that two-thirds of road traffic accident casualties stayed in hospital for more than three weeks (Macharia, 2000). Just over half (51.9%) stayed for more than a month. Other reports document the burden of traffic injuries on hospital workload, with respect to utilization of x-rays services and operating theatre: staff overwhelm and inadequate nurses to investigate injuries. Of all patients who had major surgery in Murang'a 49 percent had been involved in a motor vehicle crash.

Perhaps an individual's responses to traumatic stressors are influenced by their perceived resource loss (Hobfoll, 1991). These resources can be of many kinds, such as financial and social, but also include the resource of physical well-being. To the extent that individuals suffer permanent resource losses, they will be more distressed. It has also been learned that psychological distress is exacerbated by the trauma survivors' perception that they have suffered a permanent change. Coupled with the relentless course of aging and the known unreliability of retrospective memory for physical and emotional symptoms, individuals who suffer a very slow recovery from physical injuries incurred in a collision will often perceive a marked contrast between their physical well-being before and after the event, concluding that some permanent (pathological) loss in their physical well-being has occurred, and therefore remain psychologically distressed (Ehlers, 1998). In short, physical well-being is an important resource to emotional well-being. When individuals suffer sudden losses in physical health, they become distressed. When an event is related to that decline in health, the average person tends to over-estimate pre-injury health and thus create a distressing comparison between pre-injury and post-injury health. If the individual perceives this as a permanent change, he or she will remain distressed. This distress often takes the form of PTSD.

4.7.3.2: Victims' opinion towards family/social support, Self guilt, health care treatment and blame after the accident

This part of study sought the respondents who were engaged in road traffic accident opinion on how they received social or family support, health care treatment, if they felt guilty about the accident and if they were blamed of the accident by other people who witnessed the accident. The respondents were to indicate on the level of agreement on the indicators provided by the researcher on a rating of 1 to 5 where 1 represent strongly agree, 2 agree, 3 neutral, 4 disagree and 5 strongly disagree.

The data obtained is presented in the table 4.17

Table 4.17: Victims’ opinion towards family/social support, Self guilt, health care treatment and blame after the accident

Statement	Strongly agree 1	Agree 2	Neutral 3	Disagree 4	Strongly disagree 5	Total
Do your family, relatives and friends morally and/or financially support you?	44 (50.6%)	20 (23.0%)	0 (0.0%)	19 (21.8%)	4 (4.6%)	87
Do you feel a sense of guilt or self pity	23 (26.4%)	50 (57.5%)	0 (0.0%)	14 (16.1%)	0 (0.0%)	87
Do you seek any health care treatment	65 (74.7%)	22 (25.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	87
Do the people you were with in time of the accident blame you for the accident?	34 (39.9%)	25 (28.7%)	0 (0.0%)	28 (32.2%)	0 (0.0%)	87
Total	166 (47.7%)	117 (33.6%)	0 (0.0)	61 (17.5%)	4 (1.2%)	348

Each cell has a chance of scoring a 100 percent meaning all the indicators could be contributing to absence of PTSD to a strongly agreed or otherwise. The measurement of the victims opinion towards family/social support, Self guilt, health care treatment and blame after the accident is based on cell representative which is the actual score or total score over the expected/probable cell times a hundred. No single indicator can be used to measure an opinion.

The distribution in table 4.16 shows the opinion of the respondents towards family/social support, Self guilt, health care treatment and blame after the accident in the area was rated high. The statements which rated to a strongly agree measured up to 47.7 percent, statements rated as an agree only measured up to 33.6 percent. Further, other statements

that disagree towards family/social support, Self guilt, health care treatment and blame after the accident measured up to 17.2 percent and those strongly disagree all measuring up to 1.2 percent rating. No respondents rated at neutral. Overall, all statements appear strong in measuring the opinion of the respondents towards family/social support, Self guilt, health care treatment and blame after the accident. This indicates that majority of the respondents were in agreement with the statements.

