

UNIVERSITY OF NAIROBI
DEPARTMENT OF SOCIOLOGY AND SOCIAL WORK

**PERCEPTION OF SAFETY AMONG PASSENGERS AS ROAD USERS ALONG THE
NAIROBI-NAKURU ROAD**

BY

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DECLARATION

This research project is my own original work and has not been presented in any other University.

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This research project has been submitted for examination with my approval as the University Supervisor.

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DEDICATION

This work is dedicated to my family, parents and friends, especially my mother Teresa who really encouraged me in the decision to take up the Masters degree and for her financial support. Grace for being a loving and understanding daughter.

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ABBREVIATIONS/ACRONYMS

DALYs	Disability-Adjusted Life Years
ETSC	European Union Member Countries
GNP	Gross National Product
KENHA	Kenya National Highway Authority
LMICs	Low & Middle Income Countries
NHTSA	National Highway Traffic Safety Administration
NRSC	National Road Safety Commission
OECD	Organization for Economic Cooperation and Development
PSV	Public Service Vehicle
RCT	Risk Compensation Theory
RCT	Randomized Control Trial
RHT	Risk homeostasis theory
RTA	Road Traffic Accidents
RTIs	Road Traffic Injuries
SCT	Social cognitive theory
UK	United Kingdom
WHO	World Health Organization

ABSTRACT

Road traffic accidents have become the leading cause of death and disability in many countries across the world. Road crashes represent a major social cost to most societies, and their management has thus been a high priority. Road traffic accidents are believed to have varying causes. Hence, the ultimate aim of all road traffic research and intervention is, to some extent, identify and reduce these causes as much as possible. The study sought to assess the perceived safety among passengers as road users of the Nairobi - Nakuru highway. The study sample constituted of 120 passengers who used the Nairobi - Nakuru road as the main respondents, and 8 key informants whose views were considered relevant for the study. The data were collected through the use of a structured questionnaire and an interview guide and were analyzed through descriptive statistics such as percentages and frequencies. The findings were presented in form of bar graphs, charts and tables. The study found that the perceived safety among the passengers who ply the Nairobi - Nakuru road is low. The passengers assessed their safety along the road through the type of driving, the speed of driving, and the condition of the vehicle among others. The study found that the passengers ensure their safety by not boarding vehicles driven by drunkards, vehicles with excess passengers and inspecting the condition of the vehicle before boarding. The passengers felt that the measures put in place by the transport ministry could have been more effective if they were well implemented especially the banning of night travel, use of alco-blow (a tool of measuring alcohol content imbibed by a driver) and imposing of heavy penalties and fines for reckless drivers.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Every day thousands of people are killed and injured on our roads. Men, women or children walking, biking, or riding to school or work, playing in the streets or setting out on long trips, will never return home, leaving behind shattered families and communities. Millions of people each year will spend long weeks in hospital after severe crashes and many will never be able to live, work or play as they used to do, (WHO, 2004).

Road traffic accidents have become the leading cause of death and disability in many countries across the world. Low-income and middle-income countries, which have only 48% of the world's vehicles, are reported to account for about 90% of these casualties. However, while the casualty rate is decreasing significantly in the developed world as a result of ambitious accident countermeasures put in place, in developing countries like Ghana limited attention has been paid to this growing threat. Hence, while traffic crashes are predicted to further decrease by 27% in countries of the developed world by 2020, they are estimated to increase by 83% in low income and middle income countries (WHO, 2004). The economic and psychosocial consequences of these crashes for the rural and urban poor, majority of who make up the vulnerable road users such as pedestrians, cyclists, and occupants of passenger-carrying vehicles, are devastating.

Road crashes represent a major social cost to most societies, and their management has thus been a high priority. At global level, about 1.3 million people die in road accidents and more than 50 million are injured every year (European Road Statistics 2008, WHO 2009). Drivers cause traffic accidents for different reasons, such as optimism and above-average biases that lead to excessive risk-taking, lack of information (Cohen and Dehejia, 2004) and externalization of some of the damages that are not borne by the risk creating drivers (Aaron, 2003). Although the deterrence achieved by enforcement of traffic laws may mitigate these behavioral inefficiencies to some extent, this solution is probably not complete if the level of deterrence is not optimal and if there are inefficient behaviors which cannot be prevented by enforcing traffic laws.

According to the World Report on Road Traffic Injury Prevention (Peden *et al.*, 2004) traffic accidents account for about 3000 daily fatalities worldwide. Statistical projections show that during the period between 2000 and 2020, fatalities related to traffic accidents will decrease with about 30% in high income countries. The opposite pattern is expected in developing countries, where traffic accidents are expected to increase at a fast rate in the years to come.

World Health Organization (WHO) strategy of 2001 reports that road traffic injuries are the leading cause of deaths and injuries, the 10th leading cause of all deaths and 9th leading contributor to the burden of disease worldwide based on disability adjusted life years. The numbers of deaths resulting from road traffic crashes have been projected to reach 8.4 million in the year 2020. In 2015, WHO reports that Road traffic injuries are the leading cause of death among young people, aged 15–29 years, with about 1.25 million people dying each year as a result of road traffic crashes, while between 20 and 50 million more people suffer non-fatal injuries, with many incurring a disability as a result of their injuries (WHO 2015).

1.2 The Concept of Risk Perception

According to the theoretical orientation this research assumed, the notion of risk perception involves two factors: the magnitude of the potential loss and the probability of its occurrence (Sjöberg, 2000), in other words, the existence or not of different risk factors and occupational accidents. This might explain why people perceive the same risk in very different situations or why the same individual might perceive risk differently depending on when he or she is asked about it (Leoni, 2010). Risk perception is frequently seen as an important factor in risk policy matters (Sjöberg, 2000).

Risk perception is the subjective assessment of the probability of a specified type of accident happening and how concerned we are with the consequences. To perceive risk includes evaluations of the probability as well as the consequences of a negative outcome. Perception of risk goes beyond the individual, and it is a social and cultural construct reflecting values, symbols, history, and ideology (Weinstein, 1984). It follows from the specificity and variability of human social existence that it should not simply be presumed that scores and ratings on identical instruments have the same meanings in different contexts (Boholm, 1998). Adams (1995) claimed that “the starting point of any theory of risk must be that everyone willingly takes

risks”. He concluded that this was not in fact the starting point of most of the literature on risk. Risk perception appeared on the stage of policy as a very important concept in the 1960's. It was implicated as a main determinant of public opposition to technology, most notably to nuclear technology, but other early examples can be given as well (Martin, 2003).

1.3 Problem Statement

According to the World Health Organization (2013) on road safety, the Nairobi - Nakuru - Eldoret highway was cited as one of the world's most unsafe roads that is prone to accidents. The Nairobi - Nakuru highway has also been ranked the 2nd most dangerous road in Africa. The highway is notorious for drunk - driving combined with speed, poor overtaking, pedestrians and poor road conditions.

A survey by Hertfordshire - based driving experience ranked the Nairobi - Nakuru highway as the 4th dangerous road in the world (Assum, 1998). Recklessness on the part of drivers and pedestrians has become systemic. This has given rise to rampant motor vehicle crashes with dire consequences for vehicle occupants and pedestrians. This is because one will find pedestrians walking on the road instead of using footpaths or overhead footbridges that have been set aside for them while drivers breaks traffic rules and regulations while they drive the vehicles recklessly thus endangering their lives as pedestrians and those of vehicle occupants.

Road Traffic Act of Kenya 2014, part Five, section 42 does not vest power in district authorities to set lower speed limits to suit the road use characteristics of their respective areas. Speed limits are set nationally. In addition, the National Road Safety Commission (NRSC) has no district branches to deal with issues of education and intervention in a context-specific manner. The enforcement of traffic laws and regulations, for example speed limit, remains at its lowest ebb. In addition, Kenya roads boards and National road safety commission operate as different entities. The result of this lack of unity between the two players has been so disastrous since Kenya continues to witness grisly road accidents which are preventable if right measures were put in place The NRSC is weak in terms of resource allocation and human resource capacity.

In addition, although Transport Licensing Board is supposed to license all public service vehicles, allocate those routes and regulate their operation timetables, it has generally been unable to allocate routes and monitor compliance or even ensure that public service vehicles

have operation timetables. Public service vehicles in Kenya have been viewed in the transport circles as driven by reckless drivers. The drivers drive at very fast speed, which makes them vulnerable to accidents. Others drive under the influence of alcohol and other drug, which reduces their ability to control the vehicle and increases chances of causing road accidents. Use of mobile phones while driving has been observed as a risky behaviour and can cause accidents (Chekijian 2012). Some drivers are also very incompetent due to the shoddy training they undergo to become drivers. In some of the cases the time allocated for driving practical's is very short and leaves the trainees incompetent, the examination done by the traffic examiners is also very shallow allowing unqualified people to become drivers (Agbonkhese *et al.*, 2013).

