

**SOCIO-CULTURAL AND ECONOMIC DETERMINANTS OF *BODA BODA*
MOTORCYCLE TRANSPORT SAFETY IN KISUMU COUNTY, KENYA.**

BY

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C82/14571/09

**A THESIS SUBMITTED TO THE SCHOOL OF HUMANITIES AND SOCIAL
SCIENCES IN FULFILMENT OF THE REQUIREMENTS FOR THE AWARD
OF THE DEGREE OF DOCTOR OF PHILOSOPHY (SOCIOLOGY) OF
KENYATTA UNIVERSITY**

JUNE 2015

DECLARATION

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

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DEDICATION

This work is dedicated to my Husband Mwanzo Nyachieo Moseti and our children Joshua Onsongo, Neema Kerebi and Jason Moindi.

ACKNOWLEDGEMENTS

This work would not have been completed without the solid support of a great number of people who in their small or big way provided the necessary contribution and support. I am indebted to my supervisors, Dr. Anne Kamau, Dr. Calvine Kayi and Dr. Otengah for their guidance and important comments in the course of this study. Special thanks also go to Dr. Rono for his reading and invaluable comments. I thank Dr Kerre for always finding time to listen to me. I also thank the chairperson Department of Sociology, Kenyatta University, Dr. Daniel Muia for his input and guidance. In addition, I recognize the department of sociology, Kenyatta University for always being there for me. I cannot forget graduate school for their role. I acknowledge the financial support accorded to me by Kenyatta University to undertake this PhD programme and for giving me the training position.

While on field work, I got an opportunity to interact with stakeholders in road safety in Kisumu town. Their contributions as key informants were very crucial in informing this study. I mention a few who held various positions at the time of field work as follows: Provincial Traffic Enforcement Officer, Mr Katsole; Provincial Director of Medical Services, Dr. Lusi Ojwang; Kisumu Traffic Police Base Commandant, Mr. Mwangangi, District Medical Officer of Health, Dr. Titus Kwambai; Imperial Driving school Manager, Mr. Peter Oluoch; Kisumu Municipal Council, traffic section, Corporal Cheror - Kisumu Traffic accident data section. In Nairobi, I interacted with Mr Soita of Traffic Headquarters, Nairobi; Cosmus Ngeso acting Head of road transport National Transport Safety Authority (NTSA); Mr Eshiwani, the Deputy Secretary, Ministry of Transport; Professor Winnie Mitullah of the Institute for Development Studies, University of Nairobi and Kenya Revenue Authority (KRA). My sincere thanks also go to Dr Melckizedeck Khayesi for his valid and invaluable contributions to this work.

I thank the other members of the field support team for their good work in data collection. I also wish to thank George Oyaro for assisting in data entry and cleaning. I am particularly indebted to the dedication of Dr. Samuel Mwangi of the department of

sociology, Kenyatta University for his invaluable comments on inferential statistics as well as reading and critiquing my work.

My special thanks go to Alfred Momanyi Nyairo, my mentor and guardian, for his selflessness, vision and belief in me. He was sure I would get this far even when I was in doubt. He saw me through high school and at my undergraduate level (without ever complaining that he was doing too much for me). I thank my mother who when faced with serious financial challenges still had hopes that someday all would be well. In the absence of a father, she did her best to pay my fees and took care of all my other needs. I also thank my house manager / help, Purity Makoko for making it possible for me to have time to concentrate on my work. With three little children and all the work that come with that, it would have been impossible to achieve my academic pursuits. My special gratitude goes to my husband and friend, Mwanzo Nyachio Moseti. He was always there for me when I faced tough academic times; our children, Joshua, Neema and Jason for enduring my absence during my academic hibernation. It would have been impossible to do this work without their unconditional love and support both social and emotional. Above all I thank God for making it happen.

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OPERATIONAL DEFINITION OF KEY TERMS

Attitude: the term refers to a consistent tendency to react in a particular way, either positively or negatively to an object, event, person or situation. Attitude was measured by scores on the attitude scales; likert and opinion scales.

Base: assembly points where riders congregate to wait for passengers.

Behaviour: the way in which one acts or conducts oneself in this study it was measured in terms of presence or lack of acquired habits and actions e.g. use of daytime headlights, wearing reflective clothing.

Boda boda: For this study *boda boda* refers to a motorcycle used for transporting passengers and goods at a fee. The term originated from the English word 'border' *Boda boda* (originally bicycle taxi) mainly provide passenger taxi services across the Kenya Uganda border at Busia.

Cultural factors: culture encompasses the set of beliefs, moral values, norms, traditions and rules of behaviour held in common by a defined group of people. The related behaviours are associated with religious beliefs and practices.

Economic factors: economic factors are all the units required in the economic activity of production of goods and or services. In this study economic factors referred to; motorcycle ownership, daily income from motorcycle business and number of hours worked. Economic factors were measured by motorcycle ownership, number of hours worked by owners and non-owners of *boda boda* motorcycles and amount earned daily by riders.

Good condition of motorcycle: means a *boda boda* in good working order and having reflectors, side mirrors, passenger seats, effective brakes among others.

Motorcycle: it is a two wheeled motor vehicle similar to a bicycle (but motorized) usually bigger in size, mainly for one rider but sometimes having two saddles.

Motorcycle accident involvement: it refers to loss of control and rolling mostly off the road of *boda boda* motorcycle or when a motorcycle collides with another vehicle, pedestrian, animal, road debris, or other geographical or architectural obstacle. It was measured by whether one has been involved accidents one has been involved in for the last 12 months.

Motorcycle safety: it has to do with aspects that reduce the vulnerability to accidents when riding the motor cycles. It involves equipment design (motorcycle design), operator training, skills and knowledge; operator's behaviour and

attitudes, leading to increase or reduction of motorcycle accidents. It was measured by the respondent's involvement or non - involvement in accidents.

Perception: it refers to the way in which something is regarded, understood, or interpreted. In this study it meant how respondents regard, understand or interpret the causes of *boda boda* motorcycle safety. It was measured by identifying causes of *boda boda* motorcycle safety as understood and interpreted by the respondents.

Pillion: refers to motorcycle passengers.

Rider characteristics: in this study it meant features that distinguish riders. For example age, number of years worked, education level, riding experience.

Risk behaviour: it means the presence of the following behaviours: speeding, drunk driving, non - use of helmets, non - use of reflective jackets, dangerous overtaking. It was measured by presence or absence of the above.

Road safety: it is a term that refers to all activities or methods and measures that are issued to reduce risks of injury, death and harm to all road users thereby reducing the rates and consequences of road crashes.

Road users: all those who utilize the road. They include pedestrians, motorcyclists, cyclists, cart pullers, passengers and drivers.

Safety: it is the state of being safe, free from risk, danger or injury. For this study safety means, non-involvement in *boda boda* motorcycle accidents.

Socio-cultural factors: social factors are things (facts and experiences) that influence Individual's personality, attitudes and lifestyle while culture encompasses the set of beliefs, moral values, norms, traditions and rules of behaviour held in common by a defined group of people. In this study socio-cultural factors included; formal training, motorcycle safety knowledge, drink driving, rider attitudes and practices and *boda boda* sitting style.

Training: it refers to instructions given theoretically and / or practically to riding Trainees by their instructors. It was measured by riders response to whether they attended driving school or not.

Vehicle: a means of transport used for moving people or goods, especially on land, for instance, a car, a motorcycle, lorry, or cart. It can also be called automobile, motor vehicle or means of transport.

ACRONYMS / ABBREVIATIONS

ACEM	Association of European Motorcycle Manufacturers
APEC	Asian-Pacific Economic Co-operation
ASEAN	Association of Southeast Asian Nations
ATSB	Australian Transport Safety Bureau
BAC	Blood Alcohol Concentration
CIA	Central Intelligence Agency
CODES	Crash Outcome Data Evaluation System
DARS	Decade of Action for Road Safety
DETR	Department of Environment Transport and the Regions
IHIE	Institute of Highway Incorporated Engineers
INTP	Integrated National Transport Policy
KABS	Kenya National Bureau of Statistics
KRA	Kenya Revenue Authority
KSI	Killed and Serious Injury
MAIDS	Motorcycle Accidents In-depth Study
MCI	Motorcycles Injury
MoH	Ministry of Health
MoT	Ministry of Transport
NTSA	National Transport Safety Authority
NARC	National Rainbow Coalition
NHTSA	National Highway Traffic Safety Administration
OECD	Organization for Economic Co-operation and Development
PSV	Passenger Service Vehicle
PTWs	Powered Two Wheelers
ROWV	Right of Way Violations
RTI	Road Traffic Injury
SAFETEA	Safe, Accountable, Flexible, Efficient Transportation Equity Act
TWMVs	Two-wheel motorized vehicles
UNEP	United Nations Environmental Program

USAID	United States Agency for International Development
WHO	World Health Organization
CBD	Central Business District
PPS	Probability Proportional to Size
EPSEM	Equal Probability Sampling Method
KNBS	Kenya National Bureau of Statistics
KSHS	Kenya Shillings
RS10	The Road Safety in 10 Countries
FIDA	Federation of Women Lawyers Kenya
CDC	Centre for Disease Control
MIROS	Malaysian Institute of Road Safety Research

ABSTRACT

Road safety remains one of the main societal concerns despite extensive research and interventions. It is a serious challenge in Kenya and the world over. The emergence of *boda boda* motorcycles as a means of transport in the village paths, the highways and city streets has brought a new dimension to road safety in Kenya. Motorcycle transport, though the most dangerous mode of transport, is still preferred by many because of its availability and flexibility. Although motorcycle safety has been a concern; only a few sociological studies have been conducted in Kenya to address the challenge. Motorcycle accidents pose a threat to the structure and functioning of the society. The study was conducted in Kisumu East sub-county in Kisumu county and sought to examine the socio-cultural and economic determinants of motorcycle transport safety. Specifically, the study sought to gather information on the demographic characteristics of riders in Kisumu East sub-county; to establish the levels of formal rider training among *boda boda* riders; to determine the levels of safety knowledge among *boda boda* riders; to determine *boda boda* motorcycle accidents rates in Kisumu East sub-county, to evaluate the attitudes and behaviour of *boda boda* motorcycle riders in Kisumu East sub-county; to establish whether pillion sitting style on *boda boda* influenced motorcycle safety and to establish whether there was a relationship between motorcycle ownership and *boda boda* safety. The study adopted descriptive and cross-sectional survey designs with a two-stage cluster sampling technique with PPS (Probability Proportional to Size) involving simple and systematic random sampling methods to select 370 respondents. The main data collection tool for the study was an interview schedule. Interview guide was also used to gather qualitative data from Focus Group Discussions (FGDs) and key informants. Qualitative data was summarized in categories and themes using content analysis and NVIVO 10. SAS 9.3 was used to manage and analyze quantitative data. Inferential statistics such as Chi-square and Binary Logistic Regression were used to test relationships. The study utilized Structural Functionalism and Marxist theory of Social Structures as explanatory frameworks. Research findings obtained revealed that, majority of the riders were young with secondary education. However, majority (62.2%) were not formally trained to ride. Majority of riders (66.5%) had low levels of motorcycle knowledge. The study also found that *Boda boda* speeds were not regulated. In addition, about 65% of riders had one helmet and rider helmet use was low (34%). The study further established that about half of the riders (56.2%) did not own the *boda bodas* they operated. Moreover, the rate of accident involvement was high at 40.3% and riders engaged in bad riding behaviour most of the time. It also emerged that passenger sitting style on *boda boda* was a gendered cultural issue. The chi-square test found that formal rider training had no statistical significant relationship with accident involvement. Furthermore, binary logistic regression showed that, motorcycle

ownership lowered the odds of being involved in accidents by 57%. Based on the study findings, the study concluded that; although individual riders caused accidents, their decisions and behaviour were influenced by other societal factors. Therefore some socio-cultural and economic factors determined *boda boda* motorcycle safety. They included; formal training, motorcycle safety knowledge, rider behaviour, pillion sitting style on *boda boda* and *boda boda* ownership. On the basis of the findings, the study recommended the following; the government through NTSA to come up with rider specific schools that are subsidized to make it affordable for the riders or the government can subsidized some existing driving schools to train riders. This will improve rider safety knowledge and skills hence reduce motorcycle related accidents. In addition, there is need to implement traffic rules and policies that improve road safety. This will ensure that testing and licensing are done accordingly. The study also recommended that BAC law be amended to reduce the officially acceptable blood alcohol content from the current 0.08 g/dl to 0.05 g/dl or less for *boda boda* riders. Since motorcycle ownership was found to influence accident involvement, the study proposes that the government through the Department of Youth Development and Youth Fund together with the private sector come up with credit facilities (with very low interest rates) that can enable the young people to own motorcycles. This may help in reducing motorcycle related accidents.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The increase in the use of motorcycles as a form of road transport for commercial or public transport in Africa is a relatively recent phenomenon. Road transport plays an important role in integrating the various sectors in any given economy in the world. This is because the transport sector makes crucial contribution to overall economic growth and development (Ndungu, Kibua, & Masinde, 2004). Transport is thus an important component of both rural and urban development programs and also an enabling element for the achievement of the Millennium Development Goals (World Bank, 2007).

Kenya, like other parts of the world, has experienced immense growth in the transport sector. Between 2005 and 2011 the overall, registered motor vehicles in Kenya increased by a factor of 4.5 (from 45,653 annual registrations in 2005 to 205,841 in 2011). The motorcycles increased by a factor of 37.7 over the same period from 3,759 to 140,215 annual registrations (Kenya Revenue Authority [KRA], 2012).

Due to the transport system's inability to fully meet the commuters' transportation needs and the availability of motorcycles, the demand for this

mode of transport has been on an upward trend (Kumar & Barret, 2008). According to the (Kenya National Bureau of Statistics [KNBS], 2010) the number registered motor vehicles have also increased. The total number of units registered increased by 32.6% to stand at 161,813 in 2009 up from 121,831 in 2008. The increase was attributed to the higher registration of motor and auto cycles which accounted for 56.3% of the total registered units in 2010. The increase was also associated with zero rating of all motorcycles below 250 cc in 2008. About 12,000 motorcycles are registered every month (KRA, 2013).

The different modes of transport include road, rail, water and air. These different modes use specific types of vehicles and infrastructure. The vehicles used include, motorcycles, buses, bicycles, animal drawn carts, mini buses, trains, trucks, tri-cycles, ships and other waterway vessels and aircrafts.

Mobility is socially produced and it relates to the way that transportation is realized as well as to the societal context and its specific conditions (Engel, 2007). There are different reasons why people choose different modes of transport. The modal choice could be based on factors like cost, flexibility, the route of travel, capability, comfort and speed or urgency. However, the use of each mode of transport comes with its unique challenges, for example, cost, discomfort, and safety which may affect its choice by the public.

Furthermore, for a desired travel pattern, the demand must be met with transport options; that is, there must be enough options to choose from depending on

individual transport needs. The transport market is focused on the choice between travel demand and the availability and affordability of transport modes and services. The demand for travel and the supply of transport possibilities may lead to a certain distribution of transport systems for travel to be made (United Nations Environmental Program ([UNEP], 2010). Therefore, if one can only use a motorcycle due to various reasons, as stated above, there should be motorcycles to enable travelling.

As a result of travel demand and modernization, there has been a global increase in motorization particularly in the middle and low income countries. This has been accompanied by a high increase in road accidents (Peden et al., 2004). It is estimated that road crashes killed 1.2 million people worldwide and injured about 20 - 50 million in 2002 (World Health Organization, [WHO] 2004). In the year 2004 road traffic injuries were ranked 9th globally among leading causes of disease burden, in terms of disability adjusted live years lost (Odero, 2004). It is feared that if this trend continues the annual number of deaths and disabilities from road traffic injuries will rise to 60% by 2020, to be the third leading cause of premature death and disability, ahead of malaria, tuberculosis and HIV/AIDS (WHO, 2004).

In Malaysia, more than 50% of road accidents involve motorcyclists. In Thailand, in the period 2008 to 2010, the number of injuries as a result of motorcycle accidents was about 70-80% of all accidents (Malaysian Institute of Road Safety Research, 2010). In Taiwan and other parts of Asia, motorcycle

transport has drawn public attention due to the high numbers of injuries and deaths. In Taiwan, for example, between 1996 -1997, about 1,153 people were killed in motorcycle related accidents (Chang, 2005). This shows that motorcycle accidents in Kenya if not timely curbed, may raise to such proportions as those experienced in Malaysia, Taiwan and Thailand. Kenya already has a high rate of fatalities and injuries in relation to car ownership. More than 3,000 people are killed on Kenyan roads annually. This translates to approximately 68 deaths per 10,000 registered vehicles, which is 30-40 times greater than highly motorized countries (Odero, Khayesi, & Heda, 2003).

In the last five years, motorcycles have flooded Kenyan roads both in cities and villages (Chepchieng, 2011). This is partly due to the zero rating of all motorcycles below 250cc in 2008, an expensive and chaotic motor vehicle transport system, and poor road networks. Also, due to rapid urbanization, the demand for transport has increased prompting the use of various modes of transport. In urban areas, the inability of transport systems to meet the demand for urban commuters has led to the acceptance of motorcycles in many of the cities of Africa as an alternative means of transport to solve the commuting problems (Adesanya, 1998).

Motorcycles play a crucial role in the Kenyan transport sector today. They are an alternative mode of transport especially for the low and middle income earners. Motorcycles serve passengers in areas where other modes of transport may not be available (Ministry of Transport, 2009). They serve as taxis and

provide the convenience of travelling irrespective of time, type of road, distance or destination and in addition, they are readily available.

In Kenya, *boda boda* motorcycles are visible in many urban centres as well as rural areas. Kisumu town in particular is known for its large number of *boda boda* motorcycles. The town being in the Western region of Kenya has a long history of the use of *boda boda*. The genesis of these taxis can be traced back to when *boda boda* bicycles were used for cross border trade in Busia (Howe, 2003). In rural areas, motorcycle taxis provide relief to an inadequate transport system, while in urban areas, they supplement passenger and goods transport services (Ministry of Transport, 2009).

All the advantages of *boda boda* motorcycles notwithstanding, the safety of motorcycle users has become a major concern to all road users, the government and non-governmental organizations concerned with transport safety. This is due to the increase in road accidents involving *boda boda* motorcycles. In some towns, for instance Naivasha, there were reported deaths of up to 40 people per month. Additionally, some hospital wards are set aside specifically for *boda boda* motorcycle victims (Bogan, 2010).

The rising number of accidents is known to overwhelm the already stretched health sector due to the number of casualties. The health facilities especially in the rural areas, may have no capacity to deal with the injured due to few medical personnel and other medical facilities. Therefore, there are social and

economic implications. The likely consequence of motorcycle accidents include a drain on the economy through loss of income for the riders who are maimed, loss of labour for the country, loss of support for household especially if the breadwinner dies or is incapacitated and loss of time for other activities because of caring for the injured. In addition, for those injured in accidents, the treatment is long and expensive because most of them sustain head and limb injuries, not to mention the emotional pain for relatives in the case of death (Khayesi, 1999). Clearly, the structure and functioning of the society is affected in the aftermath of motorcycle accidents.

The zero rating of duty levied on imported motorcycles was meant to create employment for the young people. Unemployment and poverty are the two basic problems that are plaguing many developing nations of the (International Labour Office [ILO] 2007). It therefore implies that most of the riders are people in the lower income category or people who were previously unemployed. The purpose of this study therefore, was to examine demographic, socio-cultural and economic factors that determine *boda boda* safety in Kisumu.

A number of researches on road safety have been done in Kenya, most of which have concentrated on motor vehicles like *matatus*, buses, minibuses and non-motorized means of transport. For instance (Khayesi, 1997) carried out a study on the regional patterns of pedestrian road traffic accidents. (Khayesi ,1999) also conducted another study on the analysis of pattern of road traffic accidents in relation to selected economic dynamics and intervention measures. Kayi

(2007) analyzed road traffic accidents using Geographic Information Systems (GIS) in Nairobi. Moraa (2010) focused on the road safety among public service vehicle drivers in Kenya.

The few studies done in Kenya on road transport safety have not focused on motorcycle safety. Using Thika as a case study, Mbugua (2011) studied the effects of motorcycle transport revolution on economic growth in Kenya. He found that, compared to their earlier sources of income, motorcycle taxis had improved the livelihoods of about 95.7% of the respondents. Chepchieng' (2011) focused on tricycles and motorbikes in Kitui town, he studied factors influencing growth of motorcycle-propelled urban public transport. He found that urban policy had greatly influenced the growth of *boda boda* and tricycles public transport in Kitui. Nyachieo (2012) studied how the youth in Kitengela-Kenya were using *boda boda* motorcycles transport to create employment. She found that *boda boda* motorcycle was a source of employment for many youths in Kitengela.

There are studies done outside Kenya that have focused on motorcycle safety and accidents. Some of them include the landmark studies by Hurt, Quillet, & Thom (1981) and the Motorcycle Accidents In - Depth Study (MAIDS) and Association of European Motorcycle Manufacturers (ACEM) of 2004 on motorcycle accidents. Other studies have been done in Asia and a few in Africa. Kumar (2011) conducted a study on understanding the emerging role of motorcycles in African cities. The focus here was on the political economy.

Other studies in Africa have focused on advantages and disadvantages of motorcycle transport (Oyesiku & Odunfunwa, 2002), operational cost, profit and willingness for motorcycles services (Fasakin, 2000; 2001), motorcycle accidents (Okoko, 2000 & Gbadamosi, 2006) and prevalence of helmet use among motorcycle users (Ackaah & Afukaar, 2010).

In Kenya, deaths and injuries related to motorcycles accidents have increased by a factor of 4.4, from 451 in 2005 to 1,991 in 2013 (KNBS, 2012). The increase in the number of motorcycles must not necessarily translate to the increase in motorcycle accidents if necessary road safety measures accompany this growth (WHO, 2006). In 2010, a total of 3,055 road traffic deaths were reported by the Kenya Traffic Police of these, approximately 7% were motorcyclists (WHO, 2013a). If nothing is done about the increasing motorcycle accidents, the percentage could increase.

According to the traffic police, the motorcycle accidents in Kisumu have shown a rising trend. For instance, in 2009 the police in Kisumu recorded 9 fatalities, 30 seriously injured and 13 slightly injured. In 2010, there were seven fatalities, 17 seriously injured and 7 slightly injured. In 2011 ten fatalities were recorded, 39 seriously injured and 6 slightly injured. In 2012 twelve fatalities were recorded, 31 seriously injured and 13 slightly injured. It is important to note that these statistics represented only the reported cases.

The current study sheds light on how much the motorcycle accidents are influenced by factors within (individual characteristics) and outside the individual rider's sphere (societal forces). This is relevant because as indicated, motorcycle accidents are a growing problem in Kenya and human behaviour has been associated with these accidents. For instance, the road traffic environment can be considered a social space with formal and informal norms (motorcycle rules and regulations). Speed limits, wearing of helmets, adhering to the Blood Alcohol Content law, are all formal norms (law). When a rider does not comply with these laws, the agent employed with the task of law enforcement for example, the Traffic Police Department sanctions the law breaker. The regularity of the sanctions creates stable social expectations (Engel, 2007). Therefore if one is found riding without a helmet, one should always be arrested. Adherence to the helmet law is therefore influenced by whether there are sanctions for those who break such rules and whether the sanctions are implemented.

1.2 Statement of the Problem

The *boda boda* motorcycle mode of transport in Kenya gained prominence after the zero rating of duty levied on imported motorcycle below 250cc by the Ministry of Finance in 2008. After the tax waiver, Kisumu East sub-county and the country at large became flooded with *boda boda* motorcycles, a scenario that resulted in increased number of accidents. *Boda boda* motorcycle accidents have therefore become a problem in Kenya in general and Kisumu specifically. For instance statistics indicate that, in Kenya there was an increase of 343.7%

for those killed or injured in motorcycle related accidents between 2005 and 2014. For Kisumu the increase was 236.5% for the same period. Furthermore, *boda boda* motorcycles came into an environment lacking in legislation about it's the operations.

Road traffic accidents are attributed to human behaviour and actions which are themselves influenced by a set of socio-cultural and economic factors. This is because individuals are shaped, influenced, and constrained by the social order in which they live. Whereas motorcycle accidents may be caused by individual behaviour factors, these behaviours are influenced by other factors outside the individual sphere (formal norm and social category), which lead to accidents. Consequently, the notable increase in accidents puts a heavy burden on families, communities and the health system in general.

In view of high and increasing number of accidents, the UN General Assembly 2011-2020 Action Plan and the WHO 2009 & WHO, 2013b-*Global Status Reports on Road Safety* called on member countries to establish ways and mechanism to stabilize and reverse the rate of road accidents before they reach disastrous proportions. It is in this context that the current study endeavoured to examine demographic, the socio-cultural and economic determinants of motorcycle accidents in Kisumu East sub-county. The above mentioned factors are easily amenable to sociological analysis. To carry out this task, the study interrogated rider demographic characteristics, formal rider training, motorcycle safety knowledge, drunk driving, rider attitudes and behaviour, *boda boda*

ownership, incomes, number of hours worked and pillion sitting styles on *boda boda* motorcycles.

1.3 Objectives of the Study

Main objective

The main aim of this study was to find out the demographic, socio-cultural and economic determinants of *boda boda* motorcycle safety in Kisumu East Sub-county.

Specific Objectives

- i. To examine the demographic characteristics of *boda boda* motorcycle riders in Kisumu East sub-county and find out its effects on safety.
- ii. To establish the levels of formal rider training among *boda boda* riders in Kisumu East sub-county and how they influence motorcycle safety.
- iii. To determine the levels of motorcycle safety knowledge among *boda boda* riders in Kisumu East Sub-county.
- iv. To find out the rates of accident involvement by *boda boda* riders in Kisumu East Sub-county.
- v. To analyze the behaviour and attitudes of *boda boda* riders in Kisumu East Sub-county.
- vi. To establish whether *boda boda* sitting style influence *boda boda* motorcycle safety in Kisumu East Sub-county.
- vii. To establish whether there is a relationship between motorcycle ownership levels and accident involvement rates in Kisumu East Sub-county.

1.4 Hypotheses of the Study

H0₁: There is no significant relationship between formal rider training and accident involvement among riders of *boda boda* motorcycles in Kisumu East Sub-county.

H0₂: There is no relationship between *boda boda* motorcycle ownership levels and accident involvement rates among riders of *boda boda* motorcycles in Kisumu East Sub-county.

1.5 Significance of the Study

This study set out to examine factors that determined motorcycle safety in Kisumu East Sub-county. The study is important to scholars in the area of road safety and especially those interested in commercial motorcycle safety. It is important because it fills a gap in literature on motorcycle safety. A review of literature indicates that in Kenya, there is limited detailed information on motorcycle transport and safety. Among the available sources of information on *boda boda* safety are the traffic police records on the number of accidents involving *boda boda* motorcycles in Kenya. The few available studies in Kenya have not focused on motorcycle safety. For instance, Mbugua (2011) studied the effects of motorcycle transport revolution on the economic growth in Thika town, while Chepchieng' (2011) studied factors influencing growth of motorcycle-propelled urban public transport.

In addition, literature shows limited evidence for sociologically oriented road safety studies. Most of road safety studies are based on mathematical models

and engineering, and so human factors are therefore limited or ignored in these studies. The current study, consequently, fills the gap in literature as concerns the sociological analysis of social science oriented concepts in motorcycle safety.

The study is relevant as it depicts the transport situation in the context of a developing country. Unlike in the developed countries where motorcycles are used for leisure, in the developing countries, the motorcycles meet the immediate and real need of the people. Therefore, it is important to understand the circumstances of *boda boda* motorcycle transport safety in this context.

This study generates knowledge in the area of motorcycle safety and contributes to the growing body of literature on motorcycle transport. The study examines economic and cultural factors that influence motorcycle safety. This is especially important due to the increasing number of accidents occasioned partly by the motorcycle boom in Kenya. The recommendations of the study may inform the stakeholders on the measures to take in dealing with the current situation both in policy and in sensitization programmes. This would further improve transportation safety and minimize other challenges associated with motorcycle transport in Kenya.

The National Transport Safety Authority (NTSA), the Kisumu town council, the Ministry of Transport and Kenya Police Traffic Division may find the findings of this study useful in devising appropriate measures and interventions to reduce road accidents involving *boda boda* motorcycles. NTSA may also utilize the

findings of this study in transport policy formulation. Furthermore, in the academic arena, the study findings, recommendations and gaps identified may be used as a baseline for further research in motorcycle safety.

The study may also be useful to riders in Kisumu East Sub-county. They may benefit from subsidized training fee if the study recommendations are adopted. This way they will gain in training, safety knowledge. This may intern reduce *boda boda* motorcycle accidents thereby reducing the consequences of such accidents.

1.6 Scope and Limitations of the Study

The study analyzed the socio-cultural and economic determinants of motorcycle safety in Kisumu East sub-county. The sub-county was selected because of its unique characteristics in regard to the study topic. Whereas motorcycle safety is a problem facing many towns in Kenya, Kisumu East sub-county is unique for the reason that it has a long history in the use of both motorcycle *boda boda* and bicycle *boda boda*.

The study was limited to the safety concerns in *boda boda* motorcycle transport sub-sector in Kisumu East sub-county. Furthermore, the study confined itself to rider responses and did not include passenger's responses except in two Focus Group Discussions that involved passengers. The main limitation of the study was completing an interview with the respondents (riders) who were constantly required to ferry passengers. Accessing accident records at the Traffic police office was also a challenge. To address this problem, interviews were mainly

conducted during off peak hours when riders were less busy. In the issue of records, the researcher worked closely with the traffic commandant of the study area.

The study established that there was a loophole in the registration of motorcycles. The law requires that motorcycles should be registered within two weeks of purchase. There is however no further guidance on what should be done or what penalties are imposed if the owners fail to register the motorcycle after the set two weeks period. Thus, there could be more *boda bodas* in operation than this study established. Moreover, the actual number of accidents was considered to be an estimate because there are both reported and unreported cases of motorcycle accidents. This study only focused on reported cases.

Additionally, the official motorcycle accident records were presented at national or regional levels only, for example, Nyanza region or Central Kenya. Currently, the classification is being changed to represent the counties. Thus, for the purposes of this study, national and regional accident records were accessed at National Transport Safety Authority (NTSA). Motorcycle accident records for Kisumu were obtained from Kisumu Traffic Police.

1.7 Organization of the Thesis

This study is organized into five chapters. Chapter one is an introductory chapter. It provides the background to the study, statement of the problem, objectives, research hypotheses, significance of the study, scope and limitations

of the study and definition of key terms. Chapter two reviews relevant literature presenting the global, regional and Kenyan experience on road transport safety, growth and expansion of motorcycle transport, factors in motorcycle safety and trends in motorcycle accidents. Likewise, the theoretical and conceptual frameworks are covered in chapter two. Chapter three presents information on site description, research design, study population, sampling design and sampling procedures, research instruments, data collection techniques, data analysis and ethical considerations.

Chapter four presents the study finding. It starts with identifying the rider characteristics. Additionally, results on socio-cultural and economic factors are presented. In this chapter the frequencies, as well as the bivariate (using chi-square) and multivariate (using Binary logistic regression model) analyses are presented. Further results from qualitative data are incorporated and are presented in themes and categories. Chapter five provides summaries of the major findings of the study and draws conclusions. The chapter also contains the recommendations of the study and highlights their relevance in informing theory, policy and areas for further research.

1.8 Chapter Summary

This chapter has presented the study background, the problem statement, research questions, objectives and hypotheses. The scope of the study justification and the definition of key terms have also been presented. The chapter has illustrated the research problem and showed the magnitude of the road safety problem in Kenya. It has demonstrated that, the entry of *boda boda* motorcycle as a mode of transport in Kenya has compounded the road safety problem. The motorcycle related accidents as well as the number of those killed and injured are on the increase. This has led to hospitals setting aside ward wings to cater for those injured in *boda boda* related accidents. Thus, the chapter has justified the need to investigate the socio-cultural and economic factors in motorcycle safety. Chapter two gives a thematically organized review of relevant literature. It also presents the theoretical and conceptual frameworks.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

The purpose of the literature reviewed in this study was to examine conceptual and empirical research to provide further understanding of the subject of determinants of *boda boda* motorcycle safety. The review is thematic and first it highlights road transport and safety. In this section, the global, African and Kenyan experiences on road transport safety are explored. Second, the review looks at evolution and expansion of motorcycle transport where among others, motorcycle growth in Kenya is presented. Third, social factors in motorcycle safety are explored. Fourth, trends in motorcycle accidents are looked at in Kenya and the world over Fifth and final the theoretical and conceptual frameworks are presented. While motorcycle safety in Kenya is the subject area of this research, the scope of literature review expands to include literature from other countries in the world where similar studies could have been done. However, there was limited literature and research on *boda boda* motorcycle in Kenya.

2.2 Road Transport and Safety

Before the *Global status report on road safety* was published in 2009, the extent of the road safety situation around the world was unclear. In 2009, however, WHO published the *Global status report on road safety* as the first assessment of the road safety situation at the global level. According to the report,

approximately 1.2 million people die each year on the world's roads, and between 20 and 50 million sustain non-fatal injuries. This report gave a broad assessment of the road safety situation in 178 countries, using data drawn from a standardized survey. The results showed that road traffic injuries remain an important public health problem, particularly for low-income and middle-income countries. Pedestrians, cyclists and motorcyclists make up almost half of those killed on the roads, highlighting the need for these road users to be given more attention in road safety programmes (WHO, 2009).

The second Global Status Report on Road safety was launched in March 2013. The objectives of this new report were to indicate the gaps in road safety in specific nations and thereby stimulate road safety activities. Moreover, it sought to describe the road safety situation in all Member States and assess changes that have occurred since the publication of the first *Global status report*. Additionally, the report was to serve as a baseline for monitoring activities relating to the Decade of Action for Road Safety at the national and international levels.

The *Global status report on road safety, 2013*) presents information on road safety from 182 countries, accounting for almost 99% of the world's population. The report indicates that worldwide the total number of road traffic deaths remains unacceptably high at 1.24 million per year. According to this report, only 28 countries, covering 7% of the world's population, have comprehensive road safety laws on all five key risk factors, namely: drinking and driving,

speeding, and failing to use motorcycle helmets, seat-belts, and child restraints (WHO, 2013b).

The report points out that the risk of dying as a result of a road traffic injury is highest in the African Region at 24.1 per 100,000 populations and lowest in the European Region at 10.3 per 100,000 populations (WHO, 2013b). The pace of legislative change needs to rapidly accelerate if the number of deaths from road traffic crashes is to be substantially reduced.

The UN General Assembly proclaimed the period 2011 - 2020 as the Decade of Action for Road Safety (DARS). The DARS goal was to stabilize and then reduce the forecast level of road traffic deaths around the world. The results of the *Global status report on road safety 2009* suggested that in many countries road safety laws needed to be made more comprehensive and enforcement strengthened. The same was emphasized in (The Global status report on road safety, 2013). It analyzed the extent to which countries are implementing effective road safety measures. In addition, it highlights the importance of issues such as vehicle safety standards, road infrastructure inspections, policies on walking and cycling, and aspects of pre-hospital care systems. It also established whether or not the countries have a national strategy which sets measurable targets to reduce the number of people killed and seriously injured on the roads (WHO, 2013). Surprisingly, the Global status report does not say much about motorcycles other than use of helmets. With the inception of NTSA in Kenya, it is expected that road safety will improve significantly and reports such as the *Global status reports* will be known by all stakeholders and also

implemented. In addition *boda boda* motorcycles must also be included in the road safety plans because they are an important means of transport that may be here to stay. Education, motorization, communication, policy, legal regulations and organizational changes are important factors in increasing road safety. These are factors that are incorporated in the Global status report therefore making it an important document for road safety and therefore *boda boda* motorcycle safety interventions.

