

**FACTORS INFLUENCING ACCIDENT RATES AMONG
MOTORCYCLE OPERATORS IN KISII TOWN.**

BY

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DECLARATION

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

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DEDICATION

My special dedication goes to my wife Emma Kerubo, Son Layton Ayienga, for their sacrifice, encouragement and support during my study. I also dedicate this work to my dear parents Mr. Benson Onserio Nyakwama, and Mrs. Peris Nyabonyi Onserio, for laying a good foundation in my life and my education. It is for this foundation that I have grown into a person who I am today.

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LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|----------------|--|
| ANDREA: | Analysis of Driver Rehabilitation Programmes |
| ATS | : Australian Transport Safety Bureau |
| CAST | : Campaigns and Awareness-raising strategies in Traffic Safety |
| DRUID | : Driving Impairments due to alcohol, drugs and medicine |
| FRSC | : Federal Road Safety Highway Codes |
| ITSL | : Integrated Transport Systems Limited. |
| KCC | : Kampala City Council |
| KRB | : Kenya Roads Board |
| MOA | : Matatu Owners Association |
| NHTSA | : National Highway Traffic Safety Administration |
| PEPPER | : Police Enforcement Policy and Programmes on European Roads |
| PPC | : Personal Protective Clothing |
| PSV | : Public service Vehicle |
| RSPI | : Road Safety performance Indicators |
| SARTRE | : Social Attitudes to Road Traffic Risks in Europe |
| TLB | : Transport Licensing Board |
| WHO | : World Health Organization. |

ABSTRACT

This study was conducted to investigate factors influencing accident rates among boda boda operators in Kisii Town, Kisii County. Motorcycles offer a number of advantages over other means of transport ranging from affordability to flexibility but exposes travellers to risks of accidents. Taxi motorcycle accidents are becoming a common phenomenon in this country with escalations in Kisii County pointing to the alarming rate of these accidents. The study sought purposely to determine factors that influence taxi motorcycle accidents. The four factors as spelt out in the objectives of this study were as follows: To examine the influence of training on motorcycle accident rates, To determine the influence of Alcohol and substance abuse on accident rates among motorcycle operators, to establish how road and weather conditions influence accident rates among motorcycle operators, and To assess how Institutional constraints influences the accident rates among motorcycle operators in Kisii town. The study would contribute to the understanding and identification of the factors underlying motorcycle accidents with possible solutions suggested on how to minimize the accident rates. This knowledge was assumed to be of great benefit for the motorists, the traffic police, policy makers, passengers and the general public as a whole. The study was guided by the following assumptions that; the respondents would be willing and ready to give honest and reliable information. That the sample size that would be used would be the right representative of the population under study, and that the research tools that would be used would yield consistent and valid results. The study employed systems theory. The study employed a descriptive survey research design and it targeted 285 motorcycle operators who were selected through simple random sampling technique. The questionnaires were the main data collection instruments. The data gathered was edited, analysed, and presented in frequency tables using SPSS computer package. Findings of the study indicated that some of the boda boda operators had no formal training on how to ride. The lack of training puts the operators in vulnerable state when operating the motorcycles on the roads. Riding under the influence of alcohol/substance abuse increased the chances of the riders being involved in accidents as this interfered with their ability to control their motorcycles and also leads to poor judgement on the road, poor state of roads and unfavorable weather conditions also influenced motorcycle accidents. Moreover, institutional constraints especially corrupt traffic police officers equally influence motorcycle accidents. From the findings, it was concluded that boda boda operators are surrounded by a host of factors that cause them to be involved in accidents. However, lack of proper training among the motorcycle operators was found to be an important determinant of motorcycle accident rates. In conclusion, most of the boda boda accidents are due to lack of training and awareness on road safety. Thus, there is urgent need for the operators to go to driving school, and also get awareness training on road safety. The County should provide continuous training and road safety awareness programmes for the operators. Above all the county government should factor in motorcycles when designing roads and preserve dropping and picking points to avoid illegal picking and dropping of passengers which is a risky practice.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Accident is an unintended and unforeseen event, usually resulting in personal injury or property damage and even death bringing agony and discomfort to many families all over the world. Accident can however happen through various ways but motorcycle accident is now becoming a common incident on our roads. Motorcycle accidents and the associated unpleasant consequences are on the rise and at such an alarming and disturbing rate.

According to the U.S National Highway Traffic Safety Administration (NHTSA) an estimated 148,000 motorcyclists have died in traffic crashes since enactment of the Highway and National Traffic and Motor Vehicle Safety Act of 1966. The rate for motorcycles is 72.34 per 100,000 registered motorcycles (NCSA, 2007). Motorcycles made up of nearly 3 % of all registered vehicles in the United States in 2008 and accounted for only 0.4 % of all vehicles miles traveled. However, motorcycle fatalities in 2008 accounted for 14% of total traffic fatalities in the United States compared to 5.92% in 1997. The Number of motorcycle fatalities in the U. S. increased by 150% from 2,116 in 1997 to 5,290 in 2008. During the same period, passenger car and light truck fatality rates decreased by 26.74% and 13.54% respectively. Considering per vehicle miles traveled in 2008, motorcyclists were 37 % more likely than drivers of passenger cars to die in a motor vehicle crash and nine times more likely to be injured. This high accident rates are in part attributed to consumption of alcohol. Alcohol consumption reduces the perceived negative consequences of risk-taking which increases the willingness to take risks after drinking (Traffic Safety Facts: 2008, NHTSA).

In 2004, figures from the UK Department for Transport indicated that motorcycles have 16 times the rate of serious injuries per 100 million vehicle kilometres compared to cars, and double the rate of bicycles. Although motorcyclists make up less than 1% of vehicle traffic, their riders suffer 14% of total deaths and serious injuries on Britain's roads

(Clarke et al., 2004). Edson and Tandoc (2007) further add that young motorcyclists below the age of 18 years make up a significant percentage of injuries and fatalities among road users in many countries due to lack of proper training, riding while they are under age and not complying with the traffic rules. Factors such as over speeding, lack of Personal Protective Clothing (PPC), risk-taking behaviour, and drunk-driving contribute to this rising trend.

According to the national study by the Australian Transport Safety Bureau (ATS) found that Motorcycle sales in Australia have increased consistently in recent years and indications are that this trend may continue for the foreseeable future. As motorcycling activity has increased, so too has the number of serious and fatal motorcycle crashes, though this is not observed as a simple linear relationship. Among the commonly cited risk factors for motorcycle crashes are excessive speed, alcohol and drug use, road conditions, inexperience and unlicensed riding. A range of modifiable behaviours have also been cited to contribute to motorcycle crashes and injuries including riding speed (Horswill and Helman, 2003; Lin and Kraus, 2009), traffic errors (e.g., being distracted or pre-occupied resulting in a near collision), control errors (e.g., trouble handling the bike) (Elliott et al., 2007), alcohol and/or drug use (Haworth et al., 1997; Lin and Kraus, 2009), and risk-taking (e.g., driving with too little headway) (Lin and Kraus, 2009; Sexton et al., 2004).

In Brazil, most of the population makes use of motorcycles to move around. Motorcycles are also used as a work vehicle for taxi motorcyclists and delivery men. Moreover, this means of transport has lower cost compared to others and is accessible to low -income people who use it as locomotion vehicle (Cavalcanti et al., 2011). Considering that motorcycle accidents are a major cause of injuries related with fatalities and disabling injuries (MacLeod et al. , 2010) , several studies have attempted to identify how individual (sex, age, licensing), behavioral (over-speed, alcohol use), geophysical (structure of roads) and situational factors (impact objects) may be linked to the greater involvement of motorcyclists in traffic accidents (Nunn, 2011; Savolainen & Mannering, 2007; Haquea et al., 2008; Oluwadiyaa et al., 2009;Albalate & Fernàndez-Villadangos, 2010)

In Tanzania 181 lives were claimed due to motorcycle accidents during the first quarter of 2010 (Nkwame, 2010). This is partly due to the rapidly increasing number of motorcycles from 6,700 in 2007 to 85,000 in 2009, a 13 fold increase in the period of 2 years (Nkwame, 2010). The reason behind the reported increase in number of commercial motorcycles is the fact that motorcycles are sold at relatively cheaper prices than other vehicles and good earnings from the motorcycle taxi business which encourages more people especially youths to join this business (Solagberu et al., 2006). According to the then Acting Chairman for Road Safety Committee, Dares Salaam alone, in the period from January to June 2010, has witnessed 64 deaths and 615 casualties due to motorcycle related accidents, involving both drivers and passengers (Mustapha, 2010). Motorcycle accidents have drawn great attention from the Tanzanian government authorities. For example, 2010 Road Safety Week had a theme of “Discourage High Speed; Cyclists Wear Helmets; Accidents Kill, Injure”. Motorcycle accidents have drawn great attention from the Tanzanian government authorities. For example, 2010 Road Safety Week had a theme of “Discourage High Speed; Cyclists Wear Helmets; Accidents Kill, Injure” (Mustapha, 2010).

According to WHO, between 3,000 and 13,000 Kenyans lose their lives in road traffic crashes annually. The majority of these people are vulnerable road users, pedestrians, motorcyclists, and cyclists. In addition, nearly one-third of deaths are among passengers many of whom are killed in unsafe forms of public transportation (WHO 2013; *Global Status Report on Road Safety*). This situation is attributed to lack of laws for helmet wearing, riding under the influence of alcohol and where road safety laws do exist they are poorly enforced.

In Western Kenya, Kakamega County a study by WHO on “Motorcycle Accident injuries seen at Kakamega Provincial Hospital in Kenya” indicated that many of the patients in the hospital were nursing injuries related to motorcycles. According to this study, young riders are usually involved in speeding which increases the risk of getting into accidents. Additionally, Study carried by (Wilson et al., 2010) show that over 90% of the motorcycle riders involved in an accident do not have formal training instead rely on family, friends or being self-taught.

According to the County Police Commander report 2014, Kisii County has recorded the highest number of fatal accidents involving *boda boda* operators. According to the County Police Commander, the County records an average of 20 to 30 fatal traffic accidents involving *boda bodas* every month. These high rates of accidents in Kisii are attributed to alcoholism and failure to observe traffic rules by riders. Most riders break traffic rules. They carry up to four passengers compromising their safety, other riders drink at work while their motorcycles are not insured and helmets and reflective jackets are not used while riding (Miruka Kenan, 2013). However, the trend is not different in Kisii town, little has been done to address the situation and it is on this basis this study is pegged.

1.2 Statement of the Problem

Globally, road traffic injuries (RTIs) are responsible for a significant proportion of overall injury morbidity and mortality; 90% of mortalities are seen in low and middle income countries (Peden, 2002). Motorcycle users are vulnerable on the road and represent an important group to target for reducing road traffic injuries.

Motorcycle registrations in Kenya have grown each of the past 5 years; from 3,759 registrations in 2005 to 91,151 registrations in 2009 as a result of zero rating the tax on motorcycles below 250cc in 2005. Consequently, there has been an increase in the number of motorcycle riders as well. It is evident that as the roadways are getting worse for other vehicles, motorcyclists are becoming the vulnerable group which needs immediate attention to improve its safety. This is also true for Kisii County. The number of fatal motorcycle crashes in Kisii remains high.

Despite the many interventions the government has tried to put in place to avert the road accident menace involving all road service providers ranging from vehicles to motorcycles, news about accidents and by extension motorcycle related accidents dominates the local media houses. The most recent attempt to avert the situation is the introduction of Alcohol blow, mobile courts and night travels ban but still motorcycle accidents are on the toll in our roads (Ministry of Transport, 2014). According to Kenya's Ministry of Transport and Infrastructure, from January to mid-July, 2013, a total of 1,725

Kenyan died in road accidents out of this number; 796 pedestrians, 442 passengers, 170 motorcyclists, 161 drivers, 77 pedal cyclists and 79 bicycle passengers. Also from the month of April to June 2014, a total of 44 motorcyclists have perished on the roads and 84 escaping with serious injuries (NHTSA 2014)

According to the County Police Commander report (2014), Kisii County has recorded the highest number of fatal accidents involving *boda boda* operators. The County is said to record an average of 20 to 30 fatal traffic accidents involving *boda bodas* every month (Miruka Kenan, 2013). Accordingly, this study proposes to investigate the factors that have led to the high accident rates among the motorcycle operators in Kisii town, with the intention of identifying critical areas and issues.

1.3 Purpose of the Study

This study sought to investigate the factors influencing prevalence of motorcycle accidents among the motorcycle operators in Kisii town.

1.4 Objectives of the Study.

The study was guided by the following objectives:

1. To examine how training of motorists influence accident rates among motorcycle operators in Kisii Town.
2. To establish how alcohol and substance abuse influence accident rates among motorcycle operators in Kisii Town.
3. To explore ways in which road conditions influence accident rates among motorcycle operators in Kisii Town.
4. To determine how institutional constraints influence accident rates among motorcycle operators in Kisii Town.

1.5 Research Questions.

The study sought to answer the following Research questions:

1. Does training influence accident rates among the motorcycle operators in Kisii town?
2. Does Alcohol/substance abuse influence accident rates among the motorcycle operators in Kisii town?
3. How do road/weather conditions influence accident rates among the motorcycle operators in Kisii town?
4. In which way do Institutional Constraints influence accident rates among the motorcycle operators in Kisii Town?

