

**MOTOR-CYCLE CRASHES AND SOCIO-ECONOMIC AND DEMOGRAPHIC
CHARACTERISTICS OF RIDERS. A CASE STUDY OF SOUTH IMENTI SUB
COUNTY, MERU COUNTY.**

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T51/34250/2019

**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTERS OF
DEVELOPMENT STUDIES IN THE INSTITUTE FOR DEVELOPMENT STUDIES,
UNIVERSITY OF NAIROBI**

DECEMBER 2022.

UNIVERSITY OF NAIROBI.

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DEDICATION

To my late brother for always believing in me.

To my dad and mum Charles Munene and Margaret Munene, you both have been my strongest pillars. Your love, support and constant encouragement has seen me through this journey and I am forever grateful.

ACKNOWLEDGEMENTS

The completion of this project required a significant investment of time and effort, which would not have been possible without the help and encouragement of many people. First, I owe a debt of gratitude to my supervisor Prof. Winnie Mitullah for her guidance and insightful criticism throughout this project. I also wish to acknowledge Dr. Ann Kamau and all the lecturers of The Institute for Development Studies for their input and guidance. Mary Mwangi, Nina Kosen and Ann Mbaya for always finding time to discuss, guide and encourage me throughout the period of this study. I also wish to appreciate the financial support accorded to me by Graduate School, University of Nairobi to enable pursue this Masters in Development Studies (MDEV) program to completion.

My sincere gratitude to all the riders, Key informants, Traffic police officers and medics who participated in the study.

Finally, to my parents and my late brother, thank you for funding my field work and my upkeep as I was studying and for always believing in me.

Above all, special thanks to Almighty God for making it all possible.

Table of Contents
CHAPTER ONE

List of Tables	viii
List of Figures	ix
List of Abbreviations	x
Abstract	xi
1.0 Background of the Study	1
1.1 Problem Statement	5
1.2 Research Questions	6
1.3 Objectives of the Study	6
1.3.1 Specific Objectives	7
1.5 Scope and Limitations of the Study	8
2.1 Empirical Literature Review	9
2.1.1 Background	9
2.1.2 Socioeconomic and Demographic Characteristics of Riders	11
2.2 Theoretical Framework	15
2.2.1 Ferrel Theory (Human Factor Theory of Accident Causation)	16
2.3 Conceptual Framework	19
3.0 Introduction	21
3.1 Research Design	21
3.2 Study Area Description	22
3.3 Study Population	23
3.4 Sampling and Sample Size	24
3.5 Data Sources and Data Collection	26
3.6 Data Analysis	26
3.7 Reliability and Validity of Instruments.	27
3.8 Ethical Considerations	27
4.1 Introduction	28
4.2 Socio-economic and Demographic Characteristics of Riders	28
4.2.1 Sex of Riders	29
4.2.2.1 Relationship Between Age and Occurrence of Rider Crashes	31
4.2.3: Level of Formal Education	35
4.2.3.1 Relationship Between Rider Level of Formal Education and Occurrence of Rider	36

4.2.4 Marital Status.....	39
4.2.4.1 Relationship Between Marital Status of Rider and Occurrence of Rider Crashes	39
4.2.5 Income Per Day	41
4.2.5.1 Relationship Between Rider Income and Occurrence of Rider Crashes	43
4.2.6 Years Worked as A Rider	45
4.2.6.1 Relationship Between Years Worked as A Rider and Occurrence of Rider Crashes.....	45
4.2.7 Motorcycle ownership.	46
4.2.7.1 Relationship Between Ownership and Occurrence of Rider Crashes.....	49
4.2.8: Rider Training.....	51
4.2.9 Motorcycle Safety Knowledge	55
4. 3 Motorcycle Crashes in Imenti South Sub-County	58
5.1 Introduction.....	64
5.2 Summary findings.....	64
5.2.1 Socio-economic and Demographic characteristics of riders.....	65
5.2.2 Relationship Between Socio-economic and Demographic Characteristics of Riders and Occurrence of Rider Crashes.....	66
5.3 Conclusion.	69
5.4 Recommendations.....	71
5.5 Areas for further research	72

List of Tables

Table 1: Target Population.....	23
Table 2: Sample Size.....	25
Table 3: Age Bracket of Respondents.....	31
Table 4: Crosstabulation of Age of Riders by Crashes.....	32
Table 5: Summary Table For Assessing the Assumptions on Socio-economic and Demographic Characteristics of Riders.....	34
Table 6: A Crosstabulation of Level of Education of Riders by Rider Crashes.....	37
Table 7: Marital Status of Riders.....	40
Table 8: Cross-tabulation of rider marital status by crashes.....	40
Table 9: Average income per day.....	41
Table 10: Average Income Per Day.....	42
Table 11: Crosstabulation of Rider Income by Rider Crashes.....	44
Table 12: Motorcycle Ownership.....	47
Table 13: Crosstabulation of Motorcycle Ownership by Rider Crashes.....	51
Table 14: Nature of Training Undertaken.....	52
Table 15: Period Taken for Informal Training.....	53
Table 16: Crosstabulation of Formal Rider Training by Rider Crashes.....	54
Table 17: Summary Table for Assessing Rider Assumptions on Motorcycle Safety Knowledge and Training.....	56
Table 18: Summary of Practices Observed in The Motorcycle Riders in The Study.....	57
Table 19: Reasons for Crashes.....	60
Table 20: Knowledge of Riders Involved in Crashes.....	62

List of Figures

Figure 1: Human Factor Theory of Accident Causation.....17

Figure 2: Conceptual Framework showing the association between independent variables and dependent variable.....20

Figure 3: Level of Formal Education.....35

Figure 4: Years worked as a rider.....45

Figure 5: Terms of Operation for Non-Owners.....48

Figure 6: Severity of crashes.....59

List of Abbreviations

Coronavirus Disease-2019 (COVID-19)

Economic Recovery Strategy (ERS)

Focus Group Discussion (FGD)

Kenya Bureau of Statistics (KBS)

Kenya National Bureau of Statistics (KNBS)

Key Informant Interview (KII)

National Crime Research Centre (NCRC)

National Transport and Safety Authority (NTSA)

Road traffic Crashes (RTCs)

Statistical Package for Social Sciences (SPSS)

United Nations Population Fund (UNFPA)

World Health Organization (WHO)

Abstract

This study acknowledges the rise in the usage of commercial motorbikes as a transportation mode in Kenya. The increase is attributable to among other factors, transport system inability to satisfy Kenyans transport needs and the fairly low cost of purchasing motorcycles. The drawbacks to this new development is that the industry is increasingly linked to traffic crashes, posing serious health and safety risks to the public. It is from this knowledge that this study draws. The general objective of the research was to investigate the association between motorcycle riders' socioeconomic and demographic attributes and the occurrence of motorcycle crashes in South Imenti Subcounty. The study incorporated a descriptive approach with a stratified random sampling method where the main data was collected from 86 boda boda riders in the identified 29 rider groups. Closed and open-ended questionnaires, observation, and interview guides for Key Informant Interviews were used to gather information from the respondents. The information gathered was coded, and with the use of Statistical Package for Social Sciences (SPSS) application, organized and interpreted to deliver meaningful information. Qualitative information gathered from Key Informant Interviews were grouped into themes and analyzed based on the study objectives to inform the overall findings. Descriptive analysis was also applied, which comprised of frequencies and percentages. The study reveals that a number of socio-economic and demographic attributes of riders have a mutual relationship with the occurrence of crashes. The findings also show the absence of formal rider training and knowledge of motorcycle safety measures which contributes to the crashes by commercial motorcycle riders in Imenti South Sub County. In summary, the research concludes that age, marital status, the income of rider, formal rider training and knowledge of motorcycle safety measures influence rider crashes. However, the study did not find any linkage between the sex of the rider and the occurrence of rider crashes because the sample was mainly male and therefore not significant for comparison. Education level and motorcycle ownership were mutually linked with rider crashes demonstrating that lower education level compromises the safety while the riders that own motorcycles had lower crashes. Recommendations include the integration of formal rider training at subsidized fees. Stringent measures on riders who do not comply to road traffic rules and regulations and the creation of awareness for riders on the importance of using safety gear such as helmets as well as risks of over speeding and overloading.

CHAPTER ONE

INTRODUCTION

1.0 Background of the Study

The Kenyan economy is significantly influenced by the public transportation industry and as of 2014, the sector generates 8.3% of the nation's total Gross Domestic Product (GDP)GIZ, (2021). This influence, however, goes much beyond its economic contribution because it provides an intermediary function to a wide range of other industries. As a result, it is vital to both economic growth and the reduction of poverty. The public transport industry also shows the diversity of life in Kenya based on aspects such as entrepreneurship, urbanization, organized crime, and their correlations with the sector. National Crime Research Centre (NCRC), 2018). By highlighting the importance of the transport sector as a key area of the recovery of the Kenyan economy initiatives as stipulated in the Economic Recovery Strategy (ERS) for Wealth and Employment Creation 2003-2007, the Kenyan government recognized the transport industry's input, especially in terms of growing the economy and development, eradication of poverty and creation of wealth.

The mid-term plans for Vision 2030 also emphasize the significance of aiming to enhance funding in the road network. In this sense, the motorbike industry, commonly referred to as "boda bodas," is growing to become a significant role of the Kenyan economy and a foundation of both employment and business for countless. Similar to other countries, Kenya has encountered considerable growth in the transport industry in the past years. The Kenya Bureau of Statistics database (KBS) (2019) reports that the volume of motorcycles registered from 2008 to 2018 has grown from 1 million to 3.2 million, constituting a 45% growth. On the other hand, as of February

2018, the National Transport and Safety Authority (NTSA) reported about 1.4 million motor vehicles registered in Kenya. The data does not fully account for the boda bodas operating in the country due to the fact most are undocumented and not in government records. Such findings show that the boda boda subsector is not appropriately policed, monitored, or regulated. As a result of such shortcomings as undocumented, the boda boda operators have demonstrated brutality, impunity, siege mentality, and recklessness (National Crime Research Centre (NCRC), 2018). Mutongi, (2017) also writes in her book “Matatu: A History of Popular Transportation in Nairobi” that, similar to the matatus in the 1960s and 1970s, the boda boda industry entered Kenya with a lot of lawlessness and illegal operation. The high use of motorbikes as a means of public and commercial transportation is a fairly new development in Africa.

The NCRC (2018) further adds that the notion of the rise of motorcycles in Kenya is because of the transport network not meeting the transport needs of Kenyans and poor transportation infrastructure. The 2008 zero-rating of the motorcycles below 250cc resulting in a decrease of prices of motorcycles is also a contributing factor. Another factor that has been identified as related to the increase of motorcycles is youth unemployment leading to youth joining the boda boda sector as a source of income. Onjoro et al. (2016) add other factors, which include growing demand for public transport, capacity to acquire motorbikes on credit, their maneuverability to remote areas, and creating job opportunities for millions of jobless youth.

on the Kenya-Uganda border, which led to the phrase "boda boda" which later transitioned to motorcycles. (Chepchieng et al. 2012). Kumar (2011) adds that although they offer certain transportation rewards, such as responding to demand, capacity to move on bad roads, and ease to

maneuver, their evolution has led to an equivalent increase in road fatalities and environmental deprivation. Their operations are increasingly linked to traffic crashes, posing serious health and safety risks to the public.

Road traffic Crashes (RTCs) and the injuries they inflict are rapidly becoming a primary source of disability and death in developing nations (Tercero et al., 1999, Razzak and Luby, 1998). The Global Status Report on road safety 2018 shows that the possibility of dying because of a road traffic crash is highest in South-East Asia and African Region at 20.7 and 26.6 deaths per 100,000 people respectively, with the Americas and Europe having low death rates at about 16 and 9 deaths per 100,000 people respectively. The World Health Organization (WHO) (2019) states that 93% of all road accidents occur in low- and middle-income nations. Africa had the greatest death rate (more than 26 per 100,000) as of 2016. (WHO,2019).

The WHO (2018) global status report on road safety indicates that the fatalities linked to road traffic crashes is unacceptably high at 1.35 million people per annum and results in about 20 and 50 million individuals with non-fatal injuries. Death rates are three-fold more in low-income nations than in developed nations. According to Adeloye & Azuh,(2016), this figure is larger than the number of deaths caused by diseases like malaria. Analysis by WHO (2022) further indicates that the world will not be able to fulfill the sustainable goal target 3.6, which aims to decrease road traffic accidents by half by 2030 if current trends continue.

Even though motorcycle transportation is the riskiest means of transportation, many still prefer it due to its accessibility and flexibility. They are a viable method of transportation, particularly for low- and middle-income individuals. They assist people even in parts where no other transport

means are available (Ministry of Transport, 2009). Despite the benefits of boda boda transportation, their safety and the resulting traffic crashes have emerged as a serious issue for all people using the road, governments and non-governmental organizations troubled by transportation safety.

Information from the National Transport and Safety Authority (NTSA) indicates a deadly trend in the motorcycle sector in Kenya. As of April 2020, Kenya recorded 262 fatalities of motorcyclists as compared to 204 as of April 2019, equating to a 28.4% increase and 107 fatalities in the number of pillion passengers as compared to 104 as of April 2019, marking a 3% increase. It also recorded 524 seriously injured motorcyclists as compared to 356 as of April 2019, significantly increasing that number by 47%, and 320 seriously injured pillion passengers as compared to 197 as of April 2019, marking a 62.4% increase.

Khayesi (1999) notes that the increased incidence of boda boda crashes is burdening an overwhelmed healthcare system because of the inadequate number of healthcare personnel and medical facilities. Health facilities, especially in rural parts, cannot handle the injured. Therefore, there are economic and social consequences. Motorbikes accidents have a greater likelihood of straining the economy because of the income lost in treating the injured, labor loss for the country, loss of households' incomes, particularly if the breadwinner becomes disabled or dies, and time loss for other activities due to caring for the injured. Furthermore, because most individuals injured in the crashes incur brain and limb injuries, treatment is lengthy and costly, as well as the emotional toll on close family members whenever there is a fatality (Khayesi, 1999).

The boda boda operations have an intrinsic strategy oversight. The government's decision to zero-rate boda bodas of up to 250cc in 2008 was part of a larger initiative to boost employment and enhance development. This strategy resulted in a significant reduction in boda boda costs, culminating in a massive influx of boda bodas into the economy without having anticipated or a set up counter system for their registration, regulation, and monitoring, as well as their role as public service vehicles. Boda bodas although operated informally, they meet a critical public transportation requirement that has fundamental implications for the public's wellbeing. (Nyaga, 2017).

1.1 Problem Statement

Notwithstanding the positive impact that the boda bodas subsector on Kenya's public transport and the entire economic growth of the country, there are issues of rising motorcycle-related crashes, injuries, and fatalities. Human conduct and actions are largely blamed for traffic crashes, which are impacted by economic and socio-cultural factors. This is due to the cultural order in which people live and are molded, which affects and controls their behavior. While personal conduct factors may cause boda boda crashes, these activities are affected by factors separate from the formal standard and categorization, resulting in crashes and injuries. As a result, this research focused on this specific aspect of rider behavior and the factors that may drive it.

The NCRC (2018) report points out that due to unsafe riding practices such as riding a motorcycle while after using drugs or alcohol, poor motorcycle maintenance, and a lack of effective training, boda boda crashes and injuries are common. Boda-boda-related crashes are among the leading surgical procedures in many public hospitals in Kenya, resulting in high costs for both the victims and the country in terms of hospitalization, surgery, and healing. As a result, the commercial

motorcycle sub-sector is swiftly turning into a possibly harmful force that, if not carefully managed and regulated, might spiral out of control, posing severe threats to the country.