The most crucial protective factors from PTSD after trauma is the ability to rely on family, friends and community to prevent isolation and distract the victim from the traumatic memories. A traumatic event is more likely to adversely affect the victim if, in the initial period following the event, the victim dissociates; believes that they are responsible in some way or did not do all they could to remedy the situation as it occurred and feels alone or isolated. Each of these conditions creates artificial separation from or unnecessary shame in regards to the event (Schiraldi, 2000). If an accident is severe enough to result in one or more deaths, the person who lives through it may experience an emotional problem known as "survivor guilt." Some psychologists view survivor guilt as another component as PTSD, while other people feel that it qualifies as its own disorder. In either case, it is a very difficult problem to live with. People suffering from this problem feel that they did not "deserve" to survive an accident when others did not. They may even blame themselves for another person's death. These feelings can lead to deep depression and sometimes even suicide attempts. Research shows some of the reasons that make the victims withdraw from social events or avoid others are guilt, self-blame and shame. Many victims blame themselves when trying to make sense of their experience especially riders or drivers. This is usually completely unfair. At best, it fails to take into account the other reasons why the events occurred. Self blame causes a lot of distress and can prevent a person from reaching out for help. Society sometimes takes a "blame the victim" attitude, and this too is wrong (Roberts, 2003).

Lack of trust can also hinder accident victims to seek help. This is likely to happen when the trauma was caused or worsened by other people as opposed to the accident. Feeling detached or disconnected from others can happen when a person has difficulty in feeling

or expressing positive feelings. After trauma, victims can get wrapped up in their problems or feel emotionally numb and then stop putting energy into their relationships with friends and family. Victims of accident or other traumatic events may get into argument and fights with other people because of the anger and aggressive feelings that are common after a trauma. This can lead to loss of caring support, friendship, intimacy and grows fears, worries, lowliness and depression.

Families can have many reactions towards survivors of road accidents. It can be helpful for the victim to know that his family members sympathize with him, especially just after the accident occurs. However, too much of sympathy from family members can have a negative effect. It may send a message that they do not believe the victim is strong enough to overcome the ordeal. Apart from sympathy, family members may want to avoid talking about the trauma or trauma-related problems. The family members may avoid the things that the survivor avoids because they want to spare the survivor further pain. Some respondents mentioned that some of their family members felt shame because of their situation. The family members develop a negative feeling about the traumatized family member. They believe the accident survivor no longer shows or even possesses the qualities that they loved or admired. According to Briere (2004) family members, relatives or friends are unavailable because they too experienced the trauma or perhaps because of their lack of connection with their own emotions. Seemingly, supportive individuals sometimes make the victim feel that they should just get over it.

One of the respondents said, *“My family members were disgusted by my over-drinking behavior”*

Family members also view the role of care giving as a burden. Care giver burden is a term that is sometimes used to describe the types of difficulties associated with caring for someone with a chronic illness. Caregiver burden includes the objective difficulties of this work e.g. financial strain as well as the subjective problems associated with caregiver demands e.g. emotional strains. Lack of Support from other people can trigger the presence of PTSD in accident survivors.

Research shows that many patients who seek physical healthcare have been exposed to trauma and post traumatic stress symptoms but have not received appropriate mental health care (Schnurr, 1996). Whether intentional or ignorant, not seeking treatment further isolates the victim and allows PTSD to progress chronically. The most effective, empirically- based treatment is Cognitive Behavioral therapy, specifically exposure therapy. Schiraldi (2000) says that progressively and safely reexposing the victim to aspects of the trauma can associate new, positive memories with the event. Current research estimates that only 38 percent of PTSD sufferers are undergoing treatment during a given year. The most popular reason for not seeking treatment was that they did not think they had a problem (Kessler, 2000).

Physical health is not enough, health care providers should assess patients for a history of trauma exposure for these reasons; trauma and trauma-related problems are common, PTSD affects health and trauma exposure affects utilization of services. A mental health care provider trained in PTSD will provide the victim with education, assessment and counseling. The therapists come from a range of disciplinary backgrounds including psychiatry, clinical psychology, social work and psychiatric nursing. Most of the respondents from the finding did not seek counseling therapist. Reasons being mistrust, deny and avoiding the fact that they will talk about their feelings thus reminding themselves of the event, something they did not want to do.

According to Murang'a superintendent, health practitioners under recognize PTSD with the result that patients are not offered the effective treatments. Health care providers can increase the chances of improved health outcomes for patients by: identifying a PTSD consultant, screen for PTSD, discuss the results, provide referral, provide educational materials and follow up with the patient. There are very few people trained in this field in Kenya; therefore, the few victims who go to visit a psychological health practitioner, face the danger of being diagnosed with anxiety or depression and being referred for the wrong type of help. However, there is a problem in that there are not enough places offering help, especially to people suffering PTSD as a result of a road crash. The respondents said they were referred to usual psychiatric, but that is for victims of crime

and mental illness, or psychological therapist working in primary care who do not specialize in supporting people who have been injured through a road crash and their families.