1.6 Significance of the Study

As a strategy of finding ways of alleviating motorcycle accidents and minimizing their consequences in terms of mortality and disability, this study was set out to help in understanding the underlying factors influencing motorcycle accidents with possible solutions in the endeavor to curb the increasing number of fatalities due to motorcycle accidents. Therefore the findings from this study were hoped to be beneficial to the; the motorists, passengers, government, and the general public as the research findings identified the gaps and possible ways of filling such gaps to curb motorcycle accidents. Above all it was hoped that this study would identify new areas of concern within the motorcycle transport sector which will trigger interest for more research in the areas and subsequently lead to discovery of new knowledge and insights to transport stakeholders.

1.7 Limitations of the Study

This study was limited by unwillingness by some of the respondents to give information due to suspicion of some nature. In addition, the study was also limited by inadequate resources for spending on developing research instruments as well as other research related expenses, and poor weather conditions which posed challenges to accessing the respondents.

These limitations were solved in order to render the study successful. The purpose of the study was explained to the respondents which was purely academic and assured them about confidential treatment of their information. Inadequate resources on developing research instruments and other related research expenses were addressed by a trade-off between sample size and the available resources in such a way that the sample was not too small to lack representativeness of the target population and not too large to constrain the resources. Weather issues were addressed by visiting the respondents early before it rained and using umbrellas to protect research instruments in case it rained while in the field.

1.8 Delimitations of the Study

The study focused on the factors influencing high accident rates among the motorcycle operators in Kisii town. The study involved; the motorcycle operators, the traffic police, the passengers/clients of motorcycles, the health professionals, and the other transport service providers. The study was conducted within the Kisii Municipality of Kisii County.

1.9 Basic Assumptions of the Study

The study was guided by the following basic assumptions; that the respondents would be willing and ready to give honest and reliable information. That the sample size that would be used would be the right representative of the population under study, and that the research tools that would be used would give consistent and valid results.

1.10 Definitions of Significant Terms

Accident rates: refers to the degree of exposure to which one is likely to be involved in an accident. Motorcycle operators in any part of the world are among the most accident prone category of transport service providers.

Accident: can be defined as an unexpected and undesirable event involving any type of road user or road motor vehicle, resulting in property damage, injury, death, or both.

Alcohol/substance abuse: The tendency of some riders to drink during working hours.

Boda boda: the local name by which motorcycles providing transport services to the members of the public are referred to.

Institutional constraints: shortcomings/barriers associated with procedures and structures in the transport sector.

Motorists: it refers to the commercial motorcycle riders who engage in the business of providing transport services for the public/also the same as motorist.

Road conditions: state of maintenance of the roads.

Training: this refers to the learning process through which riders pass to acquire riding skills

1.11 Organization of the Study

The study is organized in five chapters. Chapter one features; background to the study, statement of the problem, and purpose of the study. In addition, the chapter contains; objectives of the study, research questions, significance of the study, and limitations of the study. Above all the chapter outlines delimitations of the study, basic assumptions of the study as well as definition of significant terms as used in the study.

Chapter two contains literature review organized in themes such as the analysis of the existing literature work on the same area of research and the empirical study. The key variables discussed in the chapter are; the influence of training, drug/substance abuse, road conditions, and how institutional constraints influences high accident rates among the motorcycle operators in Kisii town. Besides, the theoretical framework, conceptual framework, and knowledge gaps in the literature.

Chapter three contains research methodology, highlighting the research design, the target population, sampling procedure and methods of data collection. Equally, it features validity and reliability of the research instruments, methods of data collection, operationalization of variables, and ethical issues in research.

Chapter four highlight on data analysis, presentation, and interpretation. Finally, chapter five gives the summary of study findings, conclusions and recommendations for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter gives literature related to the historical background of the study. It gives literature based on the historical perspectives of motorcycle transport, the extent to which training, drug/substance abuse, road conditions, and how institutional constraints influences high accident rates among the motorcycle operators, and also presents theoretical framework and conceptual framework of the study.

2.2 The Concept of Motor Cycle Accidents

In recent years, there has been a growing concern with the significant increase of accidents involving motorcycles in a number of countries (Naci et al., 2009). Despite the use of motorcycles as a major means of transport in some countries, they constitute a means of transport that is considered to be highly risky (Nunn, 2011). This is because they do not have safety devices to the entire body or protection structure for drivers and passengers (Albalate & Villadangos, 2010). According to the World Health Organization in 2004 around 1.2 million people were killed (2.2% of all deaths) and 50 million more were injured in motor vehicle accidents. This translates to 2 lost lives per minute. Developing countries are particularly at a disadvantage since 70% of these accidents are occurring in these states. By 1990, road accident was the 9th leading cause of death, this condition is projected to immensely rise by 2020, and it will be the 3rd leading cause of death. Road accident is also the leading cause of injury, with road accident injuries higher than occupational injuries. This has attracted many studies being conducted to uncover the causes, and impacts of motorcycle transport accidents in different countries.

In Brazil, motorcycles are the second largest fleet of vehicles; but they are responsible for the highest death rate due to traffic accidents. In Singapore, motorcycles constitute about 19% of all vehicles; yet they are responsible for only 36% of total accidents (Haquea et al., 2008). In Great Britain, motorcycles account for less than 1%

of vehicles, but drivers suffer 14% of total deaths and serious injuries in roads (Clarke et al., 2007).

Although they are widely used, they are also involved in a significant number of accidents which shows their vulnerability due to their low stability as compared to other road users (Mallikarjuna & Krishnappa, 2009) and greater body exposure of the motorcyclists (Jain et al., 2009; Albalade & Fernández-Villadangos, 2010; Saadat & Soori, 2011). Traffic disorganization, failure of inspection, poor maintenance conditions, reckless cycling and the impunity of riders, all significantly contribute to the occurrence of accidents, especially involving motorcyclists (Bastos et al., 2005; Reichenheim et al., 2011). However, alcohol consumption among Brazilian cyclists involved in traffic accidents is considered very common (Bacchieri & Barros, 2011; Reichenheim et al., 2011). This implies that alcoholism is the major cause of accidents among motorcyclist operators in Brazil among other factors.

In Thailand, motorcycle-related accidents accounts for the majority of road accidents. Some of the common contributing factors in Thailand that have been cited includes alcohol consumption, invalid driver's license, inexperience and age of the drivers, as they were found to be a common characteristics in motorcycle accidents than in accidents by other vehicles (Chin and Huang, 2009).

The condition of traffic safety in Indonesia is an issue that is still not given enough attention. This is based on facts that the level of accidents in highways in Indonesia is still high. According to the Directorate of Land Transportation Safety – General Directorate of Land Transportation (2006), 26.211 people died in Indonesia in 2003 due to road traffic accidents. The reason for the ever rising motorcycle accidents is attributed to the rising population of motorcycle owners in Indonesia which is growing fast. However, this should not be taken as the only factor responsible for these accidents but rather there are a number of interacting factors that can cause this. According to Suraji and Sulistio (2009), motorcycle accidents are influenced by traffic volume, speed, road status, the number of lanes, and environmental conditions. The government of Indonesia has come up with safety policies, strategies, action plans and other appropriate programs to better the safety conditions of all road users. The Road user safety campaign “Road

Safety for All”, is among the many flagship programs for reducing the number of accidents by raising awareness among the motorcycle operators and other transport service providers on road safety measures (Undang Undang RI, 2009; Peraturan Menteri Perhubungan, 2006).

In Philippines, lack of comprehensive road safety program is believed to have contributed to the continued increase in road accidents. Due to laxity and absence of comprehensive safety measures by the Philippian government just like in many other developing countries, over-speeding, and lack of awareness on traffic safety rules by the operators of motorcycles has continued to remain among the main factors that causes accidents in roads (De Leon Mark Richmund et. al 2013).

In Australia, coincidentally with increased sales and registrations of motorcycles, the crashes also increased in Queensland from 2001-2005, (Blackman & Haworth, 2013). The rise in motorcycles is attributed to the increasing traffic congestion in most urban areas. According to Blackman, Ross & Haworth, Narelle (2013) “*Comparison of moped, scooter and motorcycle crashes: implications for rider training and education*” risky riding behaviours are more prevalent among younger motorcyclists, which potentially lead to accidents. (Morris, 2009; Teoh & Campbell, 2010). In their study, the common rider -specific crash risks include speeding (over limit) and inappropriate speeds, rider impairment, unlicensed riding, holding a foreign license , non-use of helmets, male gender, rider age (younger or older), rider inexperience and riding for recreation (Blackman & Haworth, 2013b; Greig; Haworth, Greig, & Nielson, 2009; Lardelli-Claret et al., 2005; Lin & Kraus, 2009; Moskal et al., 2012). Lack of rider training and licensing were cited as the main causes of accidents involving motorcycles in Queensland Australia. Regardless of licensing requirements, rider training and education has historically been seen as important for improving rider safety, and continues to be widely promoted by researchers and industry (Bowdler, 2011;).

Many studies have been carried out on the use of motorcycles as means of public transportation in Nigeria. Ogunmodede et al (2012) identified factors influencing high rate of commercial motorcycle accidents in Nigeria. They found that over-speeding, wrong overtaking, bad roads, sudden mechanical defects and alcohol intake as

major factors. They also discovered that commercial motorcycle riders do not comply with Road Safety Highway Codes. Nigeria, attested to the fact that motorcycles have higher fatality rate per unit of distance travelled when compared with other automobiles, this is because motorcycle riders are otherwise refer to as exposed road user.

According to Taiwo (2007), most drivers take for granted the ability of their automobile to handle minor road hazards such as pot holes or rail road tracks, these minor road hazard are major problems for motorcycles because these hazards may require sudden changes of lane position and direction. Accidents due to motorcycles riding especially in developing countries like Nigeria increase every year due to the fact that the motorcyclists do not follow the traffic rules and they in their mentality believe they are „the king on the roads“ (FRSC, 2007). FRSC (2007) further stated that motorcycle accidents are more likely to occur on certain times especially raining seasons in Nigeria is a season for motorcycle accidents because of the filled pot holes with water and the slippery surfaces of the roads.

The state of roads is one of the causes of motorcycle accident in Nigeria, as a result of the various pot holes and wobbles motions on deformed roads, the motorcyclists“ lose control of their motorcycles and collision with oncoming vehicles may occur. Often factors responsible as identified by FRSC (2007) include brake failure; control of the motorcycle is lost when the brake fails and thereby resulted in an accident. road traffic accident have been increasing in developing countries like Nigeria and Tanzania while there has been a reduction in developed countries like Australia (Ogbeide, et al, 1994).

To overcome over speeding running mode on a curve due to excess speed or under cornering, riding under the influence of alcohol which affects the riders judgment, riding bikes with worn-out tyres, brake failures accounted for motorcycle accident due to loss of control, lack of accessories like rear mirror, functional horn and head lamp, route violation: facing on-coming vehicles that is riding against the traffic and riding motorcycle without crash helmet which accounts for 95% motorcycle accidents (Ogagaoghene, 2011).

The government of Nigeria formulated various laws which were enacted by Federal, State and Local Governments to curb the excesses of the riders, this includes The National Road Traffic Regulation of 2004 and FRSC Establishment Act 2007 to mention but few, (Ogagaoghene, 2011).

In Tanzania, just like in many developing countries, road traffic accidents are increasing with time with majority of the reported cases involving motorcycles. According to “National Council of Traffic Safety and Security Annual Report 2003”, In Tanzania, the number of all forms of motor vehicles on the roads has greatly increased due to government liberalized policies. Unfortunately road maintenance, driver’s education, vehicle up-keeps and traffic regulations have not grown accordingly. Ironically despite the ever rising incidents of road accidents which call for further empirical attention, few studies have investigated how this situation can be averted. This scenario calls developing countries to put more effort toward control and prevention of road traffic accident and their outcome. This can be achieved through multidisciplinary approach and research to uncover the underlying factors behind this trend in road accidents involving different road users.

In Kenya it is estimated that the number of motorbikes in Kenya increased from 3,759 units in 2005 to 91,151 in 2009 as a result of Zero rating the tax on motorcycles below 250cc in 2008 (Daily Nation 3rd October 2010). The landmark tax exemption slashed the price of Chinese made model from an average of seventy thousand to between thirty and forty thousands. According to Odero et al. (2003), nearly 3,000 people are killed on Kenyan roads annually, translating to approximately 68 deaths per 10,000 registered motorcycles.

Like in western Kenya, boda bodas are the most popular means of transport commonly used in short distances and this has revolutionized the movement of people and have driven once popular bicycles out of business (Kisia, 2010). However, the new mode of transport has come with its share of misfortunes as their number increases day by day, so is the number of accidents (RTIRN, 2010). The accidents are so frequent necessitating many hospitals to establish special wards for *boda boda* victims, and relevant stakeholders to carry out road safety campaigns. Much of the reported accidents

are said to be caused by careless driving due to inadequate training and awareness among the youths and individuals involved in the *boda boda* industry.

In Kisii County, Motorcycle accidents are a common phenomenon too. Over-speeding, drunk driving, poor state of roads, lack of training and experience among other factors are assumed to contribute to such accidents.