As mentioned in the preceding paragraph, several factors influence rider behavior, such as inadequate policy regulations and implementation concerning boda boda transport. However, this study was limited to understanding and examining the socioeconomic and demographic characteristics of riders and whether they correlate to boda boda crashes in Kenya, using the South Imenti sub-county as a case study. To realize this, the researcher interrogated the following rider's socioeconomic and demographic attributes: age, gender, marital status, education level, income, motorcycle ownership, as well as rider training and knowledge of motorcycle safety measures.

1.2 Research Questions

The study aimed at addressing the following questions:

- i. What are the socioeconomic and demographic attributes of boda boda riders in the Imenti South sub-county?
- ii. What is the relationship between socioeconomic and demographic characteristics of riders with crashes in the Imenti South sub-county?
- iii. To what extent does formal rider training impact motorcycle crashes in the Imenti South sub-county?

1.3 Objectives of the Study

The overall objective of the research was to explore the relationship between the socio-economic and demographic attributes of motorcycle riders and occurrence of motorcycle crashes.

1.3.1 Specific Objectives

- i. To explore the socio-economic and demographic attributes of motorcycle users in Imenti South sub-county.
- ii. To evaluate whether there is linkage between socio-economic and demographic attributes of motorcycle users and the occurrence of rider crashes in Imenti South sub-county.
- iii. To examine how formal rider training impacts motorcycle crashes in South Imenti Sub-County.

1.4 Significance of the Study

This research was motivated by the inadequacy of literature associating crashes with the demographic and socioeconomic characteristics of riders in Kenya. Literature reveals that the precise number of motorcycles in the country's 'boda boda subsector is not known and documented as well as the exact number of boda boda crashes. Thus, this research intended to generate knowledge and fill this literature gap in motorcycle transport.

The research is also significant because it paints the transport state of affairs in the context of a developing country. It is especially interesting since it vividly depicts the situation of transportation in a developing nation. Such a situation contrasts that of the developed nations, where motorbikes are mostly utilized for entertainment; motorbikes in the global south are utilized to address people's immediate and actual transportation needs, particularly among low-income populations. As a result, it's critical to comprehend the circumstances surrounding boda boda motorbike transportation and the challenges in this setting.

The study aimed to understand whether age, gender, marital status, education level, income, motorcycle ownership, rider training, and knowledge of motorcycle safety measures correlate to the occurrence of motorcycle crashes. Overall, the findings and policy recommendations will help stakeholders in the motorcycle sector to devise appropriate strategies to reduce the number of crashes within the industry.

1.5 Scope and Limitations of the Study

The current research covers the public transport motorcycle sector, also known as the boda boda sector, with a focus on the socioeconomic and demographic attributes of riders in the South Imenti sub-county, one of the nine administrative regions in Meru County. The study was limited to the sub-county because of resources and time limitations to carry out the study. This sub-county was selected because it falls in one of the most populated counties in Kenya, which provides a larger scope for boda boda operations to thrive in the area. Besides, many boda-boda users operate on numerous roads to move workers and business persons, and agricultural products to numerous parts of the sub-county.

Most operators in these areas are in specific sections along busy transport routes. The main challenge of the study was that the available literature does not indicate the precise numbers of the motorbikes plying as 'boda bodas' in Kenya since some are not documented.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This literature review is based on review of books, scholarly journal articles, and other relevant materials. The review offers a summary, critical assessment, and description of these works. Literature assists a scholar in unearthing state-of-art and debates in the subject area of study. It aims at providing the reader with the outline of the source one is going through while researching a specific issue and linking the research with the greater field of study. This chapter reviews the key thematic areas as follows: the empirical literature review, the theories relevant in this context, and the conceptual framework.

Literature review is the methodical identification of articles that provide pertinent information about the topic being studied as a predetermined research problem (Mugenda Mugenda, 1999). The chief goal of the literature review is to support the investigator in gathering a thorough comprehension of the investigations or studies conducted by other academics or researchers. In addition, it aids the researcher in understanding the various findings and arguments related to the study's topic.

2.1 Empirical Literature Review

2.1.1 Background

This subsection explored previous studies to inform the research in this study. Kumar & Barret (2008) notes that motorcycle use for public transportation is becoming more popular around the world. The global increase of motorcycles, especially in low- and middle-income nations, as well as the unsystematic and inefficient transportation systems in many developing countries, has resulted to the surge in the use of motorcycles for transportation. However, this development has

come with its challenges. Motorcycles use in public transport has had its favorable circumstances yet has additionally carried alongside its security challenges and intensified road safety concerns." (Zhang et al., 2004).

WHO (2013) observes that motorcycle riders make up a large percentage of fatalities and roads in many middle and low-income nations, as they are emerging as more popular modes of transportation. Motorcycle incidents, in addition to car crashes, are on the rise in many countries. According to the WHO (2018), around 1.35 million individuals were killed in road crashes involving motorcycles in 2018, with 20 to 50 million injured annually.

In Africa, Kumar & Barrett (2008) observe that motorcycles have emerged as a viable alternative to inefficient public transportation options, owing to their affordability, high flexibility, fuel efficiency, and cost-efficiency. As a result, the number of motorcycles and motorcycle-related transportation services has increased in many African countries. It is a common belief, however, that the boda bodas have largely contributed to the rise in traffic crashes in Africa (Muhumuza, 2011).

For several years, Kenya, like other low- and middle-income republics, has realized an unprecedented rise in the use of motorcycles on public transportation. According to Nyachieo (2015), the rise in the sector is attributed to several factors, including the 2008 government reforms that zero-rated motorbikes with engines under 250cc, leading to a substantial drop in their prices. There is also the failure of Kenya's transportation service to address the needs of Kenyans, poor

transportation infrastructure, and widespread youth unemployment, which forces youth to join the commercial motorcycle sector as a link to employment and livelihood.

In Kenya, Boda Boda motorcycles are now among the most common mode of transportation, in particular for rural areas but also urban passengers. However, safety concerns have been posed due to incidents involving Boda Bodas and other safety-related issues. This can be demonstrated using data from Kenya's National Transport and Safety Authority, which shows a destructive pattern in the motorcycle industry in recent years. As of September 2022, Kenya recorded 903 fatalities of motorcyclists as compared to 865 as of September 2021. (NTSA, 2022).

2.1.2 Socioeconomic and Demographic Characteristics of Riders

Income, education, employment, age, gender, and social support are all socio-demographic and economic characteristics that can significantly affect how well and the length people live. These characteristics have a bearing on the ability to make rational decisions, have enough money for basic human needs, and manage stress, among other things. In the same way, these factors influence how boda boda riders are involved in their day-to-day business operations.

Boda Bodas play a significant role in the Kenyan economy and offer employment and income for many, especially the unemployed youth group (Nyachieo,2015). The Kenya National Bureau of Statistics (KNBS) (2018) stipulates that the subsector brings approximately Ksh 219 billion per year to the Kenyan economy.

According to Engel (2007), various demographic characteristics make up an individual, where one is either a woman or a man of a specific age and possessing a certain educational experience. The person may have unique riding skills, or he or she can fit into a specific social class and also has a

standing and a role to serve in each of the many social classes to which he/she belongs. Status or class is the relative social position of an individual within a group (O'Neil,2006). Based on such an understanding of class or status, an individual may belong to a certain informal social group of either socioeconomic or demographic status with distinct behavior patterns that play a role in the accident's occurrence.

The majority of motorcycle riders, as well as users of transportation, are low-income earners. However, according to Zhang, Norton, & Tang (2004), individuals of all income levels are likely customers because motorbikes provide a reliable and inexpensive mode of transportation. As applied to motorcycle safety in this study, the perspective of the social status approach contends that boda boda riders cause crashes as they struggle to make a living in a rough economic environment. Because of their association with the production means, riders fall into a specific social group (Nyachieo, 2015). Riders can also lack the needed skills to do their work because they lack formal training due to the costly training fees. According to Nyachieo (2015), the motorbike riders who were involved in accidents lacked basic rider training, with 92 percent of the participants being self-taught or learning from friends or family members.

According to NCRC (2018), the boda boda transport sub-sector consists mainly of young people. Young individuals from lower socioeconomic backgrounds and inexperienced in riding. Findings from the report also note that minors are employed in the sector, as (1.1%) of the riders were under 18 years old. Studies carried out by various scholars show that being young is a risk factor compared to being an older individual when it comes to engaging in risky behavior and attitudes (Seleye et al., 2003). The viewpoints of the young motorcycle riders did not correspond to their

protective habits, as one might assume (Reeder et al., 1996). A majority of the young riders are aware of the legal safety provisions, yet they obviously disregarded them. In another study, Hung et al. (2006) note that riders of a certain older age, for example, are more likely to use a helmet. Kumar & Barret (2008) point out that crashes and injuries are common and usually fatal as age is identified as having a bearing on the riders' behavior, hence having safety implications. Kahuthia et al. (2013) observe that in Kenya, most boda boda crashes have been blamed on reckless driving and over speeding by adolescent riders. In addition, an investigation focusing on the attitudes and behavior of younger motorcycle riders is needed to better understand why the younger population takes risks at a higher rate than any other age group.

The sub-sector is also mainly dominated by the male gender with family obligations and responsibilities. An investigation in Kwara State, Nigeria, identified the entire sample as male, with 65% married and the rest single (Taruwere, 2012). Sentongo-Kibalama, Kisaalita & Josephat (2007) also identified that in Uganda, all the motorcyclists were male at the age of 16 and 35, with half of them having children and married. In Kenya, research conducted by Luchidio (2015) also identified that in Kakamega, all participants in the study were male between 18 –28 years. A report by the Department of Planning, Transport and Infrastructure in South Australia (2014) notes that males outnumber females by a significant margin in respect to motorcycle crashes and injuries. This report indicates that high-risk behavior such as speeding and drunk are key contributors to severe crashes. These findings have also been attributed partly to exposure; more males than females have motorcycle licenses, and males have a substantially larger number of documented drunk-driving-related fatal accidents than females. According to literature, male motorbike riders are involved in more motorcycle accidents than female riders. Women are safer riders than men,

according to a study done by the University of New South Wales Transport and Road Safety Research Unit in 2012.

Nyachieo (2015) identified many motorcycle riders in Kisumu as young adults ages 25 to 31, with about 70 percent being married, which meant they had duties and financial obligations to meet. Therefore, they adopt the commercial motorbikes occupation as a source of revenue for their wellbeing. However, riders may not follow to traffic guidelines and protocols if such compliance can lead to less economic returns. Consequently, they can be obliged to participate in dangerous practices such as overloading, wrong overtaking and speeding. (Nyachieo, 2013).

The NCRC (2018) notes that most persons in charge of the boda boda business have only completed primary and secondary education. However, persons with university degrees are employed in the sub-sector, highlighting the prevalence of unemployment in Kenya. Every day, the number of boda boda business operators in Kenya grows (Olawo et al., 2014), employing many unemployed youth. The growing competitiveness in the industry has also been blamed for the crashes, which shows that motorcycle riders must increase the number of daily trips to stay in business, which creates weariness and dangerous driving and, as a result, crashes (Kitara, 2011).

In the area of ownership of boda boda motorcycles, most of the riders are known to have ownership; others are employed on commission or as casuals hired, as temporary riders, or on stand-by (squad riders). Nyachieo (2015) points out that the riders who are non-owners must work hard to meet the targets of motorcycle owners. There are also circumstances where motorbike owners take loans to purchase motorcycles and need to pay off these loans. As a result, there are many shortcuts the riders take in terms of traffic rules and regulations, to meet these targets. They

are obliged to participate in risky riding behavior such as wrong overtaking, speeding, and overloading (Nyachio, 2013).

The boda boda business requires extensive training and public awareness. Proper rider training is one of the most crucial aspects of lowering the risk of motorcycle crashes. Training is about enhancing knowledge and skills. Training is a systematic development of attitudes, skills, and knowledge required by a person to complete a specified task or job appropriately (Armstrong, 1977). A good motorcycle training program may help motorcyclists recognize and observe road and traffic rules. Diverse training can help riders become more alert and maintain the presence of mind when riding. It also fosters defensive and safe riding practices. It's worth noting that the boda boda riders involved in crashes are largely untrained. A large number of them are self-taught or learned through family or friends. (Hurt et al., 1981). Nyachio (2015) points out that it is unclear what percentage of riders attended formal rider training in Kenya, Findings by the same researcher also indicate that most riders in Kisumu receive informal training at a cheap fee of about Kshs 50 to 200, which is cheaper than formal training of about 6,000 and 9,000 Kshs for two or three weeks.

2.2 Theoretical Framework

A theory can be said to be what may explain the occurrence of a social phenomenon. In this section, the research is focused on explaining the theoretical relationships that exist in explaining the phenomena at hand. In this study, the Human Factor Theory of Accident Causation will be used to try and explain the occurrence of motorcycle crashes regarding riders' socioeconomic and demographic attributes.

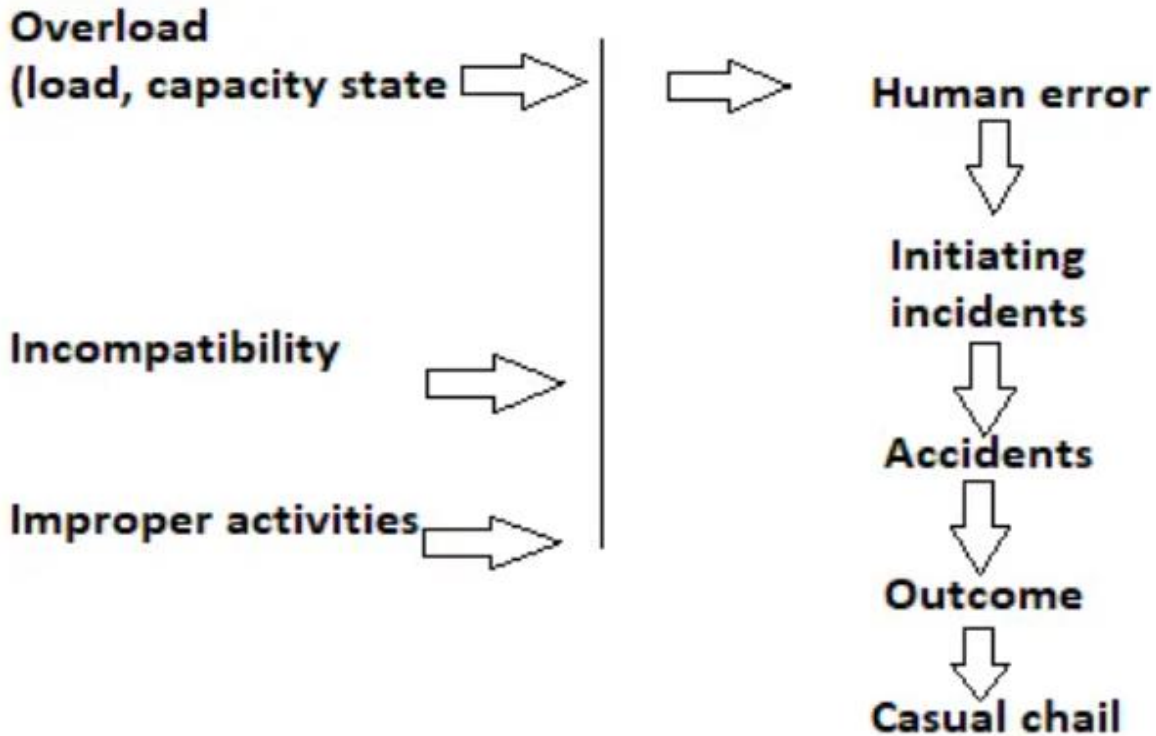
A theory is as a system of describing phenomena by identifying laws and constructs that interrelate (Mugenda and Mugenda,1999). In another definition, a theory is identified as an acknowledged

fact that tries to offer a rational or plausible description of cause-and-effect (causal) association amongst a group of observed phenomena (Kothari, 2004). Conti (1983) describes a theory as "systematically organized knowledge applicable in a wide variety of circumstances; especially, a system of assumptions, accepted principles, and rules of procedure devised to analyze, predict, or otherwise explain the nature or behavior of a specified set of phenomena."