One of the respondents who was seeking trauma therapy had this to say;

“If you have a road traffic collision and as a result suffer PTSD symptoms, which will probably emerge a few months after the incident, treatment might not be available for months after that.”

Therefore, someone suffering from PTSD as the result of a road crash may not only be suffering the symptoms of PTSD several months after the incident, but also continue to suffer the symptoms while they wait for treatment, which could possibly then be the wrong type of treatment. He complained of long waiting list, which could range from as short as two weeks to six months or more. In addition, these counselors were not all specialized in PTSD.

Unlike Nottingham where we find Centre for Trauma, resilience and growth; Australia where there is National Centre for Road Trauma Support; there are no PTSD centres and PTSD therapist who deal with road accident survivors here in Kenya. Most road accident survivors first visit their primary care physicians for treatment and do not consider psychological treatment for some time. Unfortunately, studies have shown that of the people who develop PTSD and do not seek psychological treatment, approximately half continue to have symptoms for more than six months or a year. Therefore, it is important to identify the symptoms early on and seek appropriate psychological treatment.

Victims suffering from various traumas in life are likely to suffer from PTSD including those that survive from accidents resulting from motor vehicles. Despite the high number of patients that suffer from the disorder, most cases of victims from accident related trauma go unreported with patients succumbing to death. This literature review has revealed the predisposing factors of PTSD as well as the importance of early diagnosis that may lead to faster healing rather than worsening the conditions of sickness. Therefore, it is necessary that all people involved in the treatment of the disorder be

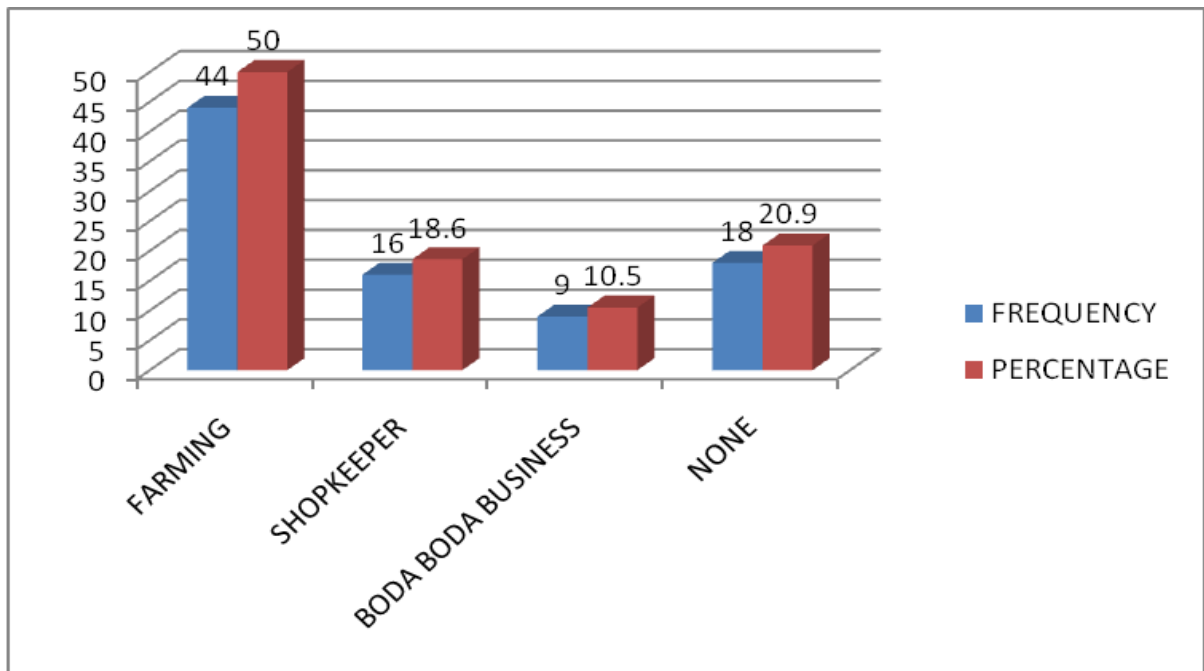
knowledgeable in predictors of the condition so that they can keep on saving lives of MVA victims

A person's proximity to a trauma has been found to be directly related to their degree of distress and PTSD development (Pynoos et.al, 2006). PTSD increases if the trauma is sudden, unpredicted, enduring or recurring. It also rises if the event poses a real threat of harm to the victim if the trauma is multidimensional and if the trauma occurs early in life. However, predisposing factors are associated with PTSD only to the extent that they continue beyond the trauma.