The World Health Organization (WHO) figures reveal that 90 per cent of the road fatalities occur in low - and middle-income countries, home to less than half of the world's registered vehicles. Africa in particular has been experiencing a high increase in road accident deaths and injuries. According to (Dhliwayo, 1997) road fatalities in Africa between 1968 and 1990 increased by 350 percent. Fatalities are no longer regarded as mere government statistics, but a serious public health and development challenge requiring urgent concerted global action. Road accidents kill more people than tuberculosis and malaria in developing nations. They are the leading causes of death among young people aged 15-29 (WHO, 2004).

Developing countries bear the brunt of fatalities and disabilities from road traffic crashes, accounting for more than 85% of the world's fatalities, and about 90% of the total disability adjusted years lost due to traffic injuries. The problem is increasing in these countries at a fast rate, while it is declining in all industrialized nations like Western Europe, North America, Japan, Australia

and New Zealand (Odero, 2004). Since developing countries have more road accidents in relation to car ownership, the increasing number of *boda boda* motorcycles may spell doom for most developing countries like Kenya because it may mean increase in *boda boda* motorcycle accidents than we are currently experiencing.

According to Diaz-Olvera, Plat, Pochet, & Maïdadi, (2012) public transport in Sub-Saharan countries has undergone a profound change in recent decades due to two factors: One, the disappearance of the state companies and two, the overwhelming development of the informal sector with its wide variety of operators. For example, Kenya has ‘paratransit’ (growth in non-conventional means of public transport like minibuses and shared taxi, vans, *matatus* and more recently by commercial motorcycles).

According to Kumar (2011) 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. Nevertheless, over the past decade, there has been a significant growth in the use of motorcycles as a commercial public transport mode in Sub-Saharan Africa. However, while offering certain transport advantages in the form of easy manoeuvrability, ability to travel on poor roads, and demand responsiveness, commercial motorcycle service growth has also led to an increase in road accidents (Kumar, 2011).

Kenya has one of the highest road fatality rates in Africa at 68 deaths per 10,000 registered vehicles and between 45 - 60% of admissions to surgical wards in public hospitals are as a result of road traffic injuries (Odero et al., 2003). The available statistics indicate that over the years, road accidents have been on the increase. Between 1994 and 1997, for example, the number of accidents in Kenya increased by 26 per cent (Aeron-Thomas, Downing, Jacobs, Fletcher, Deslby, & Silcock, 2002).

In relation to car ownership in the world, Kenya has a high fatality rate with an average of 8 deaths from about 35 road crashes that occur each day. The country registers about 3000 deaths and 30,000 injuries every year (Odero et al., 2003). With the increase in the number of *boda boda* motorcycles in Kenya, the number of crashes will increase unless urgent counter-measures are taken to reduce the number of those killed and injured.

Kenya has experienced a rapid increase in number of road traffic injuries and their consequences in terms of mortality, morbidity and disability. According to the Kenya traffic police reports, road traffic crashes rose from 3,562 in 1965 to 14,342 in 1998, and the number of persons killed from 552 to 2,972, reflecting an increase of 300% and 430% respectively. This means that the number of casualties per crash has increased from 1.3 in 1965 to 2.0 in 1998, partly reflecting the frequent involvement of matatus and buses with high passenger load (Odero et al., 2003).

In the temporal and spatial analyses of traffic road accidents, Kayi (2007) observes an upward trend in road accidents between 1992 and 2004 with a sharp decline (41.9%) in road crashes observed in 2004 as compared with 2003. This was attributed to the new traffic regulations introduced in February 2004. With the amendment of the Traffic Act 2012, to insert section 103B, a decrease in road accidents involving *boda boda* motorcycles is expected. Road safety laws therefore need to be made more comprehensive and their enforcement strengthened in order to reduce the high death rates associated with road traffic injuries. Table 1 shows the various factors responsible for accidents in the period 2007 to 2012.

Table 1: Those Responsible for Accidents

RESPONSIBLE FOR ACCIDENTS	2007	2008	2009	2011	2012
Human factors					
Drivers & M/Cyclists	5433	4548	6075	5284	4259
Pedal cyclists	1288	1482	1257	1159	1071
Pedestrians	3089	2251	2450	947	936
Passengers	601	388	415	401	423
Animals	69	167	107	217	201
Non - human factors					
Obstruction	107	76	86	94	89
Vehicle Defects	600	420	604	489	412
Road Defects	260	209	149	131	104
Weather	119	140	95	73	85
Others causes	904	839	1207	976	613
TOTAL	12470	10520	12445	9771	8193

Source: Traffic Police, 2013

As indicated in Table 1, those responsible for most accidents in Kenya were the drivers and motorcyclists. The other categories were pedal cyclists pedestrians and passengers.

In conclusion, the Global, African and Kenyan experience of road transport safety indicates that there is still much to be done to ensure road safety the world over. As indicated in the Global status report, all countries need to actively participate in improving road safety. The developing countries, however, have a bigger burden in ensuring safer roads due to the high numbers of accidents they record. With the emergence of the motorcycle as a means of transport in most African countries, concerns of motorcycle safety need also to be addressed because they also affect the general road safety status in the world.

2.3 Growth and Expansion of Motorcycles Transport

This section focuses on the growth and expansion of motorcycle transport. It presents the global, African and Kenyan perspectives.

2.3.1 Growth of Motorcycle in the Global Context

The use of motorcycles is growing rapidly in different countries in the world. This is due to the global increase in motorization particularly in low and middle income countries, and the disorganized and inefficient transport systems in many developing countries (Kumar & Barret, 2008). The high levels of unemployment have also forced the youths in these countries to turn to motorcycle transport as a source of income (Peden et al., 2004).

Ownership and use of motorcycles as personalized transport is common in South and East Asia (Krishnan & Smith, 1994). The highest numbers of motorcycles used in this way are found in Vietnam with about 95% of all the motorcycles in South and East Asia (Tung, Wong, Law, & Umar, 2008). Laos follows closely with 80% with Taiwan having 67% while China has 63%. Malaysia has 60 % of these motorcycle users (Zhang, Norton, & Tang, 2004). The lowest numbers of motorcycles in ASEAN countries are found in Brunei with 31% of motorcycle riders.

In Taiwan, statistics show that in 1977 there were 2 million motorcycles. Twenty years later, in 1997, the number had risen to 10 million motorcycles. Majority of the users are low income earners such as students, but people of all income levels are potential users. This is because motorcycles present a regular and affordable means of transport for commuting (Zhang, Norton, & Tang, 2004).

In the United States there are over 4 million motorcycles registered (National Highway Traffic Safety Administration [NHTSA], 2007). Most of the motorcycles are for personal use or leisure, and are rarely used for public transport. This may suggest a lower incidence of accidents because riders are not under pressure to meet the days target as in the case of commercial motorcycles.

In China, motorcycle ownership grew rapidly between 1987 and 2001. During this period, it increased from 23% to 63%, with a corresponding increase in the composition of traffic fatalities sustained by motorists rising from 7.5% to 19% (Zhang et al., 2004). However, in other low- income and middle-income countries, lack of road safety data means that precise levels of motorcycle rider fatalities are still unknown. For instance, in Kenya estimates are still used because there are both reported and unreported cases. In low-income and middle-income countries, car ownership and use rates are generally much lower than in high-income countries. However, the ownership and use of motorcycles is generally high. For example, in India 69% of the total number of motorized means of transport are motorcycles. This is considerably higher than in high-income countries (Mohad, 2000).

It therefore emerges that due to offering certain advantages such as affordability, availability, flexibility and even ability to travel on poor roads, commercial motorcycle services growth will continue increasing globally because majority of the population needs a flexible means of transport. This has implications in that, the growth of motorcycles for transport may increase significantly and if measures to curb accidents are not put in place; many people may be killed or injured in motorcycle related accidents.

2.3.2 Growth of Motorcycle Transport in African Countries

The commercial use of motorcycle transport is limited to a few countries in Africa. The motorbike taxis are very popular in Uganda and Kenya where they

are known as *boda-boda*. In Benin and Togo, they are known as *zemidjan*; in Cameroon, *bendskin*; in Niger *kabu-kabu*; in Nigeria *okada* or *alalok* and *oleyia* in Togo.

According Kumar & Barrett (2008), moving around the African cities is very difficult because of the big numbers of minibuses and motorcycles. The genesis of transportation problems in Africa is the disorganized transport system. Some bus companies that came up to solve the problems of transportation in some of these countries did not succeed due to weak government transport policies and authorities (Kumar & Barrett, 2008). Therefore, motorcycles have come up to replace these unreliable public transport services. This has seen an increase in motorcycles and their services for transportation in many African countries.

In increasing numbers of cities and towns around the world, there are dozens of young men on motorcycles congregating at major intersections, offering feeder connections between mainline bus routes and nearby neighbourhoods for a reasonable fare. These privately operated, small-scale services are varyingly referred to as “paratransit”, “low – cost transport” “intermediate technologies”, and “third-world transport” (Cervero, 2000) .

In Nigeria, *Okada* is the equivalent to *boda boda* motorbikes in Kenya and Uganda. *Okada* refers to commercial motorcycles, where motorcycle riders carry passengers and freight for hire. *Okada* is one of the chief modes of transport and by far, the most common form of informal transport system.

Okadas are used mostly to escape traffic congestion because they are able to navigate roads that are inaccessible to buses and other automobiles especially in villages and urban slums. Okadas are also preferred due to their low buying price, fuel efficiency, flexibility and affordability for the common man (Cervero, 2000).

Konings (2006) observes that, motorcycles are used by the youths in solving the transportation problems in Douala, Cameroon. He points out that the youths have very few chances of getting employment in the state bureaucracy and formal sector due to economic liberalization and the state withdrawal from the sector. The youths have therefore come up with this innovative activity called “bendskin”, that is, the use of motorcycles as taxis.

In Kampala, Uganda, public transport is dominated by cavalier taxi drivers but this is seen as inadequate for the peoples' needs. The increased numbers of cars on the roads like many countries in Africa and the subsequent traffic jams have made *boda boda* motorcycles a necessity. Many people believe that the *boda boda* have led to the increase in traffic accidents. The 2011 annual traffic report showed that a total of 1,762 serious accidents involving motorbikes occurred in the capital city during that year (Nakiyimba, 2012). Riders do not wear protective clothing and do not have riding licenses. They are reckless due to their lack of proper training. They also ignore traffic rules while others are ignorant of them. Despite all this, the *boda boda* mode of transport seems to be the best choice for many especially those who want to avoid traffic jams (Muhumuza, 2011).

In Douala, Kampala and Lagos the use of motorcycles for commercial transport has grown rapidly in recent years. This has been due to poor state of the roads and the inability of public bus companies to meet the growing demand for transport. Use of privately owned motorcycles is common in Ouagadougou and Bamako. Initially, motorcycle services provided access from residential areas to main roads, where passengers would take taxis or buses. However, motorcycle services are now found on main roads and even in the city centre (Kumar & Barret, 2008).

In Kenya and Uganda, although the motorbike taxi is relatively new, the bicycle taxi already existed as far back as the 1960s. According to Malmberg-Calvo, (1994) motorbikes were for carrying both people and goods. In Nigeria, motorbike taxis appeared in the 1970s (Oyesiku, 2001).

2.3.3 The Origin and Growth of Motorcycle Transport in Kenya

Howe (2003) observes that *boda boda* transport services are a Ugandan innovation that grew from small beginnings in the 1960s in the border region with Kenya. The term itself is originated from the English word 'border'. *Boda boda* mainly provide a passenger taxi service, although they can sometimes be hired to move goods. The original services were provided on a bicycle, equipped with a padded cushion fitted over the rear carrier for comfort. 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. The introduction of motorcycle based services in Uganda

is widely reported to have been initiated by a local firm in Uganda. It is said that a trade visit to Cyprus introduced the firm owner to the use of motorcycles by farmers and this led to the introduction of motorcycles in Uganda (Pankaj, 1991).

As indicated above, the motorcycle transport in Kenya has its roots in Uganda. It is known to have originated in the Busia County of Tororo District in Eastern Uganda in the mid-1960s (Malmberg-Calvo, 1994). Currently, both bicycle and motorcycle services share the same name *boda boda*. The *boda boda* taxis are part of the East 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 using motor vehicles crossing the international border. This started in southern border town crossing of Busia (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 (Howe, 2003) . *Boda boda* motorcycles now constituted a big proportion of model choice for passengers in both rural and urban areas in Kenya. But with the increase in accidents associated with *boda boda* motorcycles and other issues to do with security and the structure and functioning of the society, safety concerns are emerging.

2.3.4 Factors Influencing Growth of Motorcycles

According to the Kenya National Bureau of Statistics (2010) the zero rating of motorcycles below 250cc in 2008 by the then Finance Minister saw the number of motorbikes leaped from 3,759 units in 2005 to 91,151 in 2009. Table 2 presents the registration of motor vehicles including motorcycles from 2005 to 2011.

Table 2: New Registration of Motor Vehicles 2005-2011

Type of vehicle	2005	2006	2007	2008	2009	2010	2011
Salon cars	14,216	14,829	17,893	18,686	16,930	16,165	11,026
Station wagon	10,158	12,631	24,115	24,747	27,599	37,553	31,199
Panel vans, pick up etc	6,308	6,721	9,470	8,983	7,120	6,975	7,442
Lorrie/trucks	3,113	3,610	6,329	6,691	6,037	4,924	5,247
Buses and coaches	885	856	2,006	1,243	1,057	1,264	1,667
Minibuses/matatu	4,076	3,714	4,252	5,206	4,483	3,600	451
Trailers	1,352	1,706	2,193	2,100	2,883	2,379	2,556
Wheeled tractors	856	920	1,213	1,262	1,115	1,161	1,179
Motor and Auto cycles	3,759	6,250	16,293	51,412	91,151	117,266	140,215
Three Wheelers	735	1,075	1,072	704	863	1,521	2,140
Other Vehicles	195	505	488	797	2,575	3,648	2,724
Total Units Registered	45,653	52,817	85,324	121,831	161,813	196,456	205,841

Source: Kenya Revenue Authority (KRA) (2012)

The Kenya Revenue Authority (2012) shows the trend on newly registered motor vehicles for the period 2005-2011. A total number of 205,841 units registered in 2011 compared to 196,456 in 2010 this is an increase of a 4.8 per cent increase. There was a significant drop in the registration of minibuses/matatu which may have been due to the intended government policy to phase out the fourteen seater public service vehicles. As a result the buses/coaches have maintained an upward trend. The registration of three

wheelers recorded a 40.7 per cent increase. Motor and auto cycles registration increased by 19.6 per cent to 140,215 during the review period. This accounts for 68.1 per cent of the total new motor vehicle registration. This is attributed to the use of alternative means of transport mainly *boda boda* in the country. Motorcycles and Auto cycles have become popular across the country. In rural areas, they have provided the much needed transport; while in urban areas they have supplemented both passenger transport and mail delivery.

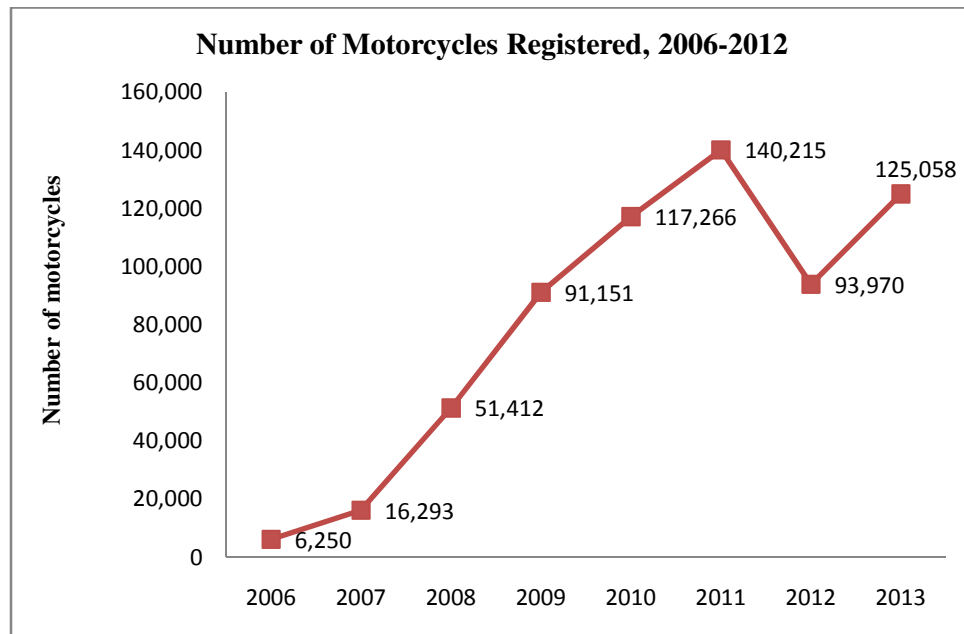
The motorcycle transport is a form of employment that has given opportunities to many people in Kenya at a time when the world is facing global unemployment problems. The National Youth Situation Analysis Report (2009) indicates that despite the government promises to tackle the unemployment problem, there are no concrete strategies to address this issue. Majority of those affected by unemployment are the young of the 15 - 29 age brackets (Ministry of Youth Affairs, 2009).

The zero rating of motorcycles below 250cc in Kenya in 2008 meant that many people were now able to buy them hence increase in their numbers. In addition, there is a high demand for motorcycle *boda boda* services due to among other things, their flexibility. With the high levels of poverty in Kenya their demand and use will most likely increase. Table 3 shows the number of registered motorcycles from 2006 to 2012.

Table 3: Number of Motorcycles Registered by Month and Year, 2006-2012

YR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOT
2006	484	283	362	354	529	492	533	465	508	588	907	745	6,250
2007	935	1,033	1,291	935	2,457	1,321	1,114	1,366	1,497	1,353	2,165	826	16,293
2008	1,740	1,982	1,904	3,840	4,390	3,859	4,530	4,605	5,964	6,680	6,471	5,447	51,412
2009	7,688	8,193	9,204	8,360	8,362	9,317	4,463	3,824	7,283	5,707	9,332	9,418	91,151
2010	9,286	12,198	10,259	9,806	7,061	9,596	8,160	9,052	9,113	11,123	12,808	8,804	117,266
2011	14,150	13,058	11,169	7,674	9,236	14,493	13,075	12,163	10,647	11,944	12,359	10,186	140,215
2012	7,655	9,205	7,600	3,336	10,946	6,130	14,587	9,989	4,680	7,713	7,463	4,666	93,970
2013	13,440	12,543	11,643	14,055	17,001	15,194	13,176	5,737	6,364	7,309	5,414	3,182	125,058

Source: KRA (2013)



Source: Authors computation from KRA statistics (2013)

Figure 1: Number of Motorcycles Registered 2006-2012

Figure 1 gives the total increase of motorcycles from 2006 to 2013. A steady increase is noted from 2006 to 2011. The 2012 recorded a big decrease in the number of registered motorcycles. This is attributed to high interest rates due to hard economic time and a lower purchasing power for the same reason. The drop can also be attributed to saturation of motorcycles where the previous year 140,215 units had been bought. In addition, 2012 was an election year; therefore, the fear of political instability may have resulted in a 'wait and see' among the customers attitude leading to lower numbers. In 2013, the numbers of motorcycles registered were 125,058. This was 31,000 units more than the previous year.

The main theme that emerges from motorcycle literature is that the growth of commercial motorcycles is as a result of disorganized and inadequate transport systems, increasing poverty levels and high unemployment rates among the youth and weak implementation of policies. The poor mostly use these modes of transport because of their low purchasing power (Cervero, 2000; Chepchieng, 2011 & Mbugua, 2011). Table 4 presents the push and pull factors influencing growth of motorcycles in Africa.

Table 4: Factors Influencing Growth of Motorcycles in Africa

<i>Positive</i>		<i>Negative</i>	<i>Push</i>	<i>Pull</i>
Demand	Supply			
Time savings Door-to-door service Improve mobility Easy access Demand responsive Easy maneuverability Employment generation/Increase in income	Easy availability Limited street space	Congestion Pollution Accidents Safety/crime unregulated	Urban sprawl poor secondary road network poor road quality Low density Uncontrolled growth Absence of safe, secure, affordable alternatives (especially for women)	Inexpensive Easy credit High unemployment Low car ownership unregulated

Source: (Kumar , 2011)

Looking at the push and pull factors in Table 4, one notices that they all reflect levels of poverty or low incomes. Urban sprawls, poor secondary road networks, poor road quality, absence of safe secure and affordable alternatives are all indicative of poverty. Poor road networks indicate general situation of poverty especially in developing countries. Urban sprawl goes hand in hand with increase of the low income earners in urban areas. These low income categories need to have mobility and since their purchasing power is low, they will need affordable modes of transport like motorcycles.

The pull factors influence the growth of motorcycles in Africa. High unemployment translates to low incomes. This means that some people will think of operating motorcycles as a source of income, as is in the case of Kenya. Due to low incomes, many people do not own cars which they could use for their travel and transport needs. Therefore, they use other means. Chepchieng'; Kyalo & Mulwa (2011) observe that it is particularly the laxity among law

enforcement officers that has actually influenced the growth of motorcycles in Kenya. This is because motorcycle *boda boda* business is seen as a *laissez-faire* endeavour. The minimum requirement is your presence and a motorcycle and you are in business. Sometimes even age may not matter as long as one can 'ride' a motorcycle. Therefore, due to the unregulated nature of the motorcycle business in Kenya and most African countries, more and more people find it easy to be operators. In addition, credit facilities have made it easier to buy motorcycles (Kumar, 2011). The end result is an increase in the number of motorcycles in most African countries. The fact that the public transport systems are inefficient means that most people will be drawn to motorcycles as a mode of transport (Kumar & Barret, 2008).

It is essential to access social amenities like health care, schools, education and jobs or markets and social networks for sustainable development (Diaz - Olvera *et al.*, 2007). To access to such social amenities requires the use of both motorized and no motorized transport. Diaz-Olvera *et al.*, (2012) observe that closing the border between two countries with strong economic and social ties called for the use of other 'un – official and unfettered' means of transport and in this case, motorcycle taxis. According to Howe (2003) this is what happened between Kenya and Uganda in the Busia border in the early 1970s.

According to Diaz-Olvera *et al.*, (2010) the level of household car ownership remains very low in the cities of Sub-Saharan Africa, and the possibility of driving a car is only open to the wealthiest individuals. They observe that in

some cities, private motorcycles compensate to a very small degree for the shortage of private cars. Angel, Shepard, & Vivco, (2005) observe that the surface area of the cities tends to increase more rapidly than their population. Diaz-Olvera et al., (2012) observe that;

” The nature of current urban growth is characteristic of cities with poor populations where central government and local authorities lack the resources to manage urban development and to meet the population’s growing needs for services and infrastructure.”

In addition, Diaz-Olvera et al., (2012) indicate that the situation with regard to urban transport illustrates the lack of public and private resources, the disorganization of the supply of public services and the major inequalities with regard to access to these services.

According to Lombard, Zouhoula, & Bi, (2008) as much as informal transport operators come with many shortcomings, the absence of other alternative means of public transport in most major cities and coupled with inadequate policies on public transport, informal operators will remain an important component of urban transportation systems.

There has indeed been growth in number and use of motorcycles in Kenya and the world over. Motorcycles have been used for private purposes in developed countries, as personalized vehicles in South and East Asia and for commercial use in Africa. It is clear from the reviewed literature that, as long as countries fail to establish and organize public transport system for its population, and

unemployment rates continue increasing, motorcycles will increase as an alternative because they offer employment and contribute by widening access to motorized modes of transport to a larger population particularly the underprivileged segment of the urban poor and most of the rural population.

2.4 Factors in Motorcycle Safety

This section precisely looks at rider age, training experience and knowledge of safety measures, observation and attentiveness, helmet use, rider attitudes and behaviour, impaired riding, speeding, motorcycles, cultural and religious factors in motorcycle safety.

Besides the factors stated above, motorcycle safety has to do with aspects such as personal protective equipment, motorcycle equipment, and design (Maharashtra State Two Wheelers User's Association. 2014). Although also important for *boda boda* motorcycle safety, these factors are not the focus of this study.

2.4.1 Motorcycle Rider characteristics

An individual person integrates a number of demographic variables; he is a man or a woman in a certain age with a specific educational background. This person may have specific experiences regarding driving, he/she may belong to a specific social status. In addition, he/she could be a member of an informal social group with distinctive behaviour patterns that may have a unique part in the production of the accident (Engel, 2007). Rutter & Quine (1996) found that,

in explaining accident involvement among young people, age played a much greater role than inexperience and indicated that training was essential in reducing accident involvement. They concluded that more emphasis should be on consequences of dangerous riding. They suggest that in order to understand the reason why young people take risks more than any other age category, there was need for further research emphasizing on attitudes and beliefs of younger riders. Forward (2006) observes that “skills will be turned into safety only when a proper set of underpinning beliefs and perceptions is provided for behaviour.”

In a similar study, Everett et al., (2001) studied trends in transport related injury risk and safety behaviour among USA high school students and found that many young people exposed themselves to risk by drink driving and improper use of safety equipment. Helmet users are more likely to be riders of older age (Hung, Stevenson, & Ivers, 2006). Ackaah & Afukaar (2010) found the difference on helmet use among different age groups in Ghana. Helmet use was highest among elderly (>50 years), followed by adults (26-50 years) and young people (<26 years). The explanation given for non - use of helmets among the young people in this case was that generally they tend to adopt risky behaviour and attitudes as compared to their older counterparts (Seleye-Fubara, & Ekere, 2003).

In another study, Reeder et al., (1996) look at the opinions and behaviours of young riders (motorcyclists) in New Zealand. The study found that there was a

difference between the riders' opinions and actual practice. The young rider's opinion did not match their protective behaviour as would be expected. For instance, protective clothing was not worn by riders as reflected in their opinion; they found it unacceptable. The explanation given was that fashion and the cost of protective gear could be contributing to this scenario.

Motorcycle riders are often young and inexperienced. Accidents are common and often fatal (Kumar & Barret, 2008). Age is therefore deemed to influence the riders' behaviour, hence has implications to safety. In Kenya where most motorcycles are used for commercial purposes and are operated by young people, there is need to ensure that motorcycle rules and regulations are adhered to.

2.4.2 Motorcycle Training, Experience and safety knowledge

Hurt et al., (1981) observe that the motorcycle riders involved in accidents were essentially without training. Ninety two percent were self - taught or learned from family or friends. In addition, motorcycle rider training experience reduces accident involvement and is related to reduction of injuries in the event of accidents.

According Moraa, (2010), majority (75%) of PSV drivers were not adequately trained. This may be the case with riders of commercial motorcycles, otherwise known as *boda boda* in Kenya. Chitere (2006) & Moraa (2010) found that PSV driver training is monopolized by commercial driving schools which are not subjected to any inspections by the government. Although their syllabuses are fairly uniform, they are not standardized by the government. Furthermore, the

syllabus is not mentioned in the Traffic Act Cap 403 and other regulations in the Ministry of Transport.

In the case of motorcycle riding in Kenya, it is not yet clear what percentages of motorcyclists actually attend driving schools. This is despite the increasing cases of motorcycle accidents among this group of riders. According to the findings of the Hurt report, more than half of the accident-involved motorcycle riders in America, had less than 5 months experience on the accident motorcycle, although the total street riding experience was almost 3 years.

2.4.3 Observation and Attentiveness

According to Hurt et al., (1981), failure of motorists to detect and recognize motorcycles in traffic is the predominant cause of motorcycle accidents. The driver of the other vehicle involved in collision with the motorcycle did not see the motorcycle before the collision, or did not see the motorcycle until too late to avoid the collision. Conspicuity of the motorcycle is a critical factor in the multiple vehicle accidents, and accident involvement is significantly reduced by the use of motorcycle headlamps, which are usually on in daylight, and the wearing of high visibility yellow, orange or bright red jackets.

Lack of attention to the driving task is also a common factor for the motorcyclist in an accident. According to the same report, 73% percent of the accident - involved motorcycle riders used no eye protection, and it is likely that the wind on the unprotected eyes contributed in impairment of vision which delayed hazard detection.

Mannering & Grodsky (1995) point out that motorcycle accidents differed from other accidents and revealed that car drivers were lacking concentration when dealing with riders. Moreover, car drivers had conditioned themselves to check out for other cars as possible collision dangers but not motorcycles. After the accidents, the car drivers always told the riders that they had not seen them. The question is, could attitudes explain why car drivers do not look out for motorcycles on the road while driving?

2.4.4 Helmet Use

A motorcycle accident caused the death of T E Lawrence (better known as Lawrence of Arabia) (Wilson, 2012). This precipitated the campaign for riders to wear helmets. In 1935, T. E. Lawrence was riding a motorcycle when he apparently swerved to avoid other road users and was thrown off. He suffered a serious brain injury and although he was given the best available medical care he died in hospital just six days later. The attending doctor observed that Lawrence's death was eminently preventable. He subsequently started a campaign advocating the use of protective helmets, initially for military dispatch riders and later for civilian motorcyclists. This initiative led to a noticeable drop in fatal head injuries in both groups (Wilson, 2012).

Motorcycle helmets provide the best protection from head injury for motorcyclists involved in traffic crashes. The US National Highway Traffic Safety Administration strongly supports comprehensive motorcycle safety programs that include motorcycle helmet usage, rider education, motorcycle operator licensing,

and responsible use of alcohol (NHTSA, 2006). In 2002, 3,244 motorcyclists died and approximately 65,000 were injured in highway crashes in the United States in the same period. In addition, a motorcyclist was approximately 27 times more likely to die in a crash than someone riding in an automobile (NHTSA, 2006). NHTSA observes that head injury is a leading cause of death in motorcycle crashes. A motorcyclist without a helmet is 40 percent more likely to suffer a fatal head injury and 15 percent more likely to suffer a non-fatal injury than a helmeted motorcyclist when involved in a crash. NHTSA estimates that motorcycle helmets reduce the likelihood of a crash fatality by 37 percent (NHTSA, 2006).

The Crash Outcome Data Evaluation System (CODES) study found that motorcycle helmets are 67 percent effective in preventing brain injuries and those motorcyclists without helmets involved in crashes were three times more likely to suffer brain injuries than those wearing helmets. From 1984 through 2002, (NHTSA, 2006) estimated that helmets saved the lives of 13,774 motorcyclists. If all motorcycle operators and passengers had worn helmets during that period, NHTSA estimates that 9,508 additional lives would have been saved.

A study conducted at the University of Southern California, which analyzed 3,600 traffic crash reports covering motorcycle crashes, concluded that wearing helmets was the single most important factor in surviving motorcycle crashes. Unfortunately, in many countries the use of helmets is low. The World Report on Road Traffic Injury Prevention, (2004) observed that wearing helmets would

save many lives. Consequently, the report recommended that countries set and enforce helmet laws for drivers and passengers of motorcycles.

Hurt et al., (1981) observe that voluntary safety helmet use by that accident - involved motorcycle riders was lowest for untrained, uneducated, young motorcycle riders on hot days and short trips. The use of the safety helmet was seen as the single critical factor in the prevention of reduction of head injury; the safety helmet is a significantly effective injury counter - measure. Riders and passengers wearing helmets showed significantly lower head and neck injury for all types of injury, at all levels of injury severity. Sixty percent of the motorcyclists were not wearing safety helmets at the time of the accident. Some respondents said they did not wear helmets because they were uncomfortable and inconvenient; others simply had no expectation of accident involvement.

The passage of helmet use laws governing all motorcycle riders is the most effective method of increasing helmet use (NHTSA, 2007). In contradiction, studies done in Africa (Nigeria), Asia (Vietnam), and even USA, indicate that low rates of helmet use are evident despite the enactment of helmet laws (Hung et al., 2008; Solagberu, Ofoegbu, Nasir, Ogundipe, Adekanye, Abdur-Rahman, 2006; NHTSA, 2001). In spite of that, NHTSA, encourages states to enact legislation that requires all motorcycle riders to wear helmets. There is need to find out other factors that may contribute to non-use of helmets even when the laws have been enacted.

2.4.5 Rider Attitude and Behaviour

Attitudes are considered to be a predisposition to behave positively or negatively towards an individual, group, event or even an object (Forward, 2006) . When talking about riding or driving, attitudes could relate to other road users. Attitudes could also relate to one's own behaviour. Attitudes may also explain why other road users especially motorists fail to see motorcyclists on the road. Mannering & Grodsky (1995) observe that car drivers tend to be inattentive to motorcyclists and are accustomed to looking out for other cars as possible collision dangers and not motorcyclists. Many motorists therefore claim that they never saw the motorcyclist.

Speed has a U - shaped relationship with accidents, with either extremes being linked with increased accident liability (Walle'n & A°berg, 2006; Lawton, Parker, Stradling, & Manstead, 1995) . The intention to speed varied across different road types and was related to the perceived negative consequences (Finch, Kompfner, Lockwood, & Maycock, 1994; Lawton et al., 1997) . For instance, the perceived negative consequences of speeding in a busy shopping street mirrored the low intention to speed on such a road. They found, however, that younger respondents who had less regard for the negative consequences for speeding, reported greater intentions to speed.

Clarke, Ward, Bartle, & Truman, (2004:10) observe that, "rider attitudes and perception of the risks involved in motorcycle riding are an important

consideration when one is deciding the extent to which a rider is at risk from injury in comparison to other road users”.

A survey by Mannering & Grodsky (1995:10) on perceived likelihood of being involved in an accident concluded that “riders were aware of the factors that could increase the likelihood of being involved in an accident. These factors included exposure (miles ridden), regularly riding above the speed limits, and passing vehicles on the shoulder or passing between lanes of traffic”.

In a study that examined cross-national differences in risk perception in Japan and the USA, Hayakawa, Fischbeck, & Fischhoff (2000) found two aspects-environment and cultural influence led to the difference in perception of risk, between the two countries. Thus to improve riders behaviour, one would raise the rider’s perception of risk.

In a study to explore attitudes towards motorcycles helmet use among adolescents in Greece which is a country with poor legal compliance, Germeni, Lionis, Davou, & Petridou (2009) found that students who reported frequent helmet use were characterized by a high perceived threat of motorcycle related injury. The high perceived threat seemed to be associated with both prior experience with an injury and sensitization on wearing helmets from significant others. Students reporting helmet non - use were characterized by low threat perception possibly associated with adolescent egocentrism and the feelings of

invulnerability or lack of knowledge accompanied by inexperience in prior injury or risk.

Two - wheel motorized vehicles (TWMVs) are widely used among the youth in Greece. The high exposure is evident from the high fatality rates, which accounted for more than 20% of the total number of road traffic deaths. It is estimated that 350 people are killed per year, of whom one-third are aged between 15 - 24 years according to road traffic police statistics. It indicated 80% of the youngsters killed in road crashes were not using a helmet at the time of the accident (National Statistical Service of Greece, 2011). Despite majority of the students in the study reporting a high positive perception on the protective effect of helmet use, only 41.4% of TWMV users reported helmet non-use (Germeni et al., 2009).

The helmet users pointed out that protection from injury in the case of an accident is the main perceived benefit for helmet use while non - users saw the perceived benefit of use of helmet as avoiding tickets from traffic police. The study concluded that, “when social norms of low compliance to safety law prevail, qualitative research can assist in developing tailored educational interventions targeting behaviour modification among adolescents” (Germeni et al., 2009).