The other major contributor of road accidents is the condition of the vehicle. Most of the vehicles are un-road-worthy. These vehicles are characterized by damaged lights, worn out braking system and poor cooling systems and are rarely taken for servicing (Agbonkhese *et al.*, 2013). These vehicles are therefore very vulnerable to road accidents. However, such vehicles continue to ply along the roads carrying passengers despite the presence of traffic police officers.

Therefore, accidents are continually on the rise leaving behind high number of casualties, injuries and material damage, as the law enforcement officers, motorists and the government continue to overlook their responsibilities on the road carnage issues. In Kenya, nearly 3,000 people are killed annually on Kenyan roads and for every death recorded up to 50 people are injured or disabled, many of them being passengers or pedestrians. There is need therefore to enact measures geared at reducing mortality, morbidity, disability and increased cost of healthcare resulting from preventable road accidents (Quinet, 1994).

However, studies done in Kenya on road safety and road accidents have not focused on perception of safety among passengers as road users along the Nairobi - Nakuru road. For example, Wanjama (2010) studied the influence of the implementation of new traffic rules in reducing of road accidents in Kenya: a case of Nyeri Central District. Another study by Murimi (2013) investigated the determinants of Severity of Road Accidents involving buses along Kenyan Roads: A Case of Nairobi - Kisumu Highway, Kenya. Ogutu (2012) did a study on the Road Traffic Accidents (RTA) characteristics along the A109 road while Pukose (2007) evaluated the outcome of the effects of the new road traffic rules and regulations on the incidence and severity of passenger service vehicle related injuries presented at Kenyatta

National Hospital. From the above studies, none focused on the perception of passenger's safety along the Nairobi - Nakuru road and therefore this study sought to fill this information gap by finding out the perception of passengers' safety along the Nairobi – Nakuru highway.

1.4 Research Questions

This study sought to answer the following questions.

- i. What do public service vehicle passengers think of the road safety measures that have been put in place?
- ii. What actions are being undertaken to ensure that passengers are safe as road users and that the road safety measures put in place are followed?
- iii. Are the road safety measures put in place along the Nairobi – Nakuru road facilitating passenger safety along the road?

1.5 Objectives of the Study

1.5.1 Main Objective

The general objective of the study was to investigate the perception of safety among passengers using public transport vehicles along Nairobi - Nakuru road in Kenya.

1.5.2 Specific Objectives

More specifically, the study was geared to attain the following objectives:

- i. To assess the extent to which passengers believe they are safe when using public transport vehicles;
- ii. To assess the actions that are being undertaken to ensure passenger safety as road users and enforce these road safety measures;
- iii. To assess if the safety measures put in place are working in ensuring that passengers are safe when using the road.

1.6 Justification of the Study

The inferences drawn from this study are hoped to be able to be generalized for main behavioural and attitudinal campaign to augment the efforts done in order to cut down the accidents along

this route. The perception of safety among the road users can be an indicator of how much ought to be done in order to improve on safety along the road. The study also provides information on the use and the effectiveness of the safety measures adopted along the major roads. This study is therefore crucial and important to various stakeholders in transport sector, health sector, insurance sector, members of the public, and to the traffic police. The study adds knowledge on understanding of what risk factors contribute to the occurrence of road traffic accidents and related injuries in a restricted risk area in Kenya and the perception of the users on these risk factors. It is applicable in road safety policy and regulations enforcement. This can be used by the road safety authorities for planning and evaluating road safety measures. The study is also of significant influence to other scholars and researchers. It can be utilized as baseline study in future related researches. This is useful to the future scholars and researchers as they can rely on the findings of this study as a point of reference. The future researchers will use the research findings as a reference point and as a base for further studies as regards safety and perception of safety among road users.

1.7 Scope and Limitation of the Study

This study was based on the “perception of passengers on road safety along the Nairobi Nakuru Road”. It was confined to the passengers as road users that was widened to encompass the road safety measures adopted to avert road accidents, and the effectiveness of such measures along the road with key interest on their impact on passengers perception. The geographical scope of the study was the Nairobi - Nakuru road in Kenya along which the passengers safety perceptions were measured. The choice of the study site was guided by the fact that this is considered one of the most dangerous roads in Kenya and therefore was a perfect location for the study. Its target population is the passengers using public transport that plies the Nairobi - Nakuru route from whom the study acquired a sample of 120 passengers who were involved in the provision of study’s requisite information. One key limitation of the study is the ethical handling of acquired information with respondents unwilling to offer personal information to be used in the study. This was solved by the researcher acquiring letters of authorization from the University to carry out the study. Issues of biases were also avoided in the study by the use of random sampling method. The major assumption had to be associated with this type of sampling where stratified random sampling was used to ensure the data collected was representative of respondents who had the relevant information required for the study.

1.8 Operational Definition of Terms

Speed Limit: This is the highest speed permitted by law along a given section of the road. According to the law, driving speed is limited by each city or town for the safety of the driver or passenger

Perception: Regarding, understanding, or interpreting something; a mental impression

Road Safety: Methods and measures for reducing the risk of a person using the road network for being killed or seriously injured. The users of a road include pedestrians, cyclists, motorists, their passengers, and passengers of on-road public transport, mainly buses and trams.

Perception of Road Safety: General feelings or impressions towards the state of road safety and the level of risk the road subject them. Low road safety perception indicates high risk levels while high road safety perception indicates low risk levels

Perception of Risk: This is the understanding of the risk levels a passenger is predisposed to along the road. High perception indicates high risk levels while low perception of risk along the road is considered to indicate low risk

Road Safety Awareness: The level of knowledge among a group of people regarding road safety measures provided in a region

CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This chapter presents a review of related literature, and theories guiding the fundamental concepts upon which the study was grounded. The review of related literature on the status of road safety and the perception of the public on road safety measures along high risk roads are discussed in this section.

2.2 Review of Related Literature

The study sought literature related to road safety measures and perception globally, which was reviewed and discussed in the sections that follow. Literature review brings out the current status of the topic under study.

2.2.1 Global Impact of Road Traffic Accidents

About 1.25 million people die and between 20 to 50 million suffer non-fatal injuries, with many incurring a disability as a result of their injuries each year, and an estimated 3,424 people die daily from road accidents (WHO, 2015). The same report has ranked the worldwide leading causes of death by age as follows; 0-4 year olds (14th), 5-14 year olds (2nd), 15-29 year olds (1st), 30-44 year olds (3rd), 45-69 year olds (8th), and 70 + year olds (20th). This data suggest that globally, among 5-29 year olds, the leading cause of death is road traffic accidents. Official statistics from police reports suggest that in 2005 alone, 41,600 people were killed and over 1.5 million were injured in road traffic crashes in the European Union member countries (ETSC, 2007).

At present, road traffic fatalities are the 9th leading cause of death and disability in the world. The World Health Organization (WHO) has described them as ‘hidden epidemics’ and has forecast that they will be the 5th leading cause of death worldwide and the 2nd leading cause of disability-adjusted life year losses in many developing countries by 2030 (Murray and Lopez, 1996). These projections are expected to bring about 2.4 million fatalities annually. Also, the International Federation of Red Cross and Red Crescent have observed that the road traffic burden is “a worsening global disaster destroying lives and livelihoods, hampering development and leaving millions in greater vulnerability” (Ameratunga *et al.*, 2006). Aside from the incalculable human and social costs, these crashes cost the world economy about US\$ 518

billion every year. Low and middle-income countries are estimated to account for about US\$65 billion of this global amount (Jacobs et al, 2000). This is far in excess of the total cumulative development assistance that these countries receive annually from donor countries. In 2004, the 15-member countries of the European Union spent more than €180 billion on treatment of traffic injuries alone (ETSC, 2007).

In many of the industrialized countries in Western Europe and North America (e.g., Canada, Sweden, Norway, Australia, the Netherlands, etc) the incidence of motor vehicle crashes is on a downward trend. However, Murray and Lopez (1996) have reported that the significant reductions in the traffic fatality rate in these Western countries have not seen a proportionate decline in non-fatal injuries. In Asia and Africa (e.g., China, India, South Africa, Kenya, Zambia, Uganda, Ghana, etc) there is an exponential increasing traffic casualty trend. A few examples backed by statistics will throw more light on the magnitude of the epidemic in the developing nations.