2.3. Influence of Training of Motorcycle Operators on Motorcycle Accidents

Driver and rider training are commonly perceived by the public as a panacea to many road safety problems, particularly in regard to novice driver/rider crash involvement. Despite the strong believe attached to training and the ability to reduce accidents, the belief is not well supported by empirical research, with past reviews suggesting little or no benefit from formal training and educational programs in terms of crash reduction for drivers or motorcyclists (Christie, 2001; Haworth & Mulvihill, 2005; Mayhew, Simpson, & Robinson, 2002; Watson et al., 1996). There are a range of potential shortcomings that may account for the apparent lack of efficacy of training programs. These include issues such as program content and delivery methods, the influence of the licensing system (where applicable), and evaluation deficiencies (e.g. self-selection bias, lack of statistical power, and exposure differences such as distance travelled). However, overconfidence following training may also potentially impact on subsequent crash involvement (Gregersen, 1996; Hatfield & Job, 2001).

The lack of positive training program evaluations may not reflect the failure of training per se, but the need for more effective program design and delivery (Rowden, Watson, & Haworth, 2007). Training program evaluations have also been typically compromised by methodological problems (Buche, Williams et al., 2010), which may help to explain the limited number of evaluations published to date. Training for long has been entirely focused on motorcycle control skills and traffic awareness, with little attention to attitudinal and behavioural issues. This kind of training may possibly fail to recognize different training needs of riders thus compromising the effectiveness of training on road accident reduction.

In Uganda for instance, the motorcyclists tend to over-speed and over load their machines for quick returns. It is because of this recklessness, indiscipline and lack of respect for other road users by the Boda boda motorcyclists who are mainly youths, are the major cause of these accidents. Young Motorcyclists hardly wear protective gear, hence aggravating the risks of getting severe head injuries and being predisposed. In Malaysia where motorcycle injuries contribute 60% of all road fatalities, improper use of helmets was the most important cause of the fatal accidents. The young age of the motorcyclists as one of the major factors responsible for motorcycle accidents due to inexperience. As a response to the increasing motorcycle accidents, the Ugandan government introduced training for motorcyclists, and alcohol restrictions to reduce the risks of motorcycle related accidents.

There is also the problem of driver training, examination and certification in Kenya right from the vehicles to the motorcycles. There is a weak legal framework for training and certification. According to the Kenyan legislation, prospective motor vehicle drivers can receive driving training from any registered driving school or from any private individual who holds a driving license for at least the class for which one wants to be trained as a driver. This means that any one holding a driving license can train others how to drive. Furthermore, there is neither a standard curriculum nor set textbooks for drivers. There is also no requirement for proof of good health before one enrolls for driving training (Kisia 2010).

Chitere (2004) has established that more often the prospective riders begin by learning from those who already know how to ride without any formal training at all. They then go to ride soon after assuming that they have known. Furthermore, these riders tend to work for long hours, in some cases up to 13 hours a day for seven days a week.

They are also paid low wages on daily basis, lack permanent employment contracts, rarely stay with one employer for long, and operate on daily collection targets set for them by motorcycle owners. Given casual manner in which training and certification is done, it is not surprising that drivers are the major cause of road crashes in Kenya (Chitere 2004).

The capacity and competence of the training institutions has also been a major concern. Most of the training institutions are not properly equipped and staffed to provide effective training. At the same time, driver/rider testing also lacks in rigor and can easily be passed even by a very weak candidate. This is partly because there are very few driving test examiners. As a result, one examiner handles too many candidates in one day which leaves the examiner exhausted thus compromising the evaluation exercise. In addition, the conditions in most of the training institutions are appalling. To begin with, the training instructors are very poorly remunerated, have low morale and keep asking for handouts from the trainees who have already paid fees to the school. It is those who are able to pay the instructors extra money that receives some form of good training. Due to low pay, the schools are unlikely to attract and retain good instructors. Cyclists also cause crashes mainly because of ignorance of road traffic signs and signals due to poor training (Odero et al. 2003).

Lack of experience is mostly addressed formally through a range of rider licensing, training and education programs for which, as noted previously, there is a lack of rigorous evaluations. Programs generally target new riders regardless of age, tending to capture not only young riders but also older ones who comprise a large proportion of those seeking a license (Haworth & Rowden, 2010).

Edson and Tandoc (2007); further add that young motorcyclists below the age of 18 years make up a significant percentage of road accidents among road users in many countries because of lack of proper training, riding while they are under age and not complying with the traffic rules.

When motorcyclists drive at excessively high speeds, beyond the recommended speed limit, they can lose control of their motorcycles relatively easily, which can then cause an accident. In addition, if a motorcyclist driving at an excessive speed hits a pothole or unseen bump in the road, it could send the motorcyclist off the bike or cause the motorcycle to go off the road. High speed therefore by any reasoning increases the chances of becoming involved in an accident.

According to Luchidio (2013); in his study on the “ impact of training *boda boda* operators and safety status in Kakamega county”, over speeding has also contributed to the increase in number of accidents with 52% of the responders agreeing that over speeding is a big problem this can be attributed to the operators who rush so as to make extra money. Over-speeding can also be attributed to the age of the riders who are still in their teenage and want to experiment with the machine. The operators who drive under influence of alcohol also contributed to the accidents in the county by 45%. Drunk driving can make operators to make wrong judgments thus putting themselves and other road users in danger. Poor roads in the county also contributed to accidents of the *boda boda* operators 19% have suffered due to the bad state of the roads. Traffic rules and regulations not being followed has also contributed to accidents 12% while overloading 4% have also contributed to accidents on the road.

2.4. Influence of Drug and Substance Abuse on Motorcycle Accidents

In Australia, there is evidence to suggest that motorcyclists drink-riding, like drink-driving, remains a serious problem for motorcycle safety as operating a vehicle under the influence of alcohol increases a person’s risk of having a serious crash (National Health and Medical Research Council, 2001). A Victorian analysis of killed or seriously injured riders and drivers concluded that, over the 10 year period from 1984 to 1993, motorcyclists were less likely to be over the legal BAC limit than other road users. Queensland data from 1997 to 2002 suggests that motorcycle fatalities are no more likely than other road users to have a positive BAC reading (Queensland Department of Transport, 2003).

Impairment by alcohol and other drugs is potentially more risky for motorcyclists than for car drivers due to the balance and awareness required to ride in the traffic environment. Adverse effects of alcohol at legal BACs have been found for obstacle avoidance for motorcyclists (NHTSA, 2008).

In Europe, drink driving is the second greatest contributory factor of road deaths after speeding. Drunk driving accounts for approximately 25% of all road accidents in the EU and for 30-40% of driver deaths (SARTRE 2004).

To overcome drug and substance abuse among the motorcyclists, some countries such as the Netherlands, Belgium, Finland, and Estonia try to measure the distribution of alcohol levels among the driver population. To establish this performance indicator, random breath testing actions are repeated regularly at selected times and locations. The Netherlands use the data from these surveys also to estimate the yearly number of accidents from drunk driving (Anderson, P. 2007). In Belgium, bi-annual measurements were started in 2003.

The European Commission set itself the target of a 50% reduction in road deaths by 2010 which was adopted in the third Road Safety Programme in 2003. This provided the appropriate framework for road safety policy planning in Europe. The programme identified three areas of action namely: the behavior of road users, vehicle safety and improvements of road infrastructure. Concerning drink driving it also included four specific measures which are: Participating in awareness campaigns including drink driving, encourage the take up of the BAC recommendation and continue its work on alcohol, propose measures to strengthen checks and ensure the police enforcement of the most important safety rules including drink driving, and lastly examine driver impairment detection devices.

In addition, the EU is also active in promoting best practice via its research Programmes. Currently it is supporting a variety of alcohol and driving related research projects including; Analysis of Driver Rehabilitation Programmes (ANDREA), Road Safety performance Indicators (RSPI 2004-2008), Police Enforcement Policy and Programmes on European Roads (PEPPER 2006-2008), Driving Impairments due to alcohol, drugs and medicine (DRUID 2006-2009), and Campaigns and Awareness-raising strategies in Traffic Safety (CAST 2006-2008).

Alcohol consumption is well known to impair driving and riding performance and is implicated more frequently in fatal crashes than non - fatal crashes (Siskind et al. 2011). Additionally, motorcyclists are involved in crashes more often at lower BAC than car drivers (Sun, Kahn, & Swan 1998). Several studies have shown impairment at motorcycle riding under the influence of low dose ($\leq 0.08\%$) blood alcohol concentration (BAC). According to N. Haworth et al., (2008) the factors contributing to crash

occurrence and injury related to motorcycle accidents include: Being young, Inexperience, riding a borrowed motorcycle, Consumption of alcohol, curves, Slippery or uneven surfaces

In Nigeria, motorcycle accidents are said to be caused by over-speeding, wrong overtaking, bad roads, sudden mechanical defects and alcohol intake as major factors (Ogunmodede et al., 2012). They also discovered that commercial motorcycle riders do not comply with Road Safety Highway Codes.

2.5. Influence of Road Conditions on Motorcycle Accidents

The road network has an effect on crash risk because it determines how road users perceive their environment, and it provides instructions for road users, through signs and traffic controls, on what they should be doing (Peden M et al., 2004).

Road hazards and driving conditions, including weather, as well as whether it is day or night, can lead to motorcycle accidents. Road hazards, which may include potholes, slippery road conditions, wet roads, loose stone or gravel, winding roads, blind spots, and even animals, can cause motorcycle accidents. Road hazards such as fresh loose stone, curves, and construction are supposed to be marked by the highway management. If hazards are not clearly marked, or not marked at all, highway management may be considered to be negligent and at fault for the accident.

Poor weather conditions, such as rain, fog, or even snow, may contribute to motorcycle accidents. Drivers of cars or trucks may not see motorcyclists; in such instances, it may be difficult to determine who may be at fault for an accident, or if anyone was at fault at all. In poor weather conditions, it is extremely important to exercise caution and be aware of other drivers.

Poor Australian road surfaces have been identified as a contributing factor in motorcycle crashes and are often mentioned by motorcyclists as an area where the government can take action to reduce motorcycle crashes (Rolison, M. R. & Scherman, A. 2003; Haworth, 1999). It is difficult to ascertain the extent to which poor roads contribute to serious or fatal crashes as this is not systematically reported in official Australian

statistics. Haworth, Smith et al. (1997) noted that the road surface was muddy, oily, or strewn with loose material in 27% of serious and fatal crashes they studied, and that many more sites had irregular or changing surfaces. On further investigation, Haworth (1999) concluded that the condition of the road, mainly “lack of visibility or obstructions, unclean road or loose material, poor road condition or road markings and horizontal curvature”, actively contributed to around 15% of the crashes.

In Sweden, Rain has been shown to be a major factor causing traffic accidents (Brodsky and Hakkert, 1988; Andrey and Yagar, 1993; Fridström et al., 1995; Levine et al. 1995; Andreescu and Frost, 1998). Indeed, some studies show a doubling of the accident rate during rainfall (Bertness, 1980; Brodsky and Hakkert, 1988). Highest accident risk of traffic accidents were caused by a reduction of road friction during rainy season (Bogren et al. 2006).

Cases of fatal road traffic accidents are reported almost daily on the major highways in Lagos State. Road accidents appear to occur regularly at some flash points such as where there are sharp bends, potholes and at bad sections of the highways. At such points over speeding drivers usually find it difficult to control their vehicles, which then result to fatal traffic accidents, especially at night (Atubi, 2009b).

Cyclists are also victims of poor road infrastructure design, which ignores their presence on the road. Ironically, the government licenses motorcycles for example, while there are no provisions for cyclist lanes or parking bays. In fact, both motorcyclists and pedal cyclists, have to struggle with motor vehicle drivers for road space. Yet, it has been observed that, "cycle-lanes help to alert drivers to the presence of cyclists and give cyclists greater confidence" (IHT, 1997:320).

Although no conclusive studies appear to have been done on the extent to which the poor, state of road infrastructure leads to road crashes, conventional wisdom indicates that the poor state of most Kenyan roads is a major contributing factor to road accidents in the country. To begin with, there are numerous cases of accidents that occur when drivers and motorcycle riders try to avoid pot-holed sections of the road network. Secondly, Kenya's road infrastructure design tends to ignore other road users like cyclists and

pedestrians who have to struggle with motorists for road space at the risk of causing crashes. Thirdly, crashes sometimes occur when motorcyclists try to overtake vehicles along narrow sections of the road. The narrowness of the road may pose risky overtaking especially for long distance driving along major routes.

Additionally, most Kenyan roads have inadequate road markings and road signs, poor street lighting and inadequate parking space.

Although, *Matatu* Owners Association (MOA) which is a private sector has tried to come up with safety strategies to bring sanity in the Kenyan roads much still need to be done. Formed in April 2003, MOA initiated a road safety awareness campaign dubbed Arrive Alive Program or *Safiri Salama* in 2004. The program was hinged on the slogan: Road Safety Depends on you. The program which was supported by Invesco Insurance Company; emphasized adherence to road traffic rules; non-consumption of alcohol and other toxic substance by road users. Although the campaign targeted all road users, it was directed more towards the *matatu* owners probably because by then motorcycle transport was not very common in the Kenyan roads.

Despite the fact that road conditions also contribute to road accidents, there is no well-established policy on the same. One of the most serious flaws in Kenya's road safety initiatives is the neglect of road infrastructure as a contributing factor to road crashes. Most of the issues addressed by past and current road safety initiatives can broadly be divided into those that deal with the behavior and attitudes of road users and regulators, and those that deal with mechanical defect on vehicles. In association with the previously mentioned factors, it is important to emphasize that traffic disorganization, failure in vehicle inspection, poor maintenance conditions, reckless driving and the impunity of infringers, significantly contribute to the occurrence of traffic accidents, especially involving motorcyclists (Bastos et al., 2005;Reichenheimet al., 2011).