4.7.3.3 Current economic activity

Accidents significantly interfere with social, educational and occupational functioning of the victim (Ouimette et.al.2004). The researcher requested the respondents to state the activities they engaged in after the accident. This was to explain if the traumatic event interfered with their daily functioning. The data is presented in figure 4.2

Figure 4.2: Current economic activity



Out of the total participants of the study who were involved in road accident, (50%) engaged in farming while (18.6%) were shop keepers, 20.9 percent of the respondents did not engage in any other extra source of income. Most of the survivors opted to do other business because they did not want to be reminded of the traumatic event. Adjusting back to life at work after an accident can be very difficult. For some people, going back to the former job is made harder because of the lack of interest they have developed in their job. A few (10.5%) of the respondent went back to the *boda boda* business. This can be attributed to victims suffering from phobia.

A phobia is an irrational fear, a kind of anxiety disorder in which the sufferer has a relentless dread of a situation, living creature, place or thing (Orsillo et.al, 1996). In his journal of Traumatic Stress, people with a phobia go to great lengths to avoid a perceived danger which is much greater in their minds than in real life. If confronted with the source of their phobia, the person will suffer enormous distress, which can interfere with their normal function; it can sometimes lead to total panic. For some people, even thinking about their phobia is immensely distressing.

A phobia starts when a person begins organizing their lives around avoiding the object of their fear. Phobia sufferers have an overpowering need to steer clear of anything which triggers their anxiety. For accident victims who's phobia affects them daily it can have a devastating effect on their relationships with other people, particularly friends and family, but also lead to awkward and embarrassing situations with strangers. Acting in a way which others find amusing, just adds to the embarrassment and humiliation, when the individual is acting with no control whatsoever. They can't help their response, it just happens.

For those with a deep-rooted phobia or indeed with a phobia that seems to have mutated their condition has a profound and daily effect, chipping away their confidence and self-esteem. Study by Hofmann et.al (2003) shows that, 43 percent of patients seeking treatment for PTSD also had a certain kind of phobia.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMEDATIONS

5.1 Introduction

This chapter presents the summary of findings, conclusions of the study and recommendations. It also provides suggestions for further research.

5.2 Summary of research findings

The objective of the study was to establish the existing traffic laws put in place by the Kenyan Government under Traffic Police to regulate *boda boda* operations in the area. The study sought to examine the extent to which *boda boda* operators complied with the existing laws and regulations put in place to reduce road accidents. The research also tried to establish the challenges faced by law enforcers. It also sought to find out the frequency and trend of motorcycle accidents. Lastly, the research tried to investigate the presence of predisposing variables to PTSD among *boda boda* operators.

The study found that there are clearly defined traffic rules and regulations that regulate motorcycle transport system under the new traffic (Amendment) Act 2012. This include, a person shall not ride on a motorcycle without wearing a helmet, a jacket and a reflector, Every motorcycle shall be insured, a person shall not ride a motorcycle unless that person has a valid driving license and anyone who fails to comply with the provision of this section is liable to a fine not exceeding ten thousand shillings or, in a default of payment, to imprisonment for a term not exceeding twelve months.

The study further sought to examine the extent to which *boda boda* operators complied with the existing traffic laws. The study found that most (65.4%) of the respondents did not adhere to the traffic laws even to those they were familiar with and only 34.6 percent complied to the existing traffic rules and regulations.

The study found that the main challenges faced by law enforcers in their effort to enforce traffic laws in Murang'a town are: lack of harsh penalties, corruption and lack of capacity.

The study found that 25.9 percent of the total annual accidents were reported as fatal, 44.7 percent as serious injuries and 29.4 percent as slight injuries. This accounted for 100 percent of the accidents, thus implying that none of the accidents reported was non – injury, a situation that is not probable, casting doubts on the credibility of the data and lead to other questions as to whether the issue of under reporting is ever addressed by the authorities charged with accidents data reporting. In many minor cases police involvement is limited or non-existent, resulting in underreporting of the real number of crashes particularly those involving damage but no injury. It had been seen that there is substantial increase in all category over the study period. In 2009 there were a total of 11,669 injuries, in 2010 there were 9771 injuries while in 2011 there were a total of 8876 injuries.