2.2.1 Ferrel Theory (Human Factor Theory of Accident Causation)

The Ferrel Theory shown in figure 1 below adopts a cause-and-effect format that links boda boda crashes to a sequence resulting from human error. Doctor Russel Ferrel (1997) established an accident theory grounded on a series of human factor causes. According to Ferrell, accidents result from an individual's error, which means that the key premise is that a single person causes accidents. According to Conti (1983.), an accident is a product of a sequence of events resulting from constant human error. According to Farrell (1997), incompatibility, overloading, and inappropriate activity are three common causes of accidents.

Figure 1: Human Factor Theory of Accident Causation



Source:(Ranjan, 2018)

Overload: the overload factor replicates the discordance between the load and the ability of the human. The outcome of such disparity is pressure, anxiety, fatigue, and emotions that can be strengthened by the physical environment, including dust, light, fumes, and noise. Where the person is working. (Ijaet, 2012). The rider is considered far off his/her ability regarding either psychological or physical factors making the rider get involved in a crash. These physical and psychological factors may include emotional stress, the excess number of pillion passengers, pressure, light, noise, drugs, physical condition, stressors, state of mind, and fatigue that impair the ability to respond. According to Githinji (2011), it is common to see up to four pillion passengers carried on a boda boda in Kenya, and that physical load may impair the ability to respond appropriately when the need arises. Also, according to the NTSA (2017), intoxicated

riding among boda boda riders is common. Nyatundo (2014) writes that in Kisii town, considerable alcohol/substance has a bearing on the crash rates of commercial motorcycle.

Incorrect response; the incorrect response by an individual is a result of an incompatible condition where one is working (Ijaet, 2012). According to DeCamp & Herskovitz (2015), there are two simple origins of accidents in this category. To begin with, it's possible that the person in charge just didn't know any better. Alternatively, he or she may have known that a certain action would lead to a crash but decided to take the risk either way. In Kenya, service terms are claimed to have a major bearing on riding carelessly, speeding, and overloading. Many riders in Kenya complain about low pay and inadequate terms of service, which can effortlessly result in risky riding as they strive to make more earnings.

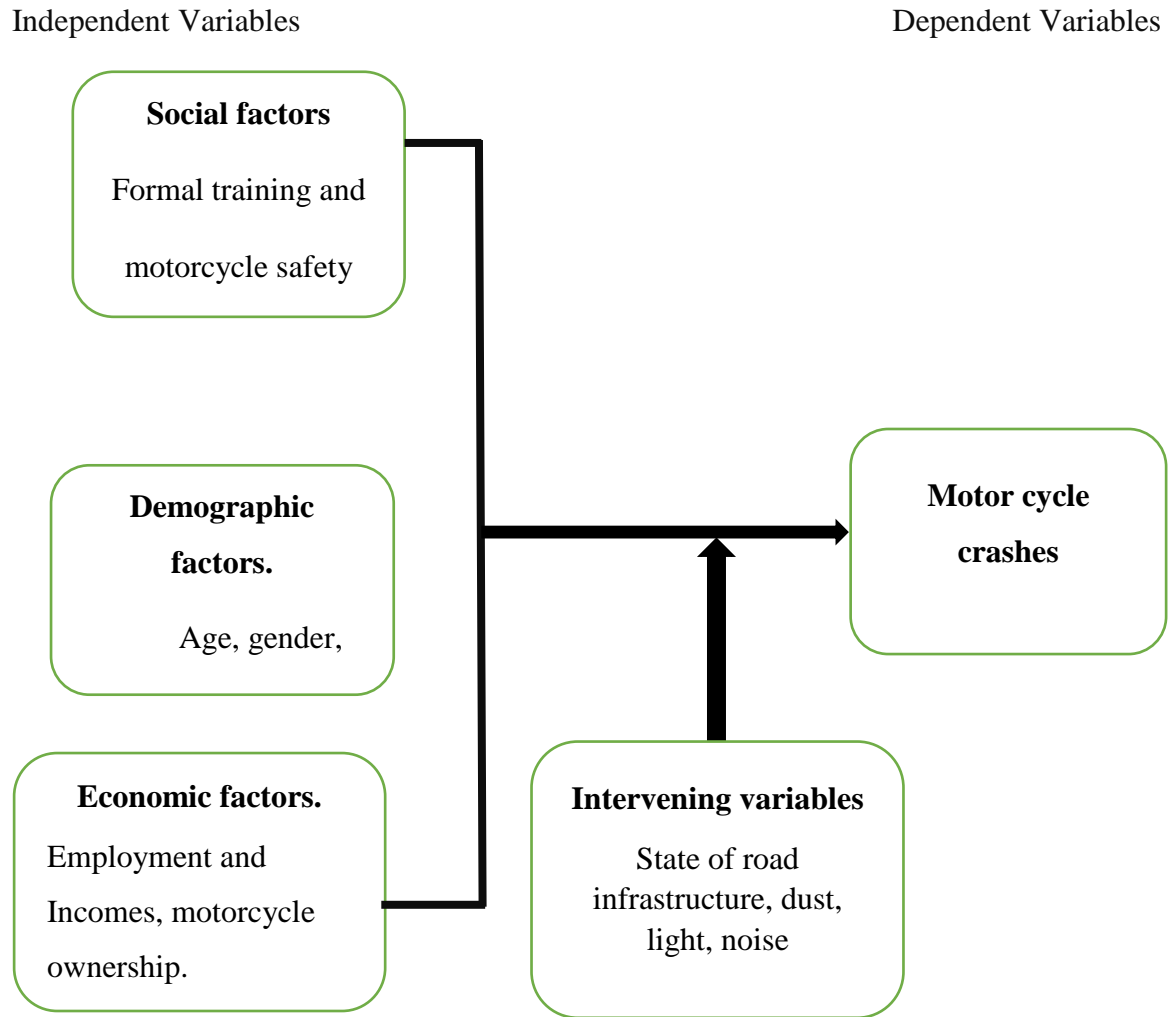
Improper activity; the individual performs an inappropriate action either because of a lack of knowledge of properly performing the action or deliberately taking the risk. (Ijaet, 2012). The rider may also perform an improper activity due to the low perceived cost of a crash or low perceived probability of crashing (Ranjan, 2018). Lack of understanding of the proper way of acting may be linked to a lack of formal rider training. Nyatundo (2014) notes that motorcycle operators' lack of awareness of traffic safety laws has continued to be one of the leading causes of road accidents. Motorcycle operators are also often found to violate the Road Safety Highway Codes (Ogagaoghene 2011). For example, the Nigerian government drafted several legislations implemented by the municipal, state, and federal governments to restrict pillion passenger excesses, including the Road Traffic Regulation of 2004 and the FRSC Establishment Act of 2007. *"To establish the federal road safety commission with the responsibility for traffic*

management, preventing and minimizing accidents on the highways, the supervision of users of such highways, the regulation of traffic thereon and clearing of obstruction on any part of the highways and for educating drivers, motorists and other members of the public generally on the proper use of highways; and for related matters to safety on the highways." However, the carrying of four passengers is still a common occurrence (Githinji 2011). The Human Factors Theory's concepts apply to the current investigation.

2.3 Conceptual Framework

The framework Breaks down and demonstrates the interconnectedness of the study variables (Socioeconomic and demographic characteristics of riders) and how these dynamics affect rider crashes (Figure 2). The dependent variable is motorcycle crashes, and the independent variables are socioeconomic and demographic factors. The intervening variables are the state of road infrastructure.

Figure 2: Conceptual Framework showing the association between independent variables and dependent variable.



Source: Author Conceptualization.

The framework depicts some of the attributes of motorcycle riders that may have a role in boda boda crashes. The demographic attributes of riders to be studied in this research include age, education level, sex, and marital status. As evidenced by the literature, such factors as age may be linked to the likelihood of being involved in crashes.

Socioeconomic factors include employment and income, motorcycle ownership, formal rider training, and motorcycle safety knowledge. The Conceptual framework indicates that these factors influence the occurrence of crashes. As a result, if one, for example, received formal rider training, the odds of being involved in crashes are lowered because it may help motorcyclists recognize and observe road and traffic rules and overall safe riding practices.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This section on methodology contains the description of the study area, study design, the target population and sample size, the data gathering approach and methods, and analysis. The chapter also elaborates on how ethical issues are dealt with.

3.1 Research Design

The concept of the research methodologies and processes an investigator selects to carry out research is identified as the research design. Investigators can fine-tune their research techniques to best align the research topic to the design, which is important for an effective study. Bryman (2012), in his book on social research methods, describes research design as a structure that directs the implementation of a study method and the scrutiny of the data that follows. The study used a descriptive approach to study motorcycle riders' social, economic, and demographic

characteristics. A descriptive survey research strategy is suitable when the study intends to comprehensively describe an issue (Mugenda & Mugenda, 1999). In this study, the descriptive survey was used to allow the evocation of a large amount of data. This study adopted both quantitative and qualitative methods to collection of data using a questionnaire as the data collection tool. Observation methods and key informant interviews were also carried out to elicit more data for this study.

3.2 Study Area Description

The research took place in the South Imenti sub-county, which is among the nine administrative sub-counties in Meru County. According to the KNBS (2019), the sub-county hosts a population of 206,506 people as of the 2019 population census. This particular sub-county was selected due to the area's significant thriving boda boda business. The sub-county is largely rural, and the main economic activities consist of crop and animal farming. Due to the problem of poor roads, lack of all-weather roads in the regions, and the distant proximity to other forms of transport such as buses, boda bodas are the main mode of transport for both people and goods within the sub-county.

This region houses the Kanyakine sub-county hospital with wards specially allocated for boda boda victims. This indicates that boda boda crashes are a concern in the study region. Also, most of the youthful population is unemployed, making the boda boda business a viable income source.

3.3 Study Population

A percentage of the target group identified as the study population is where the actual sample is drawn. Mugenda & Mugenda (2003) states that purposeful sampling enables the investigator to use respondents with the essential information for the purpose of the research being carried out. The sample population comprises a group of objects, events, and individuals with common observable attributes (Mugenda & Mugenda, 2008). In this case, the target group was all the boda boda riders in the South Imenti sub-county. A contact setting exercise carried out by this study gathered 847 actively operating boda bodas within the study area. They are organized in randomly distributed clusters or groups and strategically located along busy routes, especially around matatu drop and pick-up stations within the sub-county. These operators are unevenly distributed within 29 rider groups registered in the sub-county social development office, as illustrated in table 1 below.

Table 1: Target Population

BODABODA GROUP NAMES	NO. OF RIDERS.	BODABODA GROUP NAME	NO. OF RIDERS.
Mathiamene Riders Youth Group	12	Ten Visioners Bodaboda Operator	10
Igoji Maxwel Bodaboda Operators	20	Mchome Bodaboda Operators	23
Kauronathi Bodaboda Operators	33	Jijenge Nkubu Bodaboda Operators	20
Digital Kabanda Operators	16	Mimbemba Bodaboda Operators	85
Jijenge Bodaboda Operators	37	Kimwega Bodaboda Operators	13
Jekim Down town Bodaboda Operators	24	Kieni kia Ndege Bodaboda Operators	15
Transformer Bodaboda Operators	16	Mutunguru Bodaboda Operators	27
Makadara Mitunguu Town Stage Operators	18	Nkubu Bodaboda operators	31
Ntharene Bodaboda Main Stage Operators	59	Kothine-Nkubu Main Stage Operators	12

Menwe Young Bodaboda Operators	8	Nkubu-Kionyo Stage Operators	50
Rubiri Nkuene Bodaboda Riders	11	Nkubu-Consolata Operators	32
Nicada Bikers	8	Kamachege Bd Operators	22
Muutiokiamu Kanyakine Bodaboda Operators	25	South Imenti Nkubu Operators	30
Lower Kanyakine Bodaboda Operators	32	Nkubu Main Stage Operators.	70
Upper Kanyakine bodaboda operators	88		
TOTAL NUMBER OF RIDERS	847		

Source: South Imenti Sub County Social Development Records, (2021).

3.4 Sampling and Sample Size

Stratified random sampling methods was adopted. Stratified random sampling was suitable for this investigation as it divided the entire population into homogenous strata. The study population in question already assumed its stratum since they were formed based on members' shared attributes or characteristics, which were shared groups of registration. Simple random sampling was applied to choose samples from each stratum. Each stratum constituted members registered in the same association.

Bryman & Bell (2003) describes a sample as part of the target group selected for research or a subgroup of the targeted group. Kothari (2014) adds that the sample selected needs to represent the entire group to guarantee that the outcomes can be generalized from the research sample to the population as a whole. Borrowing from Bullen (n.d), ample sample size is usually about 10% of the population but not more than 1000." With this regard, the study adopted a sample size of 86 participants drawn from the 29 registered rider groups. The number of 86 for the sample size was arrived at by drawing 10% from each of the 29 registered rider groups, as shown in table 2 below.

Table 2: Sample Size

BODABODA GROUP NAMES	NUMBER OF RIDERS	SAMPLE SIZE
Mathiamene Riders Youth Group	12	1
Igoji Maxwel Bodaboda Operators	20	2
Kauronhi Bodaboda Operators	33	3
Digital Kabanda Operators	16	2
Jijenge Bodaboda Operators	37	4
Jekim Down town Bodaboda Operators	24	2
Transformer Bodaboda Operators	16	2
Makadara Mitunguu Town Stage Operators	18	2
Ntharene Bodaboda Main Stage Operators	59	6
Menwe Young Bodaboda Operators	8	1
Rubiri Nkuene Bodaboda Riders	11	1
Nicada Bikers	8	1
Muutiokiamama Kanyakine Bodaboda Operators	25	3
Lower Kanyakine Bodaboda Operators	32	3
Upper Kanyakine bodaboda operators	88	9
Ten Visioners Bodaboda Operator	10	1
Mchome Bodaboda Operators	23	2
Jijenge Nkubu Bodaboda Operators	20	2
Mimbemba Bodaboda Operators	85	9
Kimwega Bodaboda Operators	13	1
Kieni kia Ndege Bodaboda Operators	15	2
Mutunguru Bodaboda Operators	27	3
Nkubu Bodaboda operators	31	3
Kothine-Nkubu Main Stage Operators	12	1
Nkubu-Kionyo Stage Operators	50	5
Nkubu-Consolata Operators	32	3
Kamachege Bd Operators	22	2
South Imenti Nkubu Operators	30	3
Nkubu Main Stage Operators.	70	7
TOTAL	847	86 estimated.

Source: Author, (2021)

3.5 Data Sources and Data Collection

Both secondary and primary data sources were applied. The chief data was collected from 86 boda boda riders sampled in the 29 rider groups. Due to limitations in time for the study, the most appropriate data collection tool was closed and open-ended questionnaires, observation, and interview guidelines for Key Informant Interviews. On the contrary, secondary data was gathered from statistics found in the various bodies in the ministry of transport, such as NTSA and the traffic police, as well as published reports such as journal articles. The data collected was aligned with the conceptual framework where the key factors or independent variables were demographic, social, and economic factors of the riders in the study. The data collection tools administered in a manner to observe the COVID-19 health guidelines provided by the Ministry of health.