Motorcycles do not offer much protection to the riders, thus helmets are required for people riding motorcycles. In spite of this, helmet use is low among Association of Southeast Asian Nations countries (ASEAN) even though there

are laws making wearing of helmets compulsory across the region (Lindskog & Al Haji, 2005). They note that only 3% of Vietnamese motorcycle riders use helmets. In Indonesia, motorcycle passengers rarely wear helmets in rural areas. In other countries like Malaysia and Singapore, there is a high percentage of motorbike riders who wear helmets. The introduction of helmet use is responsible for the significant reduction in motorcycle deaths in both countries.

Lindskog & Al Haji, (2005) observe that it is necessary for the ASEAN countries to share their best practices and good experience among each other with respect to motorcyclist safety. For instance, the successful campaign "Helmets for Kids" in Vietnam could be shared among ASEAN countries as well as other regions including Kenya.

2.4.6 Impaired Riding

Hurt et al., (1981) observe that, drinking and riding, was even more dangerous than drinking and driving a car. In the study, almost half of the fatal accidents showed alcohol involvement. According to Mannering & Grodsky (1995) motorcycle riding is a more complex task than car driving. They pointed out that riding requires tremendous riding ability, physical co-ordination and balance. Therefore any impairment would increase the rider's risk of an accident. This is in comparison to the same level of impairment when driving a car. Therefore, riding a motorcycle while under the influence of drugs or alcohol is more dangerous than driving under the same circumstances alcohol poses a greater risk factor for fatal crashes involving motorcycles than other

types of vehicles. One in four automobile driver fatalities in the United States were alcohol-related during 2005 (NHTSA 2006). Center for Disease Control and Prevention (CDC) report found that an increasing number of motorcyclists aged 40 - 44 were dying in alcohol - related crashes in the USA (NHTSA 2006). This could be due reduced enforcement of traffic rules. Goldstein (1986) found that for the average rider involved in the average accident, the probability of death increases from 2.1% to 11.3% when the rider's blood alcohol level increases from 0.0 to 0.1.

Alcohol is a risk factor for crashes involving all road users. That notwithstanding, there is limited data currently to assess extent of alcohol impairment in Africa, with the exception of South Africa (Odero, 2013). The *Global Status Report on Alcohol* observes that the culture of drinking is influenced by gender, religion and status. There is high abstinence among women (>80%) and Muslims (>98%). Prevalence of alcohol use is highest in Seychelles (87%), Benin 48%, Cameroun (44%) and Uganda (44%); lowest in Comoros (1%) and Senegal (2%). Africa has the highest rate of binge drinking at 25% (of drinkers) compared to the global rate of 11.5% (WHO, 2004b) .

The effects of alcohol impairment are magnified when combined with fatigue. This explains why alcohol is considered a particular risk for commercial drivers/riders, who spend long hours on the road and also have legal responsibilities for the passengers or cargo they carry(WHO, 2013b).

A variety of Blood Alcohol Concentration (BAC) limits are in place for some countries across the world. Kenya is one of those countries with the legal BAC limit of 0.08 g/dl. Despite the BAC limit for Kenya, it is one of the highest in the world. The setting of maximum allowable BAC levels is a tool for enforcement and for prevention of alcohol related road accidents. BAC limits of 0.05 g/dl, can lead to significant reductions in alcohol - related crashes. Better still, setting lower BAC limits (0.02 g/dl or less) is an effective means of reducing crashes related to drink-driving (Elvik & Vaa, 2004).

The main challenges in preventing road crashes involving alcohol are lack of or weak national alcohol policies to regulate the production, sale, promotion and advertising of alcohol. In addition, most African countries either do not have BAC limits or have limits that are above the recommended level of 0.05g/dl (Odero, 2013).

Enforcement of drink-driving laws will be important (Odero, 2013). In addition, drivers of all ages can help by avoiding the consumption of any alcohol before driving (Ogen, 2004). It is therefore necessary to establish sustainable and effective behaviour change programmes for the general population to reduce alcohol abuse and adopt responsible drinking habits. Alco-blow has been used to identify drivers who drink and drive. However, the campaign seems to target mostly private car drivers. It will be necessary to also target *boda boda* riders.

2.4.7 Motorcycling Speed

Injury severity increases with motorcycle speed (Hurt et al., 1981). According to the MAIDS report, about twenty one percent of motorcycles had an unusual speed compared to surrounding traffic and this difference was a contributing factor to accidents (Association of European Motorcycle Manufacturers [ACEM], 2004). The largest percentages of these motorcycles were found to have travelling speeds of between 40 km/h and 70 km/h, which was higher than the travelling speeds for all Powered Two Wheelers (PTWs) accidents. Twenty one percent of single vehicle accidents were found to have travelling speeds of over 100 km/h (Association of European Motorcycle Manufacturers, 2004) Goldstein (1986) observes that the major determinant of fatality is the rider's crash speed. An increase in the crash speed from 40 to 60 mph increases the probability of death from 7.1% to 36.3%.

Clarke et al., (2004) found out that 25.5% of the respondents considered riding too fast for the condition as the major cause of motorcycle accidents. That notwithstanding, 58% of the respondents admitted to always or frequently breaking the speed limit. The remaining admitted to occasionally breaking the speed limit. The riders therefore made a clear distinction between breaking the speed limit and driving at inappropriate speeds that are too fast for conditions but not necessarily breaking the speed limit. It was reported that travelling at inappropriate speeds (that is, too fast for conditions) resulted to many accidents. It was observed that riders did not take observing speed limit seriously. About

79.6% considered observing the speed limit as being one of the least important safety measures a motorcyclist can take (Clarke et al., 2004)

In Kenya the Traffic Act CHAPTER 403 states that:

“1.(a)(i) Motorcycles and motor cars, including motor cars normally used for hire but excluding all other public service vehicles, when travelling on dual carriageway highways have a speed limit of 110 kph

(ii) Motorcycles and motor cars including all cars normally used for hire but excluding all other public service vehicles when travelling on single carriageway highways have speed limit of 100 kph (Traffic Act, 2009)

(b) All commercial vehicles, motor omnibuses, *matatus* and public service vehicles (excluding self drive hire cars) travelling on any type of road) 80” (Traffic Act, 2009)”.

The above section of the Traffic Act does not guide on how *boda boda* should be treated in regard to the speed limit. *Boda boda* motorcycles can utilize all the above speed limits since *boda bodas* are not classified as public service vehicles. Therefore, the issue of speeding may not arise. The road conditions in Kenya are generally poor (Wasike, 2001; Ministry of Transport, 2009). Therefore, if inappropriate speed is used (depending on the roads conditions) accidents may increase. This is because poor roads have been linked to motorcycle accidents (Clarke et al., 2004).

2.4.8 Cultural and Religious Factors in Motorcycle Safety

Durkheim defines social facts as collective ideas about right and wrong that exist outside the individual and have a controlling effect on their lives (Hadden, 1997). Although Durkheim did not utilize the concept 'culture' but he implied it in his concept of "social facts."

Therefore, social facts (norms) are an important aspect of culture. People in society learn certain rules on how they should or should not perceive the world, act and relate to others. These rules are called norms and they apply in familiar, recurring situations. Norms also differ in the degree of importance attached to conformity and the severity of punishment for non-conformity. Culture is attached to a particular society and is shared by most societal members (Allan, 2005).

In a rapidly changing world, norms may be unclear or outdated. These norms may even not exist in new situations. Non-conformity increases and may even be highly valued. This results in having many unclear areas where norms need to be reinterpreted. People may need to make up their own rules or even decide whether or not those rules apply. This may be the case in this study. This society has norms that guide the lives of its members, for example, how close one should be to someone of the opposite sex especially when they are not in a marriage relationship (Allan, 2005).

In Kenya, the *boda boda* motorcycle is a new means of transport whose norms are largely unclear. This means that even the users need to know how to deal with this new way of ferrying people and goods. Due to the 'new' means of transport, non-conformity due to lack of safety knowledge and ignorance of traffic regulations may be reported. Culture may also define what we wear and how we wear it. In addition, culture may define how close we can sit with people who are not our spouses. It was therefore of importance to find out how culture influences the sitting styles on *boda boda* motorcycles and this in turn affects *boda boda* safety.

Religion can be defined as a shared set of beliefs and practices oriented towards the sacred and the supernatural (Yorburg, 1995). Religious beliefs prescribe and sanction relations with other human beings. They are a major source of ethics and social control in society. Religious beliefs restrain impulse and reinforce conscience. Religion and motorcycle use among women is a contentious issue.

In the 12 states of Nigeria that implement Sharia law, women are prohibited from using *okada*. Muslim men are also banned from carrying women for religious reasons (Nasir, 2011). The Indonesia's north-western province Aceh, introduced a law banning women from sitting on motorcycles with their legs apart. According to a government official, "the government is only preserving morals and women should not straddle motorbikes because it provokes the male riders (Paramita, 2013).

According to the Hivos Knowledge Programme (2012) in Indonesia's North Western province Aceh, women are only allowed to straddle motorbikes if they

were the ones riding and were dressed in a Muslim way. Those supporting the law claim that by sitting astride, women dishonour themselves and show their body curves. In addition, their front body parts are in contact with the men's back which they claim is forbidden in Islam. On the contrary, Malaysia, which also implements Sharia law, forbids riding sideways people get arrested for side-saddling. This could be because the Koran is silent on this issue. The Malaysian administration may also be more liberal than the Indonesian administration. But one would expect the rules to be the same if the Sharia law is the same but this is not the case.

In Kenya, it is only Kisumu County that has raised an issue regarding how to sit on a *boda boda* on cultural grounds. Towns with predominantly Muslim populations in Kenya have not raised the issue as one would expect. This may be because their women do not use the *boda bodas* due their religious beliefs. The current study sought to establish whether cultural factors influence *boda boda* motorcycle safety in Kisumu East County.

2.5 Trends in Motorcycle Accidents

2.5.1 Types of Motorcycle Accidents

According to Clarke et al., (2004) a review of literature indicates that few researches have been done on the types of crashes experienced by motorcyclists and found that motorcycles manifested different characteristics when compared to other groups of vehicles. For the Killed and Serious Injured (KSI) casualties in the UK, most Right of Way Violations (ROWV) that were recorded were

caused by young people within the age bracketed 20-39. Some of the accidents that occurred involved going off the road while negotiating a corner, while others were due to how riders did their riding for example overtaking. Preusser, Williams, & Ulmer (1995) found out that a subset of fatal motorcycle accidents with characteristics similar to these accounted for around 85% of the total in a sample of over 2,000 such accidents.

There are about four types of motorcycle collisions that mostly occur in developing countries, namely: motorcycle and other vehicle collisions, motorcycle - pedestrian, motorcycle - motorcycle and lone motorcyclist crash where the lone motorcyclist crashes are collisions with stationary objects and unexpected loss of control of motorcycle (Clarke et al., 2004). The only problem is that precise data on the types of accidents may not be available for most developing countries. For instance, in Kenya it is not known which type motorcycle accident is predominant because this data may not have captured while recording accidents. In addition, this issue is beyond the scope of this study.

2.5.2 Motorcycle Accident Rates in the World

Road transport is the predominant mode of internal travel for most African countries, carrying about 90% of goods and persons. However unlike other modes of travel, road travel is by far the most hazardous and accident prone. In Africa, where the effort to combat the adverse effects of road transport are minimal, the incident and severity of road traffic accidents is worse than the

other regions (WHO, 2013b). In Kenya, there are various means of road transport, they range from buses, minibuses, *matatus*, *tuk tuk* and non-motorized transport. However, in the last five years, commercial motorcycles (*boda boda*) have come in to supplement the other means of transport.

Motorcycles injuries (MCIs,) are underreported from developing countries. Globally, Road Traffic Injuries (RTIs) are responsible for a significant proportion of overall injury and mortality (Peden, McGee, & Sharma, 2002). Motorcycle users are vulnerable on the road and represent an important group to target for reducing RTIs. Even in developed countries with low injury and death rates from MCIs, the risk of dying for every kilometre travelled from a motorcycle crash is 20 times higher than from a motor vehicle crash (Peden, et al., 2004). The likelihood of one getting killed in a motorcycle accident is very high because unlike other vehicles, motorcycles do not offer protection to the rider, in case of an accident; it is the rider that takes the full force with nothing to protect him or her (NHTSA, 2006).

According to the Department of Environment, Transport and Regions [DETR], 2000) motorcyclists have an especially poor record when compared to other road user groups. Their Killed and Serious Injury (KSI) rate in the United Kingdom (UK) per million vehicle kilometres is approximately twice that of pedal cyclists and over 16 times that of car drivers and passengers. Motorcyclists make up less than 1% of vehicle traffic but their riders suffer 14% of total deaths and serious injuries on Britain roads.

In 1999, a motorcyclist was killed or seriously injured for every 665,894 kilometres ridden. Car drivers, however, covered an average of 18,661,626 kilometres before a serious injury or death occurred. In 1999, motorcyclists were approximately 28 times more likely to be killed or seriously injured on the roads in Britain (DETR 2000). Motorcycles have a higher fatality rate per unit of distance travelled when compared with automobiles. According to the NHTSA, in 2006, 18.06 cars out of 100,000 ended up in fatal crashes.

A national study by the Australian Transport Safety Bureau (ATS) found that motorcycle rider death rates increased among all rider age groups between 1998 and 2000. Similarly, motorcycle rider deaths were found to be nearly 30 times more than that of drivers of other vehicles. It also found that motorcycle riders aged below 40 are 36 times more likely to be killed than other vehicle operators of the same age. Motorcycle riders aged 40 years and over are around 20 times more likely to be killed than other drivers of that same age.

In Australia, in a study on fatal and serious road crashes involving motorcyclists, motorcycles accounted for 4.5% of all Australian passenger vehicle registrations and 0.9% of vehicle kilometres travelled in 2007 (Johnston, Brooks, & Savage, 2008). However, motorcycle riders accounted for approximately 15% of all road crash deaths and an even higher proportion of serious injuries. Per distance travelled, the Australian rate of motorcyclist deaths was approximately 30 times the rate for car occupants. The corresponding rate for a serious injury was approximately 41 times higher.

Similar elevated rates were also found in other developed countries (Johnston, Brooks, & Savage, 2008).

According to NHTSA, 4,008 motorcycle occupants were killed on United States roads in 2004, an 8% increase from 2003. During that same period, drivers of automobiles showed a 10% increase in fatalities, and cyclists showed an 8% increase in fatalities. Pedestrians also showed a 10% increase in fatalities. A total of 37,304 automobile occupants were killed in the US in 2004.

In the United States of America, motorcycle fatalities represent approximately five percent of all highway fatalities each year, yet motorcycles represent just two percent of all registered vehicles in the United States (NHTSA, 2007) . One of the main reasons motorcyclists are killed in crashes is because the motorcycle itself provides virtually no protection in a crash. For example, approximately 80 percent of reported motorcycle crashes result in injury or death, a comparable figure for automobiles is about 20 percent (NHTSA, 2007).

Reflecting this difference, the levels of motorcycle rider fatalities as a proportion to those injured on the roads are typically higher in low-income and middle-income countries than in high income countries. In India, for example, motorcycle users account for 27%, while in Thailand and Malaysia they account for between 70–90% and about 60% respectively (Mohad, 2002; Suriyawongpaisal & Kanchanusut, 2003).

The global survey shows that pedestrians, cyclists and motorcycle riders and their passengers account for 46% of global road traffic deaths (WHO, 2004a).

Majority of the road accident victims in developing countries are vulnerable road users. In developed countries, car occupants account for for most of the victims since there are many people who own cars.

The problems of motorcycle safety are not specific to Kenya. For example, in the United Kingdom (UK) according to the Association of European Motorcycle Manufacturers (ACEM), motorcycle riders form one of the most vulnerable groups of road users and road accidents are a major social concern in the region. Riders make up a large proportion of those injured or killed on the roads. Motorcycle riders are at an increased risk of being involved in a crash or even killed because they often share the traffic space with fast-moving cars, buses and trucks. In addition, their lack of physical protection makes them particularly vulnerable to being injured if they are involved in a collision (ACEM, 2004).

2.5.3 Motorcycle Accidents in Africa

As a region, Africa has its share of motorcycle accidents just like other parts of the world. Statistics indicate that motorcycle safety is a problem in Ghana. At the National level, 6.8% of all fatalities are motorcycle related. There are also regional differences in motorcycle accidents. The Northern Region (Tamale) had 21% of fatalities and the Ashanti Region (Kumasi) had 4% of fatalities

while Greater Accra Region had 7% of fatalities (Afukaar, 2009). The study does not give reasons for the variations in motorcycle accidents in Ghana.

The challenges faced by the government of Ghana are typical to all other African countries that have faced any motorcycle accident problems. They are as follows; low helmet use compliance, low level of enforcement on use and sale of protective crash helmets, low funding level for program implementation and no formal training of motorcycle riders (Afukaar, 2009).

Accidents due to motorcycle riding especially in developing countries like Nigeria increase every year due to the fact that the motorcyclists do not follow the traffic rules. In their mentality they believe they are, the king on the roads (Federal Road Safety Commission, 2007). In Nigeria, *Okada* has become increasingly popular as a means of commercial transport as it is often the only means of transport available and is useful for navigating poor road networks or traffic hold-ups. The riders often ignore safety measures, making them more vulnerable to accidents with other road-users (Oluwadiya, Oginni, Fadiora, & Olasinde, 2004).

There are various factors associated with accidents including alcoholic and high speed driving (Aganga, Umoh, & Abedii, 1983). Motorcycle accidents in Oyo State, Nigeria are caused by the rider's disobedience to traffic rules and regulations (Ogagaoghene, 2011). Drivers' negligence is another contributing

factor to accidents and these includes reckless driving, improper overtaking and disregard for traffic light (Odero et al., 1997; Clarke et al., 2007).

In Uganda *boda bodas* are referred to as silent killers. The 2011 annual traffic report showed that a total of 1,762 serious accidents involving motorbikes occurred in the capital city in 2010 (Nakiyimba, 2012). Two patients die on average every week at Mulago hospital as a result of *boda boda* accidents. Between 10 and 20 victims of *boda boda* accidents are received at Mulago hospital on a daily basis and 20 per cent of the victims are left disabled. It was noted that 155 passengers perished in motorcycle-related accidents in the same period (Nakiyimba, 2012).

In Rwanda, motorcycle travel is regulated where each motorcycle rider must wear a coloured vest with a registration number on it. Not only are riders required by law to wear helmets, they are obliged to carry a second one for their passengers too (The New Times, 2012 June 29). All riders, private or commercial cannot be on the road without a helmet. It is a traffic offence to ferry passengers without a helmet. Both riders and passengers in Rwanda abide by the rules that have been set. The accidents may be fewer compared to other regions. Other countries can learn from Rwanda that even for motorcycles, safe roads are possible if the riders can adhere to the traffic rules. The set rules need to be implemented and harsh penalties put in place.

2.5.4 Motorcycle Accident Rates in Kenya

Kenya has been recording high accident rates involving motorcycle lately. This is attributed to an increasing numbers of motorcycles ownership and use that was prompted by the zero rating of motorcycles by the ministry of Finance in 2008. Table 5 shows road crashes involving motorcycles between 2002 and 2013.

Table 5: Road Crashes Involving Motorcycles, 2002-2013

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Killed	18	38	49	33	54	44	34	35	152	263	250	315	310	485
Seriously injured	164	192	141	145	154	171	155	219	449	842	993	954	818	1204
Slightly injured	271	397	237	225	276	236	229	227	415	602	355	262	176	302
Total	453	627	427	403	484	451	418	481	1016	1707	1598	1531	1304	1991

Source: Kenya Traffic Police Records (2013)

Table 5 indicates that, there has been an increase in motorcycle related accidents. There is a marked increase from between 2007 and 2008 whereby the numbers of those involved more than doubled. This is partly attributed to the zero rating of all motorcycles below 250 cc. This led to their prices going down hence they were more affordable and therefore more available to many people. The number of motorcycles in Kenya leaped from 3,759 in 2005 to 140,215 in 2011 (This is a percentage increase of 3730 %.) (KNBS, 2012).

Before the zero rating many people would not afford motorcycles because one needed at least 150,000 (1,666 Dollars) Kshs to acquire a motorcycle. The

motorcycle price slash meant that even with 70,000 (778 Dollars) one would acquire a motorbike. However, as the prices went down the accidents seemed to increase. According to the Kisumu provincial director of medical services, the province records over 250 serious accidents in a month. One out of every 10 of those accidents resulted in death (Bogan, 2010).

The case of long working hours is not only a problem with motorcycle riders but also other public service vehicles. For instance Khayesi (1997b) found out that majority of the matatu drivers worked long hours per day (9 - 15) and their payment was on a daily basis. They also had to achieve the set goals by the matatu owners. This encouraged dangerous driver behaviour. The same case may apply to motorcycle workers who also work for long hours. This could contribute to engaging in bad riding habits leading to road accidents.

Following a spate of road accidents involving motorcycles in the country in 2010, the government directed the enforcement of the rules that require all motorcycle riders and passengers to use helmets and reflective jackets, and motorcycle taxis not to carry more than one passenger at a time. These directives were later made into law by the 2012 amendment of Traffic Act.

In a National Road Safety Stakeholders Conference on road safety held at Bomas of Kenya on 19th Oct 2010, a crackdown on motorists who speed and those driving under the influence of alcohol and other intoxicants was suggested. Also pointed out was the new and increasingly popular means of transport, that is, the *boda boda* motorcycles and its new road safety challenges.

It was confirmed that operations of these popular means of transport were not adequately catered for in the existing legislation regime adding that the National Road Safety Council would ensure Kenyans were socialized to adopt positive attitudes towards personal safety and the safety of other road users (Lucheli, 2010).

Despite the advantages that have been associated with this mode of transport, there has also been a marked increase in motorcycle related accidents in Kenya. In June 2009, 180 motorcycles were involved in road accidents compared to 148 *matatus* which are the main passenger service vehicles in Kenya. This study therefore sought to find out the socio- cultural and economic determinants of the *boda boda* motorcycle accidents in order to find a way of curbing them.

2.5.5 Motorcycle Accident Safety Interventions in Kenya

There have been very few documented interventions in motorcycle safety in Kenya. The Road Safety in 10 Countries Project (RS10) was funded by Bloomberg Philanthropies in 2010 to improve road safety in 10 low and middle income countries (LMICs). Kenya was among the 10 countries selected for the intervention. The RS10 project in Kenya focuses on improving helmet wearing and reducing speed in two districts, that is, Thika and Naivasha. A study carried out in Naivasha hospital by RS10 revealed that 36% of patients who were taken to the emergency department because of road traffic crashes were motorcyclists. About 75% of these patients were not wearing a helmet at the time of the crash. Helmet wearing among motorcycle passengers is as low as 3% (WHO,2013a).

The *No Helmet, No Ride* social marketing campaign as part of RS10 Kenya project aims at increasing knowledge about the importance of wearing a helmet as well as changing attitudes and behaviours through a series of radio advertisements, billboards and posters. Motorcycle-related road crashes in Kenya are a major health concern and will continue to grow if there are no appropriate intervention measures.

As a form of intervention, the government of Kenya could adopt the Haddon matrix of safety interventions in order to deal motorcycle safety adequately. This is because it uses a safety systems approach to road safety. This approach emphasizes the thinking that the road user, the vehicle, and the road infrastructure form a dynamic system.

Table 6: The Haddon Matrix of Safety Interventions

		Prevent crash	Reduce injury severity	Improve treatment
Road User	Rider	Licensing Training of riders on riding and safety Enforcement of law	Helmets use Use of protective clothing	Safer removal of helmets
	Other road user	Increased awareness of motorcycles Enforcement of law		
Vehicle	Motorcycle	Improvements to braking Improved maintenance Conspicuity Choosing safer motorcycles Improved field of view	Knee protection	
	Other vehicle	Improved field of view	More motorcycle-friendly design	
Environment		Better road surfaces Road space allocation for motorcycles Better demarcation of roads Black spot identification	Improved roadside safety (including barriers)	Improved emergency response (access and trauma management)

Source: (Asian-Pacific Economic Co-operation APEC, 2011)

The Haddon matrix shows how these accidents can be prevented by the road user, vehicle - which in our case is the motorcycle, and also the environment as well as showing ways of reducing injury severity and improvement in treatment of those already involved in accident. This matrix has tried to look at all

possible areas of safety interventions, but the matrix may not apply to all countries the same way. For example, in the area of law enforcement to prevent clashes/accidents, it is evident that a country like Kenya has laws which are not enforced meaning that that aspect may not help in preventing crashes. In the same way, looking at the environmental aspect for preventing crashes, a country like Kenya lacks road space allocation for motorcycles which could be an impediment in reducing motorcycle related accidents.

2.6 Theoretical Framework

The current study utilized two theoretical perspectives that sought to analyse human societies employing the social structural approach. It focused on Structural Functionalism and Marxist Theory of class Structures. The Marxist perspective augments the structural functionalist perspective in explaining socio-cultural and economic determinants of motorcycle accidents.

2.6.1 Structural Functionalism

The origin of contemporary sociological references to social structure can be traced to four main contributors: Herbert Spencer ((1820-1903). Émile Durkheim (1858-1917), Talcott Parsons (1902-1979) and Robert Merton (1910-2003).

Herbert Spencer a British philosopher came up with the ‘organic analogy’ He envisioned society as a biological organism made up of interdependent parts like a human body. Émile Durkheim a French sociologist was concerned with

the question of how certain societies maintain internal stability and survives over time. Talcott Parsons (1902-1979) tried to come up with a grand theory of society. Robert Merton (1910-2003) believed that any social structure could have a number of functions some which could be manifest (evident) and others latent (covert).

Structural Functionalism is a sociological theory that attempts to explain why society functions the way it does. It does this by focusing on the relationships between the various social institutions that make up society. In this theory society is seen as a complex system whose parts work together to promote solidarity and stability. Social structure and social functions are the important elements in this perspective.

The theory holds that our lives are guided by social structures, which are relatively stable patterns of social behaviour. Each structure performs a social function which contributes to the operation of society as a whole. The theory explains the maintenance of parts, structures, institutions, norms or cultural patterns of a social system. It looks at the particular function each part plays or satisfies. This is seen to contribute to the maintenance of the larger system. According to (Parsons, 1951; 1966), society is not just an aggregate of social structures but an actual functioning or operating system, with some varying degrees of coherence, integration, and effectiveness. Therefore the subsystems in society such as politics, law, economics, and education are interrelated and

may give different contributions to overall systemic performance, the quality and quantity of which may vary.

Durkheim argued that parts of society are interdependent and that this interdependency imposes structure on the behaviour of institutions and their members. It is at this level that this study utilizes the structural functionalist perspective in explaining how various institutions concerned with road safety play their role in reducing accidents. This is because, to ensure a society's survival, its various social processes must mesh smoothly together to meet the systems needs. Each process, institution and practice is seen as performing a function that meets a societal need (safety) and thereby helps to maintain the society's structure or equilibrium. Societal processes and institutions are understood in terms of their contribution to an ongoing social whole (Wallace, 1995) .

Just like a society, the road and transport system has many units or parts that perform different roles for the whole (the whole here means the road transport system in Kenya). The current study conceives of the road transport system as consisting of several institutions and structures such as NTSA, the Traffic Police Department, the Criminal Justice System, Ministry of Transport and Infrastructure, KRA, the Kenya Roads Board. Driving/riding schools, Non Governmental Organizations (NGOs), Insurance Regulatory Authority (IRA), the Automobile Association of Kenya, motorcycle manufacturer among others. To this end, the study presupposes that the survival of the system, in this case

the road transport system is dependent on the working together of the different institutions to meet the road and transport systems need for safety. Each institution is seen as performing a function that meets that need of safety.

As indicated above, in Kenya there are many institutions involved in road traffic safety. These institutions may contribute to or hinder accident causation behaviour among riders depending on how they play their roles within the system. For instance, NTSA has many responsibilities in ensuring road safety. These include developing and implementing road safety strategies, facilitating public safety education on road safety, establish systems and procedures for and overseeing, training, testing and licensing of drivers/riders and general implementation of policies formulated by relevant authorities. The Traffic Police Department is concerned with traffic law enforcement. The traffic offenders are processed through the Criminal Justice System. Ministry of Transport and Infrastructure it is also concerned with road networks and infrastructure. Driving/riding schools are concerned with rider training, the Ministry of Health take care of those injured in the accidents. Ministry of Finance is involved in financing the various ministries concerned with road safety. Non Governmental Organizations (NGOs) are mainly concerned with road safety education and campaigns. Primary and secondary schools help in sensitizing learners on road safety, motorcycle rider's associations sometimes deal with sensitizing riders on road safety. The Kenya Urban Roads Authority (KURA) and Kenya Roads Board are concerned with road networks and audits. As already indicated, all these institutions have a role to play in order to realize road safety. They need to work in a co-ordinated manner to realize safety. Road

safety interventions in Kenya are known to be sporadic, unregulated and disorganized without systematic and effective approach to improve road safety (Odero et al., 2003). Therefore the institutions which are interdependent can help in reducing motorcycle accidents significantly if they work together effectively.

Within the above institutions there are those which dictate policies and those that implement the policies. For the *boda boda* to be able to minimize accidents which is the main objective of the study, these institutions must work hand in hand.

The Structural Functionalism theory, therefore, helps us to understand the *boda boda* motorcycle safety situation in terms of institutions/parts that are not functioning accordingly and as a team thereby negatively influencing behaviour and as a result contribute to accident causation. The emphasis in the current study is on the implementing institutions of law and policy together with related institutions. Huang (2007) observes that accidents occur when the performance of the joint system cannot meet the requirements of its environment.

Although Structural Functionalism attempts to explain why society functions the way it does, the theory does not consider social inequalities like class or social categories. Therefore it cannot adequately explain why motorcycle accidents are on the increase. The study therefore introduces the Marxist Theory of Social Structures to complement the Structural Functionalist theory in

explaining socio-cultural and economic factors that influence accident causing behaviour among *boda boda* riders.

2.6.2 Marxist Theory of Class Structures

Karl Marx (1818-1883) was a German of Jewish descent. For him, the basic structure of society was economic, or material and this structure influenced the rest of social life. Marx distinguishes one class from another on the basis of ownership of the means of production and control of the labor power of others. According to him class is determined by property relations. Thus, for Marx, economy is of primary influence on the functioning of social structures and the ideas which people espouse about themselves and their social conditions. Marx argues that economic relations constitute the base of society on which is erected the superstructure of non-economic institutions such as politics and religion, the nature and scope of which are deeply determined by the base which is the economy. That is to say that in the final analysis, it is the productive relationships that people engage in that inherently have the decisive influence on their lives. This argument is central to Marx's conception of human nature and behaviour. Marxists therefore emphasize that social analysis should focus on class structure and relations.

As has been indicated before, that patterns of social relationships that comprise society determine, to some varying degree, the actions of the individuals socialized into a certain structure (Andersen, 2001). In the current study, this perspective will be viewed from the system of socio-economic stratification in

terms of class structure. People in society hold different positions relative to the economic, social, political and cultural resources of society (Andersen, 2001).

While motorcycles are common in most parts of Kenya (rural and urban) they are common in relatively poor neighbourhoods. It is likely, therefore, that the class structure in Kenya determines the dominant mode of transport and a form of employment for a certain category of people. In Kisumu where the poverty level is 48% and unemployment rate stands at 40% (according to the 2008 estimates by the World Fact Book 2012) motorcycle use is bound to increase like most parts of Kenya because it is a form of employment. This increase in the number of motorcycles may lead to increase in accident especially in a situation where rules and regulations are not enforced.

The orientation of this approach as applied in the current study concerning motorcycle safety, argues that *boda boda* riders engage in accident causing behaviour in the process of trying to make a living in a tough environment. This is because riders belong to a certain social category based on their relation to the means of production. They may not be adequately prepared in skills (trained to ride) to do their work because they could not afford to pay for the formal training. They therefore must work hard to find a way to get the daily remittances that must be given to motorcycle owners. Even the motorcycle owners could still be servicing their loans. In addition, riders may not adhere to traffic rules and regulations if by adhering to them they cannot make enough money to make ends meet. They may therefore be motivated to engage in bad riding behaviour (speeding, overloading, wrong overtaking). These coupled

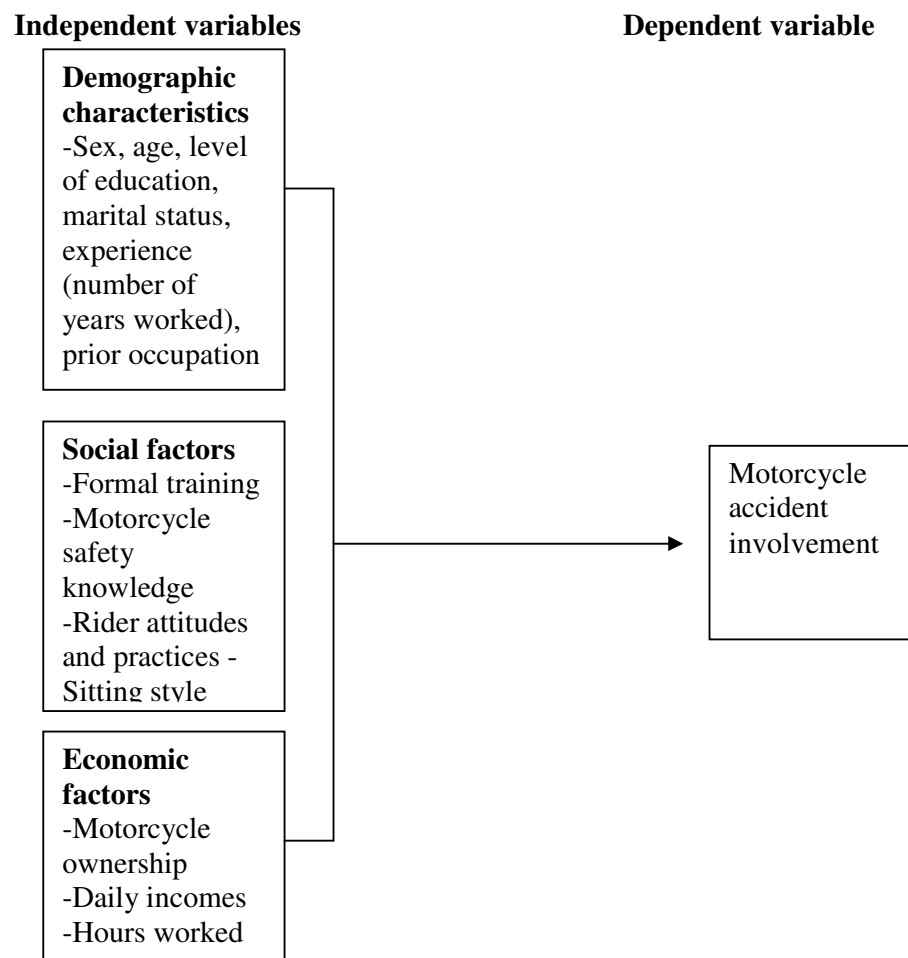
with their demographic characteristics in an environment that has weak implementation of law and policies would result in many *boda boda* accidents.

It is also a well known fact that, resources such as education, training and experience gives prospects for better earnings because of the many opportunities that one can access. For riders, most of whom only attain secondary education, such opportunities do not present themselves easily and therefore they are open to do anything that comes by. Commercial motorcycle transport is therefore a source of livelihood for the poor. Some operators of this informal mode of transport take it as last resort to generate income for their families and dependants to survive (Arosanyin, Olowosulu, & Oyeyemi, 2011; Oluranti, 2011).