The Asia region for example China, for year 2006 alone there were 89,455 road traffic deaths and 431,139 non-fatal injuries. The same year (2006), Chile lost 2,280 people to traffic crashes and as many as 50,010 injuries were reported in the country (WHO 2011). Research indicates that there is an anticipated increase of 67% in global road traffic crashes by 2020 in many of these low-income and middle-income countries. Consequently, the WHO has declared this decade (2011-2020) as a 'Decade of Action for Road Safety'.

2.2.2 Road Carnage in Developing Countries

According to research carried out by Pierce and Maunder (1998), under the auspices of Road Research Laboratory in UK, they found out that, road accidents worldwide caused an estimate of 20,000,000 victims for a time period which 70% of the accidents occurred in developing countries. The number of accidents per registered vehicles was 10% to 20% higher in developing countries than in the developed world. The more general reasons advanced by these researchers for an increase of accidents in developing countries were as follows: 1. Rapid urbanization process in these countries; 2. High growth rates of traffic; 3. Poor road conditions; 4. Reckless driving; 5. Non-adherence to the traffic regulations by the motorists and the traffic officers (due to corruption); and, 6. The majority of people in developing countries were dependant on public

transport for their daily movement. In developing countries the public transport system such as minibuses has a much higher accident risk than in developed Countries.

In developing countries the proportion of serious injured and killed casualties are higher than in the developed countries. An analysis of cross-sectional data on road traffic related deaths has shown that the poorest countries have highest road traffic related mortality rates (Soderlund & Zwi, 1995). In this analysis, many industrialized countries appear to have introduced interventions that reduced the incidence of road traffic injuries and improve survival of those injured (Soderlund & Zwi, 1995). In developing countries there are some peculiarities regarding the accident profiles. A study done in Calcutta India reported that there are some host (human) factors (such as the behavior of drivers, pedestrians and cyclist behaviors) and seasonal factors (weather and time) that contribute to fatal road traffic accidents (Zhang, *et al.*, 1998). Overall, most traffic accidents occurred on main roads (highways) and in the majority of cases pedestrians were found to be at fault during crossing of the roads (Majumder, *et al.*, 1996).

In the Africa region, ten out of the over 50 countries account for about 70% of all road traffic deaths. They include Ghana, Nigeria, Kenya, Ethiopia, South Africa, Republic of Congo, Tanzania, Madagascar, Uganda, and Mozambique (WHO, 2009). For instance, in Uganda between 2006 and 2007, 2,838 people perished and 12,058 others were injured in traffic accidents. In 2007, South Africa recorded 14,920 traffic fatalities with 219,978 injuries. In the same year Nigeria lost 4,673 of her citizens to motor vehicle crashes with 17,794 sustaining degrees of injuries in 2007. While 2,893 people died on Kenya's roads in 2007, 12,470 got injured.

2.2.3 Road Carnage in Kenya

Road accidents are the third leading cause of death after malaria and HIV/Aids in Kenya more often than not affecting the economically productive population in Kenya (Odero, Khayesi and Heda 2003 as cited in Kibua and Chitere, 2004). Odero, Khayesi and Heda (2003) observe that Kenya, with an average of 7 deaths from the 35 crashes that occur each day, has one of the highest road fatality rates in relation to vehicle ownership in the world. According to the trio, nearly 3,000 people are killed on Kenyan roads annually. This translates to approximately 68 deaths per 1,000 registered vehicles, which is 30-40 times greater than in highly motorized countries. Road traffic crashes present major public health problem in terms of morbidity,

disability and associated health care costs. Despite this huge burden, road safety measures in place are ineffective, characterized by crackdowns on motor vehicles following a tragic road crash.

These accidents have been occasioned by the government's neglect of the road sub-sector in the past 10-15 years. When NARC government took power, it put two measures to correct the situation. First, it developed the integrated national transport policy. Secondly, it introduced reforms in the operation of public service vehicles (PSVs) by publishing Legal Notice No.161 in October, 2003 Daily Nation August 4th, 2004).

Despite the above measures, A report by WHO (2010) indicates that on average between 3000 Kenyans lose their lives in road traffic crashes every year. The majority of these people are vulnerable road users – pedestrians, motorcyclists, and cyclists. In addition, nearly one-third of deaths are among passengers – many of whom are killed in unsafe forms of public transportation. According to the report there are no laws for helmet wearing, blood alcohol concentration levels for drivers or child restraints in Kenya and where road safety laws do exist they are poorly enforced.

2.2.4 Status of Road Safety

While progress in traffic safety policy and road engineering has been made in high-income countries, low and medium income countries remain disproportionately affected by traffic injuries. It is estimated that 90% of road traffic fatalities occur in low and middle income countries (WHO, 2011). These fatalities and injuries disproportionately affect young and productive members of society (WHO, 2011).

Low to middle income countries face particular challenges related to lack of resources to address safety concerns including infrastructure and enforcement efforts, cultural usage norms for safety devices, and compromised road engineering due to lack of innovation and upkeep (Forjuoh, 2003). Areas of opportunity for impact include introduction and enforcement of legislation governing driving while intoxicated, traffic speed limits, mandated safety device presence and usage in cars and two wheeled vehicles, including seatbelts, child restraints, and helmets. Equally important, is careful work with road safety engineers to eliminate hazards introduced by roads and road conditions as well as development and maturation of emergency medical systems.

In this era of United Nations' General Assembly's declaration of the Decade of Action for Road Safety, remarkably little is known about current conditions and public policy efforts underway. Even less is known about the current population based acceptance and awareness of the concept of road safety and the use of safety devices (WHO 2011). As part of the Decade of Action the World Health Organization (WHO) has set goals to strengthen global efforts towards road safety. Pillar 4 of the WHO action plan focuses on the development of "safe road users" by developing "comprehensive program to improve road user behavior, sustaining or increasing enforcement of laws and standards, combined with public awareness/education to increase seatbelt and helmet wearing rates, and to reduce drunken driving, speed and other risk factors," (WHO, 2011).

2.2.5 Road Traffic Injuries in Kenya

Road traffic injuries (RTIs) are one of the leading causes of death and disability worldwide. They account for more than 1.2 million deaths - 3.6 percent of the global mortality burden (WHO 2009). It is also estimated that in 2004, RTIs contributed to 2.7 percent of the total disability-adjusted life years (DALYs) lost globally, a proportion that is expected to rise to 4.9 percent by the year 2030 and position RTIs as the third leading contributor to the global burden of disease (WHO, 2008). Low- and middle-income countries (LMICs) are estimated to be responsible for as much as 90 percent of this burden, with the African region accounting for approximately 205,000 fatalities and 7,151,000 DALYs due to RTIs (WHO, 2008). This translates to 969 DALYs per 100,000 population in Africa, compared to the global rate of 640 DALYs per 100,000 population due to RTIs (WHO, 2008).

As LMICs in Africa develop and road infrastructure is enhanced, the number of vehicles as well as vehicle speeds is expected to increase, resulting in increased RTIs and fatality rates in these settings (Chandran et al., 2010). Kenya, for example, has seen a sharp increase in the number of registered motor vehicles over the past 2 decades, from 1.4 motor vehicles per 100 people in 1985 to 2.7 motor vehicles per 100 people in 2007 (WHO, 2009). Road usage has correspondingly also gone up for every type of vehicle (Assum, 1998). Study by Odero (1995) found that over the 7-year period from 1983 to 1990, there was a 125 percent increase in kilometres driven by cars and light vehicles, a 123 percent increase in kilometres driven by buses and taxis, and a 91 percent increase in kilometres driven by lorries.

Motorcycle use in Kenya has also significantly increased over the last decade. A study conducted in Nairobi showed that in just 3 years, motorcycle registration rose from 4136 in 2004 to 16,293 in 2007 (Nesoba, 2010). In addition, over the last 5 years, motorcycle transport burden from RTIs in Kenya have indicated an increasing trend. A 1998 study comparing mortality due to RTIs in 12 countries found that out of all 12 countries, Kenya had the highest RTI fatality rate. The rate was 1.6 times higher than that for Zimbabwe, 3.6 times higher than Chile, and 48.9 higher than Great Britain (Assum 1998). Other studies conducted in Kenya have found that road traffic fatalities in Kenya have increased steadily over time, from 7.8 in 1985 to 10.6 deaths per 100,000 population in 1998, indicating a 35 percent increase in the rate of RTI fatalities in Kenya (Odero *et al.*, 2003).