3.6 Data Analysis

For data to be meaningful, it must be adequately analyzed for it to be understood both by the researcher and third parties. Data collected underwent both quantitative and qualitative analysis. The quantitative information gathered was coded, and using Statistical Package for Social Sciences (SPSS) software, the information was organized and interpreted to deliver meaningful information. Each of the questionnaire's questions had a unique name and number allocated to the keywords as a code. Prior to data input, codes were also allocated to the scale's response categories. Listing all the crucial responses provided by the respondents to the other open-ended questions allowed for their analysis.

Qualitative information gathered from Focus Group Discussion, Key Informant Interviews, and observation were grouped into themes that were analyzed based on the research objectives to generate the overall findings. Descriptive analysis was also applied, which comprised frequencies and percentages.

3.7 Reliability and Validity of Instruments.

Reliability is about assessing the level that the research tools lead to the same outcomes in repeated trials under the same conditions (Mugenda & Mugenda, 1999). To ascertain the reliability and validity of the study instruments, the investigation integrated a content validity test with a pre-test to assess the level to which the study instrument represents the gathered data. Items that could be effortlessly misinterpreted or misconstrued were reviewed and adjusted to enhance validity.

3.8 Ethical Considerations

According to Diener & Crandall (1978), four ethical principles revolve around issues of social science research, and they include: i) Ensuring no harm to the participant, ii) Acquisition of informed consent, iii) Ensuring there is no invasion of privacy, iv) Ensuring there is no deception involved. The researcher ensured an ethical approach by obtaining research permits from the relevant bodies and informing the respondents that their participation was entirely voluntary and information provided will be confidential and limited to academic purposes.

CHAPTER FOUR

FINDINGS AND DISCUSSION.

4.1 Introduction.

This segment of the research is aimed at providing the findings and discussions that connect the link between the independent and dependent variables and the intervening factors. The key objective of the research was determining the socio-economic and demographic features of the motorbike riders in South Imenti, assess the extent to which the characteristics contribute to crashes in the region as well as to examine the extent to which formal rider training impacts on motorcycle crashes in South Imenti Sub- County. Therefore, the independent variables of the research were linked to the social, demographic and economic factors as stipulated in the conceptual framework. Thus, the main observations from the findings are that age, marital status, the income of rider, as well as formal rider training and knowledge of motorcycle safety measures influence rider crashes. The sex demographic could not be examined because the respondents were predominantly men. The study findings also shows that there is a mutual relationship that motorcycle crashes and the training. Formal training has a positive influence on safety as demonstrated by this study. Those formally trained encountered less crashes compared to those trained informally. This partly implies that informal and lack of training significantly contribute to crashes. The section below discusses the findings in detail.

4.2 Socio-economic and Demographic Characteristics of Riders

Socio-economic and demographic attributes of the rider are important because of their mutual relationship with the occurrence of motorcycle crashes. For instance, Nyachieo (2013) states that the commercial motorcycle sector is significantly affected by the socioeconomic attributes that have also affected the demographics of the people that are part of the business. Besides, the study's

first objective was to scrutinize the socio-economic and demographic attributes of the boda boda users in Imenti South Sub County. Hence, this section included the age, sex, marital status, education level, income, motorbike ownership, formal rider training, and knowledge of motorcycle safety measures. The following sections (4.3.1-4.3.9) provide in-depth explanations of these findings.

4.2.1 Sex of Riders

This segment discusses the demographic features of the participants in terms of the sex of the riders in the commercial motorcycle sector. However, the female sample was not significant enough to provide comparisons of sexes when it comes to motorcycle crashes because a large percentage of the respondents were men. Similarly, studies by Taruwere (2012) in Kwara State, Nigeria and Mugwe (2018) in Kakamega, Odhiambo and Konnings (2018), Yogo (2016) and Maichuyie (2020) demonstrate that a majority of the participants in their studies were primarily male. Like Mahlstein (2009), Bolbol and Zalat (2018) claim that males dominate commercial motorcycling because it is considered a male job. The researchers further argue that most females cannot meet the energy demands in the occupation, which entails high-risk ventures and is strenuous. However, the notion is changing as Kamau & Mitullah (2022) identify that the transport sector that has been traditionally dominated by men is becoming gender sensitive and challenging hegemonic perspectives of societal views about women and male dominance.

Similarly, Mugwe (2018) also points out that the industry's inherent risks and challenges may help explain the prevalence of men in the sector. The scholar highlights the risks involved in the profession because of the frequent run-ins with other road users during boda boda operations, especially considering the lack of designated lanes for motorbikes and bicycles on most Kenyan

roadways. Mugwe (2018) further argues that men are more suited to the sector than women because of the demanding nature of the work, which lays heavy demands on the human body. An article by Hunter (2014) concurs with the statement mentioned above by claiming that there are physiological differences between males and females, with the former being more robust than the latter. Therefore, it can be true that the demanding nature of the commercial motorcycle sector can have a higher bearing on women than men. Such attributes have made women shy away from the commercial motorcycle sector. The findings have also been affirmed by the qualitative data from Focus Group Discussion (FGD), where the discussions exposed several reasons that include the demanding nature of the business, particularly at night, which may not be easy for most females considering their other roles.

According to the above findings, it is apparent that male boda boda riders outnumber female riders. While there have been significant improvements in the industry's safety, viability, and the structure, extremely few women have access to or the courage to venture into this operation (UNFPA, 2020). The dominance of men in the commercial motorcycle industry can be used to explain the high rates of crashes. Studies have, however, acknowledged that the sex of riders plays a crucial role in traffic crashes (Yagil, 1998). According to the literature, males are more likely than females to be part of crashes (Singoro, Wakhungu & Obiri, 2016). For instance, "male motorcycle riders have a larger predisposition for risky behaviors, and it has been demonstrated that these behaviors are connected with increased crash risks" (Lin et al., 2003; Rutter & Quine, 1996).

4.2.2 Age of Respondents.

The age classification was based on the knowledge that various age groups perceive risk levels differently. "Young and male motorcycle riders", for example, "have a stronger propensity for risky behaviors, and these behaviors are associated with increased risks of crashes" (Lin et al., 2003; Rutter & Quine, 1996). Therefore, the age of riders is deemed necessary for safety compliance.

Based on the total percentages of the two age groups of 18 to 24 and 25 to 35 years old in table 3, the data reveals that more than three quarters (79.1%) of boda boda users in the Imenti South Sub County fall within the category of youth.

Table 3: Age Bracket of Respondents

what is your age bracket?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-24	24	27.9	27.9	27.9
	25-35	44	51.2	51.2	79.1
	36-45	17	19.8	19.8	98.8
	46-59	1	1.2	1.2	100.0
	Total	86	100.0	100.0	

Source: Field Data

Similarly, research by Opondo and Kiprop regarding boda boda transport and security challenges identified that 88.2% of the boda boda users in Kenya were ages 18-41 years old. Therefore, based on other research and current research, most commercial motorcycle riders are young.

4.2.2.1 Relationship Between Age and Occurrence of Rider Crashes

According to the age classification, which was based on the identifying that diverse age groups remark risk levels in a different way, the riders' age is considered a crucial factor in safety

compliance. A cross-tabulation of age by the number of riders crashes in table 4 below confirms that the age of riders plays a vital role regarding rider road safety compliance.

Table 4: Crosstabulation of Age of Riders by Crashes

number of crashes * age bracket Crosstabulation

Count

		what is your age bracket?				Total
		18-24	25-35	36-45	46-59	
Number of crashes	1	5	8	3	0	16
	2	8	13	5	0	26
	3	2	4	2	0	8
	4	0	5	0	1	6
	N.A	9	13	7	0	29
Total		24	43	17	1	85

Source: Field Data

It is evidenced that young riders are prone to crashes and crashes-causing activities than their older counterparts. In this study, riders between the ages of 18-35 recorded the highest number of crashes, with most riders recording more than one crash incident. It is therefore evident that the bulk of the riders in this study falls within the youth category, which could have substantial safety consequences. For instance, Gboyega et al. (2012) found that motorcycle riders in their early adulthood years and late adolescence had high driving risky behaviors and were consistently aggressive and in a hurry. Hence, the rider's age is a determinant factor of crashes among commercial motorcyclists.

However, the arguments regarding crashes with motorcyclists based on age vary. Hence, the conclusion that the rider's age is a crucial factor in safety compliance can be explained in several ways. For example, Bayati et al.; (2015) assert that one of the reasons is that many younger motorcycle riders lack a legal motorcycle license. It is also argued that older riders are usually safe

and in control (Fitzpatrick and O'Neill, 2017, IIHS, 2018). Other claims by Tunnicliff et al. (2012) conclude that younger motorcyclists ride at severe speeds more frequently and pull off more stunts.

Additionally, studies by Stutts, Foss, & Svoboda (2004), Chang and Yeh (2007), and Rutter and Quine (1996) showed that youthful riders are usually more aggressive, and they have a higher inclination toward breaking the laws. Another study carried out in Rural Kenya by Karau PB et al. (2003) on the Risk Factor Profile of Motorcycle Crash Victims noted that young male cyclists, possibly without prior driving experience, likely under the influence of alcohol, and transporting multiple passengers are the typical victims of motorcycle crashes. Poor compliance with road traffic rules has also been attributed to the high crashes by younger riders in a study conducted by Olumide and Owoaje (2015) in Nigeria. A Ugandan study by Tumwesigye et al. (2016) concluded that younger age groups of motorcyclists were most likely to be involved in crashes and crashes-causing activities. There is also the argument that inadequate resources prevent young riders from obtaining protective equipment (Kamulegeya et al., 2015). Still, the ones having helmets and other protective equipment rarely utilize them because they think they are immune to accidents and injuries (Olusayo et al., 2015). Moreover, risk-taking behaviours among very young riders may be an expression of independence, the desire to impress others, coping with stress and aggression, or both (Hodgdon et al., 1981). However, Linet al. (2004); Mangus et al. (2004) note that they did not alter their risk-taking behaviours or levels even after being involved in crashes or suffering injuries.

Age is also an important attribute when it comes to safety practices of motorcyclists. Hence, based on the feedback of the respondents provided in table 5 below dangerous riding, safety compliance and crashes that are linked to age were mentioned by the participants.

Table 5: Summary Table For Assessing the Assumptions on Socio-economic and Demographic Characteristics of Riders

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Age of riders play an important role in safety compliance	30.2%	26.7%	34.9%	7.0%	1.2%
Young riders tend to be more involved in crashes than their older counterparts	52.3%	34.9%	9.3%	3.5%	
Most bodaboda crashes are caused by dangerous riding by young riders	43.0%	45.3%	8.1%	3.6%	
Most riders have formal education but unemployed hence fall back to bodaboda riding as their source of income	42%	40.7%	12.8%	2.3%	
A majority of the riders have their own motorcycles	8.1%	30.2%	18.6%	30.25	12.8%
Most riders do not own motorcycles and therefore have to work extra hard to meet the owners' targets and remain with some amount for their income	40.7%	40.7%	11.6%	4.7%	2.3%
Riders who own motorcycles tend to be more careful than those who hire and work on commission and hence lower number of crashes	45.3%	36.0%	9.3%	5.8%	3.5%
Riders are involved in crash causing activities such as overloading as they strive to meet their daily targets	34.9%	47.7%	7.0%	7.0%	3.4%
Most riders have family obligations and are involved in crash causing activities as they strive to make a reasonable income for their families	12.8%	44.2%	26.7%	11.6%	4.7%

Source: Field Data

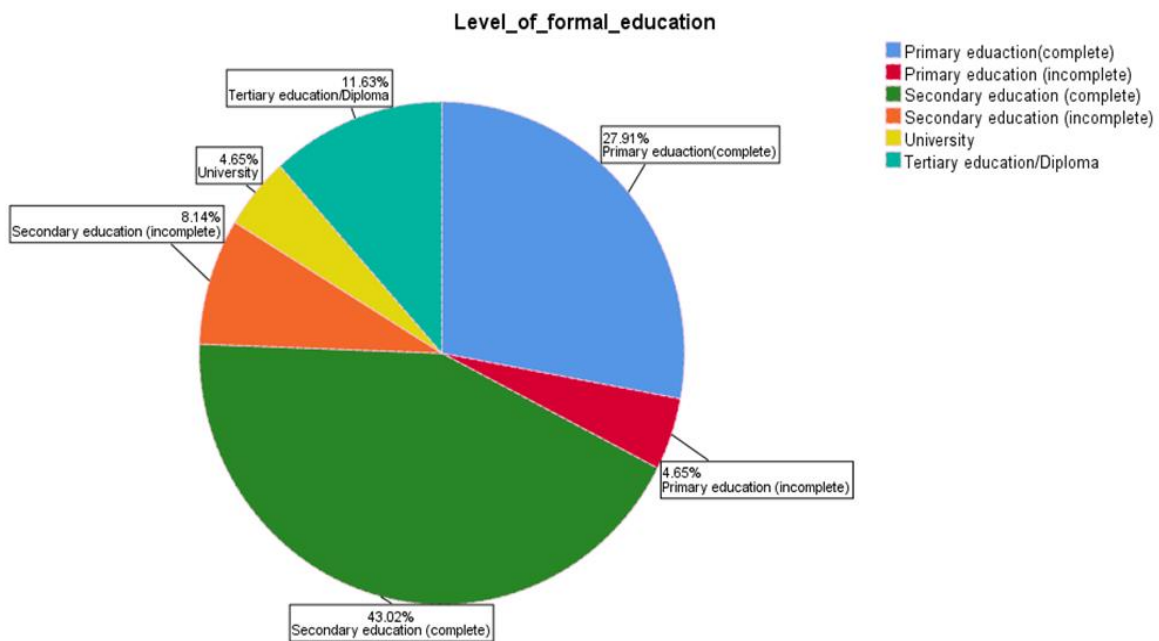
A large portion of the respondents agreed on the mutual relationship between age and adherence to safety practices. The survey identified that 30.2% of the riders strongly agreed that the age of the rider participates in a critical role in safety compliance, and 26.7% also agreed with this statement. Therefore, the data shows that over half of the respondents agree with the perspective that young riders have a higher possibility of being part of crashes compared to older riders. I therefore conclude, according to the findings in table 4, the views of the riders in the study in table 7, and literature from previous studies; age is a factor when considering the occurrences of

motorcycle accidents, with the younger riders having a higher likelihood of being involved in the crashes.

4.2.3: Level of Formal Education

Education is a process that provides skills and knowledge and in relation to this study, it is essential in developing a required attitude toward safety precautions, which plays a role in making decisions while riding. Regarding educational attainment, more than half of the respondents (59.3%) had completed at least high school. This implies that a sizable proportion of survey participants were literate enough to express informed opinions on the subject under study. In the survey, 14% of respondents stated that they have other forms of training than those provided in figure 3 below.

Figure 3: Level of Formal Education



Source: Field Data

The training included certificates in welding, mechanics, computer packages, National Youth Service training and disk jockey training. Based on the data shared in figure 3, the most significant

percentage of riders in the commercial motorcycle industry are those who have completed secondary school and those that completed primary school education without further education or training. Therefore, based on the deductions in figure 3, this study identifies that individuals that have a university or diploma education have a higher likelihood of finding employment elsewhere and not in the commercial motorcycle sector as riders.

4.2.3.1 Relationship Between Rider Level of Formal Education and Occurrence of Rider Crashes

The level of formal education of riders is crucial since it is linked to their understanding of road safety rules and regulations (Sufiyan, 2012). Using a base scenario of a diploma and university education, the study findings show that riders with less than a diploma are significantly associated with rider crashes. Although most of the respondents were literate, educational levels of the participants who had not gone beyond the primary education level may impact their understanding of motorbike safety, raising their chances of being involved in a boda boda crash.