2.6. Influence of Institutional Constraints

Poor implementation of motorcycle operating policy in Nigeria over years has remained to be among the causes of motorcycle accidents (Oyesiku, O. K. 2001).

The constraints in the implementation of this directive are both attributed to cultural and religious. Particularly for Nigeria and many countries in West Africa, the greater significance of direct government intervention in the policy initiatives on motorcycle operation relates to the poor management of public transportation systems in both the metropolitan and intermediate cities with rapidly growing population. The weakness in the existing structure regarding the difficulty of poor co-ordination between transport and land use and between physical planning and infrastructure development. There are no structural plans or even master plans for physical development of most cities in the country. Thus, there is hardly any specific land allocation made that could be critical to the sound development of the nations' transport network.

Transport regulators in developing countries tend to be weak, with inadequate capacity, creating an unfavorable environment for transport services. The in-charge authorities are mostly government bodies (central, local, or both) such as a ministry of transport whose schedules and statutory provisions are overseen by the responsible minister. Many traffic laws are inadequate for modern traffic and transport conditions. Recent trends toward liberalization of transport services and the formation of road agencies have highlighted the shortage of resources and human capacity available to ministries of transport. For example, in 2001 in the Uganda Ministry of Works, Housing, and Communications, for every person assigned to work on transport planning and regulation issues, 20 people were assigned to work on road planning and engineering. In Ethiopia the Road Transport Authority is the poor cousin of the Roads Authority. Such arrangements make it very difficult for regulatory authorities to monitor user requirements and to provide an environment conducive to transport services this creates room for motorists to break traffic rules and hence lead to accidents (Howe 2001).

Ineffectiveness in traffic law enforcement by the police is perceived as a major motivation for aspects of careless driving in Ghana roads. The police rather seemed to be interested in extorting money from motorists who commit traffic offences and letting them go unpunished (Huang et al., 2006).

In South Africa institutional factors play a larger role than road environment factors. It is said that one out of every ten motor-vehicles on South African roads are considered to be un-roadworthy so is the case with motorcycles (Department of Transport, 2004), which is the likely cause of this phenomenon.

The National Department of Transport (2004) which organizes the Arrive Alive campaign claims that 95% of all road accidents are the direct result of a traffic violation (Vogel, L. 2004).

South Africa displays trends similar to those of other developing countries with rise in road accidents. This implies that an increase in the number of motor-vehicles on the road has contributed to an increase in the number of road traffic fatalities. The road safety measures aimed at reducing road traffic fatalities have had little significant effect in this regard partly due to failure by the concerned authorities (Van Schoor et al. 2001)

Between 2005 and 2006, victims of serious traffic accidents in Uganda rose from 4000 annually to 5000, with deaths occurring in hundreds and motorcycle accidents as the fastest-growing subcategory (ITSL 2008). Drivers were considered to be illiterate ‘hooligans’ prone to criminality; the ‘worst group’ in society. People often referred to the uneducated urban underclass generally as ‘the boda-boda class’.

To address these high incidents of accidents, the state (KCC in particular) attempted to implement a regulatory framework. In addition to helmet requirements, the realization early in the millennium that many drivers did not have driving licenses prompted a series of regulations requiring drivers to carry documents including a license, PSV permit and third party insurance. A special motorcycle enforcement unit (Kuboka) was created around the same time, with the mandate of enforcing regulations and prohibiting carrying two passengers simultaneously. Kuboka consisted of drivers familiar with the ‘tricks of the trade’ trained by the police to act as plain clothes boda-boda policemen. It became associated with bribes and extortion, rather than effective regulation of the sector, and in any case was formally disbanded in 2007, ostensibly due to lack of resources (ITSL 2008: 30). The establishing of this regulatory body and formulation of regulations without any control over the industry’s expansion only made the prospect of implementation more hopeless (Goodfellow and Titeca 2012).

Institutional fragmentation in the transport sector is a key obstacle to road transport planning. The Kenya Roads Board (KRB) is the main institution responsible for the national road infrastructure network in Kenya. Other institutions include, the Transport Licensing Board (TLB), Motor Vehicle Inspection Unit, Registrar of Motor Vehicles, Driving Test Center, Traffic Police and Local Authorities. These institutions are fragmented across government ministries and departments. The Registrar of Motor Vehicles, who determines and fixes passenger and luggage capacity for all motor-vehicles, is currently under the Ministry of Finance, while the Driving Test Unit is under the Office of the President. This leads to disjointed handling of transport issues (Odera, 2003).

Although TLB is supposed to license all public service vehicles, allocate those routes and regulate their operation timetables, it has generally been unable to allocate routes and monitor compliance or even ensure that public service vehicles have operation timetables. This could be a consequence of the fact that the Board does not incorporate stakeholder representation and hence, is not conversant with the routes. There is also lack of data on vehicle requirements by route.

Local authorities have also not been able to perform their roles with regard to urban public road transport. Consequently, certain routes lack parking terminuses, and where they exist, they are inconveniently located, and generally small in size. This encourages arbitrary picking and dropping of passengers which equally puts the life of the operators and the passengers at risk considering the poor environment into which they are exposed to.

The consequences of this dangerous built environment are enhanced by the poor performance of traffic police and the judicial system. There are three major problems related to police performance. First, police personnel are not properly qualified. Second, there is a low supply of personnel, vehicles and specialized equipment, such as radars and alcohol-measuring devices. Third, enforcement logistics give priority to parked-vehicle offenses that often have little impact in safety. This is so for several reasons: unrestricted mobility is seen as a right and policeman act accordingly, focusing on traffic fluidity; parking enforcement is easily performed on foot and is highly productive; the lack of

proper equipment makes it difficult for the policeman to enforce moving vehicles and enforcement is primarily organized to enhance mobility.

The Traffic Police is required to enforce traffic rules, examine PSV drivers and issue certificate of good conduct to the motorists. However, traffic rules continue to be violated right under the nose of the traffic police. Section 42 of the Traffic Act, for example, limits public service vehicle speed to 80km/hour, yet the police have been unable to enforce the speed limit. According to Chitere and Kibua (2004), the failure of the police to enforce traffic rules is due to massive corruption, ill equipment and the impracticality of some of the rules such as Section 66 of the Traffic Act, which prohibits continuous driving of PSV vehicles for more than eight hours, yet the police cannot detect how long one has been driving continuously.

The Traffic Police on the other hand, while charged with enforcing The Traffic Act, have on numerous occasions been caught on camera receiving bribes, and have featured in various corruption indices reports as leading in the vice. In fact, while the Kenyan Police was reported as the most corrupt institution in Kenya by the East African Bribery Index Report, it's the traffic arm of this organization that tops the list (Kibua and Chitere, 2004).

Evidently therefore, the policy, legal and institutional framework for road safety in Kenya has been very weak. Besides the legal provisions scattered in various Acts of Parliament, there has been neither a coherent policy nor a coordinated safety institutional framework. Even the existing safety legislation often faces implementation hurdles (Asingo, 2004).

2.7. Theoretical Framework

A theory is a system of concepts that are interrelated in ways that are clearly described and suggests the causal mechanisms that lead to specific outcomes allowing explanation and prediction of phenomena. This study was guided by systems theory. A system is a group of elements organized such that each one is in some way interdependent (either directly or indirectly) with every other element. In addition, it is required that the systems have a function, goal or purpose (Johnston et al, 2000).

The systems theory also known as the systems approach (Reason, 1990; Rasmussen, 1997; Dekker, 2002; Rothe, 2002) is the most predominant framework employed in safety research in recent decades (Salmon et al., 2010). Its advent dates far back to 1940s when Chapanis (1999) in a groundbreaking study in the 1940s on aviation safety and plane crashes found that ‘pilot error’ was essentially ‘designer error’. Systems theory adopts an analogy of a living organism which is made up of different organs that perform different but complimentary role for the general well-being of the organism. Accidents arise from interactions among human, machines and the environment but not from simply chains of events or linear causality, but more complex types of causal connections. Under normal circumstances chances of an accidents is low. Rather than looking at the environment as being full of hazards and people prone to errors, systems theory assumes that there is a steady state between individuals and the environment. For example the theory explains how combination of illegal speed and alcohol use is significantly related to occurrence of motorcycle accidents and how such factors responsible for the accidents can be changed to serve better the community.

The strengths of this theory are in its holistic approach to the road traffic problem. It is both a method and an intervention blueprint to accident management. It is also comprehensive because its tenets cover all categories of road users such as drivers, pedestrians, cyclists, and passengers (Johansson, 2009).

As other theories which preceded it, systems theory does not account fully for all aspects of the traffic carnage. For instance, traffic law enforcement has not been given attention yet it is known to be another key factor in accident research. It is also considered by many safety researchers to be too generic in scope and thus lacks specificity when it comes to particular accident situations.

These weaknesses notwithstanding, it stands tall among its counterparts for its universal appeal and interdisciplinary orientation or application.

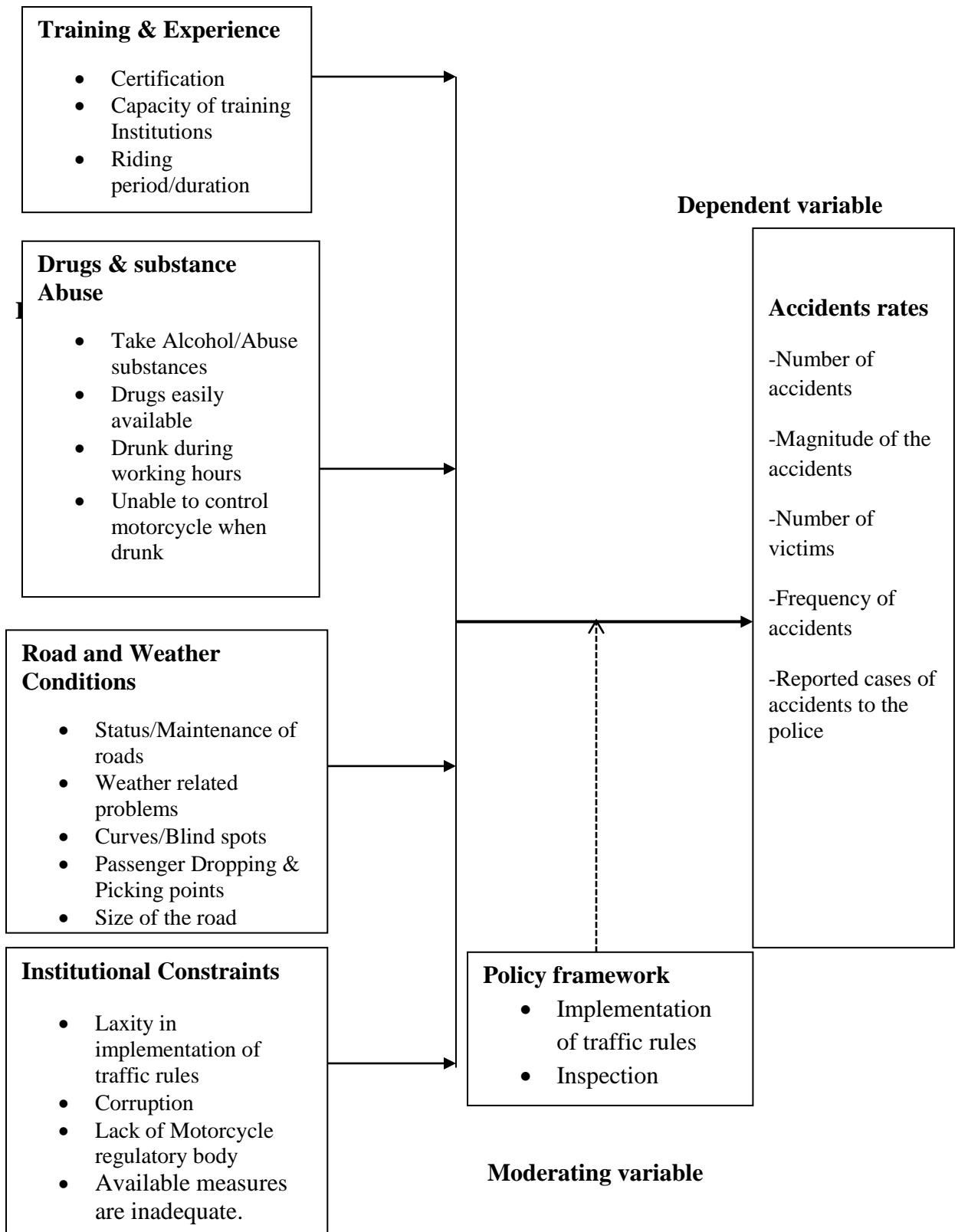
Motorcycle accidents are seen as resulting from the failures of the whole system rather than a failure of the driver or any single factor. As such this theory provides a holistic view on the causes of motorcycle accidents.

2.8. Conceptual Framework

Earp and Ennett (1991) define a conceptual framework as “a diagram of proposed causal linkages among a set of concepts believe to be related to a particular public problem. Conceptual Framework is a set of concepts that are placed within a logical and sequential design. It represents less formal structure and used for studies in which existing theory is inapplicable. In this study the conceptual framework will be derived from the research variables and will seek to show the relationship between the independent and dependent variables. The conceptual framework in figure 2.1 attempts to explain the relationship between the independent variables and the dependent variable.