The above mentioned demographic socio-cultural and economic factor may lead to *boda boda* accidents. It should be noted that that all the factors mentioned have a financial implication and could influence a rider's actions and behavior which may lead to motorcycle accidents. For instance a young person who is unemployed finds riding as an option. Since he cannot raise the driving school fee, he gets informally trained by a friend for a day and knows how to 'ride'. He eventually gets involved in an accident due bad riding behaviour and lack of safety knowledge. Subsidizing training fee would see to it that more riders acquire proper training and motorcycle accidents would reduce. Therefore the two theories, Structural Functionalism and Marxist Theory of Social Structures are used to augment each other in explaining *boda boda* motorcycle accidents.

2.7 Conceptual Framework

Figure 2 presents the conceptual framework used for the analysis of socio-cultural, economic and socio-demographic determinants of *boda boda* motorcycle accidents. The framework illustrates how the various motorcycle accident causative factors interact.



Source: Synthesised from review of literature

Figure 2: Conceptual Framework for the Analysis of Socio-cultural, economic and demographic Determinants of *Boda boda* Motorcycle Accidents in Kisumu.

The Conceptual framework shows the interconnections between the study variables that are important in understanding the dynamics of motorcycle safety in this study. The dependent variable is accident involvement which is affected by the independent variables such as socio-cultural and economic factors as shown in Figure 2.

The framework shows some of the characteristics of riders that could contribute to motorcycle accident involvement. Rider socio-demographic characteristics examined in this study were sex, age, level of education, experience (number of years worked) and prior occupation. Some rider characteristic may affect and could also be affected by some social factors in the study. For example, age as a variable may be associated with speeding. As literature indicates, younger riders are bound to engage in more risky riding practices leading to accidents. Therefore age may be associated with rate of accident involvement as Germení et al., (2009) observed.

The age of a rider could also affect motorcycle ownership (economic factor) in that, younger people may not have the capacity to buy their own motorcycles as opposed to the older people who could have accumulated some wealth (this may not always be the case). Therefore the youth or young people may not own motorcycles which in turn may affect safety.

Socio-cultural factors in this study included formal training, motorcycle safety knowledge, rider attitudes and practices. Some socio-cultural factors are

affected and also affect socio-economic factors (motorcycle ownership, daily incomes and hours worked). For example, those who own motorcycles are most likely to be formally trained riders and this may have safety implications. Consequently, motorcycle ownership may affect rate of accident involvement among riders. The Conceptual framework indicates that motorcycle ownership influences accident involvement. Therefore, if one owns a motorcycle that s/he operates, there are reduced chances of accident involvement. For none owners, there are increased chances of accident involvement especially with the pressure to meet daily targets (economic factor). Coupled with these are weaknesses in policy implementing institutions which all increase the likelihood of occurrence of accidents involving motorcycle.

In addition, motorcycle safety knowledge could be affected by motorcycle ownership because it would be expected that those formally trained to ride, would have a higher motorcycle safety knowledge that those not formally trained to ride. In turn, motorcycle ownership may be affected by formal rider training - that is, owners are more likely to be formally trained than none owners. Motorcycle ownership may also affect number of hours worked (motorcycle owners are likely to work fewer hours than non-owners). This may affect motorcycle safety.

The conceptual framework therefore indicates interplay between socio-demographic, socio-cultural and economic factors and motorcycle accident involvement, especially in a situation where there is weak implementation of

policies and regulation. The study hypotheses were derived from the adopted theoretical perspectives and review of literature.

2.8 Chapter Summary

This chapter has presented a review of relevant literature, the theoretical framework and the conceptual basis for this study. The review has looked at the global, regional and local status of road safety and its implication to developing countries. The emerging scenario shows that traffic accidents are a global problem but developing countries bear the brunt with high injuries and fatalities. It has also given the global overview of motorcycle transport highlighting growth and development of motorcycles in the developed nations and in Kenya. Reasons for the rapid growth in use of motorcycles in Africa have been presented. The chapter also explored the trends in motorcycle accidents globally and regionally. The accident trends in Kenya indicate a steady increase in accidents involving motorcycles and its implications to the health sector and general development of the country. The chapter has also highlighted demographic, socio-cultural and economic factors in motorcycle safety. The theories guiding this study have also been discussed in this section. Chapter three presents the research methodology.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the design of the study and the procedures that were undertaken to address the research problem. It describes the study design, the study site, study population and sampling procedures, and the data collection and management plan. In addition, the chapter shows how ethical issues were addressed.

3.2 Site Description

The study was conducted in Kisumu East sub-county. This sub-county was selected on the basis of its perceived uniqueness in *boda boda* motorcycle transport business. Kisumu East sub-county has a population 150,124. This is according to the 2009 population census. The sub-county host Kisumu town which is the largest town in western. Kenya, it is also the county headquarters. Kisumu East sub-county was selected because it had the highest population amongst the other sub-counties in Kisumu county (see table 7), in addition, it is the headquarters for the county and therefore it was expected that it would have many *boda boda* riders because it is an economic hub for the region. Furthermore the Kisumu East District Development Plan 2008-2012 indicated that there were 10,000 *boda boda* riders in operation in Kisumu East. Table 7 indicates the sub-counties in Kisumu County.

Table 7: Kisumu County

Sub-County	Population (2009 National Census)	Area (Sq. Km)
Kisumu East	150,124	135.90
Kisumu West	131,246	212.90
Kisumu Central	168,892	32.70
Seme	98,805	190.20
Nyando	141,037	413.20
Muhoroni	145,764	667.30
Nyakach	133,041	357.30

Source: Independent Electoral and Boundaries Commission (IEBC)

The country also hosts two major government hospitals namely Jaramogi Oginga Odinga Teaching and Referral Hospital, the Kisumu District Hospital and the Aga Khan Hospital which is a prominent private hospital. These government hospitals have special wards for *boda boda* victims. This was a clear indication that there problems relating to *boda boda* motorcycle accidents in the area of study. This is another reason why Kisumu East was purposely selected for the study. In addition, Kisumu has a long history of *boda boda* transport making it an area of interest for the study.

In the 1960s and 1970s, *boda boda* services by bicycles were commonly used in Kisumu and Kakamega. This is an activity that originated from Busia which is a border town between Kenya and Uganda. *Boda boda* bicycles were used for cross-border business especially smuggling, hence, the name *boda boda* (Howe, 2003). Later on in the late 1990s, motorcycles were introduced. Ownership and use of *boda boda* motorcycle in the region has increased over the years although a few operators still use bicycles.

The main attraction of the Kisumu town is the availability of jobs, business opportunities, training institutions, health and recreational facilities. Kisumu town has three informal settlements, namely: Manyatta, Nyalenda and Obunga. Kisumu town has high levels of skilled and unskilled labour. The unemployment rate is about 40%. Fifty two percent (52%) of the working population is in the informal sector (United States Agency for International Development, [USAID], 2006). The monthly wage for the majority is the range of Ksh.3,000 - 4,000. Approximately 48% of the urban population lives within the absolute poverty bracket, while the national average is 29% (USAID, 2006).

According to the 1999 population census, the youth population (15-29) was 77,766. It increased to 93,108 persons in the year 2008. It is expected to be 100,857 at the end of 2012. This has socio-economic implications in employment for the youth.

3.3 Research Design

This study adopted a descriptive cross-sectional design. The descriptive design helped to generate information on *boda boda* motorcycle safety. The study answered the questions of who, what, when, where, and how issues associated with *boda boda* motorcycle safety in Kisumu county. The potency of descriptive design is that it yields rich data that leads to useful study recommendations. Additionally, this approach collected a large amount of data that allowed detailed analysis. Moreover, descriptive research is often used as a pre-cursor to more quantitative research designs, because it points out some

important variables that could be subjected to further quantitative analysis. The current study points to potential areas for further research.

Given that the study was conducted at one point in time, a cross-sectional survey was best suited for this study. The study focused on capturing and drawing inferences from existing differences among the subjects, in this case the *boda boda* riders. This design examines the relationships between variables at one moment in time. Moreover, the cross sectional survey allowed for the collection of data from a large number of subjects (370). The design obtained generalizable data for the study.

This study used a mixed method approach in data collection. Both quantitative and qualitative approaches were used. The quantitative approach (FGDs, Key informants) enabled the description of the distribution and the exploration of associations among variables in the study. It also captured variations among the respondents. The qualitative approach enabled an in-depth understanding of the phenomenon of motorcycle safety and utilized written and spoken words. Qualitative data had no direct numerical interpretation, in this study but the meaning was attached to respondents live experiences (Lincoln & Guba, 1985; Maykut & Morehouse, 1994). Therefore, the qualitative approach was useful in capturing the safety situation through the participants' life experiences as they interacted with other road users.

3.4 Study Population

The target population were all the *boda boda* motorcycle riders in Kisumu East sub-county who ferried pillion passengers at a fee. This is the population that the study made inferences to. The target population of the *boda boda* motorcycle riders in Kisumu East sub-county and environs was 10,000 obtained from the Kisumu East Development plan 2008-2012 (KNBS, 2008). Thus, this study uses an estimated population of 10,000 *boda boda* motorcycle riders.

3.5 Sampling Techniques

3.5.1 Sample Size Determination

The sample size was determined by the use of the Online Sample Size Calculator (Creative Research Systems, 2013). This calculator has three main features; the population, confidence level, and confidence interval. It utilizes the three features named above to come up with the required sample size. The calculator uses a standard sample estimation formula. Moreover, it is user friendly, not manual and therefore more accurate. It uses the following formula;

Sample Size

$$Ss = \frac{Z^2 * (p) * (1-p)}{c^2}$$

Where:

Z = Z value (e.g. 1.96 for 95% confidence level)

p = percentage picking a choice, expressed as decimal

(0.5 used for sample size needed)

c = confidence interval, expressed as decimal

(e.g., .05 = ± 5)

To get the sample size, the researcher needed to know the actual or approximate population size. With the population size of 10,000 the researcher then selected the desired confidence level and interval. Thereafter, the computer generated the sample size automatically. For this study, the sample was calculated at a confidence level of 95% and confidence interval of 5 and a population of 10,000. The sample size generated was 370.

3.5.2 Sample Selection

Kisumu East sub-county was purposely selected because of following; it had a long history of *boda boda* transport, high number of *boda boda* riders and had special wards for *boda boda* motorcycle victims by the start of this study. In addition, traffic police statistics showed that at the start of the study Kisumu was recording more accidents compared to other areas for instance, Busia and Mombasa. In 2012, Busia traffic police recorded 4 fatalities, 20 seriously injured and 7 slightly injured while Mombasa traffic police recorded 6 fatalities, 15 seriously injured and 6 slightly injured. These cases were fewer than those

recorded for Kisumu for the same period as indicated earlier (2012; 12 fatalities recorded, 31 seriously injured and 13 slightly injured).

Kisumu East sub-county is within the larger Kisumu County. Kisumu East sub-county is one of the seven sub-counties that make Kisumu county. Kisumu East sub-county has five country assembly wards. The study sample was selected from within these wards.

To get the study sample, the study utilized a two-stage cluster sampling technique. Cluster sampling is an equal probability sampling method (EPSEM). This method was considered the most suitable technique for this study because there was no complete sampling frame of all the *boda boda* operators in Kisumu East sub-county. It was also not practical to compile an exhaustive list of *boda boda* motorcycle riders in Kisumu East sub-county given the riders level of mobility and the fact that they were widespread all over the town.

As a first step, the researcher undertook a reconnaissance a week prior to field data collection. The aim was to get familiar with the study area and to identify sites where *boda boda* motorcycles operated. The researcher observed that the *boda boda* motorcycles congregated at some points to wait for passengers. These assembly points are referred to as “base” by the riders. These “bases” were treated as clusters for the purpose of sampling in this study. The first base/cluster was identified within the Central Business District (CBD). The researcher then used the snowball method to identify and map other assembly

points (clusters) in the town. A total of twenty-two (22) bases/clusters were identified and listed. (See appendix 7).

The second step involved listing of riders from the various bases with the help of base leaders. From the 22 bases/clusters, 1272 riders were listed. The “bases” have set a system of control where they decide on who operated and who did not operate at the various ‘bases’. No rider is allowed to operate from a ‘base’ without first being registered there. For registration they are required to pay a one-time membership fee of Ksh 3,000 (about 34 Dollars) per motorcycle.

The third step was to select the bases from where the individual samples would be drawn. As noted earlier, cluster sampling is an equal probability sampling method (but it is only if the clusters are approximately the same size). If the clusters are not of the same size, as is the case of this study, the researcher can use “probability proportional to size” (PPS). That is, the probability of selecting a cluster is dependent on the proportional distribution of its elements in the target population. This study used PPS because the clusters did not have equal number of riders. The use of PPS made cluster sampling in this study an EPSEM, therefore, producing representative samples. This is because every element in the population had an equal chance of being included in the sample.

As already noted, the study identified 22 clusters with different riders’ populations totalling 1272. With the PPS method, the researcher purposely determines the number of cluster to pick depending on the already determined

sample size for the study and the number of respondents that are to be selected per cluster. The choice of 12 clusters was based on the fact that the desired sampled size was 370 and other logistics such as money and time and the area of study put into consideration. The next step was to determine the 12 clusters that were to be covered (using PPS), from which the samples would be drawn.

To do this, the researcher first made a table with five columns. Column 1 was used for serializing the clusters. The names of the clusters were listed in column 2 and then the population of each cluster was indicated in column 3. The next step entailed getting the cumulative population of each cluster as listed in column 4. This was done by getting the sum of the population of a particular cluster plus the population of all the clusters above it (see Table 8).

The next step entailed obtaining the sampling interval to be used in selecting the actual clusters to be covered in the study (column 5). This was done by dividing the 1272 (total number of riders) by 12 (number of 12 clusters to be covered). The sampling interval of $1272/12$ was 106. Next was choosing a random number between 1 and 106. The number 98 was selected by use of a table of random numbers. The first cluster was located by finding the cluster whose cumulative population exceeded the random number (more than 98). For example in this study the first cluster was *Nyahera* where the cumulative population was 104. The next cluster to pick was determined by adding 98 to 104. This gave 202 (*Kibos road*) thus the next cluster to be picked was 231 as this had to be more than 202. Identifying the location of each subsequent

cluster was done by adding the sampling interval to the number which located the previous cluster. This exercise was done until the researcher identified the desired number of 12 clusters. It is important to note that if a cluster had a population size larger than the sampling interval it was selected twice (that is creating two independent clusters from that cluster) as in the case of Bus station. Table 8 presents cluster selection by PPS. (See appendix 7 for cluster locations in Kisumu East sub-county)

Table 8: Cluster selection by Probability Proportional to Size Sampling

Number	Cluster Location	Population size	Cumulative population	Clusters selected
1	Pipeline	44	44	
2	Nyahera	60	104*	2
3	Nyamasaria	57	161	
4	Mega city	33	194	
5	Kibos road	37	231*	5
6	Bandani	20	251	
7	Western	51	302	
8	Kawater	17	319*	8
9	Konamaji	45	364	
10	Sulwe	23	387	
11	Dunga	41	428*	11
12	Nakumatt	87	515	
13	Bus station	122	637**	13,13
14	Kachok	39	676	
15	Pand Pieri	42	718	
16	Format	60	778*	16
17	Kicomi	49	827	
18	Mamboleo	55	882*	18
19	Konalejo	68	950*	19
20	Manyatta	103	1053*	20
21	Kondele junction	121	1174*	21
22	Kibuye Market	98	1272*	22
Total		1272		

Source: Field data (2012)

The fourth and last stage was to select individual riders for the study. The total population of the 12 selected clusters was 782. The needed sample of

individuals was 370. To achieve this, the study had to determine the number of riders that would be selected from each of the selected clusters. This was done by using proportion or sample weight of the population within the clusters (percentage cluster population from the total (12) clusters). The percentage of each cluster was used to determine the sample size for each cluster thus a total of 370 riders. Finally all selected clusters were subjected to systematic sampling to get the required sample of 370. Table 9 presents the number of selected riders per cluster while table 10 presents the summary of the sampling procedure.

Table 9: Number of Selected Riders per Cluster

Selected Cluster	Cluster population size	Proportion/sample weight %	Selected riders per cluster
Nyahera	60	8	28
Manyatta	103	13	49
Kondele junction	121	15	57
Kibuye Market	98	13	46
Kibos Road	37	5	18
Kawater	17	2	8
Dunga	41	5	19
Bus station	122	16	58
Format	60	8	28
Mamboleo	55	7	26
Konalejo	68	9	32
Total	782	100	370

Source: Field data (2012)

Summary of the Sampling Process

Table 10: Summary of the Sampling Process

Method used	Why	How
Purposive	To select Kisumu East sub-county was based on prior knowledge of the history on <i>boda boda</i> .	Picked Kisumu East sub-county as the study site
Snowballing	To identify the areas where the riders operated, and to identify the areas the riders congregated.	22 clusters identified starting with one 'base' at the CBD.
Cluster sampling with Probability Proportional to Size" (PPS).	To select representative cluster samples from the 22 identified clusters for the study. The decision on the number of clusters depended on the study sample size and number of respondents that were selected per cluster.	12 clusters selected using PPS.
Systematic random sampling	Identification of individual riders to be included in the sample.	Proportional samples picked from each cluster totalling 370. All selected clusters subjected to systematic sampling to get individual riders.

Source: Author (2012)

3.6 Research Instruments

The main data collection tool for the study was an interview schedule. It had both open and closed ended questions and was administered face-to-face. This mode of administration yielded a high rate of response although it was expensive and time consuming. An interview guide was used to collect qualitative data through key informants interviews and focus group discussions (FGDs). This enabled getting in-depth information on motorcycle safety.

The current study addresses public safety and therefore it was necessary to use triangulation to meet the data requirement for this study. Both qualitative and

quantitative data was necessary for a deeper and clearer understanding of the issues at hand.

3.7 Data Collection Procedures

This sub – section looked at the data collection procedures. It specifically explored pre-testing and field data collection.

3.7.1 Pre-testing

Before embarking on data collection, the developed tools were pre-tested on 15 people (*boda boda* riders) in similar conditions to the research. As a general rule, 5 -10 people are enough for a pre-test. After the pre-test, the section modified was the researcher’s introduction. In addition, the numbers of questions were also reduced by removing repetitive and redundant questions. Moreover, some questions were re - worded and revised to ensure clarity of instructions to respondents. This was done to ensure validity and reliability.

3.7.2 Field Data Collection

The research assistants were trained and then supervised to ensure data quality. This was done by meeting with research assistants every evening for the duration of data collection to go through the entire interview schedules for that day.

Primary data was both qualitative and quantitative in nature. Quantitative data was obtained from the *boda boda* motorcycle riders using the interview schedule. The researcher used face – to - face interviews in order to maintain

and enhance quality of the output (data). This is because this mode of administration of the interview schedule allowed for clarification in case the questions asked were unclear to the respondents. This ensured proper answering of the questions asked because the respondent was only needed to have basic verbal and listening skills. The researcher also ensured most interviews took place during off peak hours, which was between 10am and 3pm, to reduce interference during interviews. It was not convenient to interview riders during peak hours because they were busy ferrying passengers.

Qualitative data was obtained from key informant interviews and focus group discussions. The focus group discussions (FGDs, henceforth) focused on the general state of motorcycle road safety among *boda boda* motorcycle riders and the socio-cultural aspects in motorcycle safety. FGDs involved holding discussion with a selected group of individuals to gain information about their views and experiences of a topic or a certain area in research (Lincoln & Guba, 1985). FGDs were important for this study because they helped to gain more information and clarifications on issues that arose from the questionnaires and interviews. In addition, FGDs helped the researcher to obtain different views on motorcycle safety and gained insights into the shared understandings of motorcycle safety among respondents. Four FGDs were conducted of which two comprised of the riders and two for the passengers. The reason for separating riders and passengers was to get their separate views on *boda boda* motorcycle safety in Kisumu as users and providers of the *boda boda* services. The rider FGDs had 9 and 10 participants respectively, whereas passengers had

8 and 9 participants respectively. The rider FGDs had all male participants while the first pillion passenger FGD had 5 male and 3 female participants. The second pillion passenger FGD had 5 males and 4 females. On average, the FGDs lasted approximately one hour. The strategy for finding participants was 'on location' where participants were invited while going on with their various activities. For the riders FGDs, riders were selected from assembly points that were not included in the sample while passenger participants were conveniently selected based on their availability and willingness to participate. The rider FGDs were held at selected assembly points one in Kibuye market and one at Nyamasaria estate, whereas passenger FGDs were held at Megacity and one at a public recreation area at the CBD. All FGDs were homogeneous and were held in a permissive environment.

Key informants were interviewed to get important expert information. They included key government representatives; the Directors and Medical Officers of Health, representatives from Kisumu Traffic Police, a Manager of a driving school and the Municipal Council of Kisumu officials. The key informants had information of the general road accident situation in Kisumu. In addition, they also had specific information on road accidents related to *boda boda* motorcycles in Kisumu East sub-county.

3.8 Data Analysis

The study generated both qualitative and quantitative data from the mixed methods approach. Qualitative data was generated from FGDs, key informants interviews and from open ended questions in the interview schedule while

quantitative data came from the closed-ended questions. Content analysis and NVIVO 10 were used in analyzing the qualitative data. The researcher read through data from FGDs, key informant interviews and recorded information. The study used NVIVO 10 to come up with themes and patterns and content analysis was used to identify the main themes. In NVIVO 10, data was imported from the source (i.e., recorded interviews) the nodes were then created based on the questions. The case nodes were set up by gathering all the information given by a respondent. Themes were then coded and any emerging theme was included. Queries were then used to compare themes and finally memos were created to record the new findings and ideas.

Quantitative data was coded, cleaned and entered into Statistical Analysis Software (SAS 9.3). SAS was used to generate descriptive statistics from quantitative data. Descriptive statistics was used to categorize variables by summarizing patterns in the responses of people in the sample. This is because it provides simple summaries and graphs, frequency distribution tables, percentages and measures of central tendency and also describes the characteristics of the population that are of interest. It was therefore necessary in this study because it helped to visualize and summarize large amounts of data to make them more manageable.

Inferential statistics included bivariate and multivariate statistical analyses. Bivariate analyses used included Chi-squared test to examine the significance. For multivariate analyses, logistic regression model was run in SAS to examine

which among accident predictors were significant. Motorcycle ownership was the dependent variable for the logit model which was a binary measure with two values, 1 for 'Yes' and 0 for 'No.'

3.9 Ethical Considerations

The researcher obtained a research permit from the National Council for Science and Technology. The researcher then notified the following by way of a copy of the research authorization letter; the District Commissioner Kisumu East sub-county, the Provincial Traffic Police officer, the District Education Officer Kisumu East, the Medical Officer of Health, Kisumu East sub-county and the Town Clerk Kisumu Municipal Council, before commencing data collection.

Additionally, the researcher indicated to the respondents that participation was voluntary and confidential. The researcher also made it clear that there were no monetary reward or any payment in kind for participation. The respondents were also informed that the results of the study could have practical value to them as riders because accidents could reduce. For the non-riders in the FGDs, the research results would also ensure pillion passenger safety. The researcher worked with the assumption of 'mature minor' in case some respondents were under-age. The researcher therefore did not need parental or guardian consent. The relevant research authorization documents can be found in appendix 9, 10, 11, 12 and 13 of this work.

3.10 Chapter Summary

This chapter has presented the research design that was used in this study. The design was descriptive and cross-sectional with mixed methods approach. It has presented the study site and gave the target population. A two-stage cluster sampling method with Probability Proportional to Size (PPS) was used to get the 370 respondents for the study. An interview schedule and interview guide and were used as research instruments for data collection. Data collected was both qualitative and quantitative. Qualitative data was obtained from key informants and focus group discussions. Quantitative data was obtained from traffic police records and data collected from the fields using questionnaire. Data analysis was done separately for qualitative and quantitative data. Qualitative data was analyzed using content analysis approach and NVIVO 10 to identify the emerging themes and patterns. Quantitative data was analyzed using SAS 9.3. Data was first entered and SAS 9.3 was used to compute frequencies and inferential statistics. Inferential statistics were used to test study hypotheses and to establish relationships between variable for example between training and accident involvement. SAS 9.3 was used to run a logit model to find out the predictors. Chapter four presents data analysis, presentation and interpretation.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

In this chapter, the results of the data analysis are presented and interpreted. The data were collected and processed in response to the objectives stated in Chapter One of this thesis. The main objective of the study was to find out the socio-cultural and economic determinants of *boda boda* motorcycle safety in Kisumu East sub-county. Consequently, specific objectives were derived from the main objective. The respondents' characteristics are presented first. This is followed by an analysis of each specific objective; stating what the results were, presenting the results, interpretation and discussion of the results and the conclusion on that specific objective.

4.2 Rider Socio-Demographic Characteristics

The study sought to find out the socio-economic characteristics of the riders in Kisumu East sun-county. These characteristics included sex, age, marital status, level of education, prior occupation and number of years worked. The study found that all respondents were male. They were aged between 18 and 31 with those aged 18-24 accounting for 27% and those aged 25 - 31 accounting for 51.9%. It was found that 70% of the study population were married. Most riders (54.05%) were literate with secondary education while those with primary education accounted for 43.5%. Prior to *boda boda* employment, 45.14% of the riders were jobless, about (25.40%) were previously bicycle *boda*

boda riders while 21.62% indicated they had been in informal employment. Most riders had less than five years riding experience. Majority (58.7%) has worked 2 - 3 years while 17% had four years working experience. The detailed discussions for these results are presented in the following sections.

4.2.1 Sex of Respondent

All the respondents in this study were male. This shows clearly that commercial motorcycle transport is a male-dominated business. Literature indicates that in most studies majority of respondents were male. For example, Konnings (2006) ; Mahlstein (2009) had only male respondents. Motorcycle *boda boda* riding is male-dominated because of its demanding nature which may not be suitable for most females. Thus, females shy away from such occupations may be because it exposes them to more dangers than men especially at night. Motorcycle riding is also physically demanding therefore it may not be an occupational option that many females would go for. In addition, family and other responsibilities that women have (for example carrying a pregnancy) may not allow them to engage in this business. Furthermore, society perceives commercial *boda boda* riding as a realm for men (Mahlstein, 2009).

Being male or female has been recognized as a significant factor in road traffic accidents (Yagil, 1998). Literature suggests that, the rate of male involvement in accidents is greater than that of female. Moreover, males incur more traffic violations than females (Factor et al., 2008; Ferguson et al., 2001). In the current study, all respondents were male. This rider characteristic can also be

used to explain the high number of *boda boda* motorcycle accidents being experienced.

4.2.2 Age of Respondents

The findings indicate that 51.9% of the respondents were aged between 25 - 31 years, whereas the ages 18-24 accounted for 27%, while those aged 32-38 were 15.9%. Only about 1%, of the respondents' were less than 18 years of age.

Table 11 presents the respondents age.

Table 11: Frequency Distribution of Respondents' Age

Age of respondent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Below 18	4	1.08	4	1.08
18-24	100	27.03	104	28.11
25-31	192	51.89	296	80.00
32-38	59	15.95	355	95.95
39-45	14	3.78	369	99.73
46-52	1	0.27	370	100.00

Source: Field data (2012)

This is an indication that many of the operators in the *boda boda* motorcycle business are mainly young adults. This was expected in the study because most young people in Kenya are unemployed. As a government initiative to create employment for young people, motorcycles below 250 cc were zero rated. This made motorcycles more affordable to most of the young people who are unemployed.

These findings agree for example, with (Nyachio, 2012) who found that majority (72%) of *boda boda* operators in Kitengela were young people aged 20-29. Some studies done in Kenya on *boda bodas*, for example, (Mbugua, 2011; Chepchieng', 2011) on *boda bodas* did not look at this variable age. Therefore, it was hard to compare this variable with studies in other locations in Kenya other than Kisumu. In other studies outside Kenya, for example, in Douala, motorcycle riders were relatively young as 85% percent belonged to the age group of 25-45 years (Kumar, 2011). It is widely recognized that young people have been among the most adversely affected by the recent economic crisis in Africa and the world (Juan, 2003). Thus, the youths are engaging in a variety of activities in the informal sector for 'survival.'

In Kenya, the motorcycle (*boda boda*) transport is a form of employment that provides job opportunities to many young people at a time when unemployment is at its peak. It has also emerged from the FGDs and key informant interviews that many young people, especially boys, view *boda boda* business as a bridge to a better future after completing primary or secondary school. Some even drop out of school to engage in *boda boda* business thereby reducing their chances of bettering their lives in future. Furthermore, many of these young people are killed or injured in the *boda boda* accidents because most of them are not trained and lack experience in operating *boda boda*. This ought to be a serious concern because this loss affects the functioning of the society.

In addition to age being a factor in *boda boda* operations, literature indicates that age is also a factor in accident causation Clarke et al., (2004; Rutter &

Quine (1996); Keskinen, Ota, & Katila, (1998) emphasized that young riders are far more likely to be involved in motorcycle accidents because they are prone to risk taking. The fact that majority of the riders in the current study were young may have serious safety implications.

4.2.3 Marital Status

More than two thirds (70%) of the respondents were married, while 25.9% were single. The rest were separated, divorced or widowed. According to the riders' FGD, most of the riders had responsibilities and financial needs that they needed to take care of. As a result, they embraced *boda boda* business as a source of livelihood. Marital status may have implications on road safety in that, since most men are the providers or breadwinners in many families they may want to ensure that they, by all means make enough money to take care of their family needs. This may lead to adoption of bad riding practices in order to realize their personal and family goals. Bad practises that the riders may adopt include overloading and speeding. Table 12 shows the marital status of respondents.

Table 12: Frequency Distribution of Riders' Marital Status

Marital status	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Married	259	70.00	259	70.00
Single	96	25.95	355	95.95
Divorced	7	1.89	362	97.84
Widowed	6	1.62	368	99.46
Separated	2	0.54	370	100.00

Source: Field data (2012)

4.2.4 Respondents Level of Education

Regarding level of education, more than half of the respondents, (54.05%) had at least secondary education. Those with primary education accounted for 43.5%. Surprisingly, none of the respondents reported not having gone to school. A small proportion comprising 2.16% had either college or university education implying that this occupation mostly attracts people with secondary education. Table 13 presents the level of education of the respondents.

Table 13: Frequency Distribution of Respondent's Level of Education

Respondents Level of education	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Primary	161	43.51	161	43.51
Secondary	200	54.05	361	97.57
University	1	0.27	362	97.84
College	8	2.16	370	100.00

Source: Field data (2012)

These findings agree with other studies on riders of commercial motorcycles. For example, a study by Mahlstein (2009) found that the 'okada' riders were not illiterate as only ten interviewees in that study had not attended school at all. Ngim & Antony (2007) also confirm that riders were not illiterate. Kumar (2011) concurs that commercial motorcycle riders were reasonably educated. Seventy percent of them reported having secondary education while 14% had higher education. Similarly, Mutiso & Behrens' (2010) study on *boda boda* bicycles conducted in Kisumu and Nakuru in Kenya also indicate that the operators had some form of formal education. The current study indicates that most riders had either secondary or primary education. This implies that their

chances of getting formal employment were low. With no prospects of such options, most of them settled for the *boda boda* business.

Educational levels of commercial motorcyclists have also been associated with their knowledge of safety protective devices (Sufiyan, 2012). In addition, levels of education have also been correlated with traffic accidents (Factor et al., 2008). Therefore the more or better educated a rider is, the less likely that he/she will be involved accidents. In the current study although most respondents were literate, their education levels were low. This could affect their knowledge of motorcycle safety thereby increasing the risk of being involved in motorcycle accidents.

4.2.5 Respondents' Prior Occupation

The study found out that slightly less than half of the respondents (45.1%) were jobless prior to becoming motorcycle *boda boda* riders. Those who formerly operated commercial *boda boda* bicycles were 25.4%. Another 21.6% were in the informal sector other than bicycle *boda boda*. Table 14 presents a distribution of respondent's prior occupation.

Table 14: Frequency Distribution of Respondent's Prior Occupation

Respondents prior occupation	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Bicycles <i>boda boda</i> rider	94	25.41	94	25.41
Informal employment (other than <i>boda boda</i>)	80	21.62	174	47.03
Unemployed	167	45.14	341	92.16
Formal employment	29	7.84	370	100.00

Source: Field data (2012)

The findings imply that many of the current *boda boda* motorcycle riders were unemployed prior to becoming *boda boda* motorcycle riders. Consequently, motorcycle *boda boda* business became a means to earn a living. The respondents that were previously bicycle riders could no longer depend on the *boda boda* bicycle business. This is because of lower returns due to competition from motorcycle *boda boda*. The advent of motorcycle *boda boda* put most bicycle *boda boda* operators out of business. The affected had to look for other ways to make money hence some opted for motorcycle *boda boda* business-a trade which they were somehow familiar with due to their prior work as bicycle *boda boda* riders.

Commercial motorcycles provide employment for many youths in some African countries. In Lagos, Nigeria, for example, commercial motorcycles provide jobs for a large number of people. In a survey on understanding the emerging role of motorcycles in African cities, about 85 percent of the respondents cited unemployment as the reason for getting into the “*okada*” business (Kumar, 2011). Similarly in Douala Cameroon, commercial motorcycle taxis or *bendskin* provided employment for the unemployed youth (Konings, 2006). The fact that the respondents were unemployed could mean that they could not afford to pay the formal rider training before they became riders.

4.2.6 Number of Years Worked as Riders

The number of years worked as riders varied among respondents. Most of the respondents (58.7%) had worked for two to three years. A number of

respondents (17%) had four years experience. Those with five years of experience were only 3.2%, while those with six years and above experience were 4.6%. The mean years worked was 2.75 with a standard deviation of 1.26. Table 15 shows the number of years worked by riders in Kisumu East sub-county.

Table 15: Number of Years Worked as *Boda Boda* Motorcycle Rider

Analysis Variable : Number of Years worked as Motorcycle <i>boda boda</i> riders				
N	Mean	S. D.	Minimum	Maximum
370	2.7513514	1.2678261	1.0000000	6.0000000

Source: Field data (2012)

Table 15 shows that the data set was not very diverse but close to the average, meaning that many of the riders had almost the same number of years in experience in the *boda boda* business. The mean for this data set reflects the number of years the *boda boda* motorcycles had been in operation in Kenya. The results were expected because in Kenya, commercial motorcycle business is relatively new. Majority got into the business after the tax exemption on motorcycles below 250cc in 2008 as a Government initiative to improve public transport and give an opportunity to the many unemployed youths to earn a living. According to the KNBS (2010), the zero rating of motorcycles below 250cc in 2008 saw the population of motorbikes leap from 3,759 units in 2005 to 91,151 in 2009. This might explain the short experience of motorcycle operators in Kenya since most riders got into the *boda boda* business after 2008.

Mahlstein (2009) had almost similar findings to the current study where in Calabar, Nigeria, 62.3% of the respondents had five years experience or less while 24.6% had been in operation for between six to ten years. The remaining 12.3% had been in operation for more than ten years. In addition, Konings (2006) who also carried out a survey among more than 100 *bendskin* riders in Douala, Cameroon, found that 76% of the respondents had less than five years motorcycle riding experience. His findings indicate that majority of those interviewed had not been in the commercial motorcycle business for more than ten years.