A cross-tabulation provided in table 6 is used to determine whether the level of education of riders impacts rider crashes, showing that a majority (84%) of riders who had been involved in crashes had either secondary school or primary school education level.

Table 6: A Crosstabulation of Level of Education of Riders by Rider Crashes

Count		Level_of_formal_education						Total
		Primary education (complete)	Primary education (incomplete)	Secondary education (complete)	Secondary education (incomplete)	University	Tertiary education/Diploma	
Have you ever been involved in a crash?	Yes	10	3	28	6	2	7	56
	No	14	1	9	1	2	3	30
Total		24	4	37	7	4	10	86

Source: Field Data

The finding is supported by the work of Gboyega et al. (2012) who examined the factors adding to the high numbers of motorcycle accidents in Nigeria. According to their finding when considering formal education, those who have dropped out of school or without formal education have high levels of ignorance as most cannot interpret road traffic signs or regulations. A scholar, Nyatundo (2014), also argues that the likelihood that motorcycle riders will be more concerned with their safety increases as the number of educated individuals rises. However, in table 4, there is a high rate of crashes among individuals who have completed secondary education, which contradicts the argument by Gboyega et al. (2012) regarding the importance of formal education and motorcycle accidents. The current study shows that formal education has no mutual relationship with the crashes even though there was a small sample size of the university-level riders attributed to the low rates of crashes in the group. Instead of education level, it has been identified that having comprehensive and structured training on traffic regulations and codes can decrease motorcycle accidents (Singoro, Wakhungu, & Obiri, 2016).

These findings show evidence that this occupation attracts primarily those with secondary education. Research carried out by Njiru (2014) in Runyenjes municipality in Kenya show that even though riders had completed high school, they were unemployable in the formal sector because of a lack of professional skills and knowledge. The scholar further argues that the riders are pushed to engage in any entrepreneurial activity, such as the boda boda riding business, to ensure their livelihoods. A boda boda operator illustrated the opportunity offered by the sector:

"Many people find it simple to become a rider because there are no severe formal qualifications to get into the boda boda industry. All a rider need is access to a motorcycle by either buying, hiring or working on commission, with a couple of hours or a day of training on basic motorcycle rider skills. The next day, you are in good business ferrying passengers and goods for a fee. Due to this, many people have found it more appealing and simpler to join the sub-sector."

Key informants in this study also mentioned unemployment as a significant cause of the region's rapid growth of boda bodas. The base commander at Nkubu traffic police station reiterated that boda bodas keep a considerable number of unemployed youths in the locale in business and provides a reliable source of income for their families. The participants of the study also agree with the argument as seen in table 5, where more than half of the participants strongly agreed (42%) and agreed (40.7%) with the statement that a majority of the riders have formal education but are unemployed, which leads them to commercial motorcycle sector as a source of employment and income. Only 2.3% disagreed with the statement. The results also concur with those of Gboyega et al. (2012), who observes that unemployment plays a large part in the influx of people to the commercial motorcycle sector.

4.2.4 Marital Status

Marital status is essential when considering the financial obligations that influence dangerous practices by riders and the motivation to be involved in safe practices for the rider. The key areas regarding marital status observed in the study are single, married, separated, divorced, or widowed. Hence, the assumption is that married people are obligated to get more income to meet the people's needs the support in the households, which exposes them to dangerous behavior such as speeding. The other argument is that marital status determines how safe the rider is, and married individuals are considered safe riders.

4.2.4.1 Relationship Between Marital Status of Rider and Occurrence of Rider Crashes

This study findings show that most of the participants who are married (60.5%) were involved in more crashes at a frequency of 52 than the single riders (39.5%) who had a frequency of 34 as seen in table 7 below.

Various studies collaborate these findings that motorcycle rider crashes and the marital status of commercial motorbike users are remarkably correlated with one another. According to Nyachieo (2015), marital status may impact road safety. She argues that married riders may want to ensure they generate enough money to meet their family's needs. Such perspectives may lead to adopting poor riding habits such as overloading and speeding to achieve personal and family objectives. On the other hand, Tumwesigye, Atuyambe, and Kobusingye (2016) focus on the factors linked with injuries occurring in commercial motorbikes in Kampala, Uganda, where the researchers note that being single increases risks behavior, which can be observed by breaking traffic rules, taking alcohol and riding at high speed.

Table 7: Marital Status of Riders

		Are you married?			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	52	60.5	60.5	60.5
	No	34	39.5	39.5	100.0
	Total	86	100.0	100.0	

Source: Field Data

Another 59.3% of the study population also recorded having children, which translates to family obligations. Still, a significant number are also single, which shows that the commercial motorcycle sector consists of young individuals with mixed backgrounds. Therefore, the motivation to join the commercial motorcycle sector is not mutually associated with the marital status of the rider.

Based on cross-tabulation in table 8 below on rider marital status by crashes, there is no notable correlation between the two variables.

Table 8: Cross-tabulation of rider marital status by crashes.

		Have you ever been involved in a crash? * Are you married? Crosstabulation		
Count		Are you married?		Total
		Yes	No	
Have you ever been involved in a crash?	Yes	32	24	56
	No	20	10	30
Total		52	34	86

Source: Field Data

Married riders who had been involved in rider crashes comprised 57.1% of all riders, while that of unmarried riders was 42.9%. Hence, in this study marital status does not have a mutual relationship with motorcycle accidents.

4.2.5 Income Per Day

The main reason riders join the commercial motorcycle sector is to make a living through income. Income is essential because most boda boda users are usually low-income earners (Tumwesigye et al., 2016). Such findings show that low socioeconomic status is a risk of being involved in motorcycle crashes because more people in the sector are low-income earners. Income categorization was used based on the understanding that it is considered a crucial factor in safety compliance. According to the findings displayed in Table 9, boda boda riders in the region earn an average of Ksh.564 daily. Besides, KIIs and FGD discussions noted that riders made higher earnings on market days when more people needed transportation to and from the market. It was also pointed out that riders made the lowest earnings on Sunday. They linked this to low economic activity since many locals close their businesses to rest and attend worship.

Table 9: Average income per day.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Average_income_per_day	86	200	1000	563.95	235.977
Valid N (listwise)	86				

Source: Field Data

The survey identified that 47.7% of the respondents recorded having other income sources with an average income of Ksh 380 per day. These range from running retail shops, shop assistants, small-

scale farming, car wash business, manual laborers and mechanics. In table 5, the findings on motorcycle ownership indicate that a majority (42.8%) of the participants disagreed and strongly disagreed with motorcycle ownership, with a significant percentage of 40.3% agreeing with the statement and another 18.6% of the riders being unsure of this statement. A large percentage of the sample (81.4%) agreed and strongly agreed that a majority of the riders do not own motorcycles, which makes them work extra hard to meet the owners' targets so that they can have some cash left as their income. In the literature review, Kitara (2011) also noted that the increasing competitiveness in the commercial motorcycle industry is also blamed for the crashes, which shows that motorbike user must make more trips daily to stay in business, which creates not only weariness but also dangerous driving and, as a result, crashes.

As shared by the feedback highlighted in table 10 below (KII 2,4 5, 6, 8, 9,10), it was gathered that riders who owned their motorcyrcles tend to make more money as compared to non-owners. The reason why non-owners make less is because they have to make money to meet daily targets for owners before making their incomes.

Table 10: Average Income Per Day.

Date	Interviewee	Quotation
09/09/2021	KII 2	<i>Usually, we have to pay the boss an agreed amount of money, which means I start earning after I have made what the boss wants. As a result, I have to work quickly.</i>
09/09/2021	KII 4	<i>The faster you work, the more money you make, and the quicker you make money the motorcycle owner needs. Customer-relation skills also play a critical role in maintaining loyal customers.</i>
06/09/2021	KII 5	<i>Meeting the targets is easy for a person who owns a motorcycle, and no deductions are made to pay another party at the end of the day.</i>
06/09/2021	KII 6	<i>I intend to save enough money so that I can buy my motorcycle because that way, I can make more income daily. As a result, I also have to strategize by being at crowded pick-up stages with many customers.</i>

11/09/2021	KII 8	<i>There are many expenses and deductions when under contract by the motorcycle owner, including fuel, maintenance and paying the owner daily</i>
11/09/2021	KII 9	<i>I always ensure that I have made as many rounds as possible and work for more daily hours to make enough money to sustain myself and pay the motorcycle owner.</i>
12/09/2021	KII 10	<i>If a person owns a motorcycle, he has the luxury of doing lesser daily rounds but still makes more income than a person employed, especially during market days when there are more clients.</i>

Source: Field Data

Other factors, regardless of boda-boda ownership status, were also said to influence the daily income of all riders. For instance, during the market day the demand was high, which meant more trips for the riders translating to more income. The more the number of customers transported per day the more the income earned by the riders. Distance traveled is also another factor with long distances bringing higher fees, which can bring in more income. Fuel prices are other factors to consider because high prices can eat into the rider's income and it is important to consider the fuel price when charging the customers. Riders who work for longer hours can also earn more income. Similarly, the ones who have better customer-relation skills can attract more customers, which increases their earnings. Another factor that is crucial is the location of pick-up stage with stages in towns with many people being more lucrative.

4.2.5.1 Relationship Between Rider Income and Occurrence of Rider Crashes

As applied to motorcycle safety in this study, the perspective of the social status approach contends that boda boda riders cause crashes as they struggle to make a living in a harsh economic environment. Nyachieo (2015) argues that riders fall into a specific social group because of their relationship to the means of production. The riders may not be ready in terms of skills (trained to ride) to operate because they do not have enough money to pay for the proper training.

In addition, literature has it that the number of boda boda business owners in Kenya is increasing daily (Olawo et al., 2014), giving many young people who are unemployed jobs. Due to this, the increasing level of competition in the market has also been cited as a contributing factor in crashes. As a result, motorbike operators must make more trips each day to be profitable, leading to drowsy and risky driving and crashes (Kitara, 2011).

As illustrated in the cross-tabulation table 11 below, there is a remarkable correlation between riders' income and the occurrence of crashes. The study gathered that 70% of riders involved in crashes earn below the average daily income while 30% earn above the average daily income. Kenya National Bureau of Statistics (KNBS) (2020) highlight that the informal industry earnings that includes that of motorcycles can have lower incomes in the rural parts than in the urban parts. Therefore, the findings that show the percentage of riders earning above the average daily income might be higher when compared with the average daily incomes of South Imenti.

Table 11: Crosstabulation of Rider Income by Rider Crashes

Average_income_per_day * Have you ever been involved in a crash? Crosstabulation

Count

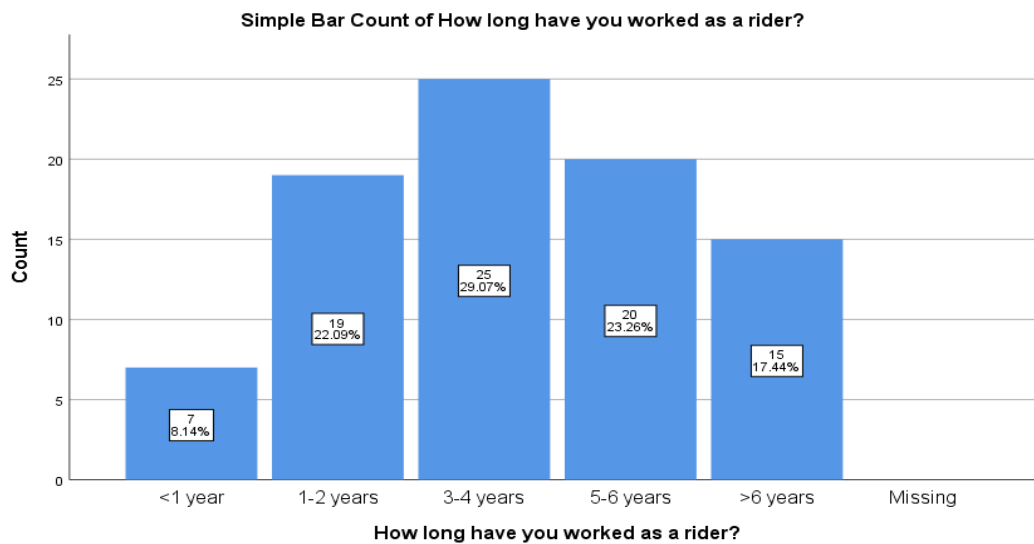
		Have you ever been involved in a crash?		Total
		Yes	No	
Average_income_per_day	200	1	2	3
	300	9	4	13
	400	7	3	10
	500	22	10	32
	600	2	0	2
	700	4	3	7
	750	2	0	2
	800	3	0	3
	1000	6	8	14
Total	56	30	86	

Source: Field Data

4.2.6 Years Worked as A Rider

The sum of years an individual is a rider can be associated with his expertise at the job, which can lead to fewer accidents or crashes. Hence, the years worked as a rider can be equated to experience, which accrues with the amount of time consistently spent on the job. The data set in figure 4 illustrates that most of the riders were between 3 to 4 years (29.1%) experience, but those between 5 to 6 years (23.3%) and 1 to 2 years (22.1%).

Figure 4: Years worked as a rider



Source: Field data.

4.2.6.1 Relationship Between Years Worked as A Rider and Occurrence of Rider Crashes

A majority of operators (74.42%) had nearly the same amount of boda boda experience ranging between 1-6 years, with 1-2 years in operation accounting for 22.09%, 3-4 years accounting for the highest number at 29.07%- and 5-6-years accounting for 23.26%. Only a small percentage of 17.44% have rider experience of more than six years. A few riders (8.14%) were also recorded to have less than one-year of rider experience. These results align with study trends in different parts of the country. For example, a survey of Kisumu city by Odhiambo (2018) indicates that a large proportion of his participants had been in the boda boda sector for a period of about 1-4 years.

The short operation time of riders is not statistically significant and, therefore, cannot sufficiently be used to reach any legitimate conclusions about its effects on rider crashes. This short operation time can be explained by several reasons, including the sector being significantly composed of young people out of school, as discussed in the sub section on the age of riders. Key informants added that due to unemployment, the venture is viewed as a temporary source of income as workers hope to get better opportunities in other sectors, including joining training and other learning institutions.

Nyachieo (2015) also points out another reason for the short operation time: boda boda for commercial and public transportation in Kenya is relatively new. The majority got into the boda boda for public transport when the government removed the tax on motorcycles under 250cc in 2008 as part of a government agenda to promote public transportation and provide work opportunities for the many unemployed youth. Such findings could explain why Kenyan motorbike operators have limited experience, as most riders entered the boda boda sector after 2008. However, there is no current data on the number of individuals that are leaving the sector, which needs to be considered when determining the operation time.

4.2.7 Motorcycle ownership.

The variable ownership was included in this study based on the assumption that owners are less likely than non-owners to be involved in rider crashes. Based on the above assumption, one can argue that most of the accidents or crashes will be associated with riders that are non-owners of the motorcycle. Regarding motorcycle taxi ownership, 53.5% of motorcycle riders said they were riding their motorcycles, while 46.5% were non-owners, as illustrated in table 12 below.

Table 12: Motorcycle Ownership

		Do you own a motorcycle?			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	46	53.5	53.5	53.5
	No	40	46.5	46.5	100.0
	Total	86	100.0	100.0	

Source: Field Data

Table 5 shows that the riders who own motorcycles are more likely to be careful than those who work on commission or hire, which translates to lower rates of crashes based on the participants' feedback. For instance, the data demonstrated that 45.3% strongly agreed and 36% agreed with the above-mentioned statement. It was also determined that 34.9% strongly agreed that riders are involved in crashes because of over-speeding and overloading as they strive to meet their daily targets, while 47.7% also agreed with this statement. Gboyega et al. (2012) also identified risky practices such as being in a hurry or aggressive increase the likelihood of accidents in the commercial motorcycle sector.