Figure 2.1 Conceptual Framework

Independent variables



The conceptual framework was used to show the relationship between the independent variables and the dependent variable. The arrows point at the direction of influence. Alcohol and substance abuse among the motorists leads to poor judgment, reduced vigilance and decrease in patience there by exposing motorists to risky behaviours. Narrow roads, potholes in the roads, sharp bends, slippery roads and lack of parking space all increases the chances of motorists being involved in accidents; poor training denies the motorists the opportunity to acquire the necessary competence required for them to operate the motorcycles hence leading to accidents; above all institutional constraints such as inadequate resources like shortage of traffic personnel, vehicles for inspection, corruption also influence motorcycle accidents.

2.9. Knowledge Gaps

| Specific variable | Source of Literature | Findings | Actual knowledge gap |
|-----------------------------|---|--|--------------------------------------|
| Training and Experience | Impact of training boda boda operators and safety status in Kakamega county, Kenya (Luchido, 2013) | Most of the boda boda accidents are due to lack of training and awareness on road safety. | Study was done in Kakamega |
| Alcohol and substance abuse | Risk Taking by Motorcyclists: Rider Training and Stages of Change (Peter Rowden, Barry Watson, and Narelle Haworth 2012) | In Australia, there is evidence to suggest that motorcyclists drink-riding, like drink-driving, remains a serious problem for motorcycle safety as operating a vehicle under the influence of alcohol increases a person's risk of having a serious crash (National Health and Medical Research Council, 2001). | This study was done in Australia. |
| Road and Weather Conditions | Winter Road Conditions and Traffic Accidents in Sweden and UK (Anna K. Anderson, 2010) | Poor road and weather conditions contribute to road accidents involving motorcycles. | The study focused on motor vehicles |
| Institutional Constraints | Accidents in developing countries. | Transport regulators in developing countries tend to be weak, with inadequate capacity, creating an unfavorable environment for transport services. The in-charge authorities are mostly government bodies (central, local, or both) such as a ministry of transport whose schedules and statutory provisions are overseen by the responsible minister. Many traffic laws are inadequate for modern traffic and transport conditions (Howe, 2011). | The study focuses on motor-vehicles. |

2.10. Summary of Literature Review

This chapter focused on relevant existing literatures, applicable theories, conceptual framework of the variables and their relationships, and the knowledge gaps.

From the used literature, the concept of motorcycle accidents was discussed with a view of comprehending the underlying causative factors. Accordingly, accident was defined as any unintended event usually resulting in personal injury.

The underlying factors that were discussed are: training and experience, alcohol and substance abuse, road conditions, institutional constraints, and overloading/excess.

Training and experience of the motorists was closely examined and it has been identified to have an impact on road accidents among the motorcycle operators.

Additionally, alcohol and substance abuse were also carefully examined and the impact on accident rates among the motorists was weighed. From the literature alcohol and substance abuse influences accident rates among motorists even than in any other motor-vehicle operators.

Road conditions on the other hand equally influences the occurrence of road accidents involving the motorists to some extent. For instance it was found that sharp corners, slippery roads facilitate accident occurrence.

Institutional constraints especially poor policy implementation has a bearing on road accidents involving the motorcycles. Corruption and lack of responsibility from the concerned transport stakeholders adds up in the institutional constraints.

Finally overloading was also found to have influence on the accidents involving motorists.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter focused on research methodology. The chapter consists of the research design, target population, and sampling procedures. Additionally, it features methods of data collection, validity and reliability of the research instruments, and methods of data analysis. Above all it comprises operational definition of variables, and ethical consideration in research.

3.2 Research Design

According to Kothari (2004) research design is defined as framework that shows how problems under investigation will be solved. The study adopted the descriptive survey research design to study the factors influencing high accident rates among motorcycle operators.

Descriptive survey research design is the most appropriate especially when the purpose of study is to create a detailed description of an issue (Mugenda & Mugenda, 1999). The study of factors influencing high accident rates among motorcycle operators encompasses practices, and conditions that already exist thus making the design appropriate for the study. The participants were given questions that were administered through questionnaires with closed ended questions using a Likert scale for easy statistical analysis (Jackson, 2009). This made it possible for the researcher to generate statistical information on factors influencing accident rates among motorcycle operators in Kisii Town. A questionnaire was administered to a sample of the respondents and the researcher carried out a study on the sampled motorcycle operators, Traffic base commander, Kisii level five Medical Superintendent, the County Single business license in-charge officer, and the Kisii Town motorcycle leader were also given questionnaires to find out factors influencing accident rates among motorcycle operators in Kisii Town. Hence the study will be conducted in Kisii Town of Kisii County of Kenya.

3.3 Target Population

A population refers to an entire group of individuals, events or objects having a common observable characteristic (Mugenda and Mugenda, 1999). This study had a population of 1190 registered motorcycle operators from whom the study sample was drawn (2014, Kisii County single business permit department). The target population comprised: the boda boda operators, traffic police base Commander, the medical Superintendent Kisii level five Hospital, the In-charge Single business license county officer, and the Kisii Town Motorcycle operators leader. The Boda boda operators were the main respondents in this study and they comprised both the trained and untrained which provide a rich source of information on whether lack of training influences motorcycle accidents in Kisii Town. Traffic Base commander on the hand was expected to provide insight on the mostly common reported causes of motorcycle accidents. This target population was able to provide answers to the research questions as it had diverse representation of the key stakeholders in the boda boda transport sector.

3.4 Sample Size and Sample Selection

3.4.1 Sample Size

Sampling procedures refers to a process selecting a given number of respondents from a representative of a defined population (Orodho, 2004). Different approaches can be used to determine the sample size like using a census for small populations, imitating a sample size of similar studies, using published tables, and applying formulas to calculate a sample size (Israel, 2009). Also time and resources available should be taken into consideration when determining the sample size to be used for the research.

The main function of sampling is to allow the researcher to conduct the study on individuals from the population so that the results of the study conclusion will be applied to the entire population. The intended targets in this study were the motorcycle operators, the Base Commander, the medical Superintendent Kisii Level five Hospital, the in-charge County single business licensing, and the Kisii Town leader of motorcycle operators. The researcher used Stratified random sampling to identify potential respondents in the study.

Stratified random sampling involves a process of segregating members of the population in homogenous groups (groups with the same characteristics). This is then followed by random selection of subjects from each stratum/sub-group. The population is first divided into mutually exclusive groups that are relevant and appropriate and meaningful in the context of the study (Mbwesa, 2006).

The sample population was obtained through both simple random and convenient sampling. All main roads (Kiogoro, Nyanchwa, Jogoo, and Daraja Mbili) from the town Centre that directly connects Kisii Town to the nearby regions were included. All commercial motorcycle drop and pick points along these roads to the geographical boundary with Kisii Town was mapped and assigned a specific identity. The mapping process was done by the researcher with one commercial motorcyclist familiar with the concerned road.

For each road, two categories of commercial motorcycle picking and dropping points, those within the urban, and those outside the urban (Peri-urban) were selected.

To effectively administer the research instruments to the respondents, the researcher booked appointment with the motorists through their stage managers (leaders) since these are highly mobile members of the community.

A population census was used to pick the base commander and municipal in-charge officer, health practitioners of Kisii Level V hospital, and the passengers.

The study targeted 1190 Motorists. In order to get the sample size, the researcher used Krejcie and Morgan table of the target population.

3.4.2 Sampling Selection

Stratified sampling was used to get the sample from the population of the motorcyclist operators. This method involved categorizing the members of the population into mutually exclusive and collectively exhaustive groups. An independent simple random sample was then drawn from each group. Stratified sampling technique was quite appealing for this study because it would provide more precise estimates of the population being studied as it is more heterogeneous than the categorized groups. The main advantage of the approach is that it's able to give the most representative sample of a population (Hunt & Tyrrell, 2001).

The target population will be divided into four categories namely: the motorists, traffic police, health practioners, and the in- charge County Single Business Licensing.

Table 1 presents the sampling matrix.

| Stratum | Target population | Number Sampled |
|-------------------------------------|--------------------------|-----------------------|
| Motorcycle Operators | 1190 | 285 |
| Base Commander | 1 | 1 |
| Medical Superintendent | 1 | 1 |
| In-charge Single Business Licensing | 1 | 1 |
| Leader Motorcycle Operators | 1 | 1 |
| Totals | 1194 | 289 |

3.5 Data Collection Instruments

The study used questionnaire to collect data from the respondents. The majority of the questions in the questionnaire were closed-ended and only a few in areas where necessary open ended so as to ensure that both qualitative and quantitative data were collected and ambiguity minimized.

The questionnaire copies were administered by the researcher in person and the research assistants after it had been explained to the respondent upon the respondent's acceptance to give the information requested in the questionnaire. Questionnaires were appealing since they are anonymous and could help to generate more candid answers than interviews. There was a common questionnaire for the motorists, base commander, medical superintendent, the in-charge county single business license, and the leader for boda boda operators in Kisii Town. The questionnaire was divided into two sections. Section A gave demographic characteristics of the respondents; and B, solicited information related to factors influencing accident rates among the motorcycle operators.

3.5.1 Piloting of the Study

The researcher conducted a pilot study in the adjacent Nyamataro commercial centre so as to avoid the respondents of the selected study areas from having prior knowledge of the items in the questionnaire.

A pre-test refers to a trial administration of an instrument to identify flaws (Kothari 2004). The questionnaires was pre-tested to determine whether questions and directions are clear to subjects and whether they understood what was required from them. A pre-test sample should be between 1% and 10% depending on the sample size, Mugenda and Mugenda (2003). The researcher pre-tested the questionnaire on ten respondents meeting the set criteria of the study.

According to Mugenda and Mugenda (1999), a pre-test sample of a tenth of the sample respondents with homogeneous characteristics is appropriate for the pilot study. The findings of the pilot questionnaire were used to improve on the restructuring of question items and setting of response expectations.

3.5.2 Validity of the Instruments

Validity of research instrument refers to the extent to which a test or instrument measures what it was intended or supposed to measure (Mbwesa, 2006). Ranjit and Kumar (2005) further define validity as the quality of measurement procedure that provides respectability and accuracy. To check on the validity of the research instruments, the instruments were written in a language that factored the education level of the respondents so that it would be easily understood by the respondents to give their responses without any difficult. Validity was also established through close consultation with my supervisor and colleagues. The instruments were also generated in response to the research objectives, and the assessment of validity is subjective opinions based on the judgment of the researcher (Wiresman, 1995).

3.5.3 Reliability of the Instruments

According to Mugenda (2003); reliability is the measure of the degree to which a research instrument yields same results after repeated trials. To ensure that the research

instruments were reliable, the researcher observed keenly the application of each research tool and monitored the results that were yielded by the instrument from time to time. The use of every research tool was also explained comprehensively to the respondents so as to minimize the error margin that may have arisen from the responses given.

Further on checking the reliability of the research instruments, the research conducted a reliability test on the instruments. A reliability test is a method of making the test reliable by pre- testing the instrument. Mugenda (2008) noted that pre-testing is essential. This is because pre-testing can help to identify errors found in the study instrument which can later be corrected. Moreover, to ensure reliability of research instruments, the researcher adopted the test – retest method where instruments were administered twice to the same group of selected sample population but after an interval of two weeks. The results from the two tests were compared and correlated with each other to give a measure of reliability while taking into account the time differences. The results obtained enabled the researcher to make improvement on the final questionnaire to be sent to respondents.

The pre-test aimed at determining the clarity of the questionnaire so that any inadequacy or vagueness would be adjusted to enhance the quality of the research instrument hence improving its reliability.

3.6 Data Collection Procedure

Before setting out to collect data, an introductory letter from University of Nairobi and a permission to carry out research from the National Council for Science and Technology were obtained to enable the researcher administer questionnaires with much needed security. The study made use of research assistants who were trained on data collection procedures and ethical issues in research. The respondents were assured of confidentiality of their responses so that they were honest.

The researcher collected both primary and secondary data for the purpose of drawing conclusions and suggestions. Primary data was collected through the use of the questionnaires which the researcher and the research assistants administered to the respondents in person. The questionnaires were closed ended guided by the five level Likert scale for easy analysis.

The researcher and the assistant researchers contacted the motorists to know the possible days and hours the sampled operators can be reached so as to administer the questionnaires that should be filled on the very day. The base commander, medical superintendent, the in-charge county single business licensing, and the leader for the boda boda operators were given a questionnaire each for which they were expected to respond to.

Secondary data was obtained from the journals, text books, Periodicals magazines, News Papers, and government gazette notices.

3.7 Methods for Data Analysis

Data analysis refers to examining what has been collected in a survey or experiment, and making deductions and inferences (Kombo and Tromp, 2006). It also refers to a variety of activities and processes that a researcher administers to a database in order to draw conclusions and make certain decisions regarding the data collected from the field. Data analysis involves summarizing large quantities of raw data, categorizing, rearranging and ordering data (Mbwesa, 2006). After the data was collected, it was organized and tabulated in form of tables so as to allow further analysis. The purpose of descriptive statistics is to enable the researchers to meaningfully describe a distribution of scores or measurements, using a few indices or role (Mugenda and Mugenda 1999). Descriptive statistics transforms large groups of members into a more manageable form. It helps with the transformation of raw data into a form that will make it easy to understand and interpret (Mbwesa 2006). Frequency tables were drawn and from these the data was presented.