In Lagos the use of motorcycles for public transport began in 1980 by a group of individuals in the Agege local government area. In Kampala, it is recorded that in 1995 there were 5,000 motorcycles which increased to 40,000 in 2007 (Kumar, 2011). The above scenario has safety implications as experience is considered an important factor in motorcycle safety. Clarke et al., (2004) conclude that more experienced riders tended to be quite aware of the risks of motorcycling unlike their inexperienced counterparts. Furthermore, loss of control while negotiating a corner was a type of accident associated with inexperience in the said study. In addition, the (Hurt study, 1980) associated lack of riding experience with accident involvement.

The foregoing discussion indicates that, there may be a relationship between rider demographic characteristics and accident involvement. In other words, rider characteristics could have safety implications on motorcycle safety. Below

is a correlation between accident involvement and socio-demographic characteristics that tries to find out whether there is statistically significant relationship between socio-demographic characteristics and accident involvement.

4.2.7 Correlation between Accident Involvement and Socio-Demographic Characteristics

Table 16 : Accident Involvement and Socio-Demographic Variables

	Age	Marital	Education level	Job before	Years worked
Accident involvement in the last twelve months	-0.03598 0.4902	-0.02709 0.6035	0.06327 0.2247	0.00440 0.9328	0.01285 0.8055

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The correlation results presented in Table 16 show that none of the coefficients is statistically significant between accident involvement and the social and demographic variables. Thus, none of the coefficient can be interpreted. It should however be noted that the coefficients indicate very weak correlations between the variables as well. For age and marital status, the coefficients are negative while for education, job before and years worked, the coefficients are positive.

4.3 Socio-Cultural Determinants

Socio-cultural determinants are factors that are found outside then individual person but are seen too contribute to accident causing behaviour. This therefore emphasises the social context of riding.

4.3.1 Formal Rider Training

This objective sought to establish the level of formal rider training among *boda boda* riders in Kisumu East sub-county and how it influenced motorcycle safety. The study found that levels of formal rider training were low. Thirty eight percentage of the riders reported formal training while 62% did not undergo formal training. These results indicate that majority of the *boda boda* riders were not formally trained to ride. On answering the question why they did not go for formal rider training, a majority 94% reported lack of finances to pay for training.

In this study, those riders that were not formally trained acquired their training from fellow riders (backstreet training) at a smaller fee (between 50 and 200 Kshs) compared to commercial schools that charge between 6,000 to 9,000 for two or three weeks respectively). The fee for backstreet training is usually negotiable-not fixed. In a study on the effects of motorcycle transport revolution on the economic growth in Thika, Mbugua (2011) indicates that majority (60%) were not formally trained on motorcycle riding whereas 40% of the respondents indicated that they had received formal training on motorcycle riding. These results for the Thika study agree with the results of the current study.

In addition, Obara, (2009) while looking at motorcycle injuries in low and middle income countries observed that in Kisumu East sub-county, riders were mostly untrained. Lack of rider training has been cited as a major problem in

boda boda motorcycle safety in Kenya and other African countries. In a study on understanding the role of motorcycles in African cities Kumar (2011) observes:

In spite of their growing importance, motorcycles present some clear disadvantages from the perspective of the public interest. The motorcycle growth has developed without adhering to safety prescriptions as contained in the traffic laws of the countries. The distribution of motorcycles has been carried out without ensuring proper operator training and licensing.

Findings from related studies clearly indicate that training is a serious issue in commercial motorcycle business. The 2005 survey by Ngim & Antony (2007) evaluating the attitude of *Alalok* riders to road safety indicated that of 247 interviewed commercial motorcyclists, less than half, that is (41.3% had received formal training on motorcycle riding, and only 88 or 35.6% had a motorcycle riders' license.

The reason cited for lack of training in the two rider FGDs held for the current study in Kisumu East sub-county and key informant interviews were that, training in a driving school was too expensive. The rider FGD participants reported that they were required to pay up to Kshs 6,500 for training which was unaffordable to them. They suggested that training fee by commercial driving colleges should be reduced to about Kshs 1,500 for most of riders to access proper rider training.

It also emerged from the two rider FGDs that informal training was cheaper than formal training. The informal training was conducted by a few riders who knew how to ride. Most riders were therefore trained informally (backstreet training). This is because it was too expensive to go to training school for formal training. The riders FGD participants also claimed that most motorcycle *boda boda* riders were previous bicycle *boda boda* riders who had shifted from bicycle *boda boda* for various reasons. After a brief informal training, the former bicycle *boda boda* riders were ready to carry pillion passengers. Some participants from the two rider FGDs claimed that *boda boda* riders did not need any training because, as indicted by one FGD participant; “The matatu drivers have licenses and they still cause accidents, why should we then attend training?”

In the first rider FGD, only one out of nine participants had attended rider training. While both theory and practice in rider training are important, the members claimed that riders who went for rider training only benefited from the theory, which comprised learning about road signs, how to use lanes, etc as part of the training, but they got very little practical skills in actual riding. They were instructed by riding short distances and thus acquiring little practice and consequently ended up with inadequate skills on the road. Informal training took one or two days and was relatively cheaper as compared to formal training where the charges were Kshs 6,500. Plate 1 show for how much some riders paid for informal training and for how long they trained. It is evident that some riders pay as little as Kshs 50 to be informally trained for an hour. This was

confirmed by the riders only FGD in the study who said the fee was negotiable and could be as low as Kshs 50 per session. Riders lack of money to pay for training maybe a major limitation to motorcycle training according to the rider FGD participants.

In contrast to what rider FGD participants thought about the inadequacy of the current driving schools, a key informant from one driving school thought that there was no need to have specialized driving schools for *boda boda* riders as quoted below:

Driving schools are enough. Furthermore traffic rules for riders and other drivers are the same so I do not see the need for introducing driving schools for *boda boda* riders only. The riders should just join the existing driving schools and learn.

The above statement indicates that motorcycle riders need to be trained but not necessarily in special schools for riders only. Many accidents involving *boda boda* motorcycle have been reported and they have been attributed to lack of training for *boda boda* motorcycle riders. As Nazif (2011) puts it, the formal rider training is a process of secondary socialization through formal institutions such professional driving schools which should have a positive impact on road users' safety behaviours.

According to the Marxist theory of class structures adopted in this study, accidents are as a result of class structures based on ones relation to the means of production. A person's position in relation to the means of production may

dictate or influence some things one may or may not be able to. The inability of the riders to pay for formal training may be due lack of finances. Lack of training leads to lack of safety knowledge and appropriate riding skills. This may in turn lead to bad riding practises. In addition, the structural functionalism theory also adopted in this study indicates that motorcycle accidents are due to failure of the interdependent institutions to perform their roles within the system. For example the traffic police department failing to arrest and prosecute those who flout traffic rules.

Plate 1: Riders Trained for Kshs 50

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LAST RIDE?
TWO WHEEL HORROR

Riders trained for a mere Sh50 in just an hour

Boda boda business becomes one of the most lucrative ventures in Mombasa as youth barely out of school are lured into the trade

By PHILIP MWAGO
Mombasa County

For as little as Sh50, you can get training as a motorcycle rider in Mombasa.

And the training does not have to take months or years. An hour or less is what a jobless youth eager to make an income, will need to be "trained" as a rider.

The boda boda business has become one of the most lucrative in Mombasa County.

The most popular Kasitu, Chumprwe and Likoni mainly conduct their training at Shigiani grounds, Mshembeni and Kasitu.

Most instructors are not trained, and do not understand basic traffic rules.

The allure to the business seems irresistible and ill-trained youths are hitting the roads to shuttle passengers for a quick shilling.

They have also become targets of gangsters posing as potential customers.

A number of cyclists have been robbed of their machines, especially at night, by knife-wielding gangsters.

Some who have attempted to resist the gangs have paid dearly with their lives.

It has also emerged that some boda boda operators disappear with the bikes enroute to them.

Workers returning home from night shifts are more of the major boda boda clients.

Mr Wani Njoroge, a trained rider, said training was sometimes by some boda boda men chosen before vulnerable to causing accidents.

He said there is need for mainstreaming them especially driving schools. "However, cyclists will come in and after less than a week, they can comfortably ride through the busy streets ferrying passengers," said another trainer.

HALF THE COST

"We teach them and provide our students to go to the more established driving schools," Njoroge said.

An open ground within the sprawling Mshembeni area, Shigiani grounds serves as a training field.

It has become famous for producing most cyclists in Mombasa for just a day or less.

Here, youths scramble to get a chance to learn to ride, coming as early as 7am and paying Sh50.

"It becomes easy for them to grasp what they learn after having prior knowledge of the key issues and ma-

on us and always want us out of the street," he said.

Mwaga showed us a scar on his face, which he claimed he got after a motorist hit him from behind.

He also said boda boda operators use the bikes while drunk.

POLICE SILENCE

"This is another open lie. Why then is it that these cyclists do not fall off while riding above if they are intoxicated?" he posed.

Despite many passengers falling victims to road accidents on boda boda, the police in Mombasa refused to

A boda boda ferries a passenger along Mombasa-Malindi road. Some operators are trained in less than an hour.

Mr Wani Njoroge trains Simen Mwacha how to ride a motorcycle in Mombasa, yesterday.

A motorcyclist and a passenger made through a busy section of the road in

Source: The Standard October 5th 2010

Plate 1 demonstrates that informal training may be more popular than formal training because it is cheap, available and fast.

4.3.2 Possession of Motorcycle License

The study found out that more than half of respondents, (60.8%) were not in possession of driving licenses. About a third (39.2%) possessed motorcycle riding licenses. The lack of riding licenses for the majority of respondents was attributed to lack of money to pay for training and the availability of a cheaper 'training' option (informal backstreet training). This is consistent with findings from other studies in low and middle income countries of Asia and Africa. Kumar (2011) observes that, in Lagos commercial motorcycles are required be registered under the Road Traffic Rule and Regulations. All operators are expected to possess a driving license and a road worthiness certificate as well as use protective helmets for passengers and riders. However, this is not the case. A large number of operators do not comply with the legislation. He estimates that over 50% of the motorcycles in Lagos operating without a valid license. The situation in Douala Cameroon, however, was worse. Only 18% of commercial motorcycles (*bendskin*) riders acknowledged having a driving/riding license. The findings in the current study on possession of riding/driving license are therefore consistent with past studies done in other African countries.

The increasing motorcycle accident rates necessitated a review of the Traffic Act to ensure stiffer and deterrent penalties. The Traffic Act was amended to include section 103B in the Traffic Act Cap 403 of 2012. This new section was introduced on 1st December 2012.

Hypothesis Testing (H0₁)

Hypothesis one proposes that rider training or lack of it is likely to affect motorcycle accident involvement. In order to establish whether or not there was a statistically significant difference in accident involvement with regard to formal training, a Chi-Square test was used.

A chi-square test tabulates variables into categories and computes a statistic. In the current study, it tabulates the observed and expected frequencies of accident involvement in the categories of formally trained and not trained and tests whether the differences between them are significant. Table 17 presents the cross-tabulation of accident involvement by formal training.

Table 17: Cross Tabulation of Accident Involvement by Formal Training

		Formal Training in <i>boda boda</i> Motorcycle Riding		Total
		Yes	No	
Accident involvement in the last twelve months	Yes	49 32.9%	100 67.1%	149 100.0%
	No	91 41.2%	130 58.8%	221 100.0%
Total		140 37.8%	230 62.2%	370 100.0%

Source: Own computation based on SAS results.

$$\chi^2 = 2.60; df = 1; P = 0.107$$

This cross-tabulation helps in understanding how having formal training may affect accident involvement among *boda boda* riders. Therefore, the

explanatory variable is formal training. The study sought to find out whether training differences may cause accident involvement differences. The percentages are within the category of the dependent variable (the rows).

The respondents who had formal training and were involved in *boda boda* accidents were 32.9% while 67.1% did not get formal training in *boda boda* riding and were involved in *boda boda* accidents. On one hand, those respondents not involved in *boda boda* accidents but had formal training in motorcycle riding were 41.2%. On the other hand, those respondents who were not involved in *boda boda* accidents and at the same time not trained formally to ride motorcycles were 58.8%.

The Chi-Square results indicate that there is no significant difference between those formally trained riders involved in *boda boda* accidents and those untrained riders involved in *boda boda* accidents ($\chi^2=2.60$; $df=1$; $P=0.107$). The odds indicate that the likelihood of formally trained *boda boda* rider being involved in an accident is 0.107 at the degree of confidence of 95%. The null hypothesis that there is no significant relationship between rider training and accident involvement rates among riders of *boda boda* is therefore accepted.

This is an important finding for this study because these results may mean that, the training received in the formal training school is not necessarily different from the one received from the informal trainers therefore inadequate. This is because the motorcycle riders are still trained in the regular driving schools and

probably by untrained and inexperienced motorcycle trainers. This would produce riders that have gone through rider training but lacking in knowledge and riding skills. This may have safety implications. The results could also mean that even those who were licensed had acquired their licenses without even taking the riding test. They could have used corrupt means to be licensed.

4.4 Motorcycle Safety Knowledge

The study sought to find out the levels of motorcycle safety knowledge among *boda boda* riders in Kisumu East sub-county. This was in order to find out how different levels of safety knowledge may influence *boda boda* motorcycle safety in Kisumu East sub-county. The safety aspect/elements included: levels of motorcycle safety knowledge, respondents rating of the most important safety measures, number of passengers transported at a time, *boda boda* motorcycle average speed, number of helmets a rider possesses, helmet use by passengers as reported by riders and frequency of helmet use by riders.

Study findings indicate that, majority (66.5%) had low level of motorcycle safety knowledge and the study came up with a typology. Personal physical safety measures were rated as most important 66.2%. On number of pillion passengers transported at a time, 58.6% reported transporting one passenger at a time. About half (48.9%) of the riders rode at 50kph. The study found that *boda boda* speeds were not regulated. On helmet possession and use, 65% had one helmet and 72.2% of the respondents reported non-use of helmets among passengers. Finally, 63% of respondents sometimes used helmets. A detailed discussion of the results is given below.

4.4.1 Level of Motorcycle Safety Knowledge

In order to assess the level of motorcycle safety knowledge, three specific areas were addressed: personal physical protection, awareness of the importance of motorcycle good conditions and rider's behaviour. Findings in the current study indicate that 66.5% of the respondents who comprised the majority had low level of motorcycle safety knowledge, while 29.2% had moderate knowledge. Only 4.3 % of the respondents had high level of motorcycle safety knowledge. To determine low, moderate and high levels of motorcycle safety knowledge, the study came up with a typology, a classification scheme designed to facilitate understanding and comprehension. In the typology, those respondents who identified all the three aspects in motorcycle safety were said to have high levels of safety knowledge; while those who identified two aspects had moderate and those who identified one or none had low levels of motorcycle safety knowledge. Table 18 shows the typology.

Table 18: Motorcycle Safety Knowledge Typology

Motorcycle safety knowledge	Personal physical protection	Importance of good motorcycle mechanical condition	Rider's behaviour or riding practices	Total count
High safety knowledge	+	+	+	
Moderate safety knowledge	+	+		
Low safety knowledge	+			

Source: Synthesised from field data (2012)

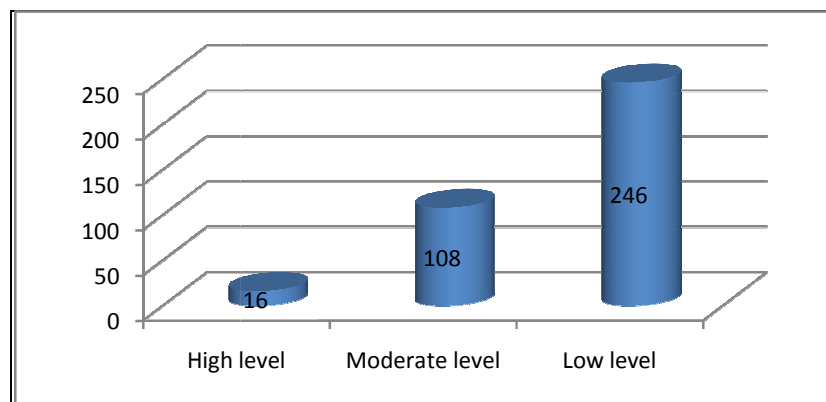
Road safety knowledge for riders is important to avoid or reduce accidents. This can be achieved through motorcycle rider training and road safety campaigns. When riders lack formal training it means that motorcycle safety knowledge is limited thus jeopardizing their safety and that of other road users. The Marxist theory of social structures explains that due to their social category, the riders are not able pay for training and therefore may not be well vast in safety knowledge and riding skills. Furthermore, most riders did not understand how important the three aspects of personal safety, mechanical and behaviour affect motorcycle safety.

There were various themes on safety that emerged from the qualitative data of the current study. For example, from the driving schools' officials, the emerging theme was lack of formal training for riders and therefore lack of information on road safety and how to avoid traffic accidents. Another theme was that riders were not conversant with traffic rules and this compromised safety. It also emerged that many riders were previous bicycle *boda boda* riders without training and did not adhere to traffic rules. Many of the riders did not have safety gear and those who had them did not use them perhaps because of lack of understanding of their importance.

These findings are consistent with other studies in Africa. Obara (2009) found out that motorcycle riders lacked knowledge on road safety; Kumar (2011) observes that, motorcycle safety standards were compromised. Urban roads and highways were increasingly unsafe as riders who were not cautious or

knowledgeable about traffic rules and regulations, compete on the streets for customers. Konings (2006) also points out that many *bendskin* riders did not know the most elementary rules.

Knowledge of motorcycle safety should be able to reduce the high incidences of traffic accidents involving *boda boda* motorcycles. In this study, it was evident that most respondents had low level of motorcycle safety knowledge. Therefore, as the structural functionalist theory suggests, the institutions charged with the responsibility of training and sensitization needs to do their work in collaboration to ensure this function is performed. Motorcycle safety knowledge can be disseminated to the public through public means like the media. Such safety knowledge may lead to positive attitudes towards road safety thereby improving motorcycle safety. Figure 3 illustrates the level of safety knowledge among *boda boda* riders in Kisumu East sub-county.



Source: Field data (2012).

Figure 3: Level of motorcycle Safety Knowledge

4.4.2 Respondents' Rating of the Most Important Safety Measures

For motorcycle riding to be safe, three aspects of safety must be considered: personal physical measures, safe riding practices and good / safe motorcycle conditions. In this study, 66.22% of the respondents reported personal physical safety measures, such as helmets, boots, gloves, and heavy jackets as the most important in motorcycle safety. This was followed by safe riding practices at 31.35%. These include practices like use of reflective jackets, not riding under the influence of drugs, not answering or making calls while riding, using daytime headlights, and not overlapping (overtaking on the wrong side). The remaining, about 1%, reported safe motorcycle conditions, such as good breaking systems, reflectors, proper and frequent motorcycle servicing, and tires in good condition as most important. The results suggest that very few respondents (1%) understood the importance of good motorcycle conditions. Table 19 shows the distribution of respondent's most important safety measures.

Table 19: Distribution of Respondent's Most Important Safety Measures

Respondents most important safety measure				
Rating	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Physical personal safety measures	245	66.22	245	66.22
Safe riding practices	116	31.35	361	97.57
Safe motorcycle conditions	4	1.08	365	98.65
Do not know	5	1.35	370	100.00

Source: Field data (2012)

From the riders' only FGDs, it emerged that riders knew the importance of a helmet as a safety gadget. Apart from protection in the event of an accident, they also noted that helmets protected riders from wind and dust. The only other gadgets for physical protection that they mentioned were gloves, which, again they said were expensive costing up to Kshs 2,00 (\$23). They did not mention other physical safety gadgets like boots or protective jackets. This may be attributed to lack of knowledge of their importance in motorcycle safety given that most respondents had a low level of motorcycle safety knowledge as already observed in the current study.

Mechanical conditions of motorcycles are an important aspect in motorcycle safety. Despite that, riders did not prioritize it accordingly in this study. This suggests that riders did not think much of mechanical conditions of motorcycle they rode. Even when they indicated knowledge they did not put it to practice, they still used faulty motorcycles. The *boda bodas* were mostly serviced by the owners whenever they found it necessary. The respondents claimed that if a rider was ferrying a passenger and the motorcycle developed a mechanical problem mid-way, the rider had to get the customer to his / her destination first before attending to the problem. Failure to do that, they claimed that the customer would refuse to pay for the distance covered. The respondents reported that since they had a financial target to meet, they would ride on to the pillion passenger's destination. This is clearly indicated by one of the participants in one of the rider only FGD.

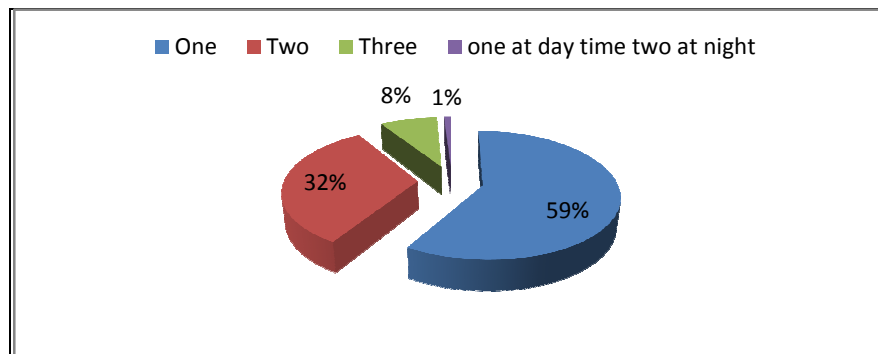
“Why we use *boda boda* even when they are faulty is because if we stop mid-way because of mechanical problems, the customer will not pay and we have a target to meet. So we ride on – *ni hali ya customer* (that is how customers are) – they will not pay if they do not get to their destinations.”

It is evident from both qualitative and quantitative data that, the helmet is the most known safety gadget and the most used as compared to others such as boots, gloves and protective jackets. The mechanical conditions of motorcycle did not receive the much attention it required. Also, the fact that one required money to fix whatever mechanical problem there was, made it hard for the riders to deal with the mechanical problem as soon as was necessary. The loss of income as one attends to the mechanical problem was also a challenge as one focus group participant indicated.

The Haddon Matrix of Accident Prevention (see Table 6) includes improved vehicle maintenance, and improvements to braking, choosing safer motorcycles among others as necessary to avoid accidents. It is therefore necessary to have motorcycles in good working conditions as one of the factors causing accidents so that mechanical faults do not lead to accidents.

4.4.3 Number of Passengers Transported At a Time

Overloading has been cited as a cause of accidents on many roads especially among public service vehicles (Assum, 1998). Despite that, this study found that majority (58.6%) of the respondents transported one pillion passenger at a time. The other 32.4% carried two passengers at a time, while 8.1% indicated that they would sometimes ferry three passengers at a time. The remaining 0.8% transported one passenger during the day and mostly two at night due to security reasons on the part of the passenger. The respondents claimed that passengers preferred to travel in twos at night for fear of attacks from riders unless they knew the rider well. Although 58.6% of the respondents reported transporting one passenger at a time, it is evident that there are cases of overloading among *boda boda* motorcycles. The 32.4% that ferried two passengers together with the 8.1% that ferry three passengers add up to 40.5%. The focus group participants and key informants also indicated that overloading was a problem in Kisumu East sub-county just like the other bad / unsafe riding practice. Figure 4 shows the number of passengers transported at a time.



Source: Field data (2012)

Figure 4: Number of Passengers Transported at a Time

The researcher observed overloading in all the streets in Kisumu East sub-county and its outskirts. As illustrated in plate 2, overloading is not uncommon in most towns in Kenya. Riders ferry up to five passengers at the same time. In the eventuality of an accident, there could be numerous losses of lives. The traffic rules introduced in December 2012 make it illegal to transport more than one passenger on a single trip. Plate 2 was evidently taken during the day in a town street where we expect law enforcement officers to be patrolling and therefore apprehend those overloading. This further indicated that the rider and the passengers did not respect the Traffic Act or they were not aware of it. With regard to the number of passengers transported at a time, the study findings indicate that riders were motivated by various reasons. Those who carried one passenger at a time, reported their motivation to be adherence to traffic rules, while those who carried more than one passenger wanted to make more money and meet their daily targets. Plate 2 presents an overloaded *boda boda*.



Source: Daily Nation 22nd April 2012.

Plate 2 an Overloaded *Boda boda*

The photo shows a *boda boda* with three adults and two children. Notice that none of the pillion passengers has a helmet. In addition, the young girl seated in front of the rider sits on the fuel tank. Box 1 below further confirms the overloading practise.

Two die as vehicle rams bike carrying pupils

BY NATION CORRESPONDENT

Two people died while four children are fighting for their lives after the motorcycle they were riding was hit by a vehicle on the Busia-Bungoma road.

The St Florida Academy pupils were on their way home when the driver of the vehicle lost control and hit the motorcycle on Tuesday evening.

A six-year-old pupil died on the spot while the rider succumbed to injuries on the way to hospital.

The four pupils were admitted to

St Mary's Mission Hospital in critical condition. Witnesses said the driver of the car swerved and rammed the boda boda.

"The motorcyclist had gone to pick his daughter and four others from the school and was on his way home when the accident occurred," said one witness who did not want to be identified.

Mumias police boss George Seda said the occupant of the ill-fated car escaped on sensing danger.

The vehicle and the wrecked motorcycle were towed to Mumias Police

Station.

The incident comes hot on the heels of a grisly road accident that left several pupils dead and many others injured in Bungoma County recently.

The officer disclosed that bumps would be erected on the Busia-Bungoma road.

"Many similar accidents have happened there due to speeding and reckless driving," Mr Seda said.

He accused motorists of violating traffic rules on the busy highway, leading to increased accidents.

Source: Daily Nation 15th March 2012

Box 1: Rider and Pupils Die in a *Boda boda* accident

Box 1 clearly illustrates that overloading school children on *boda boda* is a common practice among riders. This form of transportation is used for school transport in many areas in Kenya. This poses a serious problem because the risk of falling off a motorcycle for a child is quite high especially on bends due to a child's light weight. And for those children who are very young such that their feet cannot reach the foot rest, it is more risky. Plate 3 shows six children on a *boda boda* motorcycle going to school. It can be observed that the younger children are seated in front of the riders facing him and their legs cannot reach the foot rest. This is a very dangerous way of transport school children. In some countries like Uganda, children are not allowed on motorcycles unaccompanied. In Kenya, the issue of children and *boda boda* motorcycles is not addressed in the Traffic Act but it needs urgent attention. The newly proposed motorcycle

regulations do not adequately address the issues of children riding on motorcycles as passengers. The regulations propose that children sit between the rider and another passenger (sandwich) while being transported. This essentially means that the riders will carry two passengers. But how safe is this sandwich passenger?



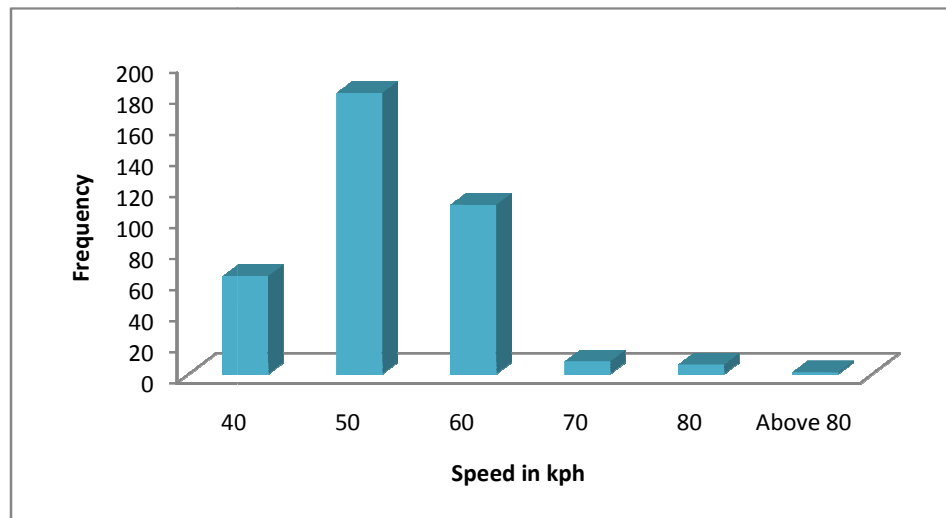
Source: Photo taken by Jacob Owiti

Plate 3: A *boda boda* rider takes six children to school in Kisumu on March 23, 2014.

The lack of motorcycle safety knowledge (due to lack of or inadequate training) together with need to make enough money for the day might motivate a rider to engage in bad riding practises. This is especially when rules and regulations are not implemented because some concerned institutions are not performing their functions as a team. This may therefore lead to motorcycle related accidents.

4.4.4 Boda Boda Motorcycle Average Speed

The Kenya Traffic Act does not explicitly indicate the speed limits for the *boda boda* motorcycles. The study findings indicate that close to half (48.9%) of the riders rode at 50 kilometers per hour whereas 29.55% rode at 60kph. Another 17% rode at 40 kilometers per hour and the rest either rode at 70, 80 and above 80kph. Figure 5 presents *boda boda* motorcycle speeds.



Source: Field data (2012)

Figure 5: Motorcycle Riding Speeds

According to the Traffic Act (2009), motorcycles travelling on dual carriageway should not exceed 110 kph while on a single carriageway, the speed limit is 100kph. In this case, motorcycles are not considered as public service vehicles. The Act also states that all commercial vehicles and public service vehicles have their speed limit at 80kph on any type of road. This only applies to commercial public service vehicles. What is not clear is the category to which

the *boda boda* motorcycles fall because legislation does not specifically classify them as public service vehicles.

The foregoing discussion indicates that the speed for *boda boda* motorcycles is not regulated. This seems to emanate from legislative issues. The amended Traffic Act (2012) does not give specific guidelines on *boda boda* motorcycle speed. This is despite the insertion of section 103 B in the traffic Act in December 2012 (amended Traffic Act). This may therefore mean there is no one speed limit for *boda boda* as per the current Traffic Act. The Act only indicates that riders must be licensed, have reflective jackets, two helmets and may not transport more than one passenger at a time among others. There is therefore a gap in as far as what the speed of *boda boda* motorcycles should be. There is even a greater gap in as far as when the motorcycle has a passenger and when they do not have a passenger. This warrants further attention.

Konings (2006:43) observed that speeding was a problem in Douala. This is how he captures it:

Young *bendskin* riders are renowned for driving recklessly. They tend to drive at high speed, ignore traffic lights overtake on the left and the right, stop without warning, and do U-turns, exposing themselves and their passengers to untold dangers. As a result of their recklessness, *bendskin* drivers cause many accidents.

In a study by Clark et al., (2004:35), speeding was found to be common among the respondents, “with 58% reported to always, or frequently, breaking the speed limit. The remaining respondents admitted to ‘occasionally’ breaking the speed limit but only when they thought it was safe to do so. Travelling in excess of the speed limit was considered to be a contributory factor in just 3.5% accidents on the motorcycle accident database. Of these, 62% were a result of the motorcyclist speeding.” In United States of America, a study among the motorcycle operators and passenger vehicle drivers involved in two – vehicle crashes in 2005, it was observed that rider was driving too fast for the road conditions. They exceeded the speed limit (NHT SA, 2007). In Kenya it is difficult to comment on the speeding issue since *boda boda* speed is not regulated.

Research has been conducted into the intention to commit violations (Forward, 2006) and specifically into the intention to speed and speed has been linked with increased accident liability in many of these researches. According to Lawton et al., (1997), intention to speed varied across different road types and that this was related to the perceived negative consequences. For example, if one perceives that they will be arrested for speeding, they will have a low intention to speeding and therefore unlikely to speed. But if they have no regard to being arrested they will still go ahead and commit the violation of speeding because they have no regard for these negative consequences of speed. And this will apply to all these other types of violations.

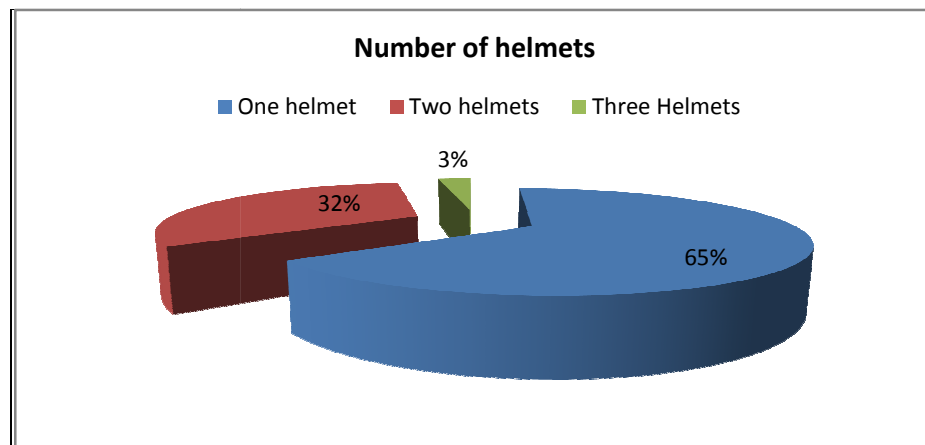
The current study has shown that, 62.16 % of the *boda boda* riders did not have formal training in motorcycle riding. In this case, riding a motorcycle even at 40kph may be potentially dangerous due to lack of training and bad road conditions. Road conditions include weather, and time of day (day or night). Other road conditions may be potholes, wet roads, loose stone and gravel, winding roads with sharp bends, blind spots, and objects. When motorcyclists ride at high speeds, they can cause accidents (Clarke et al., 2004).

4.4.5 Number of Helmets a Rider Possesses

Every rider or *boda boda* motorcycle operator needs to have at least two helmets, that is, one for the rider and the other for the passenger. When only one helmet is available, it then means that one of them will be without a helmet. This study found that 65% of the respondents possessed one helmet, 32.2% had two helmets while 2.7% had none. These findings imply that, 65.1% of users of the *boda boda* motorcycles may not have had the chance of using the helmet assuming that the one helmet is used by the rider only. The remaining 32.2 % had two helmets which may or may not have been put to use for other reasons which the study will explore later. It emerged that when one motorcycle is bought, it comes with one helmet. It is the responsibility of owner to buy the second helmet mostly for the passengers. If the owner does not buy the extra helmet, then either the rider or the passenger will lack a helmet. From the one of the rider only FGDs, a participant observed that helmets were expensive as they averaged between (Kshs 1500-3,500) or (\$ 17 – 38) per piece. This price was

said to be rather prohibitive for most *boda boda* owners. Owners of the *boda bodas* were unwilling to buy hence majority of the respondents had one helmet.

In addition, lack of enforcement of the helmet law meant that there was no motivation to have the two required helmets. It is easy for the *boda boda* owner to avoid buying an extra helmet because the law requiring that the rider and pillion passenger wear helmets is not enforced and therefore there is no fear for the consequences. Hence, the owner does not buy the extra helmet. The hired riders may not buy the extra helmets because it is not their responsibility. Figure 6 illustrates respondents' number of helmets.



Source: Field data (2012)

Figure 6: Respondent's Number of Helmets

4.4.6 Helmet Use by Passengers

The Kenya Traffic Act requires that, *boda boda* passengers use helmets. The Traffic (amendment) Bill Cap 403 has had insertion of section 103 B, where

among other things in the Traffic Act, section 103B states that, motorcycle operators should only ferry one passenger and the passenger and rider must put on reflective vests and helmets. This study found that 72.2% of the respondents reported non-use of helmets among passengers, while only 24.6% reported the use of helmets. The remaining 3.2% used helmets occasionally. Consequently, this study found, use of helmets by passengers as reported by the respondents to be minimal. In the recently amended Traffic Act, there is a fine of Kshs 10,000 and in default 12 months imprisonment for those who do not comply with the helmet law. It is not easy to tell if this has been enforced fully. This is because many riders could still be spotted ferrying passengers that did not have helmets. There have also been sporadic arrests of those not using helmets. Table 20 shows the frequency of use of helmets by motorcycle passengers.