Since commercial motorcycle or boda boda business is considered informal, the issue of contracts is important. Figure 5 illustrates the terms of operation for non-owners.

Figure 5: Terms of Operation for Non-Owners



Source: Field Data

In figure 5, 46.5% of non-owners said they were operating motorcycles that were either rented, on contract/agreement, on a commission basis or as squad riders. Of that number, 18 riders were operating on contract/agreement, with 11 working on a weekly contract and 7 on a daily contract. Some of the contracts were verbal, while others had written documents. One rider was operating on a commission basis, 8 hired motorcycles at a rate of ksh.300 per day and 13 were squad riders (squad riders are riders who do not have motorcycles and therefore borrow from other riders or act relievers after which they share their earnings with the owner). The contracts had no warranties, and usually, if the rider did not meet the set targets, the motorcycle was taken away. While examining the pros and cons of Kenya's informal economic activity, Ronald Hope Sr (2014) observes that the labor contracts in the informal sector do not come with any warranties. Therefore, the leading assurance for the riders is when they meet the set targets agreed upon by the owner. Those for rent and contract/agreement were hired at an agreed rate between the owner and the rider. The agreement entailed the amount of money to be paid to the owner and the frequency of the payment. The study gathered that most contracts/agreements were either weekly or daily. Riders operating on a commission basis earned a commission of between Ksh 50 to 100 shillings on every Ksh 300 shilling earned.

The primary reason the motorcycle is confiscated is that the owner believes that the rider might not be able to meet the next day's targets because they would be double what was needed the day before. The rider has less power in such contracts than the owner. One of the significant issues that Bigsten, Kimuyu, and Lundvall (2004) have identified regarding the informal business is the enforcement of contracts that makes individuals in the sector not use formal avenues of conflict resolution because of the undefined legal status and in the event of a breached contract the dealings are often so small that the time and monetary expenses linked with legal actions would not be defensible in any case. The researchers argue that most entrepreneurs pick trading approaches that lower the risk of contract violations, including information-sharing practices where there are recommendations from a joint acquaintance. The same can be said for the boda boda business; the individuals that had referrals are the ones that have better relationships with the owners than those that have sought the contracts without any recommendations. For instance, the squad riders, on the other hand, did not have motorcycles with them. They were situated at the different motorcycle stations and borrowed motorcycles from other riders for a fee whenever they got customers. Such riders usually have weekly agreements, and the individual giving them the bike can take it at any point without consulting the squad rider. In terms of medical benefits, the insurance covers the rider based on the type of cover the motorcycle owner selected. Presently, there is no mandate for boda boda sector to have insurance for passengers with motorcycle owners not having cover to cater for injuries or death that emerge from an accident (Mutuia, 2022).

4.2.7.1 Relationship Between Ownership and Occurrence of Rider Crashes

A Cross tabulation in table 13 below on motorcycle ownership by rider crashes shows that more than half (53.6%) of the riders involved in rider accidents were non-owners, whereas owners

accounted for 46.4%. Hence, the study shows that motorcycle ownership and crashes have a mutual relationship, with riders that own the motorcycles having a lower likelihood of crashing than those under a contractor.

Literature contends that most boda-boda-related crashes are caused by riders who do not own motorcycles. Hagan et al.; (2021), in an investigation conducted in Ghana, states that Motorcyclists who did not own motorcycles were less likely to follow traffic laws. On the other hand, owners are more inclined to be cautious when riding the motorcycle because it tends to be their sole source of income, which they rely on to sustain their livelihoods and families; hence, it should be secured. In addition, several riders take out loans to acquire their motorcycles and are responsible for repaying the loan. As a result, persons who do not own motorcycles may not be concerned about being accountable for repairing and maintaining them, which may lead to their mishandling or failing to follow safety rules. (Hagan et al., 2021).

According to KII 2, 3,5 and 9, non-owners may be pushed into crashes due to overloading and over speeding to meet the set targets by owners and still make an income for themselves. It is, therefore, safe to say that ownership has an impact on boda-boda crashes. Johnson (2012) also reports that excessive speeding is a high cause of motorcycle crashes in research that uses the commercial motorcyclists to examine the prevalence and pattern of road traffic accidents in a southern Nigerian city. The survey also identified that the individuals who owned motorcycles were 68%, making a majority of the riders. Even though the motorcycle owners had no contract or agreement, they also had targets that were much more flexible than those under contract with the motorcycle owner. Hence, in the survey, the riders under a contract with the motorcycle owner

were 98.8% of the respondents, which means the same percentage of riders have daily targets. In comparison, one (1.2%) of the motorcycle owners did not have any set targets, and 88.4% of the respondents confirmed they could meet their daily targets. In comparison, 10.5% confirmed that they cannot always meet their targets and mitigate this by putting in extra work hours in the succeeding days. Similar findings have been shared by Olvera et al. (2016) where riders have to work extensively to meet targets set in the contract with the owner.

Table 13: Crosstabulation of Motorcycle Ownership by Rider Crashes

Have you ever been involved in a crash? * Do you own a motorcycle? Crosstabulation

Count

		Do you own a motorcycle?		Total
		Yes	No	
Have you ever been involved in a crash?	Yes	26	30	56
	No	20	10	30
Total		46	40	86

Source: Field Data

4.2.8: Rider Training

Formal rider training and ownership of a riding license create the impression that a motorbike operator is skilled in their riding abilities (Owour, 2018). Hence, those that have formal training can be identified as skilled riders. The goal was to determine the extent of formal rider training among commercial motorbike riders in the Imenti South sub-county and how it affected motorcycle safety.

As illustrated in table 14, the study shows that 55.8% of riders had received formal training while 44.2% had undergone informal training. The data further shows that 95% of the riders who had received informal rider training cited a lack of adequate financing to facilitate their formal training,

4% attributed their lack of formal rider training to inaccessibility of formal rider training institutions, and 1% indicated that they did not see the need for training as they only operate when they have access to boda bodas such as squad riders.

Table 14: Nature of Training Undertaken

nature of training undertaken

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Formal Training	48	55.8	55.8	55.8
	informal Training	38	44.2	44.2	100.0
	Total	86	100.0	100.0	

Source: Field Data

Based on the focus of this study, the data shows that 44.2% of the informally trained are susceptible to crashes because of poor skills associated with inadequate training. Therefore, absence of formal training can be ascribed to the crashes in the commercial motorcycle sector in South Imenti. Cost is the main reason the riders receive informal training because they cannot afford the payments for formal training. As a result, riders that underwent informal rider training received their training from fellow riders for a lower rate of between Kshs 100 to Kshs 500 than those who attended formal rider training institutions, which charge between Kshs 7,000 to Kshs 8,000 for two or three weeks. In addition to other costs that include: National Transport and Safety Authority (NTSA) fee of Ksh 3,000 and Mock book fee of Kshs 350.

Data gathered from key informants (KII 1,3,4,5,6,7,10,11) and focused group discussions also linked the lack of formal rider training to costs of training being expensive for riders. They proposed that formal rider training institutions that are approved by the NTSA need to subsidize

their training fees so that most riders can receive competent training. The finding from the FGD and key informants revealed that the informal training was directed to a few motorcycle users already in the business, composed of both those that had undergone formal and informal training. Survey data indicates that this training was sometimes done in a few hours to a few days, and the training cost could be as low as Ksh 100. These findings are illustrated in table 15 below.

Table 15: Period Taken for Informal Training

For informal training, how long was the training period?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hours	4	4.7	4.7	4.7
	Days	31	36.0	36.5	41.2
	Months	3	3.5	3.5	44.7
	N.A	47	54.7	55.3	100.0
	Total	85	98.8	100.0	
Missing	System	1	1.2		
Total		86	100.0		

Source: Field Data

Only 3.5% of the riders cited training for more than a month. The following is what one rider had to say:

"For an hour of informal training, we pay as little as Kshs 50-100."

Salako, Abiodun, and Sholeye (2013) conducted a study to examine the risk habits for road traffic crashes and serious crash injuries among boda boda users and identified that the absence of formal training is a significant risk factor for crashes. The findings of this study, as shown in the cross-tabulation in table 16 below, found that 26 (46.4%) of the motorcycle riders who had undergone formal rider training were involved in traffic crashes while riding, compared to a higher number of 30 (53.6%) of motorcycle taxi riders with no formal training skills. Gboyega et al. (2012) also affirm that inadequate training is an essential factor in commercial motorcycle

crashes in Nigeria. Therefore, the riders that have not received formal training are at greater risk of causing accidents than those that have received training.

Table 16: Crosstabulation of Formal Rider Training by Rider Crashes

If yes, how many times? * nature of training undertaken
Crosstabulation

Count

		nature of training undertaken		Total
		Formal Training	informal Training	
If yes, how many times?	1	6	10	16
	2	13	13	26
	3	4	4	8
	4	3	3	6
	N.A	21	8	29
Total		47	38	85

Source: Field Data

However, data from key informants and FGDs revealed that several riders who had undergone formal rider training were equally involved in rider crashes as those who had undergone rider training. This could be linked to different reasons: that the motorcycle taxi riding instructors are unqualified, that the ones with valid licenses are overconfident, resulting in carelessness, or the flagrant disregarding traffic laws while riding. It's also likely that the licenses were obtained fraudulently. For instance, Tumwesigye et al. (2016), while assessing issues associated with harms among commercial motorcyclists, argue that police strategies to examine the rising competency of commercial motorcycle riders in Kampala, Uganda, have stimulated the rush for counterfeit licenses. In this study, some respondents confirmed that, indeed, a majority of riders did not legally acquire their rider licenses, and they, therefore, did not undergo formal rider training. Others cited unqualified instructors at the formal rider training institutions, and they, therefore, did not cover the approved rider training curriculum. The following is what a respondent had to say:

"I attended motorcycle driving school for 3 days, and this only covered a few classroom theories and a few hours of practical training. The training instructors were very rude and unbothered. After the 3 days, one of the instructors approached us and offered that with a small price of Ksh 4000, they would have our approvals by NTSA, and we would get our rider licenses without having to do a test. This was a good deal to those of us who had to struggle to come to raise money for rider training."

4.2.9 Motorcycle Safety Knowledge

Knowledge on motorcycle safety is an important factor because it is crucial to have the knowledge for crash prevention, which improves the safety of the riders. This study aimed to assess how well boda boda riders in the Imenti South sub-county understood motorcycle safety because it directly impacts rider crashes. The passengers number transported at a time, the mean speed of a boda boda motorcycle, the use of protective gear such as helmets, the number of helmets a operator possesses, passenger helmet use, and the frequency of helmet use by riders is among some of the factors to examine.

According to the study findings illustrated in table 17 below, a significant percentage of boda boda riders (69.5%) are aware of road safety rules and guidelines, the use of safety gears such as helmets (100%), the acquisition of a license (100%), observing speed limits (60.4%), carrying only one passenger at a time (54.5%), proper signaling (51%), observing lane discipline (60.4%), and avoiding riding while intoxicated (60.4%).

The viewpoints shared in table 17, however, differed from what motorcyclists do, in that although majority of the riders were aware of the legal safety requirements, they willfully ignored them.

Table 17: Summary Table for Assessing Rider Assumptions on Motorcycle Safety**Knowledge and Training**

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Majority of riders have not undergone formal rider training.	45.3%	50.0%	1.2%	2.3%	1.2%
Lack of rider training is a major contributor of bodaboda related crashes	40.7%	38.4%	5.8%	10.5%	3.5%
Majority of riders do not have rider licenses and are therefore ignorant of road traffic rules.	29.1%	33.7%	4.7%	30.2%	2.3%
Majority of riders do not have rider licenses and are therefore ignorant of compliance requirements for riders	26.7%	30.2%	8.1%	26.7%	8.1%
Majority of riders do not own motorcycle safety gears such as helmets	24.4%	33.7%	26.7%	11.6%	3.5% ²
Majority of riders own motorcycle safety gears but do not use them	23.3%	40.7%	24.4%	9.3%	2.3%
Majority of riders tend to overload in a bid to meet targets	40.75	46.5%	8.1%	3.5%	1.2%
Riders experience pressure in reaching targets	30.2%	54.7%	14.0%	1.2%	
Majority of riders carry more than one passenger at a time	53.5%	43.0%	2.3%	1.2%	

Source: Field Data

Table 18 demonstrates how riders are not adhering to safety practices that can mitigate and even eliminate crashes by commercial motorcycle riders. These disparities, awareness of road safety rules and regulations and oblivious disregard for them suggest a lack of understanding of their importance in avoiding or minimizing the severity of motorcycle crashes as well as negligence or recklessness by the riders. Studies in other parts of the country also collaborate with these findings.

A study by Njiru (2014) in Runyenjes municipality found that many riders were aware of the legal safety provisions, yet they obliviously disregarded them.

From table 18, the highest violation that is observed and can lead to crashes is not wearing a reflector jacket at 80%. According to a study by Solah et al. (2013) on the prevalence study of motorcycle lighting and conspicuity in Malaysia, for riders to increase their visibility while on a motorcycle, reflective and bright clothing are cheap interventions that can significantly decrease motorcycle crash-related injuries and deaths.

Table 18: Summary of Practices Observed in The Motorcycle Riders in The Study

Description	Percentage
Intoxicated	26.7%
Sober	73.3%
Good customer relations	67.5%
Poor customer relations	32.5 %
Appeared tired	53.3%
Appeared well rested	46.7%
Appeared roadworthy	60.4%
Appeared unroadworthy	39.9%
Two helmets	16.7%
One helmet	49.3%
No helmets	34%
Reflector jackets on	20%
No reflector jackets	80%
Over speeding	51%
Carrying more than one passenger	56.7%
Not observing lane discipline	59.5%
Careless overtaking	40%

Source: Field Data

However, the absence of motorcycle safety familiarity may be attributed to nonexistence of or insufficient training. The results are in line with the research by Fagnant and Kockelman (2015) that examined motorcycle use in the United States with an emphasis on safety perspectives, crash

experience and countermeasures. In the study, the helmet-use prediction showed that riders who acquired formal motorcycle training are expected to wear a helmet.

4. 3 Motorcycle Crashes in Imenti South Sub-County

It is important to note that motorcycle crashes are increasingly becoming a leading cause of fatalities and disability in emerging countries. Despite the benefits of boda boda transportation, their safety and traffic crashes have become a serious concern in South Imenti region.