Descriptive statistics like the frequency tables were used for the qualitative data so as to identify the patterns, and biases. The results were presented by Statistical Package for Social Sciences (SPSS) which was used to aid in analysis process.

3.8 Ethical Considerations

Mulwa (2006) describes ethical issues as the standards of behaviour and practical procedures that researchers are expected to follow. The conducting of research requires not only expertise and diligence, but also honesty and integrity. This is done to recognize

and protect the rights of respondents. To render the study ethical, the rights to self-determination, anonymity, confidentiality and informed consent were observed.

The researcher sought clearance and approval from the school of post-graduate studies and also permission to conduct the research from the National Commission of Science, Technology, and Innovation. The health officers, the police and study subjects were also assured of the confidentiality, data safety and appropriate data usage.

Informed consent is the prospective subject's agreement to participate voluntarily in a study, which is reached after assimilation of essential information about the study (Burns and Grove 1993). The subjects were informed of their rights to voluntarily consent or decline to participate, and to withdraw participation at any time without penalty. All respondents were treated equally after explaining to them the purpose of the study and their role.

3.9 Operationalization of Variables

Operationalization of the variables is a technique that helps in establishing relationships that exist between study variables and indicating how such relationships can be measured, (Ogada, 2011).

| Objectives | Variable Indicators | Measure | Scale of measure | Data collection method | Approach of analysis |
|---------------------------|--|--|-------------------------|-------------------------------|-----------------------------|
| Training | Certification of examinations done Capacity of training Institutions Frequency of Training | Possession of riding license. Equipment available Certification tests attended Training curricular & number of training staff Number of tests done | Nominal | Questionnaire | Descriptive analysis |
| Alcohol/Substance abuse | Reduced patience Low vigilance | Reported cases of drunk driving/riding Observed drunk riders Aggressive riding in & out of traffic jams | Nominal | Questionnaire | Descriptive analysis |
| Road conditions | Maintenance defects Dusty/muddy/slippery roads Blind spots Road Signs & street lights | Presence of potholes Obscured vision Declared black spot areas Presence or absence of street lights | Nominal | Questionnaire | Descriptive analysis |
| Institutional Constraints | Understaffing Corruption | Shortage of personnel Shortage of vehicles for traffic police patrol Unreported accident cases | Nominal | Questionnaire | Descriptive analysis |

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION, AND DISCUSSION

4.1 Introduction

This chapter analyses, presents interprets and discusses research under the following thematic areas: Response return rate, demographic characteristics of respondents, influence of training on accident rates among motorcycle operators, establish how drug/substance influences accident rates among motorcycle operators, influence of road/weather conditions on accident rates among motorcycle operators and finally how institutional constraints influence accident rates among motorcycle operators in Kisii Town, Kisii County.

4.2 Questionnaire Response Rate

The sample size of the study comprised of 285 respondents clustered on the basis of routes of operation that is; Mwembe, Jogoo, Nyanchwa, central district business zone, and Daraja mbili. Copies of the questionnaire were administered to the respondents by the research assistants, while closely supervised by the researcher for the purpose of getting good response rate. Of the 285 questionnaires that were administered, two hundred and sixty nine questionnaires were received giving a return rate of 94.39%. The realized response rate was assessed and accepted as a close representation of the entire target population since feedback was ascertained from all strata that had been identified by the researcher. This response was considered and accepted to be representative of the target population since according to Cooper and Schindler (2000) a response rate of more than 75% of the targeted respondents is enough for the study. The resulting 5.61% non-response was not significant with respect to influencing both validity and reliability of ultimate findings. In addition the fact that this data was obtained from all the five routes within Kisii Town helped to enhance the findings dependability and generalizations. This study is therefore perceived to have an excellent response rate.

4.3 Demographic Characteristics of the Respondents

This section outlines the respondent's demographic features that were believed to be significant to the study. Demographic characteristics of the respondents were held to be of great significance to the study; as such features would help to describe the composition of motorcycle operators. These demographic characteristics of the respondents include; age, duration of operation and level of education.

4.3.1 Characteristics of Respondents by Age

In this study, it was assumed that age was a crucial feature of the respondents that would influence the experience and involvement of respondents in accidents. The respondents were asked to complete the questionnaire and their responses were captured as illustrated here below in table 4.2

Table 4.1: Characteristics of Respondents by Age

| Age | Frequency | Percentage |
|----------------|------------------|-------------------|
| Below 18 Years | 12 | 4.5 |
| 20 - 29 Years | 147 | 54.6 |
| 30 - 39 Years | 83 | 30.9 |
| 40- 49 Years | 23 | 8.6 |
| Above 50 Years | 4 | 1.4 |
| Total | 269 | 100.0 |

Table 4.2 Indicates that, of the respondents who completed the questionnaires 12 (4.5 %) were below 18 years of age, 147 (54.6%) were in the age bracket of 20 – 29, 83 (30.9%), were in the age range of 30 – 39, 23 (8.6%), in the age range of 40 - 49, and 4 (1.4%) above the age of 50 years.

This implied that relatively a higher number of motorist operators are young people, with a small number of elderly members of the society taking part in motorcycle operations.

4.3.3 Characteristics of Respondents by Level of Education

Education which is a lifelong process which equips one with skills and knowledge is considered to be very crucial in creating a desirable attitude concerning safety measures which is a factor in determining one's operations while on the road. The respondents were requested to fill the questionnaire indicating their level of education and their responses were recorded as illustrated in table 4.3

Table 4.3: Education Level of the Respondents

In the study, the researcher believed that the level of education would significantly influence respondent's ability to make decisions given that they would be informed of the existing traffic rules and their role to respect and observe them. In this respect, the respondents were asked to fill the questionnaire stating their level of education and table 4.3 presents their responses.

Table Educational Level 4.3

| Educational Level | Frequency | Percentage |
|--------------------------|------------------|-------------------|
| Primary | 57 | 21.2 |
| Secondary | 157 | 58.4 |
| Tertiary level | 41 | 15.2 |
| University | 13 | 4.8 |
| Other (Specify) | 1 | .4 |
| Total | 269 | 100.0 |

As reflected in the table above, majority of the respondents 157 (58.4%) were Secondary school leavers, 57 (21.2%) attended primary school, 41 (15.2%) attended college, and only 13 (4.8%) were graduates. This indicated that boda boda business attracted largely people with relatively low level of education, while those with higher education presumably preferred career competitive jobs.

All respondents had at least been to primary school and there were no respondents without any formal schooling. As the number of educated people increases, it also increases the chance for the motorcycle riders to be more aware about their safety. It also develops a sense of responsibility and compliance toward existing laws.

4.3.3 Duration of Engagement in Motorcycle Operations

In this study, it was assumed that the duration of time served in the boda boda operation would influence experience and commitment to duty performance. In this respect, young motorists with relatively less experience were perceived to be less vigil while operating. Similarly, these young motorists were considered to be always careless and fond of breaking traffic rules such as over-speeding. However, motorists with more experience and many years of operation, tend to be more vigil and respectful for traffic rules. On account of this eventuality, the respondents were requested to complete questionnaire stating their duration in the field and their responses were noted as illustrated in table 4.4

Table 4.4 Riding experience

| Duration | Frequency | Percentage |
|-----------------|------------------|-------------------|
| Below 1 Year | 36 | 13.4 |
| 1 - 2 Years | 128 | 47.6 |
| 3 - 4 Years | 80 | 29.7 |
| 5 - 6 Years | 22 | 8.2 |
| Above 6 Years | 3 | 1.1 |
| Total | 269 | 100.0 |

When it came to the motorcycle riding experience, 47.6% of the respondents had been riding motorcycles for a period of between 1 - 2 years. Almost thirty per cent (30%) of the riders had motorcycle riding experience of 3-4 years, followed by riders having riding experience of below one year at 13.4%. Worthy observing from the statistics is that majority of the riders have limited experience which potentially causes them to be involved in accidents.

4.4 Influence of Training and Experience on Motorcycle Operator's Involvement in accident

This variable was measured on the basis of such parameters as; the mode of training on how one learns to ride, riding period, and possession of a driving/riding license.

4.4.1 Mode of Training and Involvement in Accident

In assessing the influence of training on accident rates among boda boda operators in Kisii town, the mode of training could be a pointer to the extent to which training influences accident prevalence among motorists. In light of this, the respondents were asked to complete the questionnaire indicating how they learned about riding and their responses were as indicated in table 4.5

Table 4.5 Mode/Type of training

| Type of training | Frequency | Percentage |
|------------------|------------|--------------|
| Driving School | 61 | 22.7 |
| Place of Work | 62 | 23.0 |
| Friend | 115 | 42.8 |
| Family | 31 | 11.5 |
| Total | 269 | 100.0 |

The mode of training is a strong determinant of one's knowledge on traffic rules as well as the skills and expertise required to ride. From Table 4.4.1; 115 (42.8%) respondents reported that they learnt how to ride through a friend, 62 (23.0%) in their place of work, 61 (22.7%), and 31 (11.5%) learns how to ride through family members. Since there is a strong relationship between the type of training and exposure to accident, then this study finding suggests that accident rates among the motorcycle operators might be high due to the type of training they receive.

4.4.2 Riding Period and Involvement in Accident

In most cases, the duration one has rode could be used to determine the exposure of one accident. On this account, the respondents were asked to complete the questionnaire indicating the extent to which they agreed or disagreed that duration of operation influence accident rates among motorcycle operators in Kisii town and their responses were recorded as depicted in table 4.6

Table 4.6 Riders with many years of experience rarely get involved in accidents

| More Experience less Accident | Frequency | Percentage |
|--------------------------------------|------------------|-------------------|
| Strongly Disagree | 20 | 7.4 |
| Disagree | 57 | 21.2 |
| Neutral | 44 | 16.4 |
| Agree | 114 | 42.4 |
| Strongly Agree | 34 | 12.6 |
| Total | 269 | 100.0 |

When it came to the motorcycle riding experience, 114 (42.4%) of the respondents had been riding motorcycles agreed that the more experienced one is the less likely s/he will be involved in accident. 57 (21.2%) of the respondents did not agree that one's riding experience influences motorcycle accident rates.

4.4.3 Possession of Riding License and Involvement in Accident

More often, possession of a driving license is linked to receiving training and being accredited to ride. Rider certification is one of the surest means of assessing the suitability and experience of the rider. Therefore possession of a riding license by the motorist can help in differentiating trained and qualified riders from novice riders which further helps to explain the vulnerability of these motorists to accidents. To determine the influence of license possession and accident rates among motorcycle operators in Kisii Town, respondents were asked to state whether they possessed a driving license or not and their responses were as indicated in table 4.7

Table 4.7 Owns Driving license

| Owns License | Frequency | Percentage |
|---------------------|------------------|-------------------|
| Yes | 100 | 37.2 |
| No | 169 | 62.8 |
| Total | 269 | 100.0 |

Majority of the motorists were found not to have a riding license that is 169 (62.8%) and a few number had 100 (37.2%). This implies that most motorists are operating without

license and this implies a loophole in the traffic sector of allowing unlicensed riders to operate.

4.5 Influence of Alcohol and Substance Abuse on Motorcycle Accident

Alcohol and substance abuse is among the most cited factors that cause motorcycle accidents. In general, riding while under the influence of alcohol or substance abuse greatly interferes with the ability of the rider to control the motorcycle. It also interferes with judgment ability while on the road. To examine how this factor influences motorcycle accident, the variable was measured on the basis of; contribution of alcohol/substance abuse on accidents, influence of alcohol/substance abuse on control of motorcycle, and majority of the booked motorists causing road accidents drink alcohol/Abuse substances.

4.5.1 Influence of Alcohol/Bhang on Motorcycle Accidents.

In most cases riding under the influence of alcohol/drug abuse is assumed to adversely affect the driver's ability to control and be careful while on the road. To ascertain the influence of alcohol/substance abuse respondents were asked to tick the extent to which they either agree or disagree that alcohol/drug abuse influence accident rates among motorcycle accidents and their responses were captured as presented in table 4.8

Table 4.8: Riders under drugs during working get involved in accidents

| Alcohol/Substance abuse cause Accident | Frequency | Percentage |
|---|------------------|-------------------|
| Strongly Disagree | 25 | 9.3 |
| Disagree | 41 | 15.2 |
| Neutral | 42 | 15.6 |
| Agree | 114 | 42.4 |
| Strongly Agree | 47 | 17.5 |
| Total | 269 | 100.0 |

According to the respondents, there is a strong relationship between motorcycle accidents due to alcohol/substance abuse. Out of 269 respondents, 161 (59.9%) accept that

alcohol/substance abuse contributes to motorcycle accidents, 66 (24.5%) disagrees, and 42 (15.6%) are neutral.

4.5.2 Influence of Alcohol/Substance Abuse on Control of Motorcycle.

Alcohol/substance abuse is known to cause “Impaired performance (loss of attentiveness, slower reaction times, impaired judgement, and poorer performance on skilled control tasks and increased probability of falling asleep) and subjective feelings of drowsiness or tiredness (McKim, 2003).