Table 20: Use of Helmets among Motorcycle Passengers as Reported By Riders

Do passengers use helmets	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Yes	91	24.59	91	24.59
No	267	72.16	358	96.76
Some	12	3.24	370	100.00

Source: Field data (2012)

Use of helmets is low in many countries. Studies have shown that wearing a motorcycle helmet correctly can reduce the risk of death by 40% and the risk of severe injury by 70%. Motorcyclists who do not wear helmets are almost three times more likely to be killed compared to those who wear helmets WHO, (2009). In a study of factors associated with severity of road traffic injuries in

Thika – Kenya, Bachani et al., (2012) observed that measures such as helmets would help reduce severity of road traffic injuries.

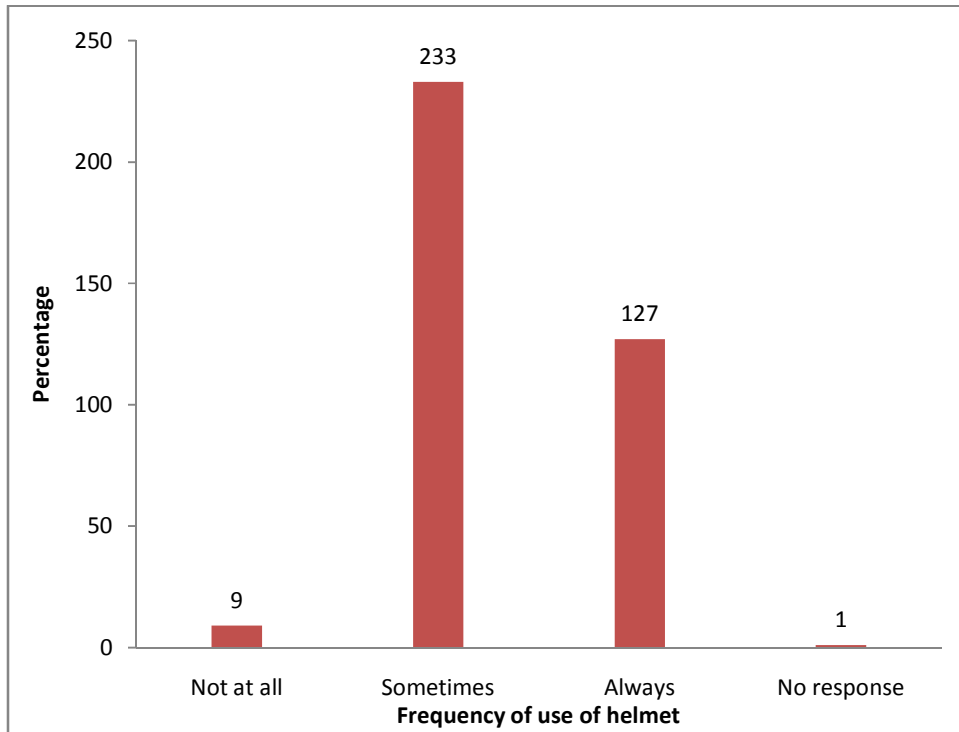
In the current study, the reasons given for non – use of helmets by passengers as reported by the riders were varied. The helmets were said to be unhygienic by 60% of the respondents, who said that they found them to be dirty, smelly and sweaty and could transmit skin diseases because they were shared. Apart from hygiene, 35% of the women were concerned about their hair; they claimed that helmets spoiled their hairstyles. They hence preferred not to use them. In both the passenger FGDs, the hair style and hygiene were emphasized. The women participants indicated that indeed those factors affected helmet use.

The reasons put forward by the passengers for non-use of helmets in this study needs to be taken seriously. When there is only one helmet which is shared among all passengers, a concern over hygiene becomes valid. On the issue of hygiene, there can be improvised or disposable paper to be put on the inner side of the helmet although this may have environmental and financial implications. In Nigeria, the people have found ways to cope with the hygienic problems. Some passengers now wear a cap, a scarf, or even a handkerchief on top of their head before putting on the helmet (Connors, 2010). This could help if adopted in Kenya to ensure that the rate of helmet use goes up if their reason for non use of helmets is hygiene. Unfortunately literature does not indicate the extent to which this strategy improved helmet use in Nigeria. In addition, in Nigeria when the Helmet law was enacted in 2009, the passengers concerns were that

the helmets had some '*juju*'(witchcraft) put there by the motorcyclist to make the passenger dumb and then steal from him or her or to hypnotize unsuspecting passengers for rituals (Connors, 2010; Oseni, 2009). In Lagos Nigeria spiritual meaning is attached to the use of helmets. While the concerns may differ slightly, they all contribute to non-use of helmets among motorcycle passengers.

4.4.7 Frequency of Helmet Use among Riders

In the Traffic Act, the inserted section 103B states that, motorcycle operators / rider must put on a helmet. This study found that 2.43% of the respondents reported never used helmets, 34.32% always used helmets and the majority at 62.98% sometimes used helmets. Figure 7 indicates the percentage frequency of helmet use by riders in Kisumu East sub-county.



Source: Field data (2012)

Figure 7: Percentage Frequency of Helmet Use by Riders

Similar to passengers' helmet use, the use of the same among riders was low. Some reasons given for non – use of helmets by riders and riders only FGD participants were that helmets were inconveniencing because they cover the ears and one was not able to hear well. The helmets were also reported to be uncomfortable. They were hot and hindered them from seeing properly. Some respondents' gave reasons, such as helmets being expensive to purchase. It was noted that riders avoided use of helmets for short distance. They claimed that nothing would happen to them because they were just taking a short distance. They did not expect to be involved in an accident in short distances. This brings in the question of risk perception, how do these riders perceive risk for short

boda boda trips? According to Swidler (1986) as cited in Factor, Mahalel, & Yair (2008), social and cultural variables may influence action through shaping a behaviour repertoire. In this case road safety actions could be influenced leading to motorcycle accidents. Given that societies include varied groups that could be ethnic or socio-economic groups there is variation in behaviour and this may have some influence on behaviour. One may then assume that different social groups have different levels of risk taking while driving/riding (Factor et al., 2008).

It is possible in hot weather for helmets to be uncomfortable. Kisumu East sub-county is characterized by high temperatures. Therefore, most of the days are hot. The general discomfort could also be attributed to the quality of the helmets, because in Kenya, the law does not give requirements for specific helmet standards. Poor quality helmets that are not worn properly may be uncomfortable. As indicated earlier, one interesting observation made in this study was that riders did not use helmets while going for short distances. The riders reasoned that nothing would happen to them while on short trips.

The findings of this study are consistent with finding from other studies done in other countries. Hurt et al., (1981) observe that, voluntary safety helmet use by those motorcycle riders involved in accidents was lowest for untrained, uneducated and young motorcycle riders on hot days and short trips. This partly reflects the situation in Kisumu East sub-county. In another study on motorcycle helmet use among adolescents in Greece, Gemeni et al., (2009)

observe that among helmet users, the perceived benefit of helmet use was protection in the case of an accident, while among non – users the benefit was avoiding arrests and fines from traffic police. The barriers to helmet use as identified by non users included: low perceived efficacy of helmets; lack of appropriate information on helmet use; high helmet cost; lack of convenience; vision and hearing and disturbance. The problem of wrong information or no information on helmet use is not specific to Kisumu East sub-county, as is evident. The findings from Germen et al., (2009) study are similar to the findings from the current study. The Germen et al., (2009) study concluded that when social norms of low compliance to safety laws prevail, qualitative research can assist in developing tailored educational interventions targeting behaviour modification among adolescents.

It is important for riders to wear helmets whenever they are riding. According to Solagberu et al., (2006) who studied motorcycle injuries and the vulnerability of riders, passengers, and pedestrians at a Nigerian university hospital, none of the motorcyclist accident victims brought over a 12 month period had been wearing a helmet at the time of the accident. For the eight patients who died, seven had head injuries due to lack of helmet to protect the head from injuries. Lindskog & Al Haji (2005) in a study on road safety in Southeast Asia observe that the risks of motorcyclists not using helmets are much higher than those wearing helmets.

Motorcycles do not offer much protection to the riders, thus helmets are required for people riding motorcycles. As in the case of Kenya, helmet laws are not enforced in many ASEAN countries despite laws making wearing of helmets compulsory across the region. Only 3% of Vietnamese motorcycle riders use helmets. In Indonesia, motorcycle passengers rarely wear helmets in rural areas. In other countries like Malaysia and Singapore, there are a high percentage of motorbike riders who wear helmets. The introduction of helmet use has led to a significant reduction in motorcycle deaths in both countries (Lindskog & Al Haji, 2005). Helmet use should therefore be encouraged in Kisumu East sub-county through education, legislation, publicity campaigns and law enforcement. Helmet-wearing rates increase by 90% when laws are enforced effectively (WHO, 2009). Plate 4 shows riders waiting for passengers at a street in Kisumu town.



Photo taken by author (March 2012)

Plate 4: Riders waiting for passengers on the streets of Kisumu town.

Note: Ben is one of the *boda boda* motorcycle riders in Kisumu town. He did not have a helmet or a reflective jacket. The author also observed the same among most of the riders at this assembly point.

It is evident that there is low level of motorcycle safety knowledge, this is in regard to safety measures, overloading, helmet use and *boda boda* speed. In addition, there is a gap in as far as what the speed of *boda boda* motorcycles should be. There is need therefore to ensure safety knowledge is disseminated to the riders and the public (potential passengers) in order to reduce motorcycle related accidents.

4.5 Rider Accident Involvement

The study also sought to find the perceived causes of *boda boda* motorcycle accidents in Kisumu East sub-county. The factors taken into consideration in this objective included: rider accident involvement, number of accidents involved in the last 12 months and perceived causes of accidents. This objective sought to find the rate of *boda boda* motorcycle accidents in Kisumu East- sub-county. The results indicated that accident involvement was high. Forty percent (40.27%) of the respondents had been involved in an accident. The main perceived causes of accidents as reported by respondents were speeding (89.7%) and drunk driving (56.5%). In addition, deaths and injuries related to motorcycles had increased from 453 in 2005 to 1,991 in 2013 according to the traffic police records.

4.5.1 Riders Accident Involvement Rates

Road traffic crashes, injuries and deaths involving motorcycles have increased noticeably and are putting a heavy burden on families, communities and the health system, in general. The study findings show that 40.3% of the respondents had been involved in an accident. The remaining 59.73% had not been involved.

On answering the question whether respondents knew anyone who had been involved in an accident for the last 12 months, the study found out that 90.3% reported knowing someone who had been involved in accident regardless of the nature of that accident. This may be an indication that there were many accidents among *boda boda* operators and passengers than were reported.

4.5.2 Number of Accidents Involved In in the Last 12 Months

There has been a 5 – fold increase in motorcycle related deaths reported by the Kenya traffic police between 2005 and 2013. The study findings showed that 40.3% of the respondents in the study were involved in only one accident. About 4% had been involved in two accidents. Fifty nine percent were not involved. It is reported that accidents involving motorcycles are on the increase. The problem has become so severe that some hospitals have complete wards set aside for these accident victims. Table 21 indicates the numbers of accidents respondents were involved in, in the last 12 months in Kisumu.

Table 21: Distribution of Number of Accidents Involved In In the Last 12 Months

Number of accidents	Frequency	Percent	Cumulative Frequency	Cumulative Percent
One	114	30.81	114	30.81
Two	15	4.05	129	34.86
Three	2	0.54	131	35.41
Four	2	0.54	133	35.95
No response	18	4.86	151	40.81
None	219	59.19	370	100.00

Source: Field data (2012)

Motorcyclists account for the most of road casualties and therefore require most attention in road safety programs. There has been a sustained increase in the number of motorcycles registered in Kenya. According to Kenya Revenue Authority, the highest registration of motorcycles was in 2011 when 140,215 units were registered; accordingly the data from the police record indicate that, deaths and injuries related to motorcycles have increased from 453 in 2005 to 1,991 in 2013. This is an increase of 439%.

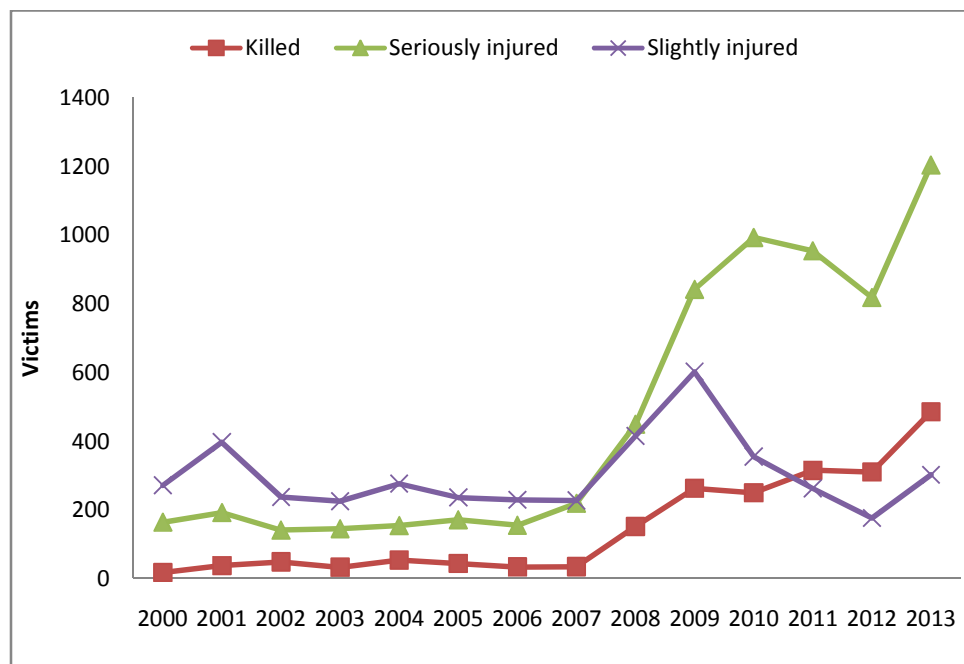
Studies from other countries also indicate that rider accident involvement was high. According to Sufiyan & Ahmad (2012) in a study in North-west Nigeria, seventy six percent (76.4%) of the respondents had been involved in accidents and 68.6% of which occurred 6 months preceding the study. In South Western Nigeria, 45.3% had been involved in a road traffic accident out of these 62.5% were involved in a single accident, while 37.5% were involved in 2 or more accidents (Owoaje, Amoran, Osemeikhain, & Ohnoferi, 2005).

Almost similar to the current study, a study in a rural community in south west Nigeria, found out that in the two hundred and ninety nine motorcyclists interviewed, 136 (45.3%) had been involved in a road traffic accident (Owoaje et al., 2005). Other studies also indicate that accident involvement is high among commercial motorcyclists in Africa (Konings, 2006; Kumar, 2011; Mahlstein 2009; Adoga 2012).

As illustrated in Figure 8 there has been a steady increase in the number of those killed and injured in motorcycle accidents among all the three categories. This may be attributed to a number of factors. For example, it was in 2008 that the Ministry of Finance (through a gazette notice) zero rated all motorcycles below 250 cc. This meant that more people were able to acquire motorcycles. In addition, there were no motorcycle specific driving schools. Therefore, those trained went to the regular driving schools or learnt to ride informally from their friends at a small fee. This may explain the sharp increase in those killed and injured in motorcycle accidents in the 2008-2010 periods.

There was, however, a slight decrease in the number of those killed and injured in motorcycle related accidents in 2012. This was also the year that there was fewer registration of motorcycles compared to the previous years (2009, 2010 and 2011). The fewer people killed and injured in 2012 could be as a result of enforcement of traffic rules. This was also the year the Traffic Act was amended and section 103 B (for motorcycles) inserted. It will be interesting to find out why even after inserting section 103B of the Traffic Act in December 2012, (with stringent rules and penalties) accident involving motorcycles' increased in

the following year. Could it be that the rules were not enforced effectively? Could it be that the riders flout the rules with impunity? Are the penalties not severe enough? Has non-adherence to the traffic rules become a way of life (culture). Figure 8 shows the number of those killed or injured in motorcycle accidents between 2000 and 2013.



Source: Own computation based on data from the Traffic Accident Statistics summary for the year (2000-2012).

Figure 8: Those killed or injured in motorcycle accidents (2000-2012)

4.5.3 Perceived Causes of Accidents as Reported by Respondents

Regarding the perceived causes of motorcycle accidents, the study found speeding, overloading drink driving, wrong overtaking and poor roads as the perceived causes of accidents but in varying percentages. Since speeding and overloading have been discussed elsewhere in this study (See section 4.4.3 and

section 4.4.4) this section will only focus on wrong overtaking, drink driving, and poor roads as perceived causes of *boda boda* motorcycle accidents.

The study found that 79.7 % of the respondents did not think poor roads were causing *boda boda* accidents. As for riding under the influence of alcohol, 56.5% of the respondents considered it a cause of accidents while 74.1% thought wrong overtaking was not a cause of *boda boda* accidents. Table 22 presents the frequency distribution of perceived causes of *boda boda* motorcycle accidents.

Table 22: Perceived Causes of *Boda boda* Motorcycle Accidents

Perceived causes of <i>boda boda</i> motorcycle accidents	Responses			
	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Speeding/careless riding	332	89.7	38	10.3
Overloading	61	16.5	309	83.5
Poor roads	75	20.3	295	79.7
Drink driving	209	56.5	161	43.5
Wrong overtaking	96	25.9	274	74.1

Source: Field data (2012)

Literature indicates that wrong overtaking, poor roads and riding under the influence of drugs is perceived to lead to accidents. Clarke et al., (2004) observes that driving under the influence of alcohol, and overtaking in inappropriate situations contributed to accidents. In addition, according to Clarke et al., (2004) poor road surfaces were considered a big threat to the riders. Thirty two point six percent (32.6%) of the respondents claimed that

poorly maintained roads were one of the main causes of motorcycle accidents. Respondents therefore associate poor roads with accidents. Also, due to the complex nature of riding a motorcycle, being drink can complicate riding leading to accidents.

Though this study did not seek to find out the actual causes of accidents, literature suggests that the actual causes of motorcycle accidents are varied and include: poor or lack of training (Clarke et al., 2004). Riding beyond the speed limit (Lawton et al., 1997). Being too fast for the road conditions, careless riding poorly maintained motorcycles, overloading, and wrong overtaking, poor observation and attention, inexperience and risk taking (Mannering & Grodsky, 1995).

In relating to the structural functionalist theory, the different institutions that are interdependent must work together to ensure safety. In order to deal with drink driving, the legislation needs to be enforced. Road designs or conditions must also be improved. It is evident that accident involvement was high and the main perceived causes of accidents as reported by respondents were speeding and drink riding. In addition, deaths and injuries related to motorcycles were on a steady increase.

4.6 Rider Attitude and Behaviour

4.6.1 Rider's Attitude towards Working as *Boda Boda* Operators

The study sought to find out the riders attitudes towards their work as riders. By use of a four point likert scale, attitude variables were ranked according to the rider's opinion on certain aspects of his work as a rider. The study found that riders were most satisfied with the conditions of their motorcycle and least satisfied with their relations with law enforcement officers. On rider behaviour and practices, the study used an opinion scale and found that 71% of the respondents had engaged in bad riding practices at some point in their work.

To find out the riders' attitudes towards the *boda boda* business, the respondents were asked to rate attitude variables statements on a 4 point likert scale, where 4 was the highest score and denoted the score with the most positive attitude. An example can be given based on the first attitude variable, statement. "I am satisfied with the money I get as a *boda boda* rider". Total responses for SA were, 11 for A =95, D=199 and SD= 65. Therefore 11 is multiplied by 4, then 95 by 3, 199 by 2, 65 by 1. Adding the results of the above gets the score that is, $11 \times 4 = 44$, $95 \times 3 = 285$, $199 \times 2 = 398$, and $65 \times 1 = 65$. The score is 792. To get the possible maximum score the total responses were multiplied by the highest score, which is $370 \times 4 = 1480$. The total percentage score for the attitude variable statement was given by $792 \div 1480 \times 100 = 53.5\%$. The ranking used, places the *boda boda* riders on a range showing how they felt about the variable statements given in the matrix. The same procedure was

carried out for all the eight variables. Table 23 presents rider's attitudes towards their work as *boda boda* riders.

Table 23: Riders' Attitudes towards Their Work as Boda boda Riders

Attitude variable statement	Strongly Agree	Agree	Disagree	Strongly Disagree	Total	Percentage Score	Rank
I am satisfied by the condition of the <i>boda boda</i> motorcycle I ride.	43×4	214×3	104×2	9×1	1031	69.66%	1
I am comfortable with the number of hours I work per day.	11×4	152×3	157×2	50×1	864	58.37%	2
I am satisfied with the money I get as a rider	11×4	95×3	199×2	65×1	792	53.51%	3
I like the way passengers hold my body while am riding	17 ×4	107×3	148×2	98×1	783	52.90%	4
Road conditions are good enough for my riding	16×3	52×3	257×2	45×1	763	51.55%	5
Other road users behave responsibly on the road.	6×4	42×3	271×2	52×1	744	50.27%	6
Law enforcement officers do not harass me unnecessarily.	14×4	45×3	181×2	130×1	683	46.14%	7
When I see traffic police officers I relax and continue with my work without fear	7×4	49×3	148 ×2	166 ×1	637	43.04%	8

Source: Field data (2012)

Key: SA=Strongly Agree, A=Agree, U=Undecided, D=Disagree, SD=Strongly

Disagree

Their results were ranked from 1 – 8. Since this is an ordinal measure scale, the results could only tell the riders position or opinion on certain issue. From the current study it is evident that, riders were satisfied most with their motorcycle condition and least satisfied with their relationship with traffic police officers. Since almost all the eight variable statements have been tackled under various sections in this study, this section will not give further discussions to the variable already highlighted. Instead, it will look at three only three variables

1. The variable ranked number 6 (other road users behave responsibly on the road)
2. The variable ranked number 7 (law enforcement officers do not harass me unnecessarily)
3. The variable statement ranked number 8 (when I see traffic police officers I relax and continue with my work without fear).

Variable statement ranked 7 and 8 will be combined since they were related.

4.6.1.1 Riders' Attitude towards Law Enforcement Officers

The study findings show that *boda boda* riders were not comfortable with law enforcement officers. The riders felt harassed by the officers. The variable statement was ranked 7th in the range with a percentage score of 46.14%. It had the third highest score of disagreement. This was an indication that the riders did not have a good attitude towards law enforcement officers. These includes the council *askaris* who must get the daily parking rates from the *boda boda* never mind that there are no designated parking areas for *boda boda* motorcycle in Kisumu town. This is likely to affect the *boda boda* rider's behaviour and practices and therefore compromise safety.

In addition, riders were uncomfortable with traffic police officers. The findings indicate that riders could not relax in the presence of traffic police. This variable statement was ranked 8th in the range with a percentage score of 43.04%. It had the second highest score of disagreement.

Unfavourable attitudes towards law enforcement officers are likely to affect the *boda boda* rider's safety and that of other road users. If riders have favourable attitude towards law enforcement officers, they are likely to obey traffic rules (behave positively); if they have a negative attitude, they will only adhere to traffic rules as long as they are in the presence of law enforcement officers. Also, when one has a negative attitude, he or she could act with impunity against the law and maybe engage in potentially dangerous practices or high risk behaviour therefore compromising safety for all road users.

Mistrust and bad attitude towards law enforcement officers is not unique to Kisumu East sub-county. Literature indicates that police harassment and extortion is a recurrent theme. Many studies on commercial motorcycles have observed this problem between riders and especially police officers (Konings, 2006; Fasakin, 2002; Ngim & Antony, 2007). *Boda boda* riders time and again have demonstrated against police harassment in different parts of the country. This is usually attributed to the frustrations that both the traffic officers and the *boda boda* riders experience in the course of their work. The traffic officers may not be well equipped to deal with the challenges that come with their work in terms of equipment or gadgets, such as, speed guns to detect those who are

speeding. Furthermore, law enforcement may be frustrating to the traffic officers because some legislation on *boda boda* motorcycle is not clear. For example, regulations on ferrying of children on motorcycles are not there; legislation also does not clearly show whether *boda boda* are public service 'vehicles' or not and there are no clear speed limits for *boda boda*.

Police officers are known to harass the *boda boda* riders as reported by participants in the attitude scale and FGDs. Riders also work under pressure to reach the target amount of money for the day for remittance. Riders may therefore break traffic rules as the traffic officer's watch.

Kayi (2007) indicates that the regulations (Legal Notice No.161 otherwise known as the Michuki rules) had little impact on behaviours and attitudes of public vehicle operating crew. For example, at the time of his study, a majority (52%) of crew members still carried excess passengers. This could have been because their general working conditions for the crew had not changed for the better. Their attitudes toward their work therefore, may not have changed. (their attitudes were still negative). Chitere (2004) observes that the matatu crew worked in poor conditions. The lack of change in behaviour could also have been due to lack of enforcement of the Michuki laws. The laws were only implemented for a short while. Moraa (2010) observes that drivers of passenger service vehicles (PSV) had a negative attitude towards their work and law enforcement officers. These negative attitudes affected how they behaved on the road therefore had implications on safety. This study similarly investigated the

riders' attitude towards their work. The aim was also to find out the riders' attitudes towards *boda boda* business.

4.6.1.2 Riders' Attitudes towards Other Road Users

Findings show that other road users did not behave responsibly on the road. This variable statement was ranked 6th in the range with a percentage score of 50.3 %. It had the highest disagreement of 323 out of 370. This is an indication that the riders did not have a favourable attitude towards other road users and this situation was likely to affect the *boda boda* rider's safety and that of other road users. According to Institute of Highway Incorporated Engineers (I H I E) (2005), rider attitudes play a major role in determining rider behaviour, regardless of age or trip purpose. Kayi (2007) observes that matatu drivers in Nairobi had bad attitudes towards pedestrians and they did not regard the zebra crossing. Pedestrians were blamed in almost 40% of the accidents while in most cases they were the victims. Konings (2006) indicates that, in Douala, Cameroon, *bendskin* riders were characterized by their aggressive attitude to other road users who may cross their path. Mahlstein (2009) was also informed that the *Alalok* riders had 'bike spirit'. Their reckless careless irresponsible riding was therefore seen as a culture.

According to police records, motorcyclists are considered responsible for most accidents. It is therefore important to understanding what factors outside the individual sphere lead to accident causing behaviour in order to reduce motorcycle related accidents.

The results of this study have shown that the rider's attitude towards their work tends to be favourable. This is because five out of the eight variable statements examined had a percentage score of above 50. However, none of the 8 variable statements had a percentage score of 100. Therefore none of the variable statements was completely negative or completely positive. Since none of the scores had 100% rating, then there are dissatisfactions among riders concerning their work as riders and this could compromise safety.

4.6.2 Riders' Behaviour

On rider behaviour, there are a number of factors that are outside the rider that would influence behaviour; this is the social context of age, education, marital status, level of education, riding experience. In addition, the formal norm (law) and whether it is implemented or not would affect how a rider would behave thereby causing accident or not.

The results on rider behaviour generally tend to be negative suggesting that most *boda boda* riders engage in bad riding practises. The findings indicate that a majority of the riders with a percentage of 45.9% wore reflective jackets while riding. On protective jackets, 50.8% used them while riding. Seventy three percent indicated that they never rode while under the influence of alcohol. On use of indicators, a majority (39.5%) sometimes used indicators. On the use of mobile phones while riding, 56.5% indicated that they used the phone while riding. Table 24 presents behaviour / practices of *boda boda* riders. Huang & Preston (2004) observe that motorcycle accidents are caused by the aggressive driving and risk taking behaviour of motorcyclists.

Table 24: Behaviour / practices of Boda boda Riders

When riding a (boda boda) motorcycle how often do you do the following?					
Riding habits	Not at all/never	Sometimes	Often	Always	Total
I wear bright /reflective clothing while riding	97 (26.2%)	98 (26.5%)	170 (45.9%)	5 (1.4%)	370 (100%)
I use day time headlights while riding	42 (11.4%)	174 (47%)	98 (26.5%)	56 (15.1%)	370 (100%)
I wear a protective jacket	2 (0.5%)	61 (16.5%)	119 (32.2%)	188 (50.8%)	370 (100%)
I wear a helmet	7 (1.9%)	170 (45.9%)	94 (25.4%)	99 (26.8%)	370 (100%)
I ride above 50 kph	13 (3.5%)	219 (59.2%)	104 (28.1%)	34 (9.2%)	370 (100%)
I ride while feeling tired	4 (1.1%)	28 (7.6%)	205 (55.4%)	133 (35.9%)	370 (100%)
I ride while drunk	270 (73%)	81 (21.9%)	15 (4.1%)	4 (1.1%)	370 (100%)
I remember to use your indicators	16 (4.3%)	146 (39.5%)	112 (30.3%)	96 (25.9%)	370 (100%)
I overtake two or more vehicles at the same time.	142 (38.4%)	197 (53.2%)	27 (7.3%)	4 (1.1%)	370 (100%)
I overtake from the left	289 (78.1%)	58 (15.7%)	13 (3.5%)	10 (2.7%)	370 (100%)
I overtake at a corner	312 (84.3%)	41 (11.1%)	15 (4.1%)	2 (0.5%)	370 (100%)
I carry more than one passenger	66 (17.8%)	253 (68.4%)	36 (9.7%)	15 (4.1%)	370 (100%)
I receive/make calls while riding	129 (34.9%)	209 (56.5%)	13 (3.5%)	19 (5.1%)	370 (100%)
Total cell score	1389	1735	1021	663	4810
Cell representative	28.87%	36.07%	21.22%	13.78	100%

Source: Field data (2012)

In order to study the behaviours of *boda boda* riders in Kisumu East county, the study scrutinized how often some of the behaviours were practiced while riding. The respondents were asked to respond to certain statements on a four point opinion scale. When the values of all the responses for each variable statement were added down the column, a total cell score was obtained. For instance, the category 'never' had a total cell score of 1389, 'sometimes' had a cell score of 1735, 'often' had a cell score of 1021 and always had a cell score of 663. The expected cell score was 4810. To get the percentage cell representative, the total cell score was divided by the expected cell score and multiplied by 100. Case in point, for the cell strongly agreed (SA), was $1389 \div 4810 \times 100$ which gave 28.9%. This procedure was repeated for all the cells.

The above opinion scale had 12 variable statements but only six have been further discussed in this section (use of reflective and protective jackets, daytime headlights and wrong overtaking riding under the influence of alcohol and using mobile phones while riding). This is because the other variables have already been dealt with in other sections of this work.

4.6.2.1 Wearing Reflective Jackets and Using Day Time Headlights

Majority (45.9%) of the respondents reported often wearing bright or reflective clothing while riding. About 26.5% reported wearing bright/reflective clothing sometimes while riding. About 26.2% reported having never worn any bright or reflective jacket while riding. Only 1.4% of the respondents reported always

wearing bright reflective jackets while riding. It is evident, that a very small percentage uses reflective jackets always.

The bright / reflective jackets are meant to enhance visibility so that the *boda boda* riders are visible to other road users. This is especially so in the case of the current study where the *boda boda* riders have to share the road with other fast moving vehicles even at night. In a study of factors associated with severity of road traffic injuries in Thika town Osoro, Ng'ang'a, Oundo, Omolo & Luman (2011) observe that measures such as reflective jackets could help reduce severity of road traffic injuries. The researcher observed very minimal use of the reflective jackets by *boda boda* riders in Kisumu East sub-county. Most of the riders were moving about without reflective jackets. One important thing to note is that when a rider wears a reflective jacket it is meant to increase visibility of the rider to other road users so when the rider carries a passenger, the reflective jacket cannot be seen by those behind the rider. This means therefore that even the passenger needs to wear a reflective jacket for visibility. On the use of daytime headlight, the study found out that most (47%) of the respondents reported using daytime head lights sometimes. Twenty six percent used daytime headlights often while 15.1% claimed to have always used daytime headlights. The remaining reported never using daytime headlights. The researcher also observed that most riders did not use this daylight headlight which is a minimum requirement for motorcycles on the roads. It should be noted that visibility is an important aspect of motorcycle safety.

Clarke et al., (2004) found out that daytime headlight use in London was fair. Over 60% of the respondents always or frequently choose to use daytime head lights. Contrary to the Clarke study, in the current study only 15.1% reported 'always' using headlights. Similar to this study, however, the use of reflective clothing in Clarkes study was less common. Only 14% of the respondents 'always' or 'frequently' chose to wear reflective clothing. This is much higher than the findings of the current study with a paltry 1.4% reportedly using bright or reflective clothing. The difference between the current study and Clarkes' study could be in law enforcement. This is in regard to use of daytime headlights and reflective jackets. Even though the use of reflective jacket was low in London, it was still much higher than in the current study. This could also be attributed to motorcycle training.

Hurt et al., (1981) noted that, the conspicuity of the motorcycle is a critical factor in the multiple vehicle accidents. He points out that accident involvement is significantly reduced by the use of motorcycle headlamps and the wearing of high visibility yellow, orange or bright red jackets. Mannering & Grodsky (1995) bring in another angle on the issue of visibility. They say motorcycle accidents differ from other vehicle accidents because as stated earlier, the car drivers tend to overlook motorcyclists. The car drivers had conditioned themselves to look out for other cars as possible collision objects or dangers but not motorcycles. The car drivers always claimed that they never saw the motorcycle rider. By the *boda boda* wearing the reflective jackets, they may be more visible to car drivers. This may help us to understand why many

motorcycle – car collisions are on the rise and sheds light on where to focus interventions. It is important not only to look at riders as the cause of *boda boda* accidents but also to understand the role that other road users play in accident causation. In addition, motorcyclists, cyclists and pedestrians are somehow softer competitors that do not pose serious challenges to motor vehicle drivers. As (Kayi, 2007) puts it, they have to give way to ‘strong shelled cars’ otherwise they risk being crashed. Incidentally, motorcyclists, cyclists and pedestrians are categorized as vulnerable road users.

4.6.2.2 Use of Protective Jackets

Majority (50.8%) of the respondents reported always wearing protective jackets when riding while a further 32.2% wore them often, 16.5% wore them sometimes. Only 0.5% reported to have never used protective jackets. The findings suggest that the respondents use protective jackets while riding. For motorcycle riders it is always very important to wear the correct protective clothing. This protects if one falls off the motorcycle. It may also protect users from the different weather conditions. In the current study the focus group discussions revealed that the respondents were associating the use of protective jackets to the possibility of getting pneumonia. They claimed that the jackets were protecting them from the wind and cold weather so as not to get pneumonia. It was indeed observed that, despite the hot weather of Kisumu East sub-county, 50.8% riders used protective jackets. The findings of this study are consistent with findings of a study by Clarke et al., (2004) which revealed that majority (81%) of the respondents wore protective jackets ‘always’ and a

further 13% wore them frequently'. The rate of use of protective jackets for these two cases differs, which can be attributed to more awareness of the importance of wearing protective jackets in the case of Clarke et al., (2004). In the current study, there seems to be less awareness on the importance of protective gear for motorcyclists as is illustrated by the low level of motorcycle knowledge in section 4.3.3 in the current study. The study found that majority (66.5%) had low level of motorcycle safety knowledge. Furthermore, the new motorcycle laws in Kenya only emphasize the use of reflective jackets and not the protective jackets.