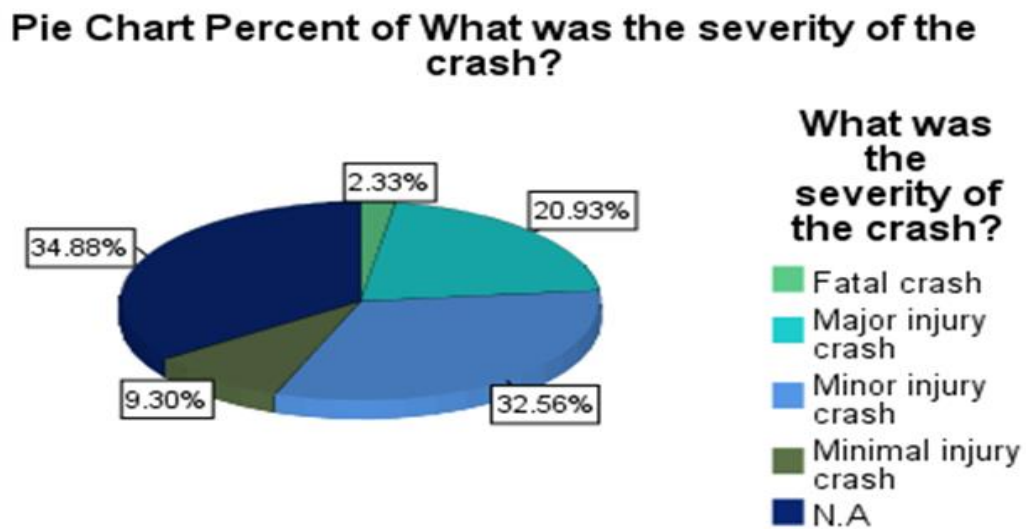
The occurrence of road traffic crashes among boda boda operators in the Imenti south sub-county was investigated in this study. The findings highlight that 65.1% of the sample were part of rider crashes. There are other factors that the study has established in section 4.3 that contribute to the crashes. For instance, the issue of sex has emerged, with males being more probable to be part of the crashes because they form the majority of commercial motorcycle riders. There is also the attribute of age, where most of the participants' age in the study ranged from 18-35 years old. Education level is also a contributing factor due to the lack of employment opportunities for persons with a secondary level education and below. Therefore, most individuals with such a level of education have contributed to an increase in riders in the commercial motorcycle sector.

In terms of marital status, there are conflicting findings, with those who are married being reckless because they are aiming at generating enough money to meet their family's needs. Other literature contend that single riders are involved in risky behavior, including breaking traffic rules, taking alcohol, and riding high speed. Income, ownership of motorcycles and crashes also have a mutual relationship. Income brings about competition in the market to make more income, with the owners of the motorcycles being less competitive than those contracted. Therefore, in pursuit of higher

income, the non-owners of motorcycles are exposed to crash risks. Individuals who lack formal training are also at higher risk of being involved in crashes.

Of the riders involved in crashes, 2.33% reported having been involved in fatal crashes, 20.93% in major injury crashes, 32.56% in minor injury crashes and 9.30% in minimal injury crashes as shown in figure 6 below.

Figure 6: Severity of crashes



Source: Field data.

Asked whether they knew any riders who had been involved in crashes, most of the respondents confirmed that riders had been involved in crashes and cited several reasons for these crashes. Evidence in table 19 below shows that the leading causes of crashes were over speeding (84.3%), followed by overloading (70%), and ignorance of road safety rules and regulations and lack of motorcycle safety knowledge at 78.6%, and lack of formal rider training accounted for 80%. Table 19.

Table 19: Reasons for Crashes

Reason for Crash	Percentage of Participants
Over speeding	84.3%
Overloading	70%
Ignorance of road safety rules, regulations and lack of motorcycle safety knowledge	78.6%
Lack of formal rider training	80%
Riding without safety gears such as helmets	65.7%
Riding under the influence of alcohol and drugs	57.1%.
Poor road infrastructure	61.4%
Failure to observe lane discipline	67.1%
Mechanical problems of the motorcycle	41.4%
Failure to observe road signs	62.9%
Reckless overtaking	32.9%
Poor signaling	54.2%
Riding between an active traffic	28.6%

Source: Field data.

Previous studies also highlight some of these stated causes of crashes. According to Clarke et al. (2004), driving under the influence of alcohol and reckless overtaking contribute to rider crashes. Poor road infrastructure, overloading and overtaking, and lack of formal rider training are other factors that the literature points out. Even though the purpose of this study was not to determine the exact causes of crashes, a variety of socio-demographic and economic factors influence human conduct and actions that are primarily blamed for traffic crashes. For example, Tumwesigye et al.

(2016) state that most boda boda riders are low-income earners. Such issues associated with low-income have led to the riders not affording formal training. Similarly, Nyachieo (2015) highlighted in her study in Kisumu that riders receive informal training at a lower cost of about Ksh 50 to 200 compared to formal training, which cost about 6,000 and 9,000 Kshs for two or three weeks. Such socio-demographic and economic dynamics have led to the causes of crashes that include ignorance of road safety rules and regulations and a lack of motorcycle safety knowledge associated with informal training.

Table 20 below presents data on the knowledge of riders involved in crashes. According to the 2022 Economic Survey Report (KNBS,2022), the number of motorcycle accident casualties in Kenya rose by 13.6 per cent from 3,818 in 2020 to 4,336 in 2021.

Table 20: Knowledge of Riders Involved in Crashes

Do you know of any riders who have been involved in crashes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	70	81.4	81.4	81.4
	No	16	18.6	18.6	100.0
	Total	86	100.0	100.0	

Source: Field Data

Data gathered through FGD revealed that the sub-county had lost 3 young riders in boda boda crashes between 2020 and 2021. They noted that the impacts of boda boda crashes are not only felt by the riders as they trickle down to the riders' families, the healthcare system, and the economy.

They pointed out that the sub-county does not have enough hospital facilities or workforce to adequately care for boda boda riders involved in crashes. A chairman of one of the boda boda groups, had this to say:

"The hospitals in this sub-county do not have wards and facilities designated for patients involved in boda boda crashes. What they do is once a patient is brought in having been involved in a crash, they monitor the severity of the crash. Patients with minor to minimal injury crashes are given some first aid and recuperate at home. Those with major injury crash also receive first aid and are referred to the Meru County General Hospital". (KI 2, 09/09/2021)

The above information shows that mental and emotional strains exist for family members who have to live with the loss of loved ones or take care of loved ones who have been disabled by crashes and loss of incomes for families and the general economy. Some key informants (KI 3, 4, 7, 9) noted that other challenges that arise from boda boda crashes in the region include financial challenges due to the money needed to cover hospital bills for those involved in crashes, as noted below:

"One of the riders in my village was involved in a crash that left him with a major brain injury. He has been bedridden for the past year and has incurred a medical bill of Ksh 8 million for surgeries and medication. The community is still raising funds for his treatment". (KI 3, 09/09/2021).

Survey data, however, indicate that several mitigation measures could be applied to curb boda boda crashes. A majority of riders (72.1%) cited formal rider training. Purposeful formal training with competent trainers approved rider curriculums and required facilities to facilitate the training.

However, 65.9% noted a need to subsidize the cost of formal rider training to make it affordable for all riders and make the formal rider training institutions more accessible. Thus, formal training is an approach that can address the problem of road safety including reduction of crashes.

The riders involved in the study mentioned some key areas that require training. For example, 67.4% indicated that riders should avoid riding while intoxicated with alcohol and drugs, 69.3% mentioned that there is a need to improve and provide proper road infrastructure for riders, 70.4% indicated that riders should avoid overloading, while 68% called for the importance of creating awareness among young riders on the importance of compliance to road safety measures. These findings highlight the impact of training on motorcycle crashes. Furthermore, the findings reveal that most of the riders in the study know the areas that need to be addressed by training and campaigns that improve safety. The findings are also in line with other studies, for example using North-western Nigeria, Ahmad (2012) examined the attitude, knowledge, and compliance with safety protective devices among commercial motorcyclists. The findings showed that ensuring formal training, enforcement of the use of protective devices and vigorous enlightenment campaigns by relevant key authorities is crucial in reducing the prevalence of crashes and injuries among commercial motorcycle riders.

CHAPTER FIVE

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction.

This chapter summarizes, discusses, and draws conclusions of the study in line with the objectives. This research was conceptualized on the assumption that certain socio-demographic and economic factors influence the behavior and actions of boda boda riders, which in turn cause crashes. Based on the study's findings, the overarching point in the chapter is to demonstrate that there are socio-economic and demographic characteristics of motorcycle riders as well as training issues that contribute to motorcycle crashes in the South Imenti Sub-County. The chapter also includes recommendations for further research, policy and practice.

5.2 Summary findings.

The study's overall objective was to explore the relationship between motorcycle riders' socio-economic and demographic characteristics and the occurrence of motorcycle crashes in Imenti South Sub County. The study established a direct relationship between the attributes of the rider (individual) and crashes as stipulated in the Human Factors Theory. In the study, several socio-economic and demographic characteristics of riders that include the age, marital status, and income of riders that have a mutual relationship with the occurrence of crashes. Besides, the study also shows the absence of formal rider training and knowledge of motorcycle safety measures which has also been attributed to the crashes observed by commercial motorcycle riders in Imenti South Sub County.

The study adopted a descriptive survey design to study motorcycle riders' social, economic and demographic characteristics. It targeted 86 respondents from Imenti South Sub-County. The study

generated both qualitative and quantitative data. Tools used to collect data included a Survey questionnaire, Key Informant Interviews, Focus Group Discussion and Observation. Statistical Package for the Social Sciences (SPSS) software was used to analyze descriptive statistics using the socio-economic and demographic and formal rider training variables to identify the impacts on motorcycle crashes in South Imenti Sub- County. The findings from the descriptive statistics were provided in frequencies and cross-tabulations. Qualitative data was organized into various themes linked to socio-economic and demographic attributes for coding and analyzing. These themes have been discussed and are summarized in the following section.

5.2.1 Socio-economic and Demographic characteristics of riders.

The first specific objective was establishing motorcycle riders' socio-economic and demographic characteristics in the study site. To achieve this, the researcher interrogated the following rider's socio-economic and demographic characteristics: age, gender, marital status, education level, income, motorcycle ownership, formal rider training and knowledge of motorcycle safety measures.

The study found a gap in gender ratio among boda boda riders, which may be partly due to a gender-biased attitude among African populations that challenging work environments like those of motorcycle (boda-boda) riding are reserved for men (Owour, 2018). The study established that most riders were male youth between the ages of 18-35years. More than half of the respondents were married and with family obligations. The study also confirmed that most riders were literate, the highest number having secondary education, which is in sync with the Kenya literacy level. Riders made an average income that varied significantly, which shows that there is no standard income in the sector because of other factors such as ownership of the motorcycle. The study

shows that more than 50% of the riders owned their motorcycles, and a majority of the riders had undergone formal rider training and, to some extent, had some knowledge of motorcycle safety measures. Such findings show that a large number of the riders are at risk of crashes with evidence showing that some riders need training and knowledge of safety practices.

5.2.2 Relationship Between Socio-economic and Demographic Characteristics of Riders and Occurrence of Rider Crashes.

The study established a direct relationship between the of age of riders and occurrences of motorcycle crashes. It confirmed that young riders are more involved in crashes than their older counterparts. Evidence from the study shows that the bulk of the riders are young which literature reveals has substantial safety consequences. Lin et al. (2003) argue that young and male motorcycle riders have a higher predisposition for risky behaviors, and these behaviors have been linked to increased risks of crashes. Other studies (Fitzpatrick and O'Neill 2018) have concluded that many younger motorcycle riders lack a legal motorcycle license; findings further show that older riders are generally safe and responsible while the lack of adequate resources prevents young riders from obtaining protective equipment.

Regarding the sex of riders, the female respondents in the study were not enough to make any conclusions regarding the contribution of sex in the crashes. However, other studies have acknowledged that the sex of riders plays a crucial role in traffic crashes (Yagil, 1998).

The marital status of riders also has a direct link to rider crashes. In this study, married rider crashes comprised 14.3% more than unmarried rider crashes. Marital status may impact road safety because riders want to ensure they generate enough money to meet their family's needs. Even though being married can mean that riders were involved in poor riding habits to achieve personal

and family obligations, the poor habits can also be attributed to the young age that is associated with recklessness. Overloading and speeding are two risky riding of riders.

Regarding the education level of riders, the study established that even though most of the respondents were literate, the rate of crashes was still high for individuals with secondary education and above. Therefore, the educational level does not have a mutual relationship with motorcycle crashes because even the respondents with tertiary education were involved in crashes significantly. Most of the riders who had been involved in crashes had a high school level of education and below. Such outcomes demonstrate how training plays a substantial role in preventing crashes than the educational level of the riders.

With regards to formal rider training, the study noted that there was a direct link between formal rider training and rider crashes. A majority of the riders who had been involved in crashes had undergone informal rider training. The study, however, noted that some riders who had undergone formal rider training were equally involved in rider crashes as those who had undergone rider training. Such findings were explained by several factors: that the motorcycle taxi riding instructors were unqualified, that those with valid licenses were overconfident, resulting in laxity, or that they flagrantly disregarded traffic laws while on the road while others obtained their riding licenses fraudulently.

The study also established a link between rider income and crashes. The study findings show that 70% (39/56) of riders involved in crashes earn below the average daily income. However, it was established that riders who owned their motorcycles tended to make more money than non-owners.

This is because they have to make money to meet daily targets for owners before making their incomes. Other factors, regardless of boda-boda ownership status, were also said to influence the daily income of all riders. For example, some days of the week are market days and busier. Thus, more income, number of customers transported in a day, distance travelled, fuel prices, number of hours worked in a day, customer-relation skills, and location of pick-up stage, such as stages in crowded areas, are more lucrative among these factors.

Motorcycle ownership consequently impacts rider crashes, but the difference is not big when comparing motorcycle owners' and non-owners' crashes. In the findings, a cross-tabulation of motorcycle ownership by rider crashes confirms that more than half (53.6%) of the riders were involved in rider crashes. However, the non-owners accounted for 46.4%, which is still a significant figure. Hence, the issue of crashes can be attributed to individual attributes and not necessarily the owners of the motorcycle. Even though literature that includes a study by Hagan et al. (2021) contends that most boda-boda-related crashes are caused by riders who do not own motorcycles, the current study does not support such findings.

With regards to formal rider training, the study noted that there was a direct link between formal rider training and rider crashes. A majority of the riders who had been involved in crashes had undergone informal rider training. The study, however, noted that several riders who had undergone formal rider training were equally involved in rider crashes as those who had undergone rider training.

In terms of motorcycle safety measures awareness, the study established that the majority were knowledgeable. These viewpoints, however, differed from what motorcyclists do. Observations made by the researcher and information from key informants and FGD also highlight that many riders are aware of some of the rider safety measures and provisions. Yet, they obviously choose to disregard them, which increases their chances of being involved in crashes. These disparities, awareness of road safety rules and regulations and oblivious disregard for them suggest a lack of understanding of their importance in avoiding or minimizing the severity of motorcycle crashes. However, the lack of motorcycle safety knowledge may be attributed to a lack of or inadequate rider training.

Regarding the implications of rider crashes on the households in South Imenti Sub-County, the study findings revealed that rider crashes rob households of income in the case of fatal crashes. Mental and emotional strains for family members who have to live with the loss of loved ones or take care of loved ones who have been disabled by crashes, as well as financial challenges due to money needed to cover hospital bills for those involved in crashes.

5.3 Conclusion.

Based on the research findings and summary, the following conclusions are made on the effects of rider socioeconomic and demographic characteristics and motorcycle crashes: That age, marital status, the income of rider, as well as formal rider training and knowledge of motorcycle safety measures influence rider crashes. Traffic crashes are mostly the result of human behavior and actions, which are influenced by above named factors. Ferrel Theory (Human Factor Theory of Accident Causation) identifies three common causes of crashes: incompatibility, overloading, and inappropriate activity. The study findings identified all the three causes of crashes as among the

common rider practices within the different socio-economic and demographic variables studied. However, the study could not identify any linkage between the sex of the rider because majority of the participants were male. However, education level and motorcycle ownership were mutually linked with rider crashes where lower education level can compromise the understanding of safety while the riders that own motorcycles had lower crashes. Education level can be linked to the human factor theory of accident causation school of thought that attributes the occurrence of crashes to human error such as improper activity where improper activity has been linked factors such as lack of knowledge of properly performing the action.