Table 4.9: Riders when under the influence of drugs fail to control

| Inability to Control | Frequency | Percentage |
|----------------------|------------|--------------|
| Strongly Disagree | 16 | 5.9 |
| Disagree | 42 | 15.6 |
| Neutral | 44 | 16.4 |
| Agree | 122 | 45.4 |
| Strongly Agree | 45 | 16.7 |
| Total | 269 | 100.0 |

Table 4.5.2 also confirms the contribution of alcohol/substance abuse on motorcycle accidents as 167 (62.1%) respondents believe so, 58 (21.5%) disagrees, and 44 (16.4%) are neutral.

4.5.3 Majority of the Booked Motorists for Road Accident Take Alcohol/Abuse Substances.

Table 4.10: Majority of booked riders causing accidents abuse drugs

| Motorist Abuse Drugs | Frequency | Percentage |
|----------------------|------------|--------------|
| Strongly Disagree | 15 | 5.6 |
| Disagree | 45 | 16.7 |
| Neutral | 62 | 23.0 |
| Agree | 105 | 39.0 |
| Strongly | 42 | 15.7 |
| Total | 269 | 100.0 |

Many of the booked motorists accused of causing accidents, 147 (54.7%) abuse drugs. This is a high number which signifies the high rates of substance abuse and thus the ever high motorcycle accidents on the road.

4.6 Influence of Road and Weather Conditions.

Poor road surfaces have been identified as a contributing factor in motorcycle crashes and are often mentioned by motorcyclists as an area where the government can take action to reduce motorcycle crashes (de Rome et al., 2002; Haworth, 1999). Road and weather conditions are considered to greatly influence the rider behaviour on the road. The status of the road compounded with prevailing weather conditions determines the speed and alertness of the rider which is key in accident susceptibility. The condition of the road, mainly “lack of visibility or obstructions, unclean road or loose material, poor road condition or road markings and horizontal curvature, actively contributed to the crashes (Haworth, 1999). Accordingly, this variable was measured on the basis of; road conditions, curves/blind spots, and weather conditions.

4.6.1 Influence of Road/Weather Conditions on Accident Involvement

Road conditions such as muddy road surface, roads with loose chips, mainly “lack of visibility or obstructions, unclean road or loose material, poor road condition or road markings all potentially contribute to accidents. This variable was examined by asking the respondents to state the extent to which they agreed or disagreed that poorly maintained roads cause accidents and the responses were captured as indicated in table 4.11

Table 4.11: Poorly maintained roads cause accidents

| Poor road condition cause Accident | Frequency | Percentage |
|---|------------------|-------------------|
| Strongly Disagree | 12 | 4.5 |
| Disagree | 35 | 13.0 |
| Neutral | 43 | 16.0 |
| Agree | 145 | 53.9 |
| Strongly Agree | 34 | 12.6 |
| Total | 269 | 100.0 |

From the findings, 179 (66.5%) respondents believe that the condition of the road has a great influence on motorcycle accident rates, 47 (17.5%) were of different opinion and 43 (16.0%) were neutral. This implies that there is a strong relationship between the road condition and the motorcycle accident.

4.6.2 Influence of Curves/Blind Spots on Motorcycle Accidents

Visibility is necessary while on road. A number of factors determine the visibility of the road user including the motorists; curves/blind spots on the roads influence this factor. To measure how this parameter influence the motorists operations while on the road, respondents were asked to fill the questionnaire in regard to this particular phenomenon and their responses were as indicated in table 4.12;

Table 4.12: Most accidents occur at Blind spots

| Accidents occur at Blind spots/curves | Frequenc y | Percentage |
|--|-----------------------|-------------------|
| Strongly Disagree | 11 | 4.1 |
| Disagree | 30 | 11.2 |
| Neutral | 52 | 19.3 |
| Agree | 140 | 52.0 |
| Strongly Agree | 36 | 13.4 |
| Total | 269 | 100.0 |

176 (65.4%) respondents associated motorcycle accidents with curves/blind spots on the roads, while 41 (15.3%) never saw any correlation between the two.

4.6.3 Weather Conditions and Motorcycle Accidents

Table 4.13: Most accidents occur during rainy season

| Rainy season more Accidents | Frequency | Percentage |
|------------------------------------|------------------|-------------------|
| Strongly Disagree | 11 | 4.1 |
| Disagree | 50 | 18.6 |
| Neutral | 38 | 14.1 |
| Agree | 122 | 45.4 |
| Strongly Agree | 48 | 17.8 |
| Total | 269 | 100.0 |

Weather conditions were found to have an influence on motorcycle accidents as majority of the accidents were reported to occur during rainy season compared to dry season. Out of the 269 respondents, 168 (63.2%) respondents cited more accidents occur during rainy season while 61 (22.7%) disagreed of there being any relationship between weather condition and accident prevalence 38 (14.1%) were neutral. Accordingly, accidents are more likely to occur during rainy seasons and this information can be used to guide the operators of the need to be extra careful during such seasons to minimize accidents.

4.7 Institutional Constraints

This variable was measured on the basis of such parameters as; Laxity in traffic rules implementation, Inefficiency of the Transport Ministry, and Lack of Motorcycle Regulatory Body.

4.7.1 Laxity in Implementation of Traffic Rules

Commitment in implementation of traffic rules determines how such rules will be taken seriously by the target population.

Table 4.14: Laxity in traffic rules implementation cause accidents

| Laxity in Traffic rules cause accidents | Frequenc y | Percentage |
|--|-----------------------|-------------------|
| Strongly Disagree | 15 | 5.6 |
| Disagree | 19 | 7.1 |
| Neutral | 29 | 10.8 |
| Agree | 154 | 57.2 |
| Strongly Agree | 52 | 19.3 |
| Total | 269 | 100.0 |

According to Table 4.7.1; 206 (76.5%) respondents conceded that laxity in implementation of traffic rules by the relevant authorities contributes to motorcycle accidents in our roads. Only 34 (12.7%) respondents did not see any relationship between implementation of traffic rules and occurrence of accidents another 29 (10.8%) was

neutral on the influence of traffic rules implementation and its correlation to motorcycle accidents.

The implication here is that how traffic rules are implemented greatly regulates the occurrence of accidents on the roads that is; the more strict the traffic rules are implemented the less likely the incidences of accident and vice versa.

4.7.2 Inefficiency of the Transport Ministry

The ministry of transport through its different organs charged with the responsibility of maintaining traffic sanity in some way contributes to the existence of accidents on our roads. For example the traffic police who are charged with enforcing The Traffic Act, have on numerous occasions been caught on camera receiving bribes, and have featured in various corruption indices reports as leading in the vice. In fact, while the Kenyan Police was reported as the most corrupt institution in Kenya by the East African Bribery Index Report, it's the traffic arm of this organization that tops the list (Chitere, 2005).

Table 4.15: Inefficiency of ministry of transport main cause of accidents

| Inefficiency of Transport Ministry cause Accident | Frequency | Percentage |
|--|------------------|-------------------|
| Strongly Disagree | 24 | 8.9 |
| Disagree | 44 | 16.4 |
| Neutral | 53 | 19.7 |
| Agree | 88 | 32.7 |
| Strongly Agree | 60 | 22.3 |
| Total | 269 | 100.0 |

Table 4.15 depicts that 88 (32.7%) of the total 269 respondents agreed that inefficiency of the ministry of transport influences accident rates among motorcycle operators, 60 (22.3%) strongly agreed, 53 (19.7%) were neutral, 44 (16.4%) disagreed, and 24 (8.9%) strongly disagreed.

4.7.3 Lack of Motorcycle Regulatory Body

The activities of the motorcycle operators should be monitored to ensure sanity in roads and adherence to the traffic rules. Although this is done on our roads, there is no independent body meant only for the motorcycles.

Table 4.16: Lack of motorcycle regulatory body contribute to accidents

| Lack of motorcycle Regulatory Body contribute to Accidents | Frequency | Percentage |
|---|------------------|-------------------|
| Strongly Disagree | 19 | 7.0 |
| Disagree | 58 | 21.7 |
| Neutral | 38 | 14.1 |
| Agree | 123 | 45.7 |
| Strongly Agree | 31 | 11.5 |
| Total | 269 | 100.0 |

From the above statistics, 154 (57.2%) respondents felt that lack of such independent body contributes to the accidents witnessed in our roads while 77 (28.7%) respondents differed and 38 (14.1%) were neutral. This strongly indicates that the absence of motorcycle regulatory body strongly contributes to the accidents involving motorcycles.

CHAPTER FIVE

SUMMARY OF FININGS, CONCLUSION, AND RECOMMENDATIONS OF THE STUDY

5.1 Introduction

This chapter contains the summary of the findings, conclusion, recommendation and suggestions for further research.

5.2 Summary

The purpose of this study was to investigate the factors influencing the accident rate among motorcycle operators in Kisii town, Kisii County. The study established that the majority of the respondents 147 (54.6%) lied in the age bracket of 20 – 29 years, followed by 83 (30.9%) who were in the age bracket of 30 – 39 years, 23 (8.6%) were in 40 – 49 years, 12 (4.5%) below 18 years and 4 (1.4%) above 50 years.

On the influence of training and experience on the accident rates among motorcycle operators, the study established that majority of the respondents 128 (47.6%) of the respondents had 1 – 2 years of experience, 80 (29.7%) had 3 – 4 years of experience, 36 (13.4%) below one year, followed by 22 (8.2%) 5 - 6 years and finally 3 (1.1%) more than six years' experience.

Alcohol and substance abuse as a variable was found to have a great influence on accident rates among motorcycle operators in Kisii town. It was established that most 161 (59.9%) of the motorists who ride while under the influence of alcohol or substance abuse were more likely to cause accidents while some of the respondents 66 (24.5%) saw no influence.

In addition, the study sought to examine the influence of road and weather conditions on the accident rates among motorcycle operators. The findings were, 145 (53.9%) of the respondents agreed that road and weather conditions influenced accident rates among the motorists, 34 (12.6%) strongly agreed, 43 (16.0%) were neutral, 35 (13.0%) disagreed, and 12 (4.5%) strongly disagreed. Rainy season was also investigated whether it had any

influence and the findings were 122 (45.4%) agreed, 50 (18.6%) disagreed, 48 (17.8%) strongly agreed, 38 (14.1%) neutral, and 11 (4.1%) strongly disagreed.

Finally, institutional constraints greatly influence the accident rates among motorcycle operators. The study established that the main institutional constraints that influenced the accident rates were 154 (57.2%) agreed to laxity in implementation of traffic rules having an influence, 52 (19.3%) strongly agreed, 29 (10.8%) were neutral, 19 (7.1%) disagreed, and 15 (5.6%) strongly disagreed.

5.3 Conclusion

All commercial motorcyclists were males. This male dominance found in this study is consistent with findings in other countries including Tanzania, Ghana and Nigeria (Amoran et al., 2005; Adogu & Ilika, 2006; Alti-Muazu & Aliyu, 2008; Iribhogbe & Odai, 2009). This may be due to the fact that it is a common observed phenomenon and customary to see more male than female gender in commercial motorcycling in African cultural context. Furthermore, since motorcycling is a high risk venture, males tend to engage more in risky ventures than their females counterparts do.

Majority of the commercial motorcyclists were between the ages 20 to 29 years. This shows that many commercial motorcyclists are young, in productive age groups. However, a big number of them are lowly educated with primary education or less. A similar observation was done by Iribhogbe & Odai (2009) in Nigeria, and Mwakapasa (2011) in Tanzania, whereby it was found that most of commercial motorcyclists (52.8%) had primary education or no formal education. This good number of commercial motorcyclists with low level of education could be partly attributed by the fact that those who are less educated find themselves with few chances of getting other jobs and thus engage into commercial motorcycling business as a last resort following unemployment regardless of being a risky job (Iribhogbe & Odai, 2009). The low level of education has further been identified as a risk factor in motor accidents in other countries (Valent et al.).

Majority of the motorists 169 (62.8%) are not licensed and only 100 (37.2%) were licensed. This partly exposes the leniency in implementation of traffic rules and the

carelessness of the traffic police in their duties. A good number of the motorists 115 (42.8%) learned through their friends on how to ride, 62 (23.0%) in their work place, 61 (22.7%) in driving school, and 31 (11.5%) through their family members. The high number of riders learning through their friends may be due to the fact that there is no cost incurred to train and there being no any other form of evaluation/testing.

5.3.1 Influence of Training on Accident rates among Motorcycle Operators

The study sought to determine whether training influences accident rates among motorcycle operators in Kisii Town.

Although training is mostly considered to positively contribute towards reduction of accidents, the belief is not well supported by empirical research, with past reviews suggesting little or no benefit from formal training and educational programs in terms of crash reduction for drivers or motorcyclists (Christie, 2001; Haworth & Mulvihill, 2005). This lack of efficacy of the training programs is attributed to a number of shortcomings which ranges from program content, and delivery methods, evaluation deficiencies, to overconfidence by the trained motorists which potentially contribute to involvement in accidents (Gregersen, 1996; Hatfield & Job, 2001).

The study findings suggest that training has a strong influence on accident rates among the motorcycle operators in Kisii Town. From the 269 respondents who were asked whether training influenced accident rates among the motorcycle operators, 118 (43.8%) agreed compared to 42 (15.7%) who disagreed. These findings differ with those of Haworth & Mulvihill which finds training to have no influence on motorcycle accident rates.

5.3.2 Influence of Alcohol/Substance Abuse on Accident rates among motorcycle operators.

On this study variable, the study wanted to examine the influence of alcohol/substance abuse on motorcycle accident rates.