In addition to the mortality and disability burden, RTIs have a significant economic impact. In Kenya, a study published by Odero and colleagues in 2003 revealed that as of 1991, RTIs were estimated to cost Kenyans as much as US\$3.8 billion annually, corresponding to 5 percent of the annual gross national product (Odero *et al.*, 2003). This is, however, thought to be a conservative estimate because it does not include costs associated with lost productivity and other related costs due to the years of life lost (Peden *et al.*, 2004). Though estimates quantifying the burden of RTIs in Kenya do exist, most of these studies date back to the late 1990s and early 2000s. There is thus a need for more current estimates on the burden of RTIs in Kenya to accurately assess the scope and distribution of this burden such that interventions can be implemented to address it. Additionally, despite the high health and economic burden of RTIs in Kenya, very little attention has historically been paid to alleviating this burden. Recently, however, there has been a renewed interest in addressing road safety in Kenya, with new initiatives by organizations such as the World Bank and Bloomberg Philanthropies that are seeking to enhance safety on Kenyan roads (Peden 2010; World Bank 2011).

2.2.6 Perception of Road Safety Measures

Various road safety measures have been instituted in various regions globally, with some being observed as useful in one area and being denied usage in another. The study reviewed literature on some of these measures used in Kenya and they are discussed in this section.

2.2.6.1 Safety Belts and Usage

Seat belt laws are considered primary laws when the police are able to pull over a car and issue a ticket to occupants for non-usage of their seat belts. Secondary laws allow for weaker enforcement as occupants can only be ticketed for non-seat belt usage if they are pulled over for another indication. It is well documented that countries or states with primary seat belt laws that are enforced have much higher usage patterns. It is estimated that seat belt usage increases 10–15% points after enactment of primary seat belt laws, (NCSA, 2003). In addition, in some countries the law governs only front seat passengers and not back seat passengers, which are largely made up of children. There is no dedicated child restraint law but children under 12 must ride in the back seat. These types of exemptions to seat belt laws have been identified as significant barriers to obtaining universal restraint usage and injury prevention, especially in at risk group such as children and infants (Weiss, *et al.*, 2006).

2.2.6.2 Perception of Pedestrian Safety

Despite a law governing the pedestrian right of way, the environment in the roadways clearly gives the right of way to motorized vehicles. This has become increasingly onerous as the number of multi-lane and high speed motor ways in and around the city has proliferated. Even with the center of the city where the primary means of transportation is by walking, there are numerous and noteworthy intersections that place the pedestrian in harms' way either by ill timed or non-existent time for crossing in heavily trafficked areas. This often means that pedestrians, including children, must venture into the middle of busy streets to wait to cross to the other side of the road. Anecdotally, it seems that everyone reports extreme difficulty as a pedestrian on a day-to-day basis.

There have recently been engineering interventions to improve pedestrian safety by providing overhead walkways on heavily trafficked, high-speed roadways within busy highways. Much work still needs to be done on the lesser intersections, which need a concerted effort to coordinate lights to allow for safe crossing. In addition, there have been efforts to resurface the roads both within and outside the capital. Higher level engineering innovations such as guardrails and pedestrian barriers, however, have remained largely unemployed, most likely due to excessive cost.

2.2.6.3 Perception about Alcohol Blow

Alcohol plays a significant role in road accidents along highways. The level of alcohol consumption appears high and may be underestimated due to low self-reporting. If there were a medical registry with such information, it would allow us to ascertain accurately what proportion of traffic crashes involves alcohol. There is a perception that it is possible to drink without being caught (Chekijian, 2012). Breathalyzers are not currently being employed everywhere and always, rather it is done at some designated spots where the drivers are aware of and can easily avoid. A more advanced control of alcohol would be the use of a sniff test. This makes for zero tolerance of any alcohol consumption while driving but one can imagine that it makes for weakened interventions. This may be a viable issue for future enforcement interventions (Chekijian, 2012).

2.2.6.4 Attitudes towards Law Enforcement

The credibility of the police force is highly linked with any enforcement efforts. The issue of corruption in law enforcement is an important one as it detracts from efforts to establish a credible and legitimate presence. It is of the utmost importance that the populace has a respect for the efforts and not belief that they are being pulled over to increase the “take” of the officer involved. Sadly, the population does not believe its police are stopping them out of a true interest in their safety along the roads but mostly to take bribes (Chekijian, 2012).

2.3 Road Safety Interventions in Kenya

Traffic fatalities constitute a large share of both deaths and the burden of disease in the developing world, and continue to rise. Traffic accidents were ranked as the 10th leading cause of death in 2001, and were projected to be the third or fourth most important contributor to the global disease burden in 2030. By that date, road accidents are expected to account for 3.7 percent of deaths worldwide twice the number due to malaria (Mathers and Loncar, 2006). Traffic accidents can be viewed simply as a cost of driving, and one that road users rationally incur in their consumption of transport services, unless market failure is present in the region. On the other hand, dangerous driving imposes obvious external costs on other road users both those traveling in other vehicles and, especially in the developing world pedestrians. Standard approaches to such market failures include either direct government regulations, the use of the price mechanism through the imposition of taxes and/or penalties levied on dangerous driving, or

both. Social marketing and advertising campaigns provide an alternative means by which behavior change might be induced, and have been used extensively in areas of public health in general, and road safety in particular. Which of the two approaches (that is social pressure through marketing or government enforcement of explicit regulations) is more (cost - effective) in inducing prudent behaviour is of general interest. But it is especially important in the context of developing countries with at best limited, and at worst dysfunctional, institutions that compromise the effective enforcement of well-intentioned rules (Mathers and Loncar, 2006).

In particular, the safety of matatu travel as measured by insurance claims is compared in two settings: first, in the wake of the draconian imperatives of the so-called Michuki Rules, regulatory requirements implemented in 2004 governing the operation of matatus; and second, in the context of a consumer empowerment campaign that circumvented all forms of public intervention and enforcement but instead appealed directly to passengers to monitor their drivers. This comparison should be interpreted as a case study, as the regulatory reforms reflected a broad-based policy intervention in 2004, and the consumer empowerment project was a relatively small-scale randomized-control trial (RCT) implemented three years later. Nonetheless, the comparison provides useful information on the comparative effectiveness of alternative interventions in contexts with limited institutional capacity. The Michuki rules, which required retrofitting of vehicles with certain safety devices and other reforms as outlined in the next section, were widely believed to have led to an immediate and sustained improvement in the safety of Kenya's roads. However despite this view, we find that most of the perceived effects were driven by the short-run compliance costs imposed on vehicle owners and drivers, as opposed to their behaviour, and that a month after the rules were introduced there was no discernible effect on insurance claims. In contrast, the consumer empowerment campaign, which encouraged passengers to actively complain directly to their drivers when they felt unsafe, led to a remarkably large reduction in insurance claims of between a half and two-thirds (Kibua and Chitera 2004).

2.3.1 The Michuki Rules

In February 2004, new government regulations initiated by and subsequently named after then-Minister of Transport John Michuki became effective. The objectives of the regulations were to reduce accidents caused by overspeeding; enhance safety of commuters; ensure responsibility, accountability and competence of drivers and conductors; eliminate illegal drivers, conductors and criminals that had infiltrated the industry; and facilitate identification of vehicles and restrict their operation to authorized routes, (Kibua and Chitera 2004). Under the reform, all matatus were required to comply with a series of rules aimed at reducing reckless driving, including: the installation of speed governors, devices that would cause the engine to shut down automatically if the vehicle's speed surpassed the national speed limit of 80km/h; the installation of passenger safety belts, which had until then been rare in public service vehicles (i.e., minibuses and buses), and infrequently used even when available; the painting of a yellow stripe on all matatus; the restriction of matatus to clearly specified and documented routes; the limitation on the number of passengers to 13, plus the driver; the licensing and vetting of drivers and conductors. The resource costs of adopting the vehicle modifications were high, amounting to about \$750 for seat belts, speed governors, and inspections (Kibua and Chitera 2004).