The study also concludes that as much as some riders had undergone formal rider training, they were equally involved in rider crashes as those who have undergone informal rider training that can be attributed to the use of unqualified instructors. The informally trained are also prone to crashes because they have not gone through adequate training with qualified instructors. This finding is linked to several factors, which include the motorcycle taxi riding instructors being unqualified, those with valid licenses were overconfident, resulting in laxity, or they flagrantly disregarded traffic laws while on the road, while others could have obtained riding licenses fraudulently. Borrowing from the Human Factor Theory of Accident Causation, riders acts inappropriately either because they are unaware of how to act appropriately or because they are purposefully taking a risk. Due to the low perceived cost of an accident or low estimated likelihood of an accident, the rider might also act improperly.

5.4 Recommendations.

The study examined the effects of rider socio-economic and demographic characteristics on motorcycle crashes. The study found out that age, marital status, the income of rider, as well as education level, motorcycle ownership, formal rider training and knowledge of motorcycle safety measures influence rider crashes. However, because the majority of the participants were men, the study was unable to find any correlation between the rider's sex and the occurrence of rider crashes. The study recommends the following to reduce/and prevent the occurrence of rider crashes based on the findings: There is a need to ensure that riders get formal rider training at subsidized prices because most commercial motorcycle riders come from low-economic backgrounds, which can affect the affordability of training. Such an approach to training allows more riders to get adequate training that improves their skills and safety knowledge.

Stringent measures must be taken upon riders who do not adhere to road traffic rules and regulations. During the study, the sector was facing an enforcement issue that had led to several traffic rules and regulations not being followed. However, the riders and their groups can develop complementary self-enforcement approaches that ensure the riders comply with the laws and regulations, which can help reduce crashes. Commercial motorcycle groups can take action against those that do not comply.

Creation of awareness for riders on the importance of using safety gear such as helmets, risks of over speeding and overloading, risks of riding under the influence of alcohol and drugs and the importance of observing road safety rules and regulations. Based on the findings, most commercial motorcycle riders are young, between 18 to 35 years old. The safety training campaigns should target the demographic because crashes are also high in the group. In addition, the campaigns

should touch on the importance of the riders ensuring that they integrate safety practices, especially if they are breadwinners. The approach will mitigate the marital status contribution to crashes where the married riders are involved in dangerous habits that lead to crashes while seeking higher incomes since the age of the crashes also cuts across to the married individuals.

5.5 Areas for further research

A couple of areas are suggested for additional research based on the findings of this study. The study findings suggests that most boda boda crashes have been blamed on reckless riding and over speeding by young riders and therefore further research focusing on the attitudes and behavior of younger riders is needed to understand better why the younger population takes risks at a higher rate than any other age group.

Generalization of the study is not recommended because the current study is limited to Imenti South Sub County; therefore, there is a need to research and look at findings from other parts of the county. For instance, most studies identified that education level directly contributes to motorcycle crashes. However, this study findings shows that even the literate riders that have finished secondary education are highly involved in crashes.

Further research is also needed to focus on the sex of riders. This study's findings could not compare sex and crashes because the sample was predominantly male. Hence, future research must use equal samples of males and females to determine whether one of the sexes has a higher risk of commercial motorcycle crashes. The study also observed that alcohol and drug use is dangerous for riding and driving. However, the observation methodology used in this study is not the best

way to identify intoxicated riders. Therefore, future studies can use data of riders in crashes who were intoxicated from hospitals and police records.

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APPENDICES.**Appendix 1: QUESTIONNAIRE FOR BODABODA RIDERS.**

UNIVERSITY OF NAIROBI
INSTITUTE FOR DEVELOPMENT STUDIES

STUDY TITLE: THE EFFECTS OF RIDERS' SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS ON MOTOR-CYCLE CRASHES. A CASE STUDY OF IMENTI SOUTH SUB COUNTY, MERU COUNTY.

Consent.

My name is Brenda Kendi Munene, a postgraduate student at the Institute for Development Studies (IDS), University of Nairobi. I am carrying out a study on the effects of socio-economic and demographic characteristics of riders on motor-cycle crashes. A case study of Imenti South Sub County, Meru County. The study is for academic purpose and has the following objectives:

1. To establish the socio-economic and demographic characteristics of motorcycle riders in South Imenti sub-county.
2. To assess whether socio-economic and demographic characteristics of motorcycle riders contribute to crashes in South Imenti sub-county.
3. To examine the extent to which formal rider training impacts on motorcycle crashes in South Imenti Sub- County.

I am kindly requesting you to accord me 30minutes of your time to answer a few questions relating to the study. Your participation in this research is appreciated and completely voluntarily. Should you agree to participate and, in the process, change your decision, you are allowed to ask me to terminate the interview. Information you give will be confidential and only used for academic purpose. For further privacy and security, your name will not appear anywhere, in any of the published materials without your consent.

Kindly confirm whether I can go on with the interview Yes [] No []

SECTION A. GENERAL INFORMATION.

1. a). Name (Optional)

SECTION B: SUMMARY TABLE FOR ASSESSING THE ASSUMPTIONS ON SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF RIDERS

- 1. On a scale of 1-5, where 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree, please rate the following statements.**

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Age of riders play an important role in safety compliance	30.2%	26.7%	34.9%	7.0%	1.2%
Young riders tend to be more involved in crashes than their older counterparts	52.3%	34.9%	9.3%	3.5%	
Most bodaboda crashes are caused by dangerous riding by young riders	43.0%	45.3%	8.1%	3.6%	
Most riders have formal education but unemployed hence fall back to bodaboda riding as their source of income	42%	40.7%	12.8%	2.3%	
A majority of the riders have their own motorcycles	8.1%	30.2%	18.6%	30.25	12.8%
Most riders do not own motorcycles and therefore have to work extra hard to meet the owners' targets and remain with some amount for their income	40.7%	40.7%	11.6%	4.7%	2.3%
Riders who own motorcycles tend to be more careful than those who hire and work on commission and hence lower number of crashes	45.3%	36.0%	9.3%	5.8%	3.5%
Riders are involved in crash causing activities such as overloading as they strive to meet their daily targets	34.9%	47.7%	7.0%	7.0%	3.4%
Most riders have family obligations and are involved in crash causing activities as they	12.8%	44.2%	26.7%	11.6%	4.7%

strive to make a reasonable income for their families					
---	--	--	--	--	--

SECTION C: MOTORCYCLE SAFETY KNOWLEDGE AND TRAINING.

1. Have you received any motorcycle rider training?

Yes [] No []

If yes, has the training equipped you with the necessary skills and safety measures?

Yes [] No []

If no, are you aware of any safety measure? Yes [] No []

If yes, list those that you are aware of.....

2. What is the nature of training undertaken?

Formal training (registered driving school) []

Informal training (friends/relatives) []

For informal training, how long was the training period?

a)..... Hours b)..... Days c)..... Months

3. What did the training involve?

.....

4. Do you have a license?

Yes [] No []

If no, please explain?

.....

5. Have you ever been involved in a crash?

Yes [] No []

a) If yes, how many time?

1[] 2[] 3[] 4[] >4[]

b) What was the severity of the crash?

Fatal crash	At least one person (driver or passenger) killed from the crash
Major injury crash	At least one person injured and admitted to hospital but no fatalities
Minor injury crash	At least one person requiring medical care but does not require hospitalization
Minimal injury crash	At least one person injured (for example minor abrasions/bruises) but no medical attention required.

6. Do you have set targets?

Yes [] No []

If yes, are you able to meet them?

Yes [] No []

If no, what happen if you do not meet the targets?

.....

7. Do you know of any riders who have been involved in crashes?

Yes [] No []

If yes, please specify the causes of their crashes?

- a).....
- b).....
- c).....

8. On a scale of 1-5, where 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree, please rate the following statements with regards to motorcycle safety knowledge and training.

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Majority of riders have not undergone formal rider training.	45.3%	50.0%	1.2%	2.3%	1.2%
Lack of rider training is a major contributor of bodaboda related crashes	40.7%	38.4%	5.8%	10.5%	3.5%
Majority of riders do not have rider licenses and are therefore ignorant of road traffic rules.	29.1%	33.7%	4.7%	30.2%	2.3%
Majority of riders do not have rider licenses and are therefore ignorant of compliance requirements for riders	26.7%	30.2%	8.1%	26.7%	8.1%
Majority of riders do not own motorcycle safety gears such as helmets	24.4%	33.7%	26.7%	11.6%	3.5% ²
Majority of riders own motorcycle safety gears but do not use them	23.3%	40.7%	24.4%	9.3%	2.3%
Majority of riders tend to overload in a bid to meet targets	40.75	46.5%	8.1%	3.5%	1.2%
Riders experience pressure in reaching targets	30.2%	54.7%	14.0%	1.2%	
Majority of riders carry more than one passenger at a time	53.5%	43.0%	2.3%	1.2%	

SECTION D: SUMMARY OBSERVATIONS.

1. In your view, what are the leading causes of boda boda crashes?

.....

.....

.....

.....

2. In your view, what can be done to make boda boda transport safe?

.....
.....
.....
.....

SECTION E: DEMOGRAPHIC INFORMATION.

1. Gender (To be observed) Male [] Female []

2. What is your age bracket in years?

- | | |
|--------------------------|---------------------------|
| <18 years [] | 18-24 years [] |
| 25-35 years [] | 36 – 45 years [] |
| 46 -59 years [] | 60 + years [] |

3. a) Level of formal education

- | | |
|---------------------------------------|---|
| Primary Education (complete) [] | Primary education (Incomplete) [] |
| Secondary Education (Complete) [] | Secondary education (Incomplete) [] |
| University [] | Tertiary education/diploma [] |

b) Do you have any other training other than those mentioned above i.e., certificate courses or apprenticeship?

Yes [] No []

If yes, please specify

4. Are you married?

Yes [] No []

If yes, do you have children?

Yes [] No []

5. What is your average income per day?

6. Do you have any other source of income?

Yes [] No []

If yes, what is the average income per day in your other source of income?

.....

THANK YOU FOR YOR TIME.

Appendix 2: KII GUIDE.

UNIVERSITY OF NAIROBI

INSTITUTE FOR DEVELOPMENT STUDIES

STUDY TITLE: THE EFFECTS OF RIDERS’ SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS ON MOTOR-CYCLE CRASHES. A CASE STUDY OF IMENTI SOUTH SUB COUNTY, MERU COUNTY.

RESEARCH STUDY KEY INFORMANTS GUIDE.

Introduction.

My name is Brenda Kendi Munene, a postgraduate student at the Institute for Development Studies (IDS), University of Nairobi. I am carrying out a study on the effects of socio-economic and demographic characteristics of riders on motor-cycle crashes. A case study of Imenti South Sub County, Meru County.

I am kindly requesting you to accord me 30minutes of your time to answer a few questions relating to the study. Your participation in this research is appreciated and completely voluntarily. Should you agree to participate and, in the process, change your decision, you are allowed to ask me to terminate the interview. Information you give will be confidential and only used for academic purpose. For further privacy and security, your name will not appear anywhere, in any of the published materials without your consent.

Name (Optional).....
 Organization
 Position
 Contact

1. Overview of road safety issues

- Overall perception of the boda boda operators
- View on boda boda crashes and injuries
- Awareness and Compliance to road safety rules
- Legislation and enforcement of regulations
- Mitigation measures against motorcycle crashes.

2. Effects of Socio-economic and demographic characteristics on crashes

- View on age, gender, education level, marital status of riders
- Status of motorcycle riders (Owners, hirers, employees).
- Link between the above factors to crashes.

3. Formal training and road safety knowledge.

- Approved motorcycle riding training institutions.
- Form of training offered/Approved driving curriculum
- Cost of training
- Location of training
- License acquisition

4. Informal training.

- Reason for opting for informal training
- Lessons provided
- Whether those giving lessons are trained
- How the training takes place (location of training, motor cycle used, whether hired or owned).
- Cost of training if any.

5. Compliance to rules and regulations

- Overloading
- Overtaking on the wrong side, over speeding etc.
- Riding under the influence of alcohol or drugs
- Protective gears such as helmets and reflector jackets.

THANK YOU.

Appendix 3: FOCUS GROUP DISCUSSION GUIDE.

UNIVERSITY OF NAIROBI

INSTITUTE FOR DEVELOPMENT STUDIES

STUDY TITLE: THE EFFECTS OF RIDERS’ SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS ON MOTOR-CYCLE CRASHES. A CASE STUDY OF IMENTI SOUTH SUB COUNTY, MERU COUNTY.

FOCUS GROUP DISCUSSION GUIDE.

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Organization

Position

Contact

1. Overview of road safety issues

- Overall perception of the boda boda operators
- View on boda boda crashes and injuries
- Awareness and Compliance to road safety rules
- Legislation and enforcement of regulations
- Mitigation measures against motorcycle crashes.

2. Effects of Socio-economic and demographic characteristics on crashes

- View on age, gender, education level, marital status of riders
- Status of motorcycle riders (Owners, hirers, employees).
- Link between the above factors to crashes.

3. Formal training and road safety knowledge.

- Approved motorcycle riding training institutions.
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- Cost of training
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- License acquisition

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- Reason for opting for informal training
- Lessons provided
- Whether those giving lessons are trained
- How the training takes place (location of training, motor cycle used, whether hired or owned).
- Cost of training if any.

5. Compliance to rules and regulations

- Overloading
- Overtaking on the wrong side, over speeding etc.
- Riding under the influence of alcohol or drugs
- Protective gears such as helmets and reflector jackets.

THANK YOU.

Appendix 4: OBSERVATION CHECKLIST.

UNIVERSITY OF NAIROBI

INSTITUTE FOR DEVELOPMENT STUDIES

STUDY TITLE: THE EFFECTS OF RIDERS’ SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS ON MOTOR-CYCLE CRASHES. A CASE STUDY OF IMENTI SOUTH SUB COUNTY, MERU COUNTY.

OBSERVATION CHECKLIST.

Route

Time

OBSERVABLE ATTRIBUTES	YES	NO	COMMENTS
1. State of riders			
• Do they appear Intoxicated			
• Customer relations			
• Do they appear fatigued			
2. Condition of the motorcycle			
• Condition of tires			
• Side mirrors			
• Rear reflectors			
• Lighting			
3. Protective gears			
• Two helmets			
• Reflector jackets			
• Gloves			
4. Adherence to road safety rules			
• Over speeding			
• Over loading (More than 1 passenger)			
• Riding on the right side of the lane			
• Careless overtaking			
• Observing road signs			
• Proper use of signals			

By.....

Appendix 5: KEY INFORMANTS LIST.

Key Informant	DESIGNATION	GROUP/ORGANIZATION	DATE OF INTERVIEW
KI 1	Chairman	Madaraka Mitunguu Town Bd Stage Operators	05/09/2021
KI 2	Chairman	Digital Kabanda Bd Operators	05/09/2021
KI 3	Chairman	Kaurinithi Bd Operators	05/09/2021
KI 4	Base Commander	Kenya Traffic Police, Nkubu station.	06/09/2021
KI 5	Police Constable	Kenya Traffic Police, Nkubu station.	06/09/2021
KI 6	Sergeant	Kenya Traffic Police, Nkubu station.	06/09/2021
KI 7	Corporal	Kenya Traffic Police, Nkubu station.	06/09/2021
KI 8	Corporal	Kenya Traffic Police, Nkubu station.	06/09/2021
KI 9	Secretary	Upper Kanyakine Bd Operators	09/09/2021
KI 10	Chairman	Jijenge Nkubu Bd Operators	09/09/2021
KI 11	secretary	Lower Kanyakine Bd Operators	09/09/2021
KI 12	Chairman	Jekim Downtown Bd Operators	09/09/2021
KI 13	Chairman	Menwes Young Bd Operators	12/09/2021