Finally, the study also investigated on the presence of predisposing variables to PTSD among *boda boda* operators. The study found a mean of 44 percent of respondents who were not involved in road traffic accident showed presence of pre-accident variables to PTSD while 50 percent of those respondents involved in road traffic accident had pre accident symptoms to PTSD. The accident related variable portrayed in *boda boda* accident victims were shock, pain, helplessness and confusion and physical injury. Out of 87 respondents who were involved in road accident, most (41.4%) experienced shock in the time of accident. The victims suffered broken limb (96.6%), road rash (50.6%), Head injury (19.5%) and spinal injury (17.2%). The study found that 61.1 percent of road *boda boda* operators who survived road traffic accident had post accident symptoms to PTSD. The study has progressively shown that if pre accident variables to PTSD are not treated, the survivor will experience accident- related variables and then post accident variables, thus they are prone to PTSD. This could be caused by risk factors that increase the trauma, such as; living through dangerous events and traumas, dealing with extra stress after the event, Pain, injury or loss of a job or home, seeing people hurt or killed and having a history of mental illness. Furthermore, there is no specific treatment for victims of road crashes suffering from PTSD in Kenya, in fact there are no centres dealing specifically with PTSD especially for victims of road traffic crashes. Although normal PTSD treatment is often effective for victims of road crashes, it depends on the severity

of the incident. And what you also need to remember is that it is not just the person who witnessed or was involved in the incident, but also their family and friends who might have been affected. For example if a man loses his legs in a horrific crash he may end up suffering from PTSD, but his family will also be devastated by what has happened and may also end up suffering from PTSD. If these people do get access to treatment it might not always be the right treatment. In simple terms, treatment for PTSD is ‘hit and miss’ all the way.

5.3 Conclusion

The study findings concluded that there are clearly defined traffic rules and regulations and penalties that regulate *boda boda* transport system under the new traffic (Amendment) Act 2012. This include, a person shall not ride on a motorcycle without wearing a helmet, a jacket and a reflector, Every motorcycle shall be insured, a person shall not ride a motorcycle unless that person has a valid driving license and anyone who fails to comply with the provision of this section is liable to a fine not exceeding ten thousand shillings or, in a default of payment, to imprisonment for a term not exceeding twelve months.

The study further concluded that most of *boda boda* operators did not recall road traffic rules and did not also comply with the existing traffic laws.

The study concluded that of all the accidents reported in Murang'a town they account for 100 percent of the accidents, thus implying that none of the accidents reported was non – injury, a situation that is not probable, casting doubts on the credibility of the data and lead to other questions as to whether the issue of under reporting is ever addressed by the authorities charged with accidents data reporting. In many minor cases police involvement is limited or non-existent, resulting in underreporting of the real number of crashes particularly those involving damage but no injury. It had been seen that there is substantial increase in all category over the study period. In 2009 there were a total of 11,669 injuries, in 2010 there were 9771 injuries while in 2011 there were a total of 8876 injuries.

The study finding concluded there was indication of presence of predisposing variables to PTSD among *boda boda* operators; thus exposed to suffer PTSD. Many factors play a part in whether a person will get PTSD. Some of these are risk factors that make a person more likely to get PTSD. Other factors, called resilience factors, can help reduce the risk of the disorder. Some of these risk and resilience factors are present before the trauma and others become important during and after a traumatic event. Researchers are studying the importance of various risk and resilience factors. With more study, it may be possible someday to predict who is likely to get PTSD and prevent it.

From the findings, the study can conclude that people bereaved, seriously injured and have witnessed road crashes are likely to suffer PTSD and other conditions and deserve to be given the right treatment they need as soon as possible by professional with the right skills and experience.

This research further concludes that most people countrywide suffer from complex PTSD. This is when initial symptoms of PTSD repeatedly reoccur in someone's life and can start weeks or months after the traumatic event but may take years to be recognized (Margolies, 2010). If you continue to be exposed to stress and uncertainty, this will make it difficult or impossible for the victims PTSD symptoms to improve. If pre trauma factors to PTSD are not addressed at an earlier stage the victim is likely to experience peri trauma factor and later graduate to Post- trauma factors of PTSD. Reasons why people do not recognize symptoms of PTSD in the earlier stages is because; None of us like to talk about upsetting events and feelings; We may not want to admit to having symptoms because we don't want to be thought of as weak or mentally unstable; Doctors and other professionals are human. They may feel uncomfortable if we try to talk about gruesome or horrifying events; People with PTSD often find it easier to talk about the other problems that go along with it - headache, sleep problems, irritability, depression, tension, substance abuse, family or work-related problems.