Although we do not have data on enforcement of the Michuki rules, anecdotal accounts suggest that compliance with the new requirements, such as the installation of speed governors and seat belts, was initially relatively high. However the impact of the regulations on actual driving behavior was not clear. For example, the development of second-generation devices known as "speed governor governors," which would allow a driver to manually engage or disable the speed governor while in motion, made it harder for police patrols to apprehend cheating operators. As noted by other authors (Gachiki, 2004, and Kibua and Chitera 2004), corruption also likely limited the impact of the rules on actual driving practices, as matatus would be randomly stopped with high probability at ubiquitous police road- blocks, independent of their speed or safety, and their drivers shaken down for bribes. These shake- downs were made easier and more remunerative by the new regulations, as they provided the police with a variety of additional dimensions on which drivers and conductors might be found in non-compliance, and the high fixed costs associated with appearing in court to contest a citation generated sizeable

rents. Such arbitrary taxation would have reduced the return to driving safely in general, and to adhering to the speed limit in particular.

The initial impact of these rules was a sudden reduction in the number of matatus and larger buses on the roads, as they were removed from service to be fitted with the necessary control devices and seat belts. In the days and weeks following the adoption of the regulations, thousands of Kenyans walked miles to work and to school, and there was a popular belief that the roads were safer. Accordingly, bus fares increased dramatically in this period, as demand far outstripped supply.

Government statistics showed an immediate and dramatic reduction in road accidents following the adoption of the new rules (GOK, 2004). For example, Mutugi and Maingi (2011) report a fall in all road accidents from 2003 and 2004 of about 20 percent.¹⁰ Similarly, Kibua and Chitera (2004) report “fatal, serious, and slight” accidents all falling by about 40 percent each in February-July, 2004 compared with the same six-month period a year earlier. However they also reported instances of tampering with speed governors, under-use of low-quality seat belts, continued over-crowding, and laxity of law enforcement.

2.3.2 Consumer Empowerment

Institutional weakness and corruption may compromise the effectiveness of a variety of reform efforts, especially those that rely on third-party enforcement. In the case of public transportation, an alternative to top-down campaigns like the Michuki rules is to empower passengers to demand higher quality services directly, not by threatening to report a bad driver, but simply by openly complaining to him. To motivate the potential impact of such a strategy, complaints to the driver represent contributions to a local public good, and that collective action problem among passengers could arise. Multiple equilibriums can exist in such environments, characterized by different aggregate levels of public good provision. This suggests that lowering the resource or psychic costs of complaints, for example by making them appear more legitimate and thereby giving passengers a voice, could lead to discrete changes in the intensity of consumer monitoring and enforcement, and perhaps meaningful changes in safety and outcomes (Habyarimana & Jack, 2011).

2.4 Theoretical Framework

Road traffic accidents are believed to have varying causes. Hence, the ultimate aim of all road traffic research and intervention is, to some extent, identify and reduce these causes as much as possible. These causes may be complex in nature and are often perceived to be impacted by science and politics (Elvik & Vaa, 2004). In attempting to understand why road accidents do occur and propose guidelines for researching their underlying causes, several theoretical frameworks and models have been put forward. Much of these have to do more with drivers than any other category of road users such as pedestrians, cyclists and vehicle occupants. While some have placed emphasis on individual characteristics, others have focused on the situational as well as the socio-ecological dimensions.

These theories and models have their strengths and weaknesses and none has complete scientific coverage of the scope of factors implicated in traffic crashes. Though no single theory or model has gained universal acceptance among the traffic research community, they nonetheless have shaped our understanding of the road accident problem in significant ways. Given the above stated reasons, three theories are used in this study. In accordance with the research focus and aims of the present study, the following theoretical perspectives and models that seek to explain accident involvement in relation to human factors and structural factors provide a good fit and had been selected to constitute the theoretical framework. They are systems theory, social cognitive theory, and risk theory. They support the case study approach to accident analysis, which holds that the actual causes of each accident cannot be fully known when they are studied independent of the context in which they occur.

2.4.1 Systems Theory

Systems theory is the interdisciplinary study of systems in general, with the goal of elucidating principles that can be applied to all types of systems at all nesting levels in all fields of research. The theory also known as the systems approach (Rothe, 2002) is the most predominant framework employed in safety research in recent decades (Salmon et al., 2010). Its advent dates far back to 1940s when Chapanis (1999) in a groundbreaking study in the 1940s on aviation safety and plane crashes found that 'pilot error' was essentially 'designer error'. Since then the

theory has engaged the attention of safety researchers over the years and it has received tremendous application in safety management as well as traffic domains (Johansson, 2009).

The basic assumption of the systems theory is that road traffic crashes result from the interactional malfunctioning of the components of systems. Its main focus is on the person - environment interactional maladjustments (Muhlrad and Lassaare, 2005). Hence, human factors and vehicle factors conspire with physical and social environmental factors to bring about road traffic accidents. The interdependence of these factors in relation to accident causation suggests that in trying to investigate the causes of motor vehicle crashes all the relevant factors within the system ought to be given equal attention. System theory does not only explain accident causation but also points to the key issues to be considered in planning any accident countermeasures. In other words, blaming the victim such as pedestrians for pedestrian-vehicle crashes and suggesting behavior modification strategies alone to deal with the problem may be unsuccessful. However, success will come when behavior modification goes hand in hand with the technical modification of the road infrastructure and equipment. This also means the modification of motor vehicle design will become a crucial component of the system to consider. Put another way, perhaps drivers of passenger-carrying commercial vehicles are over represented in road traffic accidents not because of person factors only but may be because of the poor nature and state of the roads which combines with the defective and used vehicles used for motorized transport in the country.

The relationship between systems theory and the study of perception is one of critical importance to our understanding of the changing nature of human cognitive maps of the perception within the safety environment. The advantage of systems theory is its potential to provide a trans-disciplinary framework for a simultaneously critical and normative exploration of the relationship between our perceptions and conceptions and the worlds they purport to represent. Studies of cognitive development and human perception are beginning to rely more and more on the systems approach (Jordan, 1998). Systems theory does much to render the complex dynamics of human bio-psycho-socio-cultural change comprehensible. Study of perception in relation to safety invariably involves complex combinations of fields, and the multifaceted situations to which they give rise require a holistic approach for their solution. Systems theory provides such

an approach and can consequently be considered a field of inquiry rather than a collection of specific disciplines.

The strengths of this theory are in its holistic approach to the road traffic perception problem. It is both a method and an intervention blueprint to accident management. It is also comprehensive because its tenets cover all categories of road users such as drivers, pedestrians, cyclists, and passengers. Inherent in this theory is the need for a political commitment in that policy makers, road engineers, vehicle manufacturers, road users, and safety professionals' actions and inactions are perceived to be important and complementary. Research indicates that already not only has the theory aided the understanding of most of the risk factors implicated in accidents, but also it has informed various safety interventions in many countries such as the Vision Zero in Sweden, Norway (Johansson, 2009) and other successful strategies elsewhere like Australia and the Netherlands (Wegman *et al.*, 2008). Evidence suggests that these countries have made significant reductions in their road crashes due to ambitious and holistic strategies that have been adopted.

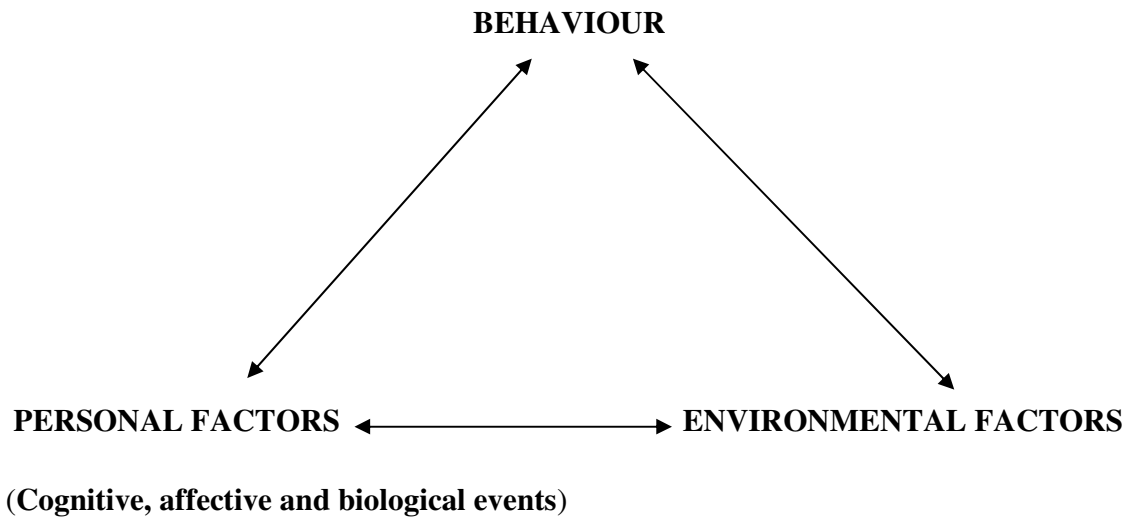
As other theories which preceded it, systems theory does not account fully for all aspects of the traffic carnage. For instance, traffic law enforcement has not been given attention yet it is known to be another key factor in accident research. It is also considered by many safety researchers to be too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