Protective jackets may not influence accidents occurrence but they play a role of reducing the severity of the accident or injury if and when it occurs. It is safer and important to get protective clothing with shields or armour at points which are most vulnerable in a crash. For example, the jacket should be well protected at the shoulders, elbows and the back. Good boots are also necessary for knees and ankles protection. It is important to wear good boots and not sandals or open shoes.

4.6.2.3 Riding While Under the Influence of Alcohol

On riding under the influence of alcohol, 73% of the respondents reported to have never ridden their *boda boda* under the influence of alcohol. Twenty one percent reported to have sometimes ridden under the influence of alcohol, while 4.1% reported to often ride under the influence of alcohol. The remaining 1.1% claimed to always ride under the influence of alcohol. In section 4.5.3 of this study on perceived causes of accidents, about 57% of the respondents

considered drink driving as a perceived cause of accidents. These findings agree with those of Clarke et al., (2004) which found that 84.7% of the respondents in the study claimed to have never ridden under the influence of alcohol. The remaining 15.3% acknowledged to occasionally riding under the influence of alcohol.

In the Hurt et al., (1981) study, almost half of the fatal accidents showed alcohol involvement and injury severity increased with speed, alcohol involvement and motorcycle size. The 2005 survey by Ngim & Antony (2007) evaluating the attitude of *Alalok* riders to road safety, suggests that cases of regular abuse of alcohol during working hours were common. The availability of some money for the riders and the prospects of making more as soon as they get the next passenger may make it easy for some riders to drink during working hours. Kenya now has a drink – drive law based on blood alcohol concentration of 0.08g/dl. It will be interesting to know whether this will reduce accidents associated with drink driving.

Binary logistic regression (for hypothesis two) showed that drink driving was a predictor of accident involvement in the current study. It was found to be statistically significant at (df 1, $p = 0.0277$ and O.R 1.63). This means that riding while drunk increases the odds of getting involved in accident by 63 percent. Literature also indicates that drinking and driving increases the risk of being involved in a crash, as well as the severity of resulting injuries (WHO, 2013). Hurt et al., (1981) indicates that more than half of fatal motorcycle

accidents involved alcohol impairment. Therefore, alcohol impairments and other factors are a prominent factor in serious motorcycle crashes. Setting and enforcing legislation on BAC limits of 0.05 g/dl can lead to significant reductions in alcohol-related crashes. Strong drink–drive laws could protect up to 70% of world’s population (WHO, 2013). It is only recently that Kenya introduced the Alco – blow to check on drivers who ride while drunk. Unfortunately, this initiative to reduce road accidents does not seem to focus on motorcycles as much as it focuses on other vehicle users.

4.6.2.4 Use of Indicators and Careless Overtaking

In the study, 39.5% of the respondents sometimes used indicators. About 30.3% often used indicators, while 25.9% always used indicators. Only 4.3% reported never using indicators. Use of indicators is important in motorcycle safety especially in this case where the *boda boda* motorcycles share the road with other vehicles. Lack of indicators does not allow other motorists to know the riders intentions and therefore can cause accidents.

Majority (53.2%) of the respondents reported sometimes overtaking two or more vehicles at a go. Thirty eight point four percent reported never overtaking more than two vehicles at ago. The remaining 7.3% and 1.1% often and always overtook more than one car respectively. The findings indicate that many riders overtake carelessly. Fifty three percent of those who sometimes overtake may be those riding in town streets where many vehicles may not be moving at a high speed therefore, they can easily overtake.

On responding to the statement on overtaking from the left, the respondents reported overwhelmingly that they did not overtake from the left. About 78.% reported to have never overtaken from the left, 15.7% said sometimes they did overtake from the left, 3.5% said they often did that while 2.7% always overtook from the wrong side. Clarke et al., (2004) observe that overtaking accidents only accounted for a total of 6.6% of motorcycle accidents in that study and a quarter of these were due to the fault of the rider. Riders may overtake on the wrong side to beat traffic or when they are not able to overtake from the right side. This is a dangerous practice because other motorists or even pedestrians do not expect anyone to overtake from the left. These riders are in a hurry to pick and drop passenger in order to make more money. They may therefore, find it time wasting to just wait for traffic to ease when they can easily overtake from the left. In addition, the size of motorcycles makes it possible to squeeze and pass by the side of the road something other vehicles may not do.

4.6.2.5 Mobile Phone Use While Riding

Making and receiving calls while riding was a common practice among *boda boda* riders. Majority (56.5%) acknowledged that they made and received calls sometimes while riding. Thirty four point nine percent reported having never made or received calls while riding; 3.5% percent often did use phone while riding and the remaining 5.1% acknowledged that they always used a phone while riding. Field observations confirmed this practice. Riders talked to friends, relatives or passengers who were asking to be picked by that rider. One

of the themes emerging from the FGDs was that riders regularly used their phones while ferrying passengers. This has implications on safety.

Any distraction while riding may result into an accident. Literature, for example, has indicated that motorcycle riding is a complex exercise (Clarke et al., 2004; Hurt et al., 1981). This means that one must be very attentive while riding. But due to the use of mobile phones by riders while riding, a rider could get distracted by an incoming call or he may even want to call for various reasons. This may lead to an accident. (Hurt et al., 1981) observes that lack of attention to the riding task is a common factor for the motorcyclist in an accident. Clark et al., (2004) noted most motorcycle accidents were due to poor observation and/or inattention.

There is limited literature on mobile phone use while riding but according to AFRO factsheet (2013), mobile phone penetration has increased in the African region. That notwithstanding, in a study conducted in 44 countries out of the 46 in the WHO African region, no data was collected on mobile phone use while driving. It was however realized that such data was going to be important for understanding road safety. Sixty one percent of the countries had national laws regulating the use of mobile phones while driving and they prohibit the use of hand-held phones. This data when collected will help better understand the role of mobile phones in road traffic crashes.

Horswill & Helman (2001) analyzed the behaviour of the motorcyclists and found that motorcyclists chose faster speeds than the car drivers, overtook more, and squeezed into smaller gaps in traffic. In regard to demographics, Chesham et al., (1993) found that young male motorcyclists were at a higher risk of accident involvement than other motorcyclists. He observed that generally, young male riders as a group behaved in a more risky manner than females and older riders and were also worse at hazard perception than older drivers.

In examining the opinions and behaviour of young motorcyclists in New Zealand, Reeder et al., (1996) observed that three broad areas of concern were; the extent and use of protective gear, risky behaviour and how conspicuous the motorcyclist was. He found that there was a difference in rider's opinion on safety and the actual practice, most riders did not practice what they professed.

Drawing from literature, there is a relationship between bad riding habits and accident involvement. There is need therefore to ensure that those riders desist from bad riding behaviour through road safety campaigns and seminars. The law enforcement officers need to enforce the law especially now that the Traffic Act has been amended to include section 103B in the Traffic Act Cap 403. Road safety has to do with safety knowledge and attitudes among other things.

This tendency towards bad riding habits can be explained or attributed the need for the rider to meet his financial goal for the day, week or month. Since commercial *boda boda* riders are under pressure to make profits they may take unnecessary risks to achieve their goals. Sometimes people behave differently when they see

themselves as members of a group, thus riders may make risky decisions because the perceived “social norms” legitimizes that behaviour (Broughton, 2005). Mahlstein (2009) indicated that *Alalok* riders had “bike spirit and they therefore belonged to a ‘culture.’” Konings (2006) on the other hand alleged that *Bendskin* rider’s referred to themselves as “Kings of the road.”

Attitudes are based on the perceived consequences of behaviour and the likelihood that performing that behaviour will lead to those consequences (Forward, 2006). When enforcement of traffic laws that forbid certain types of behaviour does not take place, there is no fear of negative consequences that should be associated with performing that behaviour. When this happens, it is more likely that the rider will perform unsafe actions or behaviour even when they know the consequences. It is also likely that they have not experienced that consequence of risky riding behaviour. Therefore, as much as the *boda boda* riders may be aware that risky behaviours have negative consequences, the riders will go ahead and still get involved as explained.

As is manifest in Table 22 of this study, most *boda boda* riders engaged in bad riding practices at one time or the other. The ‘not at all’ category had a percentage cell representative of 28.87%. The ‘sometimes’ category had a percentage cell representative of 36.07%. The ‘often’ category had a percentage cell representative of 21.22% and finally the ‘always’ category had a percentage cell representative of 13.78%. When the percentage cell representative of sometimes, often and always categories, are summed up, about 71. % of the

respondents interviewed had engaged in bad riding practices at some point in their work. Only about 29% claimed to have never engaged in bad riding behaviours or practices. This indicates that majority (71%) of riders engage in bad riding practices / behaviour.

4.7 Culture and *Boda Boda* Safety

In every society, there are societal approved ways of doing things Durkheim, (1895) held that social factors or forces were external to an individual but they imposed various kinds of constraint on individual behaviour. In this study morality or decency as a social force influences how women sat as pillion on the *boda bodas*.

The study sought to find out the cultural factors in motorcycle safety. It sought to establish whether sitting style influenced *boda boda* motorcycle safety in Kisumu East sub-county. The findings indicate that 75.1% of the respondents supported sitting with legs astride but in regard to acceptability of sitting astride on a *boda boda*, 54.9% did not find sitting astride acceptable for cultural reasons. The results indicated that, sitting style is a gendered issue in *boda boda*. In addition, there was conflict between how women should sit on *boda boda* motorcycles and what the law stipulates. This is because the law requires one to sit astride (The Traffic Act section 59 (2) (1)) while culture demand that one sits across.

4.7.1 Sitting Style and safety

The study found that majority of the respondents (75.1%) supported sitting with legs astride 17.3%. reported that men should sit with legs astride and women should sit across. Table 25 presents the distribution of sitting style on *boda boda*.

Table 25: Distribution of How Passengers Should Sit On a Boda Boda

How to sit on motorcycle	Frequency	Percent	Cumulative Frequency	Cumulative Percent
With legs astride	278	75.14	278	75.14
Across	5	1.35	283	76.49
Depends on what customer wants	22	5.95	305	82.43
Ladies to sit across for decency	64	17.30	369	99.73
No response	1	0.27	370	100.00

Source: Field data (2012)

Culturally, society expects women to be decent, that is, to conform to generally accepted standards of respectable or moral behaviour. All society members are socialized into a culture. From early in life, girls are supposed to 'sit properly'. It is therefore no wonder that a Kisumu North Representative proposed that a law be enacted that will require all female riders to sit across / astride a *boda boda* motorcycle for the purposes of decency. She claims that in the Luo tradition '*bet ang'ewa* (sitting with legs apart) is discouraged among female children. They were socialized that way all their lives.

She claims that, '*bet ang'ewa* was uncultured and deprives women of respect because women expose their bodies to men and it portrays a “bad picture.”. As a result, the Kisumu County Assembly debated motions on the cultural practices including one that could see women compelled to embrace a ‘decent’ sitting position while riding on *boda boda* motorcycles (Oudia, 2013). According to a Key informant in the Traffic Unit in Kisumu County, the Culture Bill was passed. When it becomes a by-law woman in Kisumu County will be required to sit sideways/across instead of facing the riders as per the alleged Luo tradition. Federation of Women Lawyers Kenya (FIDA) had previously condemned the proposed law terming it discriminatory and biased. If implemented, female passengers could be forced to sit across on *boda boda* motorcycles thereby increasing their chances of being involved in accidents because they could easily fall off on a bend.

Research Uganda has shown that sitting style could lead to being involved in accidents. In a cross-sectional retrospective study of *boda boda* injury in Mulango hospital in Kampala- Uganda Naddumba (2004) found out that, male passengers sat astride behind the motorcyclist with their feet placed on the foot rests. However, female passengers preferred sitting sideways. But the researcher observes that the most common sitting style for both men and women was with legs astride.

According to a study conducted by Injury Control Centre Uganda, as reported by Nakiyimba (2012) passengers are more often injured than riders, and women

are more prone to motorbike accidents than men. More females are injured as *boda boda* passengers than in road traffic accidents. This is because according to the executive director of the Injury Control Centre Uganda, ladies sit on the *boda boda* in the wrong way; their legs hang on the side such that, in case of an impact on the *boda boda*, a passenger may fall off. If this passenger is between cars, their legs may crash. The way one sits on a motorcycle could have implications on safety.

Passengers may be much more of a problem on a motorcycle than in a car. Passengers are often a distraction for a motorcyclist because they sit right behind the motorcyclist sometimes holding on to them. It may therefore be necessary to re-design public transport motorcycles in such a way to ensure no contact between the rider and passenger. For example, a metal or wooden bar can be put up to separate the two. If motorcycle design is improved to reduce contact, it could help in reducing accidents deemed to be caused by such contact. Sitting style on a *boda boda* may determine how safe both the rider and passenger will be due to the issues of balancing the motorcycle and falling off by passengers. Sitting across may lead to a passenger falling off the *boda boda* especially on a bend.

It is evident that to sit astride or across is a contested issue in Kisumu East sub-county and it raises gender issues. If the culture bill is implemented, it will be discriminatory and target only women advising them how they should dress and act in public. It would also pose as challenge on how to ferry the disabled and

aged female clients who may not be able to seat sideways on a *boda boda*. This is because although right now it is only in Kisumu East sub-county that sitting style in relation culture has come up in the use of *boda bodas* it could happen in other places as more and more communities in Kenya increase ownership and use of *boda boda* motorcycles. This finding could serve as a guide for future studies because the same issues may arise in other areas due cultural or religious reasons. The study therefore concludes that culture plays an important role in motorcycle safety and therefore needs attention.

4.7.2 Acceptability of Sitting astride For Passengers

With regard to acceptability of sitting style, study findings indicate that, 54.9% of the respondents reported that it was not acceptable for a passenger to sit close to a rider with legs astride. The other 45.1% reported that it was acceptable. This is contrary to what was reported in Sections 4.5.3 and 4.5.4 on how one should sit on a *boda boda*. Acceptability of seating astride is low. This means that the riders know that sitting astride could be safe but culture demands that women especially sit across and not astride. The findings show that there is a conflict in terms of sitting styles adopted and its acceptability in the community. Table 26 presents acceptability of sitting with legs astride.

Table 26: Distribution of Acceptability of Passengers Sitting with Legs Astride

Acceptability of sitting astride	Frequency	Percent	Cumulative percent
Yes	167	45.1	45.1
No	203	54.9	100
Total	370	100.0	

Source: Field data (2012)

It is also evident that there is a conflict between law and culture as demonstrated through the Traffic Act. The Traffic Act section 59 (2) (1) states as follows:

“It shall not be lawful for more than one person in addition to the driver to be carried on any two-wheeled motorcycle, nor shall it be lawful for any such one person to be so carried otherwise than sitting astride the motorcycle and on a proper seat securely fixed to the motor cycle behind the driver’s seat. (2) If any person is carried on any such motor cycle in contravention” (Traffic Act, 2009)

4.7.3 Children Sitting Positions on *Boda Boda* Motorcycles

Study findings show that majority (63.8%) of the respondents think that children should sit behind the rider on a motorcycle. Others (17%) think children should sit in front of the rider while still others (11%) think a child should sit between a rider and another passenger. The risk of falling off a motorcycle for a child is quite high especially on bends or corners due to a child’s weight he or she very unstable. In addition children helmets in Kisumu just like most parts in Kenya are rare. Table 27 shows the distribution on how children should sit on a *boda boda* motorcycles.

Table 27: Distribution on How Children Should Sit on a *Boda Boda* Motorcycle

Where should a child sit on a motorcycle	Frequency	Percent
1. Behind rider-back	236	63.8
2. In front of rider	63	17.0
3. Between rider and other passenger	41	11.1
4. Close to driver either behind or in front	17	4.6
5. Depends on age and body size of child	13	3.5
Total	370	100.0

Source: Field data (2012)

And for those children who are very young such that their feet cannot reach the foot rest, it is more of a challenge. In Kenya the law is silent on where children should sit on a motorcycle or if at all they should be allowed on motorcycles in the first place. There is no legislation on it and therefore a gap. Unfortunately there is limited literature on where children should sit on a *boda boda* motorcycle. It is therefore not possible to have similar experiences from other countries. The only available literature is on school children being transported to school (Kumar 2011). They ferry up to six children on the same motorbike taxi (see box 1), even after the introduction of the new rules, forbidding the transporting of more than one passenger at a time. Mahlstein (2011) indicates that before the traffic regulation were put in place in Calabar, it was common to see a motorcycle ferrying at least two adults and several children between them and in front of the rider on the motorcycle tank. Plate 3 shows six children on a motorcycle on their way to school. Notice how they try to hold on the rider and they have no helmets. Plate 3 shows a *boda boda* rider taking six children to school in Kisumu town. The new proposed regulations (2015) for motorcycles by NTSA state that children will sit between the rider and another passenger. If adopted, it will mean that there will still be overloading and the child will still not be safe.

4.8 Economic Factors

4.8.1 *Boda Boda* Motorcycle Ownership and Safety

The study sought to find out the how motorcycle ownership may influence *boda boda* motorcycle safety in Kisumu East sub-county. The issues considered were motorcycle ownership, daily incomes and number of hours worked.

The study found that majority 56% did not own the *boda boda* they operated. On daily income, majority (30.3%) made ksh 700 per day as *boda boda* income. The mean amount of money made per day was Kshs 721. The study also found that more *boda boda* non-owners worked many hours as opposed to owners. For owners, 53.7% worked 16 – 18 hours while 74% non-owners work 16 – 18 hours. Binary logistic regression indicated that motorcycle ownership was an important factor in accident involvement (57%). The detailed discussions of these findings are presented below.

4.8.2 *Boda Boda* Motorcycle Ownership

The study findings showed that, 56.2% of the respondents did not own the *boda boda* motorcycles they rode. Only 43.78% were owner operated. As indicated in this study (under rider characteristics) most of the respondents were unemployed or informally employed prior to becoming *boda boda* operators. They, therefore, could not afford a motorcycle even after the zero rating of all motorcycles below 250 cc. In addition, majority could not qualify for bank loans. They therefore opted to be hired as riders. In Kenya, a common

motorcycle costs between Kshs 69,000 – 96,000 about 750-1,000 Dollars. (They are mostly from China and India). According to the riders only FGD, politicians buy *boda boda* motorcycles for those who are unable to buy their own. This was for the politicians' political gains. They ask people to come together in groups, campaign for them and in return they buy motorcycles for them. This was reported to happen mostly during election years. However, it is hard to tell how this practice affects levels of motorcycle ownership in Kisumu East sub-county.

Although literature does not say much about motorcycle ownership, the results of this study are similar to what Kumar (2011) found out about *boda boda* ownership in Kampala where 40% of the *boda bodas* were owner – operated. In Lagos and Douala, the motorcycles were mostly owner – operated, with Lagos at 65 % and Douala at 50%. (Mahlstein (2009) also found that 58.5% of the respondents owned the motorcycles they rode in Calabar, while 41.5% were operated by hired riders. Higher owner operated motorcycles in other countries could be explained by the fact that motorcycle business in the those nations has been thriving for a longer time as compared to Kenya where *boda boda* motorcycles have only become common recently after the zero rating of all motorcycles below 250 cc.

Motorcycle ownership or lack of it may have an influence on safety. In a study on motorcycle taxis and road safety in South western Nigeria, those who owned the *okada* motorcycles they operated had higher safety self – efficacy scores

than those who did not own them, they were therefore more keen on safety than the non owners (Akinlade & Brieger, 2003).

The nature of ownership could have implication on the behaviour and attitudes of a rider. The owner is more likely to be careful because it could be his only source of income and may avoid bad riding practices therefore ensuring *boda boda* motorcycle safety. The case could even be more serious for owners still servicing loans because they could lose the motorcycle or anything they attached as security in order to get the loan from the banks. That notwithstanding, the fact that one had to service the bank loan meant that they needed to make more money for loan repayment and upkeep. This could lead to one engaging in unsafe riding practices like over speeding and overloading in order to make more money. The non – owners were more likely to be careless and fail to observe safety. This could be attributed to the mandatory fixed daily remittances where the hired riders, have to give between Ksh 300 and 500 to the *boda boda* owner on a daily basis and also fuel the motorcycle at the end of each day. They must make sure they meet their targets failure to which they may be jobless the next day. This may motivate them to disregard the rules and regulations and only focus on making money. It may also lead to accidents. In case of an accident, non – owners are likely to run away from the scene of the accident leaving the *boda boda* there. The traffic Act requires that all accidents are reported but because the riders are not the registered owners of the motorcycles, they can easily get away with it and be hired by a different motorcycle owner.

According to the Marxist theory of class structures, people belong to different social categories or groupings depending on their relation to the means of production. Therefore it can be said that *boda boda* riders belong to a lower social class. By virtue of their position in society, they are therefore constrained financially and may do whatever it takes to earn a living.

4.8.3 Daily Income from *Boda boda* Transport

The study's findings reveal that many of the respondents made between Kshs 500 and 900 per day. The majority of the respondents (30.27%) made Kshs 700 per day. Twenty percent made Kshs 600 and Eighteen percent made Kshs 800 while 14.32% made Kshs 500. The remaining made between 900 and 2,000. It is from this money made per day that the respondents (hired riders) get the fixed amount to pay to the *boda boda* owners. The mean amount of money made per day was Kshs 721. Mbugua (2011) observes that in Thika, the riders made between Kshs 10,000 and 14,999 per month which translates to about between Kshs 300 and 500 per day. This is almost similar to the finding of the current study. Table 28 shows the amount of money made by riders per day.

Table 28: Amount of Money Made by Riders per Day

How Much Money do you make per day?				
Money made per day	Frequency	Percent	Cumulative Frequency	Cumulative Percent
300	2	0.54	2	0.54
400	8	2.16	10	2.70
500	53	14.32	63	17.03
600	74	20.00	137	37.03
700	112	30.27	249	67.30
800	68	18.38	317	85.68
900	7	1.89	324	87.57
1000	30	8.11	354	95.68
1100	1	0.27	355	95.95
1200	3	0.81	358	96.76
1300	1	0.27	359	97.03
1500	10	2.70	369	99.73
2000	1	0.27	370	100.00

Source: Field data (2012)

Literature suggests that pay for the hired rider is low. Kumar (2011) observes that in Lagos and Kampala, hired riders get low remuneration which is also uncertain. He however did not indicate how much they were paid per day. He also observes that in Douala, the rider's remuneration "is significantly lower than the average personal income" (Kumar, 2011). Mahlstein (2009) indicates the amount of money the hired riders had to return to their employers varied from between N 1,800 to N 7,800 (11.16 to 48.38 Dollars) a week, very much depending on individual arrangements.

Although most people experience work related pressure, the results of pressure among *boda boda* riders may have fatal consequences. As already emphasized

earlier, the target set by mostly *boda boda* owners could lead to bad riding practices. The majority (67%) of the respondents experienced pressure meeting their daily targets. Those that claimed they did not experience pressure were 14.9% while those who experienced pressure sometimes were 18.1%. Owners and non-owners equally experienced pressure. Table 29 shows the frequency distribution of whether respondents experienced pressure in meeting daily targets.

Table 29: Distribution of Whether Respondents Experience Pressure

Experience of pressure in meeting target	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Yes	248	67.03	248	67.03
No	55	14.86	303	81.89
Sometimes	67	18.11	370	100.00

Source: Field data (2012)

4.8.4 Number of hours worked per day by owner and non-owners

Regarding the numbers of hours worked by owners of *boda boda* motorcycles, the study found out that slightly more than half (53.7%) worked between 16-18 hours a day. About 19.75% worked for 10-12 hours while 17.28% worked for between 13-15 hours. On the part of non-owners, the study found that about three quarters (74.03%) worked between 16-18 hours a day. About 13% worked for 13-15 hours while 10.57% worked for 10-12 hours.

A comparative analysis on ownership shows that both owners and non – owners work for many hours. In general, however, *boda boda* owners worked fewer hours than the non-owners. This may be explained by what has been indicated

earlier; the fact that the hired riders had a financial target to meet beyond earning their daily wages. Hired riders were, therefore, forced to work more hours than the owners because failure to meet the target had implications. On their part, the owners had to work for many hours to make more money especially if the *boda boda* is on loan. The safety implication with regard to fatigue is that one is less attentive while riding and this may lead to accidents (Mahlstein, 2009). Table 30 presents the frequency distribution of number of hours worked by owners and non owners.

Table 30: Number of Hours Worked by Owners and Non-owners

Number of hours worked	Owner		Non-owner	
	Frequency	Percentage	Frequency	Percentage
4-6	5	3	1	1
7-9	10	6	4	2
10-12	32	20	22	11
13-15	28	17	27	13
16-18	87	53	154	74
	162	100	208	100

Source: Field data (2012)

Mahlstein (2009) indicated that, *Alalok* riders worked for between 5 to 15 hours. Kumar (2011) observes that a riders' working day lasts on average over 12 hours. This implies that a rider is often fatigued and hence may compromise their safety that of passengers as well as other road users.

4.8.5 Strategies Used to Meet Daily Target for *Boda Boda* Riders

One of the strategies employed by the respondents to meet daily targets was working many hours and late into the night. The study found out that majority (61.1%) of the respondents worked 10 – 18 to meet their targets. Some respondents (12.7%) resorted to carrying more than one passenger whenever an opportunity arose. The remaining (26.2%) did not indicate their strategies for meeting their targets. Working many hours has safety implications; this is because it could lead to fatigue. Riding a motorcycle when fatigued may be dangerous. Therefore, some of these strategies to meet financial targets have implications on *boda boda* safety. Table 31 presents a distribution of respondents' strategies for meeting their daily financial targets.

Table 31: Distribution of Respondent's Strategies for Meeting Daily Targets

Strategies for meeting daily financial targets	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Work more hours (until late in the night and Sundays)	226	61.08	226	61.08
Transport more than one passenger at a time	47	12.70	273	73.78
N/A (Did not indicate strategy)	97	26.22	370	100.00

Source: Field data (2012)

Riding while fatigued has implications on motorcycle safety in that, fatigue makes one less attentive and may lead to poor judgment. Mahlstein (2009) observes that being a motorcycle rider requires physical strength. Mannering & Grodsky (1995) indicate that motorcycle riding or operation is a more complex task than driving a car. This is because it requires excellent motor skills,

physical balance and coordination. This may not be effectively done if one is tired and may lead to accidents.

Contrary to the findings of the current study, Clarke et al., (2004), found out that only 7.6% of the respondents regularly rode their motorcycle while fatigued. A quarter of the respondents reported never riding while fatigued. It is important to find out the safety implications of the long hours *boda boda* riders have to work. The current study found out that 53.7% of *boda boda* owners worked for 16 – 18 hours per day. On the hand, 74.03% of the hired riders worked 16-18 hours per day (See Table 30).

Kumar (2011) in a study carried out in Douala, Kampala and Lagos, points out that motorcycle taxi drivers worked under strenuous conditions where their working day lasted on average 12 hours. On the same breath, a study by Mahlstein (2009) in Calabar- Nigeria also reported *Okada* riders working for between 5 – 18 hours a day. It is possible that most riders work while tired which is safety concern. Contrary to these findings, an in – depth study on motorcycle accidents by Clarke et al., (2004) indicated that most riders did not ride while fatigued. This is attributed to the fact that in Clarke's case, the motorcycles are for personal transport while in the case of the studies by Kumar (2011) & Mahlstein (2009) they are for commercial transport.

Hypothesis Testing (H₀₂)

To test the relationship between *boda boda* motorcycle ownership and accident involvement, binary logistic regression was used as illustrated in Table 32.

Binary Logistic Regression

Table 32: Logit Model for Predictors of Accident Involvement

Variable Name	Parameter Estimate	Std. Error	Wald X ²	DF	p-value	Odds Ratio	95 % CI	
Intercept	1.3679	0.7877	3.0154	1	0.0825	-	-	-
Age	-0.1696	0.1502	1.2741	1	0.2590	0.844	0.629	1.13
Education level	0.0779	0.1838	0.1797	1	0.6716	1.081	0.754	1.50
Years worked	0.0151	0.0953	0.0250	1	0.8744	1.015	0.842	1.24
Motorcycle ownership	-0.8439	0.2308	13.3665	1	0.0003***	0.430	0.274	0.66
Drunk riding	0.4908	0.2230	4.8462		0.0277*	1.634	1.055	2.59
			<u>Chi-sq.</u>	<u>DF</u>	<u>p-value</u>			
		Likelihood Ratio	21.6984	5	0.0006***			
		Wald	20.3504	5	0.0011**			

* $p < .05$, ** $p < .01$, *** $p < .001$

Several variables were subjected to logistic binary analysis using SAS in order to predict respondent's accident involvement. These variables were age, education level, years worked, motorcycle ownership, and drunk riding. Only motorcycle ownership and drunk driving were found to be statistically significant. Although the relation between drunk driving and accident involvement was not hypothesized, the logit regression indicated a relationship. The findings show that motorcycle ownership lowers the odds of getting involved in motorcycle accidents by 57 percent. Lower odds of accident

involvement: $1 - \text{O.R (odds ratio)} = 1 - 0.43 = 57$ percent lower odds. On the other hand, riding while drunk increases the odds of getting involved in accident by 63 percent. Higher odds of accident involvement Odds Ratio (OR) $1.63 - 1 = 63$ %.

The above findings imply that motorcycle ownership is an important predictor of accident involvement. These findings concur with other studies done in Africa. A study on commercial motorcycle and road safety in south-western Nigeria, found out that those who owned the motorcycle they operated had higher safety self - efficacy scores than those who did not own them, they were therefore more keen on safety than none owners (Akinlade & Brieger, 2003). In the Hurt study, drinking and riding a motorcycle, was found to be more dangerous than drinking and driving a car (Hurt et al., 1981).

4.9 Chapter Summary

This chapter has presented the study findings. It has described the findings and analyzed them in tables, pie charts, bar and line charts. The findings were presented as per the study objectives: The first objective was to find out the characteristics of *boda boda* motorcycle riders in Kisumu East sub-county. The study found out the following; all the respondents were male and many (51.9%) were aged between 25-31 years. Slightly above half (54.05%) had secondary education while 43.5% had primary education. Many of the respondents (45.1%) were jobless prior to becoming *boda boda* operators and majority (58.7%) had worked for 2-3 years at the time of the study.

The second objective was to establish levels of formal rider training. The study found that; majority of the riders (62.2%) were not formally trained to ride *boda boda* motorcycles. Chi square test did not find a significant difference between formal training and accident involvement. Therefore the null hypothesis was rejected. This could be attributed to inadequate training on motorcycle riding and safety. This may also be due to lack of funds to pay for rider training.

The third objective was on the level of safety knowledge, 66.5% riders had a low level of safety knowledge while 29.2% had moderate level of safety knowledge; only 4.3% had a high level of safety knowledge. About 34% of the respondent carried more than one passenger at a time. About 65% of the respondents had only one helmet and helmet use by passengers was very low. Seventy two percent of the passengers did not use helmets. On the part of the respondents, helmet use was also low with only 24.6% always using helmets. *Boda boda* speeds were not regulated. It was therefore hard to say that a rider was over speeding.

The fourth objective was on *boda boda* rider's accident involvement rates in Kisumu East sub-county. About 40% of the respondents had been involved in accident and 90.3% reported knowledge of someone who had been involved in accident. Careless driving/speeding, driving under the influence of alcohol and wrong overtaking were perceived as the main reason why the accidents occurred.

The fifth objective was on *boda boda* riders attitudes towards their work and the riders behaviour, the study found that most respondents engaged in bad riding behaviour such as non use of indicators and careless overtaking, overloading and mobile phone use while riding. Binary logistic regression indicated that drink driving was predictors of accident involvement. On the rider's attitudes towards their work, results of this study have shown that the rider's attitude towards their work tends to be favourable.

The sixth objective was to establish whether *boda boda* sitting style influenced *boda boda* motorcycle safety in Kisumu East sub-county. Sitting style on *boda boda* was a gendered issue in relation to culture. On one hand, the Traffic Act 59 (2) indicates that all motorcycle passengers (pillion) must sit with legs astride behind a motorcycle rider. On the other hand, Luo culture indicates that it is indecent for women to sit 'bet *ang'ewa*. There is therefore a conflict between law and culture. Literature points out that sitting style on a *boda boda* has safety implications.

The seventh objective was to establish whether there was a relationship between *boda boda* motorcycle and *boda boda* safety in Kisumu East sub-county. The study found that, 56.2% did not own the motorcycles they operated/rode. Binary logistic regression indicated that, motorcycle ownership lowers the chances of getting involved in motorcycle accidents by 57 percent. As a strategy for meeting daily financial targets, 61.1% worked for more hours. The mean of the money made per day was Kshs 721. Generally *boda boda* operators work for

many hours. But many non owners worked for more hours than owners. Fifty three point seven percent of the owners worked for 16-18 hours while 74.03% of the non owners worked for 16-17 hours. Chapter five presents summary conclusions and recommendations.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The main objective of this study was to carry out a comprehensive analysis of the socio-cultural and economic determinants of *boda boda* motorcycle safety in Kisumu East sub-county. The objectives were divided into three parts as follows; socio-demographic rider characteristics, socio-cultural factors and economic factors. The specific objectives were to; find out the characteristics of *boda boda* riders in Kisumu, determine the level of awareness of motorcycle safety among riders, to determine the rate of *boda boda* accident involvement in Kisumu East sub-county, to analyze the attitudes and behaviour of *boda boda* motorcycle riders, to explore the cultural factors in motorcycle safety and to identify the effects of motorcycle ownership on *boda boda* motorcycle safety. This study was based on the idea that *boda boda* motorcycle safety was influenced by certain socio-cultural and economic factors that were within (individual characteristics) and outside the individual sphere (societal forces) and that these factors influenced the rider's behaviour and therefore accident involvement. Research has shown that most road traffic accidents are attributed to human behaviour and actions which are themselves influenced by a variety of socio-cultural and economic factors.

The study generated both qualitative and quantitative data. SAS was used to compute frequencies, and inferential statistics. Microsoft Office Excel was used

to construct pie charts, bar charts, line charts, column charts and area charts for data presentation. Qualitative data was organized by content analysis and by the use of NVIVO 10, where various themes were generated and organized.

5.2 Summary of Findings

In response to the research objectives, the main findings are as follows:

a) The socio-demographic characteristics of *boda boda* motorcycle riders in Kisumu East Sub-county

The study sought to find out the socio-demographic characteristics of the riders in Kisumu East sub-county. It established that riders were all young males and a large number were married. In addition, most riders were literate, the majority having secondary education. It was also noted that prior to *boda boda* riding, most riders were jobless or bicycle *boda boda* riders. Moreover, most of the riders were inexperienced. The study did not find a statistically significant relationship between rider socio-economic characteristics and motorcycle accident involvement.

b) Formal rider training in motorcycle riding

In trying to find out the levels of formal training in Kisumu East sub-county, the study established that levels of formal training were low. Despite these finding, the study did not find a statistically significant relationship between formal training and accident involvement. Riders claimed that they could not afford to pay for formal rider training because it was expensive.

c) Level of motorcycle safety knowledge

The study found that levels of motorcycle safety knowledge were low. Most riders did not identify three key aspects in motorcycle safety which were; personal physical measures, safe riding practices and good motorcycle conditions. Personal physical safety measures were rated as most important. Contrary to evidence on overloading, most respondents reported transporting one passenger at a time. Furthermore, the study found a gap indicating that *boda boda* speeds were not regulated. It was therefore hard to say that a rider was over speeding. Moreover, helmet possession and use was low among riders as well as pillion passengers.

d) Rate of *boda boda* motorcycle accidents involvement

In an attempt to find out the rates of *boda boda* motorcycle accident involvement, the results indicated that accident involvement was high among riders. The main perceived causes of accidents were speeding and drink driving. In addition, Binary Logistic Regression confirmed drink driving as one of the predictors of accident involvement. Furthermore, the study found that deaths and injuries related to motorcycles had steadily increased.

e) Rider attitudes and behaviour

The study found that riders were most satisfied with the conditions of their *boda boda* motorcycles and least satisfied with their relations with law enforcement officers. In addition, the study established that most riders, engaged in bad riding practices at some point during their work. These practices included; not

wearing reflective jackets, not using a helmet, making and receiving calls while riding, wrong overtaking, overloading, riding while tired or fatigued and not using indicators and daytime headlights.

e) Culture and *boda boda* motorcycle safety

The study sought to establish whether sitting style influenced *boda boda* motorcycle safety. The findings indicate that majority of the respondents supported sitting with legs astride but its acceptability was low. The results indicated that, sitting style on *boda boda* was a gendered issue in relation to culture. Moreover, there was conflict between how women should sit on *boda boda*, and what the law required. The Traffic Act requires women to sit astride while 'luo culture' requires them to sit across or sideways. The study therefore concludes that culture plays an important role in motorcycle safety and therefore needs attention.

f) *Boda boda* motorcycle ownership and safety

The study sought to find out the how motorcycle ownership may influence *boda boda* motorcycle safety in Kisumu. The study found that majority of the riders did not own the *boda boda* motorcycles they operated. Moreover, the riders made an average gross income of Kshs 721 per day. In addition, motorcycle ownership or non-ownership determined the number of hours worked in that, more non-owners worked many hours as opposed to owners. Furthermore, Binary Logistic Regression indicated that motorcycle ownership was an important predictor of accident involvement.