5.4 Recommendations

From the findings of the study, the following recommendations are made.

The Kenyan government should recognize *boda boda* business as a country's contribution to economy. It should therefore play a big role in regulating its operation just like any other transport sector. The government through the Ministry of Transport and the police should bring the menace of *boda boda* taxis to sanity in order to curb uncalled deaths on Kenyan roads.

1. The government should introduce regulatory authority to curb fatal accidents by *boda boda* motorcycles on Kenyan roads.
 - I. Since *boda boda* is the new mode of transport in the country, the police must ensure the riders are competent enough to ferry passengers on the main roads and highways.
 - II. If necessary, the *boda boda* motorcycles should be confined only to operate on feeder and access roads but not on the highways.
 - III. The riders should produce certificate of proficiency, driving licenses and certificate of good conduct from the police before they are allowed to operate on the main roads.
 - IV. The *boda boda* motorbikes should be reduced to a manageable number by a licensing authority.
 - V. Distributors selling motorbikes must be compelled to ensure they only sell the new motorcycle to a rider on production of a driving license.
2. Intensified road safety campaigns and awareness should be enhanced in order to educate all road users on the existing traffic laws.
3. Traffic police officers should undertake regular traffic check in order to ensure all *boda boda* operators adhere to traffic laws
4. Traffic police working conditions should be improved and they should be provided with the right gadgets to enhance full enforcement

5. Serious disciplinary actions should be taken to all traffic police officers who are found taking bribes at the expense of non-compliance of traffic rules and regulations.
6. There should be a follow up of accident victims to cater for their psychological health.
7. More research should be done to study the importance of various PTSD risk and resilience factors. Trauma research centres should be established such as that in Aberdeen.
8. There should be the skilled and experienced therapists, readily available in hospitals and private counseling centres to offer immediate emotional care and on-going counseling to trauma victims and their families
9. In Wales there is a Mental Health Act that states, during a person's stay in hospital they should ensure that the person's full range of needs are assessed, and a multi-disciplinary plan drawn up to meet those needs. This plan should be drawn up together with the person and their carers, and it should be clear which professional is co-ordinating the implementation of the plan. Currently, in Kenya this guidance applies specifically to people detained on the ward under a Section, but good practice suggests it is relevant for all patients.

5.5 Suggested areas of further research

- The study focused on investigating the presence of predisposing variables to PTSD in boda boda operators. Therefore, there is need for further research focused on measuring the presence of PTSD symptoms in boda boda accident victims.
- The relationship between pre accident, peri accident and post accident symptoms with PTSD
- More research should be done on how to develop a reliable assessment tool that can identify victims at high risk for PTSD. The instrument can be used to connect those at high risk for PTSD with psychological treatment or pschoeducation services soon after trauma

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APPENDICES

APPENDIX 1

QUESTIONNAIRE FOR BODA BODA OPERATORS WHO HAD NOT BEEN INVOLVED IN ROAD TRAFFIC ACCIDENT

This questionnaire should be asked only to Boba boda operators who have NEVER been involved in Motor Vehicle Accidents

Respondent no _____

All instructions to Respondents are written in bold italics

OFFICIAL USE

Date of interview:

District:

Result: Completed partially comple

Introduction

Dear Respondent, My name is Janet W Macharia and I am a Master of Arts student in Advanced Disaster Management at the University of Nairobi. I am interviewing boda boda operators in Murang, a town to establish the causes and the response to road accidents in the town. If you are willing to be interviewed, I will explain what is involved in participating in the assessment. You can then decide whether or not you want to be in the assessment.

Informed consent

First, I would like to describe what your participation in this assessment will involve. Participation is completely *voluntarily*. The information collected from you will be treated with confidentiality. Your identity will be kept anonymous because you are *not required to reveal your name* both during the interview and on the questionnaire. Please note that your honesty in answering the questions in this questionnaire and during the interview is vital in understanding the causes of road accidents and the measures taken to reduce road accidents in Kenya.