2.4.2 Social Cognitive Theory (SCT)

Social cognitive theory (SCT), used in psychology, education, and communication, holds that portions of an individual's knowledge acquisition can be directly related to observing others within the context of social interactions, experiences, and outside media influences. The theory states that when people observe a model performing a behavior and the consequences of that behavior, they remember the sequence of events and use this information to guide subsequent behaviors (Bandura, 2002). Albert Bandura's social cognitive theory also provides an important framework for this study. This is because the theory helps to explain other latent factors in accident causation aside from explaining the usual factors addressed by other theories. The social cognitive theory (Bandura, 2002) has an agentic orientation to human functioning. Its central assumptions are that three broad constructs i.e., personal factors, behaviour, and environmental

factors are the foremost determinants of human behaviour. Figure 1 shows the constructs of the theory.

Figure 2.1: Bandura's triadic reciprocal model



Source: Bandura (2001) and Pajares (2002)

The bi-directional arrows in the model show the relationship among them. The triadic reciprocal framework of the theory's constructs demonstrates how they mutually interact with each other and also points to the fact that all the constructs are relevant when it comes to the explanation of behavioral outcomes. The agentic perspective it assumes shows the importance of the human agency in the scheme of things. Hence, the theory can be compartmentalized into two broad 24 constructs: human agency and structure. Personal factors and behavior can be grouped under human agency category while environment can be put under structure. Put another way, human behavior is determined by internal mechanisms and environmental factors. Inherent in the human agency is the role of self-efficacy in determining what behavior individuals are likely to engage in. The essence of the theory is that it enables us to describe and explain behavior such as road user behavior. It also provides guidelines for designing and implementing interventions (e.g., accident counter-measures, etc) to address the shortcomings of the behaviors described (e.g., speeding).

This theory provides a good fit for the present research because it addresses two key constructs (i.e., attitudes and behavior) found in the title of this thesis. Under the personal factors, Bandura

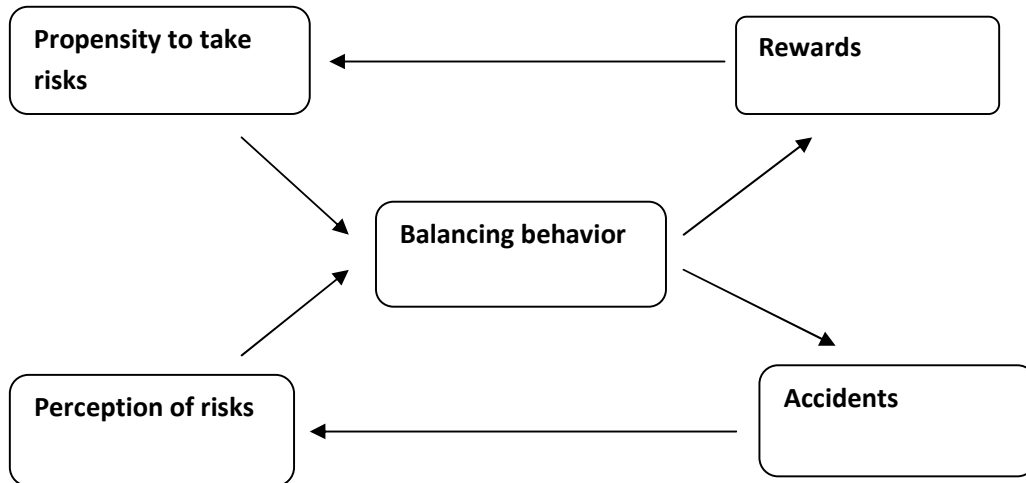
includes cognitive, affective, and biological events to show that personal agency is influenced by internal dispositions. These behavioral patterns interact with environmental processes and are both influenced by each other. This theory shares similarity with the nature-nurture debate in that while it accepts that both nature and nurture are principal determinants of behavior; it does not suggest which construct is more important than the other is. This is foundational because affective beliefs and cognition are integral components of attitudes. Research indicates that cognition and behavior may be inversely related e.g., drivers think that distracted driving is dangerous yet some of them pick calls and text while driving (Lawton *et al.*, 2007). However, the role of affect in risk taking has been documented (Lawton *et al.*, 2007).

Again, the attitude-behavior relationship has been the subject of intense debate in the social psychology literature. This has given rise to the theory of reasoned action (Fishbein & Ajzen, 1980) and its extended version the theory of planned behavior (Ajzen, 1991). However, what is not in doubt is that attitudes influence behavior and vice versa (Festinger, 1975). McCrae and Costa (1995) have reported that an individual's internal dispositions influence how they perceive and appraise the environment. This finding supports Waylen and McKenna's (2008) conclusion that risky road user attitudes are developed before adolescence.

Environmental factors shape behavior and personality characteristics (Bener & Jadaan, 1992). These factors represent both the physical and social aspects of the environment. Via observational and vicarious learning individuals (e.g., drivers) learn to speed because they may have observed similar behavior but go unpunished within their social environment. Pedestrians also may decide to cross the road outside of the crosswalk because they may have seen significant others do same. In reality, human development, adaptation and attitudes to change are deeply rooted in social systems within the environment. And thus, this causal structure emphasizes the point that people are both producers and products of their social environment (Bandura, 2001). The SCT is applicable in many disciplines and can be used to study varying behavior patterns; hence it is very suitable to study the perception in relation to safety within the roads.

2.4.3 Risk Thermostat Model

Figure 2.2: Risk thermostat model



Source: Adams (2003); Adams & Thompson (2002)

In regular day to day life, at work and in our personal time, we all take risks, even when we are aware of the hazards present. If we feel the hazards have been adequately controlled, (for example rubber soled boots protect feet from sharp coral) or our perception of the risk changes, we may be more or less inclined to take those risks. Professor John Adams of University College London describes what he calls ‘the risk thermostat’; the process by which people incorporate perception and experience and then modify their behaviour to a level they believe will appropriately mitigate the risks. When people commonly speak of ‘managing risks’, what they actually mean is controlling the hazards (which, however, is an act of managing ‘risk to the business’). The risks taken will always be in the hands of the operators or persons undertaking activities in the business.

Professor Adams states that most risk management practices address only the bottom loop of the risk thermostat. The occurrence of accidents, near misses, negative reinforcement and education may increase the perception and awareness of risks, and balance risk-taking behaviour by an individual by making them act more carefully and less likely to take risks. However, the occurrence of ‘reward’ events (e.g. increased productivity, ‘getting away with it’, absence of accidents witnessed) can have the opposite effect and increase the propensity to take further risks. When addressing threats, consider which aspects are controllable hazards and which fall

under risk-taking behaviour and require cooperation, education and stakeholder buy-in to manage on an ongoing basis. Remember that human error is normal and should be expected, so where possible, control the hazard to minimise the potential for harm that may occur from either unintentional human error or intentional risk taking behaviours.

This propensity varies from one individual to another - some like it hot, others cool - but no one wants absolute zero. The propensity is influenced by the potential rewards of risk taking. Perceptions of risk are influenced by experience of accident losses – one's own and others' risk taking decisions represent a balancing act in which perceptions of risk are weighed against propensity to take risk. Accident losses are, by definition, a consequence of taking risks; taking a risk is doing something that carries with it a probability of an adverse outcome. The more risks an individual takes, the greater, on average, will be the losses he or she incurs; but also the greater will be the rewards.