5.3 Conclusions

An analysis of the socio-cultural and economic determinants of *boda boda* motorcycle safety in Kisumu East sub-county concluded that there exist some socio-cultural and economic factors that affected motorcycle safety. The study demonstrates that a better understanding of motorcycle accidents will need identifying socio-cultural and economic factors both of which are found within and outside the individual rider's domain. Although individual riders may cause accidents, their decisions and behaviour are influenced by other societal factors. The motorcycle boom in Kenya is a fairly recent phenomenon which has brought with it a lot of challenges. Road safety being a big and complex problem will require the input of all road safety stakeholders. These stakeholders include the National Transport Safety Authority (NTSA), the Traffic Police Department, Ministry of Transport, driving schools, non-governmental organizations, the Criminal Justice System, insurance companies and the public. Additionally, adopting a sociological approach in understanding road safety may help in understanding why riders behave the way they do. This may contribute in reducing motorcycle related accidents.

The emerging conclusion for this study is that rider formal training is important in reducing motorcycle related accidents. Therefore the government and all other stakeholders must work together to subsidize rider training because the study indicates that lack of funds is the main reason why riders are not formally trained. Furthermore, lack of training leads to low levels of safety knowledge. Concerning rider behaviour and practises, the study concludes that road safety

policy implementation and traffic law enforcement are important in making sure that bad riding practises are discouraged. On the issue *boda boda* ownership, the study concludes that increased levels of ownership may reduce dangerous riding behaviour. This is because the study found that in their endeavour to make enough money to pay their daily remittances and still have some money for themselves, riders engage in the dangerous behaviour such as overloading and speeding (especially in an environment with weak traffic law enforcement). These three factors; lack of funds to pay for formal rider training, weak enforcement of traffic regulations, and low levels of *boda boda* ownership (also due to lack of funds) stand out as the key issues that must be addressed if motorcycle safety is to be realized. The three issues are the societal factor that influences or motivated accident causing behaviour among *boda boda* riders in Kisumu East sub-county. According to the theories informing this study, institutions concerned with road safety and a riders social position (social category) in society influence how riders behave.

This study contributes to the body of knowledge on determinants of motorcycle safety, an area that is relatively new in Kenya. It therefore, bridges the gap in literature on *boda boda* motorcycle safety and acts as a baseline for subsequent studies in the area of motorcycle safety in Kenya and globally. The study's recommendations could provide a strong foundation for policy formulation regarding this means of transport which could significantly reduce deaths and injuries due to motorcycle accidents now and in the future.

5.4 Recommendations

This study sought to examine socio-cultural and economic determinants of *boda boda* motorcycle safety. Based on the study findings, the study suggests the following measures to reduce the magnitude and severity of road accidents involving *boda boda* motorcycles. This will ensure safer roads for *boda boda* motorcycle riders, passengers and other road users. Consequently, recommendations on policy and programmes are presented in the following section as per the objectives stated in Chapter one of this study.

(i) Rider Training and Motorcycle Safety Knowledge

The study has shown that most riders in Kisumu East sub-county were not trained and consequently had low motorcycle safety knowledge. The study therefore suggests reducing the accident rate by improving rider skills and motorcycle safety knowledge. This can be accomplished by doing the following;

- a) Introduction of rider specific schools. The government through National Transport Safety Authority (NTSA), which is in charge of establishing systems and procedures for and overseeing, training, testing and licensing of drivers/riders, should ensure that levels of formal rider training and motorcycle safety knowledge are increased by making sure that most riders are trained. This can be achieved by introducing rider specific riding schools. The schools will have to charge less in terms of training fee considering that most riders did not go for formal rider training because they could not afford the fee.

This may help those who want to be riders but cannot afford formal training fee in the regular driving schools. This may go a long way in reducing *boda boda* motorcycle accidents in Kenya. Alternatively, the government can identify specific driving schools in the country and subsidize for rider training.

- b) To ensure the problem of inadequate training is tackled, NTSA must come up with a standardised training manual which must be implemented and audited periodically.
- c) The study found that most riders were not licensed as required by the Traffic Act. The study therefore recommends that rider testing and licensing should be enforced. NTSA together with the Traffic Police Department (driving test units) should make sure that riders are tested before being licensed to ride. NTSA must ensure that all riders are in possession of genuine licences. Driving schools must also be compelled to ensure that a rider trains for the stipulated hours. This can be accomplished by NTSA through periodic inspections and audits. The idea of only registering riders to take the riding/driving test must be discouraged.
- d) Road safety education should be included in the school curriculum from nursery to university so that everyone is well conversant with road safety. This will help inculcate the culture of safety early enough.

(ii) Riding Behaviour and Practises

The current study shows that riders engaged in risky behaviour such as overloading, speeding, drink driving, not wearing a helmet, riding without reflective jackets and headlights, using mobile phones when riding and wrong overtaking. This study recommends;

- a) NTSA in collaboration with the Traffic Police Department must enforce traffic rules and road safety policies. To ensure implementation, the government needs to increase the number of traffic police officers, train them and acquire the necessary equipment. In addition NTSA must ensure implementation of policies on road safety. The recently amended traffic regulations will not be of any use if they will not be enforced. When riders know that there are consequences to certain actions and behaviour, they will be careful not to violate the law.
- b) After training has been used to communicate the potential consequences of dangerous riding behaviour, the Criminal Justice System should impose severe penalties for violation of traffic rules and regulations. This could deter the would-be violators. Mobile courts for *boda boda* riders should also be introduced.
- c) NTSA, Ministry of Transport, driving schools, Insurance Regulatory Authority and non-governmental organizations and other stakeholders concerned with road safety need to promote motorcycle safety education and awareness. This can be achieved through the mass media, road

campaigns, peer groups, motorcycle rider associations, and educational institutions of all levels.

- d) The study found out that alcohol impairment was associated with accident involvement. There is need for the government to amend the Blood Alcohol Content (BAC) for *boda boda* riders. The current 0.08 g/dl BAC is among the highest in the world. Reducing the BAC to below 0.05 g/dl could help reduce *boda boda* motorcycle related accidents especially if enforced.
- e) The study found that *boda boda* speeds were not regulated. NTSA therefore needs to regulate the *boda boda* speeds on the different types of roads.
- f) The study found that, there were low levels of helmet use. Various reasons (economic) were given by riders and pillion for non-use of helmets as follows; cost, discomfort/heat, spoiling hairstyles (for women), hygiene, and short trips. Therefore helmets should be made cheaper, more hygienic (by users using a scarf inside) and safety education on importance of helmets even on short trips. Implementation of helmet laws will be of significance.

(iii) Motorcycle Ownership

The study has shown that motorcycle ownership had an effect on *boda boda motorcycle* safety. The riders who owned the motorcycles they operated were less likely to be involved in motorcycle accidents. The study also found out that

motorcycle ownership had an effect on training and the number of hours worked per day which had implications on motorcycle safety. While some people found motorcycles to be more affordable after the tax waiver, others still found them expensive. The study therefore recommends collaboration between the Department of Youth Affairs, the private sector and other stakeholders to ensure that those youths in the *boda boda* business own their motorcycles through loan facilities from the Youth Fund and other subsidized lending facilities that do not require a lot of collateral. This is because most of this youths have nothing much to offer as collateral. These loans may enable more youths to own motorcycles which may lead to reduced cases of accidents.

Other recommendations

- a) Since sharing of the road with other vehicles has been pointed out as contributing to motorcycle accidents, the Integrated National Transport Policy (INTP) should refocus and include as part of its plan, the incorporation of motorcycles lanes in its infrastructural plans.

- b) The study found that *boda boda* sitting style (for pillion) was a gendered issue in relation to culture. This was mainly due to the society's recognized standards of proper behaviour for women. In this study, women were required to sit across as opposed to sitting with legs astride for decency. According to the Traffic Act, it is unlawful for passengers to sit across on a motorcycle. It is evident that there is conflict between culture and law. The Kisumu county assembly may need to re-visit the

‘proposed bill’ on sitting side ways by women on *boda boda* considering the implication it has on safety and what the traffic Act requires.

5.5 Areas for Further Research

Drawing from the findings of this study, a number of issues are recommended for further research. The pursuit of these issues may facilitate better and more effective intervention strategies in motorcycle safety.

First, based on the existing studies, more studies could be conducted on factors other than socio-cultural and economic that could influence motorcycle safety.

Second, this study only covered Kisumu East sub-county. There is need to expand the sample and also cover other towns and counties in Kenya.

Third, it will be necessary to carry out studies on *boda boda* motorcycle riders and passengers risk perceptions. This is in order to understand why people still use *boda boda* even when reports indicate that more and more people are affected in the *boda boda* accidents.

Fourth, in the interest of knowing or establishing trends it will be important to do the similar studies at intervals of two years to assess whether trends are changing with regard to motorcycle safety and accident involvement.

Fifth, since children issues in *boda boda* motorcycle transport are not focused on in this study, there may be need to conduct a study to find out to what extent children are affected by *boda boda* accidents.

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APPENDICES

Appendix 1: TRAFFIC ACT CHAPTER 403

(a) Traffic Act Chapter 403

Revised Edition 2009 (1993)

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5 A. (1) A person 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) A passenger shall wear a helmet and a jacket which has reflectors as provided under paragraph (2).

(4) Every motor cycle shall be insured against third party risks in accordance with the Motor Vehicle (Third Party) Insurance Act.

(5) For the purposes of this regulation 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.

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

(7) For the purposes of this rule, "ride" means to operate, manage or to be in control of a motor cycle.

(8) A person 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.

The Traffic Act - Cap 403 Rules under section 119

The Traffic (speed limits) rules

These Rules may be cited as the Traffic (Speed Limits) Rules.

1.(a)(i) Motor cycles and motor cars, including motor cars normally used for hire but excluding all other public service vehicles, when travelling on dual carriageway highways -110

(ii) Motor cycles and motor cars including all cars normally used for hire but excluding all other public service vehicles when travelling on single carriageway highways -100

(b) All commercial vehicles, motor omnibuses, *matatus* and public service vehicles (excluding self drive hire cars) travelling on any type of road) 80

59 (2) (1) It shall not be lawful for more than one person in addition to the driver to be carried on any two-wheeled motor cycle, nor shall it be lawful for any such one person to be so carried otherwise than sitting astride the motor cycle and on a proper seat securely fixed to the motor cycle behind the driver's seat. (2) If any person is carried on any such motor cycle in contravention.

The Traffic (Amendment) ACT, 2012.

Insertion of new section in Cap. 403.

12. The principal Act is amended by inserting the following new sections immediately after section 103—

Helmets and reflector jackets.

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.

Appendix 2: INTERVIEW SCHEDULE FOR *BODA BODA* RIDERS

My name is Gladys Moraa Nyachieo. I am a PhD student at Kenyatta University. I am doing a research on *boda boda* motorcycle safety. I want to understand what determines *boda boda* motorcycle safety in Kisumu East sub-county. I have chosen you as one of the key informants because you are conversant with road safety issues. I will ask you some questions concerning *boda boda* motorcycle safety. Please note that the information that you share with me will be treated with utmost confidentiality and will be used only for the purposes of this study. Kindly note that, participation in this study is voluntary. You should therefore feel free to participate and if you feel that you would like to discontinue the interview at any time, you are free to do so and there will be no penalties. There will be no monetary compensation for participation in this interview. If you would like to contact me even after this interview for any reason, you can reach me on telephone number 0722 719874. You may also contact the department of Sociology at Kenyatta University on Telephone 020-8710901-12. Would you like me to continue with the interview with you?

SECTION A: BACKGROUND INFORMATION/ RIDER CHARACTERISTICS

1. Sex 1. Male 2. Female
2. Age 1. <18 2. 18-24 3. 25-31 4. 32-38
5. 39-45
6. 46-52 7. 53-59 8. 60+
3. Marital status 1. Married 2. Single 3. Divorced 4. Widowed
5. Separated
6. Other(specify)
4. Level of formal education 1. Primary 2. Secondary 3. College/university 4. Others
5. What is the engine capacity of the motorcycle you ride?
6. What job were you doing before becoming a *boda boda* motorcycle rider?

SECTION B: MOTORCYCLE SAFETY KNOWLEDGE AND TRAINING

8. For how many years have you worked as a *boda boda* motorcycle rider
1. <1yr 2. 2yrs 3. 3yrs 4. 4yrs 5. 5yrs 6. >6yrs .
9. Did you go through formal training to become a *boda boda* motorcycle rider?
1. Yes 2. No
If no above why?.....
Explain your answer above.....
10. Do you have a motorcycle license? 1. Yes 2. No
Explain your answer above
11. Do you know any motorcycle safety measures? 1. Yes 2. No
12. If yes to 11 above, list at any four safety measures for motorcycle riders that you know.
13. In your view which of the safety measures you have listed above is important to you. **Start with the most important** in motorcycle safety.
14. How many passengers do you carry at a time, most of the time?
Explain why

15. What is your average estimated speed while riding?
16. How many helmets do you have? 1. One 2. Two 3. Three 4. None
Give reason for your answer
17. Do your passengers use helmets? 1. Yes 2. No 3. Some of them 4. Never
Explain your answer above.
18. How many vehicles should you overtake at a time? 1. None 2. One 3. Two or more
Explain your answer above
19. When you overtake (vehicles or other motorcycles), do your passengers react?
1. Yes 2. No
Explain your answer above
20. Do you know of riders who ride while drunk? 1. Yes 2. No

SECTION C: ECONOMIC FACTORS IN *BODA BODA* MOTORCYCLE

21. Is this motorcycle yours? 1. Yes 2. No (if no go to 29)
22. If yes in (29) above, how much did you buy it for?
23. How many hours do you work per day?
24. Do you have set targets for yourself? 1. Yes 2. No
Explain your answer above
25. Are you able to meet the targets? 1. Yes 2. No
26. Do you experience pressure in meeting the set targets? 1. Yes 2. No
Explain your answer above
27. If you do not meet the target how do you adjust? Explain your answer
28. How much money do you make per day from the *boda boda* motorcycle business?
29. If the *boda boda* motorcycle is not yours, who does it belong to?
30. Do you have a contract with the owner? 1. Yes 2. No
31. What type of contract do you have with the owner? Explain
32. On average how many hours do you work per day?
33. Who takes care of the maintenance expenses?
34. On average how much are you paid per day?
35. Do you have set targets? 1. Yes 2. No
Explain your answer above.
36. If yes in 35 above, Are you able to meet the targets? 1. Yes 2. No
37. Do you experience pressure in meeting the set targets? 1. Yes 2. No

Explain your answer.

38. If you do not meet the target how do you adjust? Explain.

SECTION D: PERCEIVED CAUSES OF *BODA BODA* MOTORCYCLE ACCIDENTS

39. Have you been involved in any *boda boda* motorcycle accident in the last 12 months?
1. Yes 2. No

40. If yes above, how many accidents have you been involved in? (Fill in the table below)

Accident	Cause	Time (day or night)	Place (highway, town streets, rural roads)	Severity (none, serious injuries, slight injuries.)	Nature of Loss)- none, human, property)
1 Accident					
2 Accidents					
3 Accidents					
4 Accidents					

41. Do you know of anyone who has been involved in a *boda boda* motorcycle accident that resulted in serious injuries or death in the last 12 months? 1. Yes
2. No

42. What are generally the main causes of *boda boda* motorcycle accidents?

43. What category of road users do you think are likely to cause a *boda boda* motorcyclist to have an accident?

User category	Reasons
Motorcyclists	
Cyclists (bicycle)	
Personal vehicles	
Pedestrians	
Buses	
Heavy commercial vehicles	
Matatus	
Others	

SECTION E: SOCIAL CULTURAL FACTORS IN MOTORCYCLE SAFETY

45. In your view, how do you think the following passenger characteristics affect rider and passenger safety?

Passenger characteristics	Effect on safety
Age	
Gender	
Social status	
Religion	
Close relative to rider	

46. In your view, how do you think a person (passenger) should sit on a *boda boda* motorcycle?

1. With legs astride 2. Across 3. Other (specify)

Explain your answer above

47. Do men and women have different styles of sitting on the *boda boda*? 1. Yes
2. No

Explain your answer above

48. Is it acceptable in this society to have person (a man or a woman) seated close behind a rider with legs astride on a *boda boda* motorcycle? 1. Yes 2. No

Explain your answer above

49. How much distance should the rider and passenger leave between them? Please explain your answer

50. From your observation, who among the passengers use helmets more? 1. Men 2. Women

Explain your answer above?

51. Does *boda boda* motorcycle as a means of transport influence dressing? 1. Yes 2. No

Explain your answer

52. To what extent is *boda boda* mode of transport culturally acceptable in this community?

1. Not acceptable 2. A bit acceptable 3. Acceptable 4. Very acceptable

SECTION F: ATTITUDES AND BEHAVIOUR OF *BODA BODA* MOTORCYCLE RIDERS.

54. When riding a *boda boda* motorcycle how often do you do the following?

Riding habits	Not at all	Sometimes	Almost always	Always
Wear bright /reflective clothing				
Use day time headlights				
Wear a protective jacket				
Wear a helmet				
Ride above 50 Kph				
Ride while feeling tired				
Ride while drunk				
Remember to use indicators				
Do you overtake two or more vehicles at the same time?				
Overtake at a corner				
Overtake from the left				
Carry more than one passenger				
Receive/make phone calls while riding				

55. Please tell whether you, Strongly agree. Agree, Disagree or Strongly disagree with the following variable statements.

A likert scale of rider's attitudes towards their work.

Variable statement	Strongly Agree	Agree	Disagree	Strongly Disagree
I am satisfied with the money I get as a <i>boda boda</i> rider				
The numbers of hours I work per day are good for me.				
I am satisfied by the condition of the <i>boda boda</i> motorcycle I ride.				
Road conditions are good enough for my riding				
Other road users behave responsibly on the road.				
Law enforcement officers do not harass me unnecessarily.				
When I see traffic police officers, I relax and continue with my work without fear.				

56. In your view, what can be done to make *boda boda* motorcycle transport safe?

60. Is there anything else that you would like to tell or share?

Appendix 3: FOCUS GROUP DISCUSSION GUIDE - Passenger general

Social issues; safety and training

(i) To determine level of the knowledge on motorcycle safety measures among riders of *boda boda* motorcycles in Kisumu East sub-county.

1. Do you know how important the following are in *boda boda* motorcycles safety?

- a) Personal protective equipment.
- b) Mechanical conditions of motorcycle
- c) Rider behaviour.

(ii) To determine the perceived causes of *boda boda* motorcycle accidents in Kisumu East sub-county.

a) What do you think is the main cause of *boda boda* accidents in this town?

(iii) To determine the relationship between riders characteristics and *boda boda* motorcycle accident involvement.

a) How old could be the youngest riders in Kisumu be.

a) Are most riders formally trained to ride motorcycles?

(v) To find out the behaviour of *boda boda* motorcycle operators.

a) It is said that most motorcycle riders ride while drunk is that the case?

b) Do you think *boda boda* riders understand traffic rules.

(vi) To find out the social cultural factors in motorcycle safety.

a) How does passengers sex, age, social status, religion and riders relation/kinship with passenger affects *boda boda* motorcycle safety?

b) Where should children sit on a *boda boda*?

c) What changes in your culture/way of life has *boda boda* transport brought in this town

d) It is said that the passengers sitting style affects *boda boda* safety, is this true

e) It has been reported that women passengers don't like using helmets. Is this the case?

f) What about male passengers' usage of helmets?

Appendix 4: FOCUS GROUP DISCUSSION SCHEDULE - Riders only**Safety and training**

- A. It is said that *boda boda* motorcycles are very unsafe is this true?
- B. As a rider do you know how important the following are in *boda boda* motorcycles safety:
- i. Personal protective equipment?
 - ii. Mechanical conditions of motorcycle?
 - iii. Rider behaviour?
- C. In your view, what category of road users are likely to cause a *boda boda* motorcyclist to have an accident?
- D. What do you think are the main causes of *boda boda* accidents in Kisumu.
- E. How old are the youngest riders in Kisumu East sub-county.
- F. It is said that most riders are not formally trained to ride motorcycles. Do you agree with this statement? Explain your answer.
- G. What training do you have in *boda boda* riding?
- H. Where did you train?
- I. Are there driving/riding schools specifically for motorcycle riders in this town? Please explain.
- J. Which traffic rules are you aware of as riders?
- K. Do you adhere to the traffic rules?
- L. Where do you get your licenses?
- M. How do you get your license
- N. Do riders use helmets?
- O. Do passengers use helmets?
- P. It is also said that some riders have one or no helmet. Why is that?

Cultural issues

Q. How do the following influence *boda boda* safety.

Sex.....

Age.....

Social status.....

Religion and riders

Relation/kinship.....

R. Is it true that riders get sexually aroused when carrying passengers of the opposite sex and that this affects *boda boda* safety?

S. Does the ways passengers dress affect the *boda boda* riders and therefore safety?

T. Where should children sit on a *boda boda*?

U. As riders what are your future expectations of the *boda boda* business?

V. Would you still want to be a *boda boda* rider in the next five years,

W. Given a chance would you engage in something else other than *boda boda*?

X. In your view, what would you do to make *boda boda* motorcycle transport safe?

Economic issues

Y. It is said that most riders do not own the motorcycles they ride. Why is this?

Z. On average how much do the hired riders get per day.

AA. What contractual agreement is there between the *boda boda* owner and the hired rider?

Policy

BB. Do you know whether there is National policy that governs motorcycle operations?

Please explain.

CC. What do you think about the policy?

DD. If you do not know how come.

Appendix 5: INTERVIEW GUIDE FOR KEY INFORMANTS

My name is Gladys Moraa Nyachieo. I am a PhD student at Kenyatta University. I am doing a research on *boda boda* motorcycle safety. I want to understand what determines *boda boda* motorcycle safety in East subcounty. I have chosen you as one of the key informants because you are conversant with road safety issues. I will ask you some questions concerning *boda boda* motorcycle safety. Please note that the information that you share with me will be treated with utmost confidentiality and will be used only for the purposes of this study. Kindly note that, participation in this study is voluntary. You should therefore feel free to participate and if you feel that you would like to discontinue the interview at any time, you are free to do so and there will be no penalties. There will be no monetary compensation for participation in this interview. If you would like to contact me even after this interview for any reason, you can reach me on telephone number 0722 719874. You may also contact the department of Sociology at Kenyatta University on Telephone 020-8710901-12. Would you like me to continue with the interview with you?

1. Name of respondent
2. Name of institution
3. The position of respondent in the institution
4. Contact details
5. In your view what role does *boda boda* motorcycle play in transportation in this community?
6. Currently, do you as an organization/ community have any program on road safety? 1. Yes 2. No
7. Please explain your answer above...
8. Do you as an organization/community have any interventions specifically for motorcycle safety?
9. Why do you think there are so many accidents involving motorcycles these days?
10. Are you doing anything as an organization / institution to reduce *boda boda* motorcycle accidents?
Yes 2. No
Please explain your answer above.
11. In your view, what factors influence *boda boda* motorcycle safety in this town?
12. Is the use of *boda boda* motorcycle generally acceptable in this community?
Yes 2. No
Please explain your answer...
13. Is there anyone in charge of traffic accidents prevention/ control in your organization/community?
Yes 2. No
14. If yes what activities are they engaged in regards to road safety?
15. Do you think *boda boda* riders are adequately trained to ride? 1. Yes 2. No
Please explain your answer above.

16. Do riders understand the traffic rules? 1. Yes 2. No
Please explain your answer
18. Do riders adhere to traffic rules if they understand them?
Yes 2. No 2. N/A
17. It is said that most riders “buy” their licenses. Do you agree with this statement? Please explain
Are there driving/riding schools specifically for motorcycle riders in this town?
Yes 2. No
Please explain
18. What do you think can be done to reduce *boda boda* motorcycle accidents?
19. Is there a national policy in place that governs operations of *boda boda* motorcycles? Yes 2. No
Please explain
20. Is there anything more you wish to share on motorcycle safety?

Appendix 6: CONSENT NOTE

RE: Consent for picture inclusion in the study

This is to confirm that I.....of
Kisumu East sub-county, has authorized the researcher, Nyachieo G.M.M. to use my
photograph for the study. I therefore have no objection now or in future.

Consenter ID No.
Signature.....Date.....

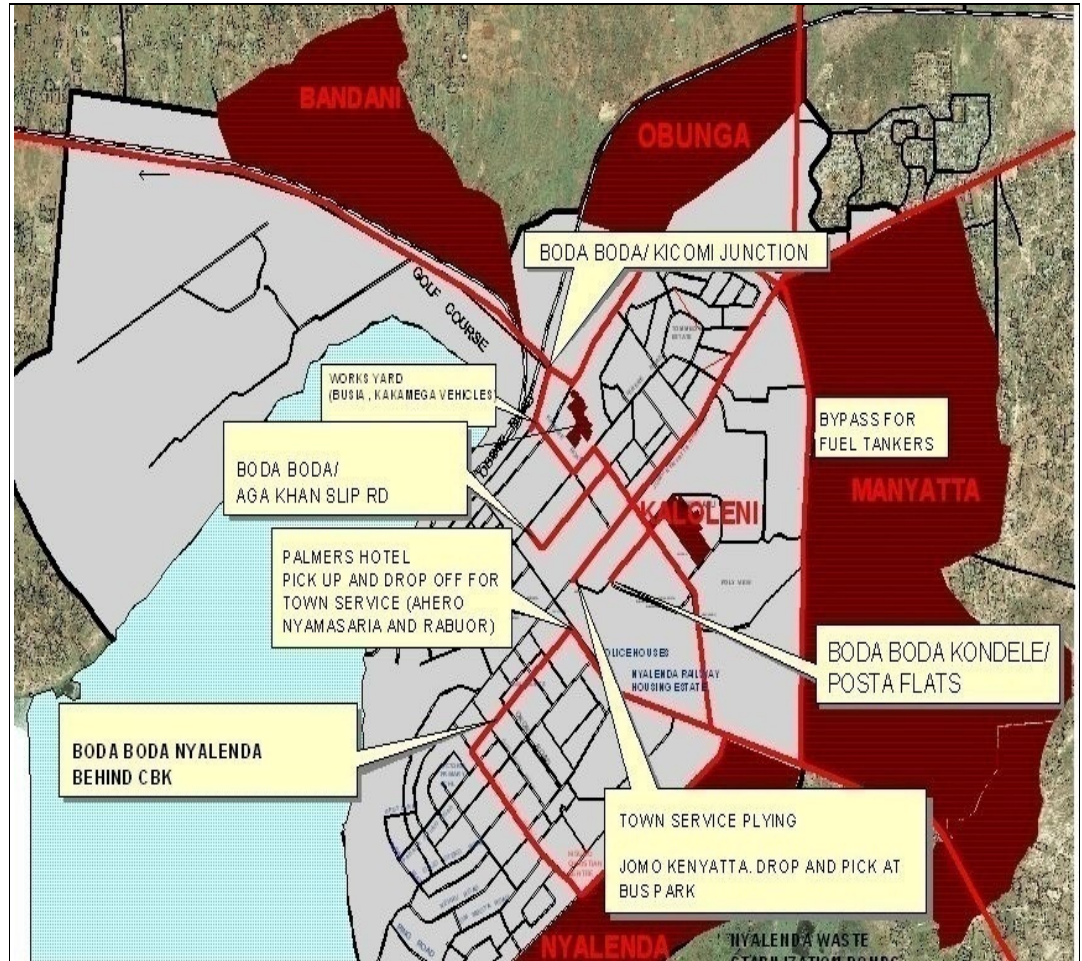
Researcher ID
No.....Signature.....Date.....

Appendix 7: A LIST OF CLUSTERS IDENTIFIED FOR THE STUDY

Cluster	Number of riders	Location
1. Pipeline	44	Past Kicomi on your way to Usoma beach
2. Nyahera	60	Kisumu-Kakamega road, towards Mamboleo
3. Nyamasaria	57	Nairobi road ,past Mega city from town
4. Mega city	33	Nairobi road before you reach Nyamasaria
5. Kibos road	37	Past Jumuia Resort
6. Bandani	20	Kisumu Busia road before you reach airport
7. Western	51	Near Milimani estate
8. Kawater	17	Past Kachok on your to Nyalenda
9. Konamaji	45	On your way to Kajulu
10. Sulwe	23	Past Nyalenda
11. Dunga	41	When at provincial headquarters, walk down straight towards the lake and you will find Dunga Beach
12. Nakumatt	87	On Oginga Odinga street next to Equity bank and is opposite University of Nairobi Kisumu campus.
13. Bus station	122	Near stage,Caltex petrol station
14. Kachok	39	Near Megacity and is situated on Nairobi road
15. Pand Pieri	42	In Nyalenda estate
16. Format	60	Opposite KCB at the onset of Oginga Odinga street
17. Kicomi	49	The last phase of Oginga Odinga street on your way to airport, Hotel Perch, opposite United Millers
18. Mamboleo	55	Manyatta estate then showground then Mamboleo
19. Konalejo	68	On the same road that leads to Manyatta
20. Manyatta	103	At Kondele junction there are two roads, one leading to Kakamega and another one to inside Kondele estate, take the second one and straight past Konalejo up to Manyatta
21. Kondele junction	121	Few kilometers from town on Kakamega road
22. Kibuye Market	98	500 meters past Tusksys supermarket from town, branch to the right and into the market


Appendix 8: A MAP OF KISUMU TOWN TRAFFIC

(Map showing a few *boda boda* assembly points/bases)



City Council of Kisumu (2012)

**Appendix 10: RESEARCH AUTHORIZATION LETTER FROM
GRADUATE SCHOOL**



**KENYATTA UNIVERSITY
GRADUATE SCHOOL**

E-mail: kubps@yahoo.com P.O. Box 43844, 00100
dean-graduate@ku.ac.ke NAIROBI, KENYA
 Website: www.ku.ac.ke Tel. 8710901 Ext. 57530

Our Ref: C82/14571/09 Date: 9th September, 2011

The Permanent Secretary,
 Ministry of Higher Education, Science & Technology,
 P.O. Box 30040,
NAIROBI

Dear Sir/Madam,


**RE: RESEARCH AUTHORIZATION
 MS. GLADYS MARIE MORAA - REG. NO. C82/14571/099**


I write to introduce Ms. Gladys Marie Moraa who is a Postgraduate Student of this University. She is registered for a Ph.D. degree programme in the Department of Sociology in the School of Humanities & Social Sciences.

Ms. Moraa intends to conduct research for a Thesis entitled, "A Study of Social Economic and Cultural Determinants of Motorcycle (*Boda Boda*) Transport Safety in Kisumu City, Kenya".

Any assistance given will be highly appreciated.

Yours faithfully,






**JOHN M. ODONGI
 FOR: DEAN, GRADUATE SCHOOL**

JMO/cww

Committed to Creativity, Excellence & Self-Reliance

Appendix 11: RESEARCH AUTHORIZATION LETTER

REPUBLIC OF KENYA



NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telephone: 254-020-2213471, 2241349
254-020-310571, 2213123, 2219420
Fax: 254-020-318245, 318249
When replying please quote
secretary@ncst.go.ke

P.O. Box 30623-00100
NAIROBI-KENYA
Website: www.ncst.go.ke

Our Ref: **NCST/RRI/12/1/SS-011/1356/4**

Date: **29th September, 2011**

Gladys Marie Moraa
Kenyatta University
P.O.Box 43844-00100
Nairobi.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*A study of social economic and cultural determinants of motorcycle (boda boda) transport safety in Kisumu City, Kenya,*" I am pleased to inform you that you have been authorized to undertake research in **Kisumu East District and the New Nyanza Provincial Hospital** for a period ending **31st October, 2012.**

You are advised to report to **The District Commissioner, Kisumu East District, the Provincial Traffic Police Officer, Nyanza Province, The District Education Officer, Kisumu East District, the Town Clerk, Kisumu Municipal Council, The Medical Officer of Health, Kisumu East District and The Medical Supretendant, New Nyanza Provincial Hospital** before embarking on the research project.

On completion of the research, you are expected to submit **one hard copies and one soft copy** of the research report/thesis to our office.


DR. M. K. RUGUTT, PhD-HSC.
DEPUTY COUNCIL SECRETARY

Copy to:

The District Commissioner
Kisumu East District

"The National Council for Science and Technology is Committed to the Promotion of Science and Technology for National Development."


Appendix 12: RESEARCH PERMIT FOR THE RESEARCHER


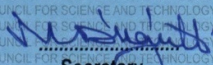
PAGE 2 PAGE 3

THIS IS TO CERTIFY THAT: **Research Permit No. NCST/RR/12/1/SS011/11**
Prof./Dr./Mr./Mrs./Miss/Institution **Date of issue 29th September 2011**
Gladys Marie Moraa **Fee received KSH.2,000**
of (Address) Kenyatta University
P.O.Box 43844-00100, Nairobi
has been permitted to conduct research in

New Nyanza Provincial **Location**
Hospital
Kisumu **District**
Nyanza **Province**

on the topic: A study of social economic and cultural determinants of motorcycle (boda boda) transport safety in Kisumu City, Kenya.



Applicant's **Secretary**
Signature **National Council for**
Science & Technology

for a period ending: 31st October, 2012.

Appendix 13: CONSENT NOTE FOR BEN ODUOR

CONSENT NOTE

RE: Consent for picture inclusion in the study

This is to confirm that I Ben Oduorof Kisumu,
has authorized the researcher, Nyachio G.M.M. to use my photograph for the study. I
therefore have no objection now or in future.

Consenter ID No. 13005004 Signature [Signature] Date 20-3-12

Appendix 14: *BODA BODA* RIDERS IN KISUMU

2 **DN2** COVER STORY DAILY NATION
Monday
October 4, 2010

Carnage on two wheels



KISUMU
In this lake-side town, the two-wheeler was first welcomed as a blessing, but it has now become a nightmare. According to the Nyanza provincial director of medical services, Dr Ojwang Lusi, the province records over 250 serious accidents in a month. One out of every 10 of these accidents results in death.

A government initiative to improve public transport in the country is turning into a nightmare as motorbikes maim and kill