Yes, will participate

No, will not particip **stop data collection and fill the reason for terminating**

MAIN QUESTIONNAIRE

Section 1: Respondent demographics

Circle for the appropriate information in the box

Q. No	Questions and Filters	Coding Category	Skip/ Filter
1	Gender of the participant	Male.....1 Female.....2	
2	How old are you?	Age in complete years { }	
3	What is the highest level of education that you attended?	Primary incomplete.....1 Primary complete.....2 Secondary incomplete.....3 Secondary complete.....4 Post secondary education.....5 Never.....6 Refused/ No response.....99	
4	What is your marital status?	Single.....1 Married.....2 Separated.....3 Divorced.....4 Widowed.....5 Refused/ No response.....99	
5	What other business are you engaged in other than boda boda business?		

Q. No	Question and Filters	Coding Category	Skip/ Filter
6	What is the type of boda boda you use?	Bicycle.....1 Motorcycle..... 2	
7	Ownership of boda boda	Employed as a driver on salary.....1 Rented/ Hired.....2 Owned.....3	
8	Have you insured your boda boda?	Yes.....1 No.....2	
9	Are you licensed to operate the boda boda?	Yes.....1 No.....2	

Section 2: compliance Measures

17	Before joining boda boda business how did you acquire riding skills	From fellow boda boda riders.....1 From private driving college.....2 From government college.....3	
18	If you attended driving college were you tested by the traffic police department in order to get a license?	Yes.....1 No.....2	
19	Did you pass the test administered by traffic police in riding?	Yes.....1 No..... 2	
20	List down traffic rules and regulations that a boda boda operator has to observe while riding on a public road? Multiple response possible		
21	Do you observe all the traffic rules you have listed?	Yes.....1 No.....2	
22	What traffic offences have you been		

	charged with? Multiple response possible		
23	What protective gear do you wear while riding a motorcycle on the road? Choose one Multiple response possible	Helmets.....1 Gloves.....2 Riding jackets.....3 Riding suits.....4 Reflectors.....5	

Thank you very much our participation

APPENDIX 11

QUESTIONNAIRE FOR BODA BODA OPERATORS WHO HAVE BEEN INVOLVED IN ROAD TRAFFIC ACCIDENT

This questionnaire should be asked only to Boba boda operators who have been involved in Motor Vehicle Accidents and who sustain serious injuries

Respondent no _____

All instructions to Respondents are written in bold italics

OFFICIAL USE

Date of interview:

District:

Result: Completed partially comple

Introduction

Dear Respondent, My name is Janet W Macharia and I am a Master of Arts student in Disaster Management at the University of Nairobi. I am interviewing boda boda operators in Murang, a town to establish the causes and the response to road accidents in the town. If you are willing to be interviewed, I will explain what is involved in participating in the assessment. You can then decide whether or not you want to be in the assessment.

Informed consent

First, I would like to describe what your participation in this assessment will involve. Participation is completely *voluntarily*. The information collected from you will be treated with confidentiality. Your identity will be kept anonymous because you are *not required to reveal your name* both during the interview and on the questionnaire. Please note that your honesty in answering the questions in this questionnaire and during the interview is vital in understanding the causes of road accidents and the measures taken to reduce road accidents in Kenya.

Yes, will participate

No, will not particip *stop data collection and fill the reason for terminating*

MAIN QUESTIONNAIRE

Section 1: Respondent demographics

Circle for the appropriate information in the box

Q. No	Questions and Filters	Coding Category	Skip/ Filter
1	Gender of the participant	Male.....1 Female.....2	
2	How old are you?	Age in complete years{ }-	
3	What is the highest level of education that you attended?	Primary incomplete.....1 Primary complete.....2 Secondary incomplete.....3 Secondary complete.....4 Post secondary education.....5 Never.....6 Refused/ No response.....99	
4	What is your marital status?	Single.....1 Married.....2 Separated.....3 Divorced.....4 Widowed.....5 Refused/ No response.....99	

Section 2: Accident Information

Q. No	Questions and Filters	Coding Category	Skip/ Filter
5	Have you ever been involved in a traffic motorcycle road accident that led to injury to you or your passenger?	Yes.....1 No.....2	
6	What was the cause of injury?	Motorcycle/ bicycle vs Vehicle.....1 Motorcycle/ bicycle vs Pedestrian.....2 Motorcycle/ bicycle vs Motorcycle/ bicycle.....3 Other collision (Specify).....91	
7	Did you report the case to the police?	Yes.....1 No.....2	
8	Give reasons why you did not report to the police or access health care		
9	Which part of the body was seriously injured?		
10	Do you think boda boda operators are the major causes of road accidents currently?	Yes.....1 No.....2	
11	How has the accident affected you:		
A.	Economically		
B.	Socially		