2.5 Conceptual Framework

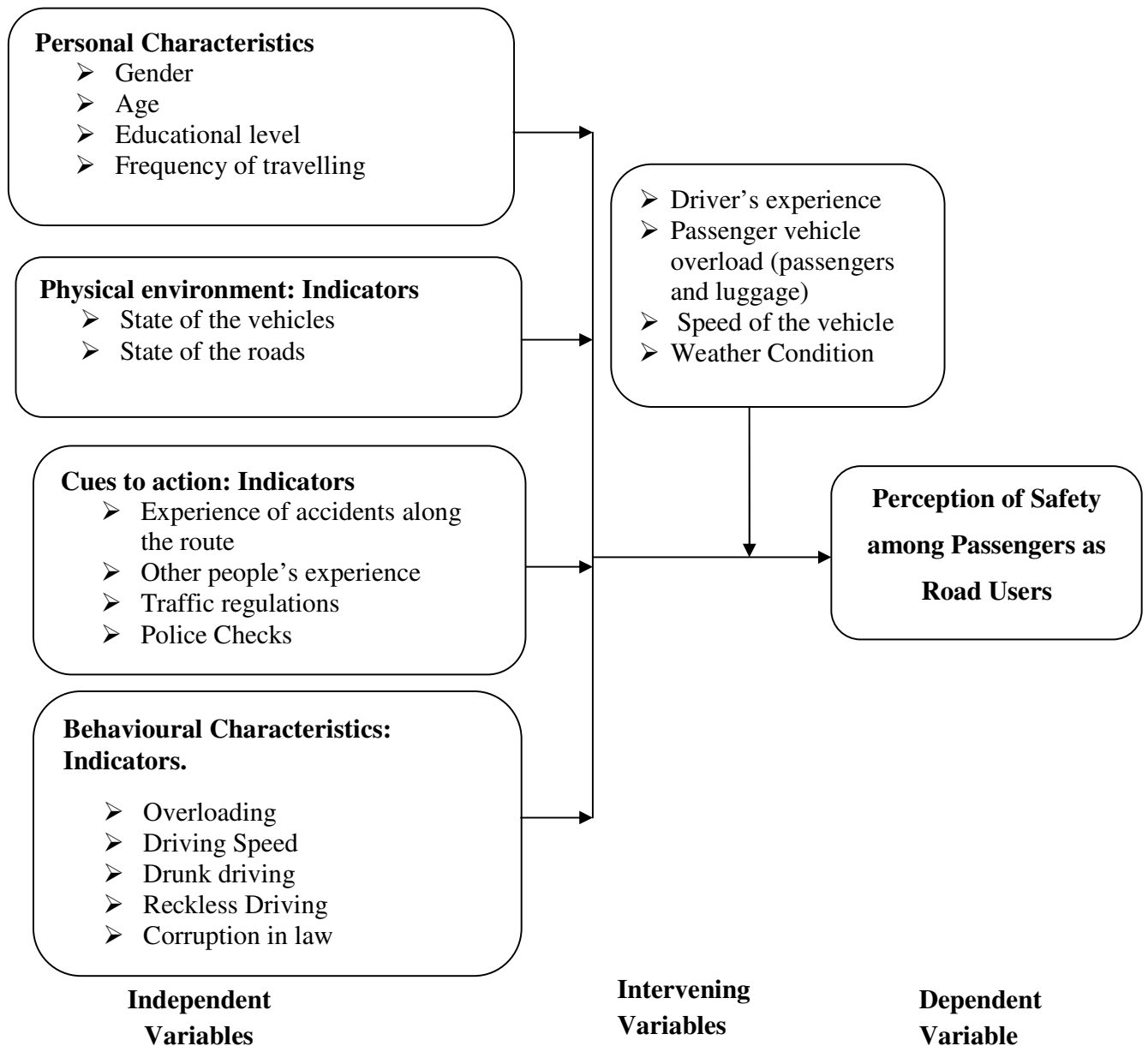


Figure 2.3: Study Conceptual Framework

The conceptual framework model above was adopted for the study which shows that each individual perception is affected by various factors that trigger the in-built risk-taking propensity but there are individual differences with regard to risk-taking. The arrowheads point to the directional influence. From the diagram, personal characteristics (e.g., age, gender, education

level and frequency of travelling, etc) have a direct influence on the perception of risk among road users. Also, risk perception is determined by physical environment (state of the vehicle and the road), cues to action (accidents experience, traffic regulations, police checks, other peoples experience, and behavioural characteristic (overloading, overspeeding, drunk driving, corruption). That is, if you have personally been involved in an accident before or some relatives of yours have been injured or killed in an accident, these negative events directly shape your risk perception. In general, risk-taking could bring both rewards and punishments (accidents). Thus, in perceiving the safety to be taken, a balancing act or in other words, a cost-benefit analysis has to be performed. This balancing act is represented by the box in the middle of the diagram. Though the model may not be comprehensive enough to answer all questions relating to safety perception, it does shed light on some important aspects of the determinants of safety perception.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter sets out the research method that was followed in completing the study. It provides the methods adopted for the collection, measurement and analysis of data. The chapter discusses the procedures and techniques that were used in the collection, processing and analysis of data. The chapter has the following sub-sections: research design, target population, sampling design, data collection instruments, data collection procedures and finally data analysis.

3.2 Research Design

The study adopted the mixed method research design. Creswell (2012) defined the mixed method research design as a procedure for collecting, analyzing, and “mixing” both quantitative and qualitative research methods in a single study to understand a research problem. The study adopted a mixed method research design since the study utilized both qualitative and quantitative data and analysis. The study also applied stratified random sampling method which is suitable in mixed method analysis, therefore making this research design the best for the study.

3.3 Target Population

The target population for this study were users of public service transport within the Nairobi-Nakuru road. The target population for the study were passengers. This study population was selected as it had credible and reliable information concerning the road accidents that happened along the Nairobi - Nakuru road. Additionally, they are either directly or indirectly impacted by the occasion of road accidents along this road and their safety perceptions concerning the same would provide the best insights on the safety perception along the route.

3.4 Sample Size and Procedure

This study employed stratified random sampling method to acquire a study sample of 128 respondents from the passengers travelling on the Nairobi - Nakuru Road, public transport agencies plying the route, traffic police officers, and KENHA employees. Stratified random sampling is a type of probability sampling technique favourable when a researcher is interested in particular strata within the population. Hunt and Tyrrell (2001) observe that with stratified random sampling, there is an equal chance (probability) of selecting each unit from within a particular stratum (group) of the population when creating the sample. Since the population of

study was infinite, the researcher acquired a representative sample of 128 respondents comprising of 120 passengers and 8 Key informants. The researcher selected the respondents who travel through the Nakuru – Nairobi Road. There were two strata: sixty (60) passengers at Nyamakima Stage (Nairobi terminus) who were arriving from Nakuru or those enroute to Nakuru from Nairobi; and, sixty (60) passengers at the main Terminus (Nakuru) who had travelled to Nakuru from Nairobi or those who were enroute to Nairobi from Nakuru. These respondents were approached at random, told the purpose of the study and asked if they were willing to participate in filling in the questionnaires. The same procedure was used until the researcher reached the desired target sample. The study sample was as presented in Table 3.1.

Table 3.1: Study Sampling Frame

Main Study Questionnaire		
Strata	Number of Respondents to be Randomly Selected	Target Respondents
Nairobi Terminal (Nyamakima Stage)	60	Passengers enroute to Nakuru at Nairobi Terminal or arriving from Nakuru
Nakuru Terminal (Main Stage)	60	Passengers heading to Nairobi at Nakuru Terminal or Arriving from Nairobi
Key Informants	8	- 4 public transport agencies plying the route - 2 traffic police officers - 2 KENHA employees
Total	128	

3.5 Methods of Data Collection

3.5.1 Collection of Quantitative Data

This study collected data through use of questionnaires, which were filled by the passengers. Quantitative data was collected in the questionnaire where closed ended questions were raised to the respondents from which they gave their quantitative views, guided by a Likert scale or other

quantitative measures. The questionnaires were divided into two major sections. The first section collected data on the demographics of the respondents while the second section collected data on study objectives. Bouma, *et al.*, (2004) stated that there are a range of advantages in using questionnaires including ease of administration of questionnaires and the potential quality of data gained from semi-structured questionnaires as was used in this study. Quantitative data was presented in form of tables, pie charts and graphs in the study.

3.5.2 Collection of Qualitative Data

The study acquired qualitative data from open ended questions in the questionnaire and by utilizing the interview guide provided to the key informants. The study sought 8 key informants from the public transport sector who included 4 public transport agencies plying the route, 2 traffic police officers and 2 KENHA employees all randomly selected. These provided their qualitative views in regard to the study objectives which enhanced the insights acquired in the study outcomes. Qualitative data was presented in form of embedded discourse in the study acquired from content analysis to enhance the output from the passengers perception discourse.