Riding under the influence of alcohol/substance abuse, increase a person's risk of having a serious crash (National Health and Medical Research Council 2001). Impairment by alcohol and other drugs is potentially more risky for motorcyclists than for car drivers due to the balance and awareness required to ride in the traffic environment (2008).

From the research findings, there is a very strong alcohol/substance influence on accident rates among motorcycle operators. This is indicated by the large number of respondents who agreed that riding under the influence of alcohol/substance abuse causes accidents among motorcyclists. Out of 269 respondents, 162 (60%) supported that alcohol/substance abuse cause motorcycle accidents compared to 65 (24.2%) who disagreed, while 42 (15.7%) were neutral. Accordingly, these findings concur with what other researchers have found out in their studies. For instance Siskind et, al (2011) found out that alcohol consumption impairs riding and driving performance which results to more frequently fatal accidents. In Nigeria, motorcycle accidents are said to be caused by alcohol intakes (Ogunmodede et, al. 2012).

5.3.3 Influence of Road/Weather Conditions on Motorcycle Accidents

The study sought to establish whether the road/weather conditions had any influence on accident rates among motorcycle operators. Road hazards, which may include potholes, slippery road conditions, wet roads, blind spots among others were considered.

Research findings indicated that road/weather conditions influence accident rates among motorcycle operators. 173 (64.4%) respondents believed that poorly maintained roads cause accidents while 52 (19.4%) were indifferent; blind spots were also found to influence accident rates among the motorcycle operators as 158 (58.9%) respondents believed so while 58 (21.6%) didn't saw any correlation between the two. These findings are in agreement with Rolison, M.R. & Scherman, A. 2003) in their study on Australian

roads where they found that poor road surfaces contributed to road accidents involving motorcycles.

5.3.4 Influence of Institutional Constraints on accident rates among motorcycle operators

This variable was measured on the basis of laxity in traffic rules implementation, inefficiency of transport ministry, and lack of motorcycle regulatory body.

Transport regulators tend to be weak in developing countries Kenya inclusive. While assessing on implementation of traffic rules, the study found out that there is laxity in implementation of traffic rules. 183 (68%) respondents agreed that laxity in traffic rules implementation influence motorcycle accidents while, 42 (15.7%) did not agree.

Ineffective in traffic law enforcement by the police is perceived as a major motivation for aspects of careless driving in Ghana roads. The police rather seemed to be only interested in extorting money from motorists who commit traffic offenses and letting them go unpunished (Huang et, al. 2006). This is the case with the Kenyan roads too.

Institutional fragmentation in the transport sector is a key obstacle to road transport planning. The Kenya Roads Board (KRB) is the main institution responsible for the national road infrastructure network in Kenya. Other institutions include, the Transport Licensing Board (TLB), Motor Vehicle Inspection Unit, Registrar of Motor Vehicles, Driving Test Center, Traffic Police and Local Authorities. These institutions are fragmented across government ministries and departments. The Registrar of Motor Vehicles, who determines and fixes passenger and luggage capacity for all motor-vehicles, is currently under the Ministry of Finance, while the Driving Test Unit is under the Office of the President. This leads to disjointed handling of transport issues Odera, 2003).

This phenomenon is not unique to Kenya alone but also in other developing countries. For instance, in Ethiopia the Road Transport Authority is the poor cousin of the Roads Authority. Such arrangements make it very difficult for regulatory authorities to monitor user requirements and to provide an environment conducive to transport services this creates room for motorists to break traffic rules and hence lead to accidents (Howe 2001).

5.4 Recommendations

5.4.1 Recommendations for Policy Formulation

As per the findings in this study there is need for a well thought out plan on motorcycle transport. On the factors influencing accident rates among motorcycle operators, and for future interventions options, the researcher recommends an all-inclusive urban transport policy which encompasses all transport service providers. The policy should spell out strict rules on age and training before obtaining the motorcycle driving license. Designing of roads should be done in a way that it takes care of the motorcycle operators by providing picking and dropping points for passengers.

The current scenario in the motorcycle transport accidents the study revealed could have been helped by more strict law enforcers. The law enforcers were blamed for laxity and therefore the study recommended more strict public officers in the law enforcers' category so as to improve the efficiency of motorcycle transport, because it is the one affordable by most of the poor town residents.

The study found that road and weather conditions had significant effect on motorcycle accident. In order to reduce motorcycle accidents in Kisii town and in other towns, the following recommendations become relevant:

1. Government should enact laws to make alcohol consumption an offence for all motorcyclists during working hours.
2. Road Safety Organizations should periodically organize trainings, seminars and public enlightenment programmes to educate motorcyclists on the need for taking more care on the road.
3. Motorcyclists should be made to undertake tests and licenses issued before they can be permitted to ride on our roads.
4. Regulation on compulsory use of protective head helmets and reflective jackets should be enforced. Drunken riders should be made to face the wrath of the law.

However to ascertain for the validity and generalizability of this study, a similar study may be done elsewhere in Kenya and other settings with similar characteristics to the original one.

5.4.2 Recommendation for Further Research.

Since this study focused on factors influencing motorcycle accidents, other studies can be done to examine the socio-economic effects of Boda boda for the rural population.

A study can be carried to ascertain how boda boda as a means of transport has contributed to security/insecurity in our society.

Boda boda a vector for HIV/AIDS transmission.

Finally further studies on the factors influencing motorcycle accidents ought to be done in other towns for generality and application of the research findings.

5.5 Contribution to Body of Knowledge.

Table 5.1 Contribution to the Body of Knowledge

| Objective | New Knowledge |
|---|---|
| To examine how training influences accident rates among motorcycle operators | Training influences accident rates among motorcycle operators in Kisii Town. The influence is slight compared to other variables. |
| To establish how alcohol/substance abuse influences accident rates among motorcycle operators | Alcohol/Substance has strong alcohol/substance influence on accident rates among motorcycle operators. This is indicated by the large number of respondents who agreed that riding under the influence of alcohol/substance abuse causes accidents among motorcyclists. Motorists abuse alcohol/drugs during working hours. |
| To explore ways in which road/weather conditions influences accident rates among motorcycle operators | Research findings indicated that road/weather conditions influence accident rates among motorcycle operators. 173 (64.4%) respondents believed that poorly maintained roads lead to accidents while 52 (19.4%) were indifferent; blind spots, and rainy season were also found to increase accident rates among the motorcycle operators. |
| To determine how institutional constraints influences accident rates among motorcycle operators | The study established that there is laxity in implementation of traffic rules. 183 (68%) respondents agreed that laxity in traffic rules implementation influence motorcycle accidents while, 42 (15.7%) did not agree. Institutional fragmentation in the transport sector poses an obstacle to road transport planning. Corruption among traffic police officers is yet another impediment in transport sector which very strongly influences motorcycle accidents in Kisii Town. |

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APPENDIX I

QUESTIONNAIRE FOR MOTORCYCLE OPERATORS

SECTION A. Demographic Characteristics of Respondents

Kindly tick inside the provided brackets or write on the spaces

1. What is your Gender

Male ()

Female ()

2. State your age bracket

Below 18 ()

20 - 29 ()

30 - 39 ()

40 – 49 ()

Above 50 ()

3. What is your level of education?

Primary ()

Secondary ()

Tertiary level ()

University ()

Other (Specify) ()

4. How long have you worked as a motorist in Kisii Town?

Below 1 year ()

1 – 2 Years ()

3 – 4 Years ()

5 – 6 Years ()

Above 6 Years ()

5. How did you learn to ride?

Driving School ()

Working place ()

Friend ()

Family ()

Others (Specify) ()

6. Do you have a driving/riding license?

Yes ()

No ()

7. Who are the main victims of road traffic accidents in Kisii town?

Pedestrians ()

School Children ()

Motorists ()

Others (Specify) ()

8. In your opinion what can be done to reduce motorcycle accidents?

Traffic laws be implemented strictly ()

Undergo intensive rider training ()

Create public awareness on road safety ()

Avoid drinking during working hours ()

Other (specify) ()

SECTION B. Key Study Variables

PART I: Training and Experience of Motorists

Indicate the extent to which you agree or disagree with the following statements. Use the following scale for your responses. Kindly do it in all sections of this questionnaire.

1= STRONGLY DISAGREE, 2=DISAGREE, 3= NEUTRAL, 4= AGREE,

5=STRONGLY AGREE.

| | STATEMENT | 1 | 2 | 3 | 4 | 5 |
|---|--|---|---|---|---|---|
| 1 | Lack of adequate training and experience among the motorists is the main cause of accidents? | | | | | |
| 2 | Most of the motorists have attended formal training in accredited training colleges | | | | | |
| 3 | Trained and experienced motorists are less often involved in accidents | | | | | |
| 4 | Those who have rode for a long period rarely get involved in accidents | | | | | |
| 5 | The mode of training influence accident rates among motorcyclists | | | | | |
| 6 | Those with driving license don't easily cause accidents | | | | | |
| 7 | Young riders are more reported to be involved in accidents than the elderly ones | | | | | |
| 8 | Over-speeding in most cases lead to accident | | | | | |

PART II: Influence of Alcohol and Substance Abuse

| | STATEMENTS | 1 | 2 | 3 | 4 | 5 |
|---|--|---|---|---|---|---|
| 1 | Motorcyclists who rider while under the influence of alcohol/substance abuse cause accidents | | | | | |
| 2 | Majority of the booked motorists causing road accidents drink alcohol/Abuse substances | | | | | |
| 3 | Motorists fail to control their motorcycles any time they are under the influence of alcohol/substance abuse | | | | | |
| 4 | Hard drugs like heroin and cocaine are common among motorists. | | | | | |
| 5 | Most motorcycle operators ride while drunk | | | | | |

PART III: Road and the Weather Conditions

| | STATEMENT | 1 | 2 | 3 | 4 | 5 |
|---|--|---|---|---|---|---|
| 1 | Poorly maintained roads cause accidents | | | | | |
| 2 | Most accidents occur during rainy season | | | | | |
| 3 | Potholes cause majority of the accidents | | | | | |
| 4 | Most accidents occur at the curves and blind spots in the roads | | | | | |
| 5 | Most accidents occur in narrower roads | | | | | |
| 6 | During the night more accidents occur than during the day | | | | | |
| 7 | Accidents are common along highways | | | | | |
| 8 | Most accidents occur due to picking and dropping passengers at non designated points | | | | | |

PART IV: Institutional Constraints

| | STATEMENT | 1 | 2 | 3 | 4 | 5 |
|---|--|---|---|---|---|---|
| 1 | Inefficiency of the transport ministry is the main cause of accidents | | | | | |
| 2 | Laxity in implementation of traffic rules causes accidents. | | | | | |
| 3 | Lack of motorcycle regulatory body contributes to high motor cycle accidents | | | | | |
| 4 | Massive corruption by the traffic police is all to blame for the accidents witnessed | | | | | |
| 5 | The available safety measures to reduce the motorcycle traffic accidents are inadequate. | | | | | |

Thank you for your time and cooperation.

**APPENDIX II KREJCIE AND MORGAN TABLE FOR DETERMINING
SAMPLE SIZE 1970**

| Table for Determining Sample Size for a Given Population | | | | | | | | | |
|--|----|-----|-----|-----|-----|------|-----|--------|-----|
| N | S | N | S | N | S | N | S | N | S |
| 10 | 10 | 100 | 80 | 280 | 162 | 800 | 260 | 2800 | 338 |
| 15 | 14 | 110 | 86 | 290 | 165 | 850 | 265 | 3000 | 341 |
| 20 | 19 | 120 | 92 | 300 | 169 | 900 | 269 | 3500 | 246 |
| 25 | 24 | 130 | 97 | 320 | 175 | 950 | 274 | 4000 | 351 |
| 30 | 28 | 140 | 103 | 340 | 181 | 1000 | 278 | 4500 | 351 |
| 35 | 32 | 150 | 108 | 360 | 186 | 1100 | 285 | 5000 | 357 |
| 40 | 36 | 160 | 113 | 380 | 181 | 1200 | 291 | 6000 | 361 |
| 45 | 40 | 180 | 118 | 400 | 196 | 1300 | 297 | 7000 | 364 |
| 50 | 44 | 190 | 123 | 420 | 201 | 1400 | 302 | 8000 | 367 |
| 55 | 48 | 200 | 127 | 440 | 205 | 1500 | 306 | 9000 | 368 |
| 60 | 52 | 210 | 132 | 460 | 210 | 1600 | 310 | 10000 | 373 |
| 65 | 56 | 220 | 136 | 480 | 214 | 1700 | 313 | 15000 | 375 |
| 70 | 59 | 230 | 140 | 500 | 217 | 1800 | 317 | 20000 | 377 |
| 75 | 63 | 240 | 144 | 550 | 225 | 1900 | 320 | 30000 | 379 |
| 80 | 66 | 250 | 148 | 600 | 234 | 2000 | 322 | 40000 | 380 |
| 85 | 70 | 260 | 152 | 650 | 242 | 2200 | 327 | 50000 | 381 |
| 90 | 73 | 270 | 155 | 700 | 248 | 2400 | 331 | 75000 | 382 |
| 95 | 76 | 270 | 159 | 750 | 256 | 2600 | 335 | 100000 | 384 |

Note: "N" is population size
"S" is sample size.

Source: Krejcie & Morgan, 1970