C.	Psychologically		
12	Are you satisfied with the health care system in Murang'a hospital?	Yes.....1 No.....2	
13	What are some barriers to accessing mental and behavioural care? Multiple response possible	Inadequate transportation.....1 Long wait times.....2 Do not know where to go.....3 Lack of insurance.....4 Stigma.....5	
14	Do you intend to go back to boda boda business?	Yes.....1 No.....2	
15	What other economic activity do you engage in now?		

Section 3: Predisposing variables to PTSD

Q. No	Question and Filters	Coding Category	Skip/ Filter
16	<p>Respond to the following statements by selecting one response from options provided. Use the following key 1- Yes, 2- No</p> <p>Multiple response possible</p>	<p>Were you neglected at childhood?</p> <p>Before the accident, had you undergone any form of domestic violence in family e.g battering, verbal abuse or unfaithfulness that may have led to parents' separation?</p> <p>Before the accident, had you ever been sexually abused?</p> <p>Before the accident, had you ever been involved in another road accident?</p> <p>Before the accident, had you ever lost a close friend or relative?</p> <p>Before the accident, had you ever been kidnapped?</p> <p>Before the accident, had you ever been robbed?</p>	
17	<p>Which of the following describes your state at the time of accident?</p> <p>Multiple response possible</p>	<p>Shock.....1</p> <p>Pain.....2</p> <p>Confusion.....3</p> <p>Helplessness.....4</p>	
18	<p>Respond to the following statements by selecting one response from options provided. Use the following key 1- strongly agree, 2- Agree, 3- Neutral, 4- Disagree, 5- Strong disagree</p> <p>Multiple response possible</p>	<p>Do your family and friends emotionally and/or financially support you?</p> <p>Do you feel a sense of guilt or self pity?</p> <p>Do you seek any psychological health care treatment?</p> <p>Do the people who witnessed the</p>	

		accident blame you for the accident?	
Section 4: Compliance measures			
19	Before joining boda boda business how did you acquire riding skills	From fellow boda boda riders.....1 From private driving college.....2 From government college.....3	
20	If you attended driving college were you tested by the traffic police department in order to get a license?	Yes.....1 No.....2	
21	Did you pass the test administered by traffic police in riding?	Yes.....1 No.....2	
22	Do you have a valid government riding licence?	Yes.....1 No.....2	
23	Do you have an insurance cover for your boda boda?	Yes.....1 No.....2	
24	List down traffic rules and regulations that a boda boda operator has to observe while riding on a public road? Multiple response possible		
25	Do you observe all the traffic rules you have listed?	Yes.....1 No.....2	
26	What traffic offences have you been charged with? Multiple response possible		
27	What protective gear do you wear while riding a motorcycle on the road? Choose one	Helmets.....1 Gloves.....2 Riding jackets.....3	

	Multiple response possible	Riding suits.....4 Reflectors.....5	
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Thank you very much our participation

APPENDIX 111
A KEY INFORMANT GUIDE
ROAD EMERGENCY MANAGEMENT
TRAFFIC POLICE

1. Is the traffic police department in Murang'a town involved in testing the motorcycle operators before issuing them with riding licenses?

Yes

No

2. What traffic laws and regulations should boda boda operators comply with?

3. To what extent do the boda boda operators comply with the existing laws and regulations?

a) To a greater extent

b) Fairly well

c) Not at all

4. How often do you carry out the following?

a) Stop motorcycles to inspect them on compliance with traffic rules?

b) How often are road accidents involving motorcycles reported?

c) Set up road blocks to check the behavior of motorcyclists?

d) Join other stake holders in sensitizing road users on compliance of traffic laws and regulation?

5. What do you think are the main causes of motorcycle accidents in Murang'a town?

6. On average how many accidents occur in a month in Murang'a town?

a) Less than 2

b) 2 to 5

c) 6 to 10

d) More than 10

7. What challenges do you get in enforcing the laws?

12. Do you do a follow up of accident patients after they are discharged?

Yes

No

13. Do you have specialists who deal with psychological care of accident patients?

Yes

No

14. If Yes to the above question, what treatment/ therapy do they give to traumatized patients?