3.6 Data Analysis Methods

The data collected was coded and entered into Statistical Package for Social Sciences (SPSS), a system used in carrying out the analysis. The data was analyzed by use of descriptive statistics for quantitative data. Descriptive statistics comprised of the use of frequencies, percentage (relative frequency). Quantitative data was presented in form of tables, bar graphs and pie chart, while explanation to the same was presented in prose. Qualitative data was analyzed through content analysis where the opinions were organized in meaningful statements and in prose.

CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents the data analysis and presentation of the data findings. The chapter has information on the respondent demographics, the extent of perceived safety, tools used to evaluate the road safety, the steps used to ensure safety and the effectiveness of the measures put in place to control road carnage.

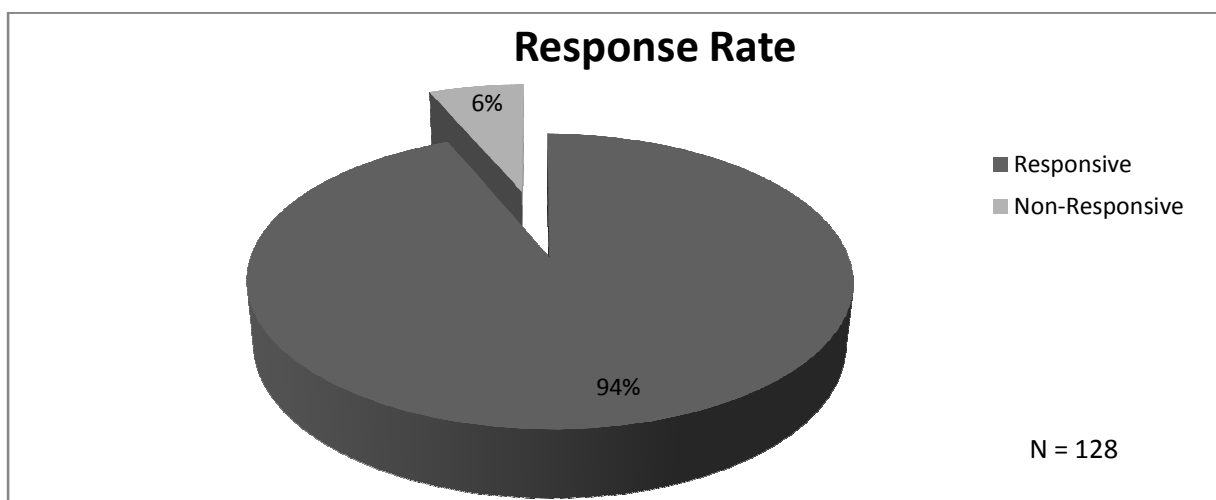
4.2 Social and Demographic Information

The background information of a person is helpful in understanding a person's character, behavior and even culture. The study collected data from respondents who came from different backgrounds. The following sections discuss their demographic characteristics.

4.2.1 Study Response Rate

The study targeted 120 passengers as the main respondents that cruise the Nairobi - Nakuru highway as the study respondents and 8 key informants comprising of public transport agencies plying the route, traffic police officers, and KENHA employees making up a total of 128 respondents. The response rate for the study is as presented in the figure 4.1.

Figure 4.1: Study response rate



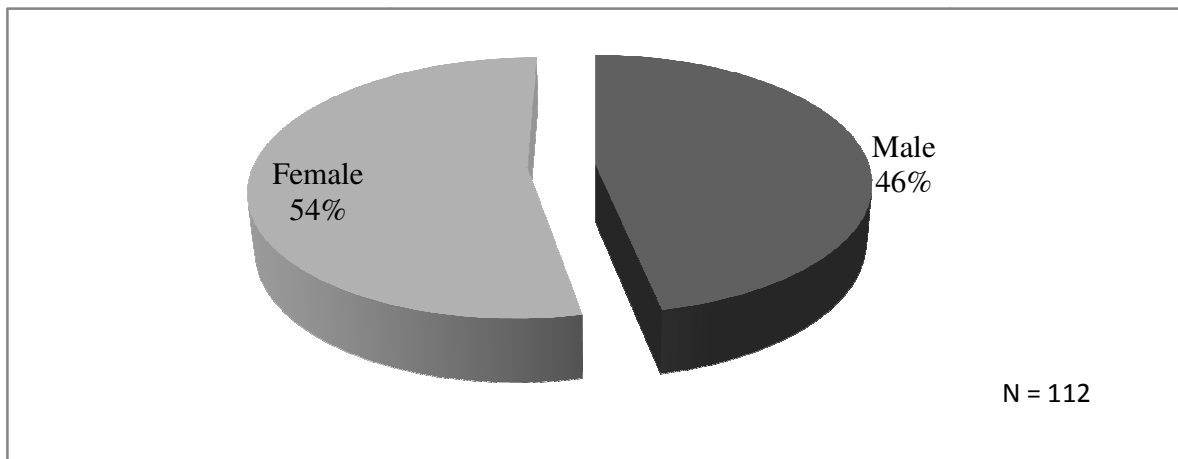
The study realized a response rate of 94% (120) out of the targeted sample size of 128 respondents with only 6% (8) of these not being interviewed in the study. The response rate of 94% comprised of 112 passengers as Nakuru – Nairobi road users and 8 key informants with

only 8 passengers failing to respond to the questionnaires provided to them. This response rate is high enough since Mugenda and Mugenda (2003) suggests an ideal response rate of above 60% to 70%.

4.2.2 Gender of the Respondents

There has been overemphasis on the gender representation in various leadership positions. This emphasis has been motivated by the need to empower women through affirmative action. This study was not left behind in capturing the women representation in the study population. The gender representation among the respondents who took part in this study was as shown in figure 4.2

Figure 4.2: Gender of the respondents

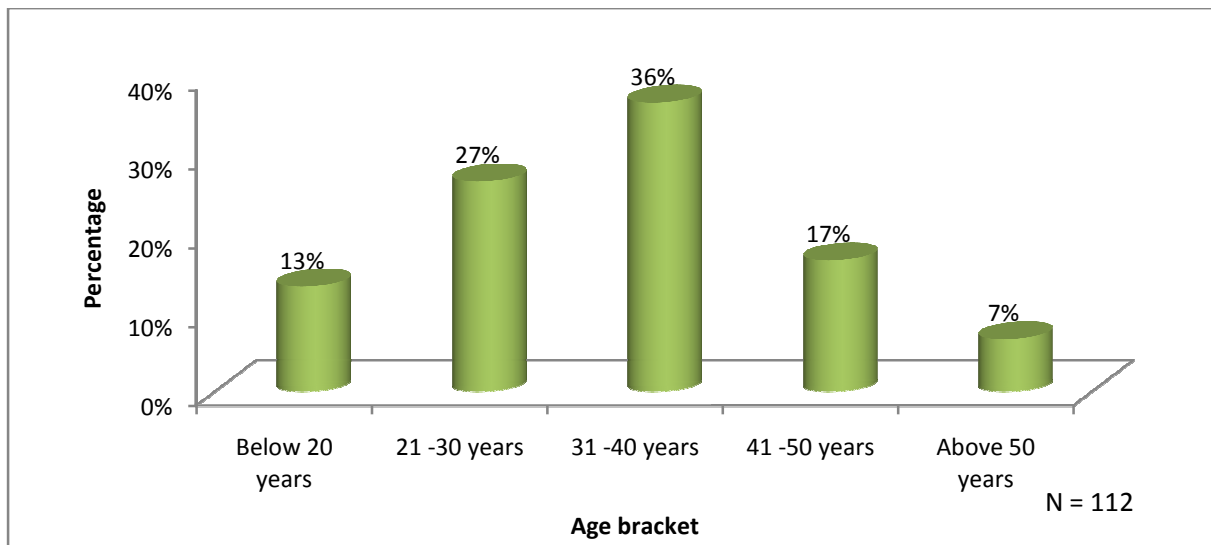


From a randomly selected hence unbiased sample, the study observed that majority of the respondents who took part in this study were women (54%) while men accounted for the remaining 46%. It indicates that women are as likely to travel as much as men in the current Kenyan society. The high participation of women is indication of a rapidly changing society where both men and women have equal chances and opportunities to take part in development and other pertinent issues of national interest, as observed in their equal need of mobility, and therefore they can take part in the road safety discussions.

4.2.3 Age Bracket of the Respondents

The age structure data and information is a very important data. It can be used to inform the proportion of the productive population and the dependent population, which comprise of the young and the elderly. The age distribution of the respondents is shown in figure 4.3.

Figure 4.3: Percentage age distribution of respondents

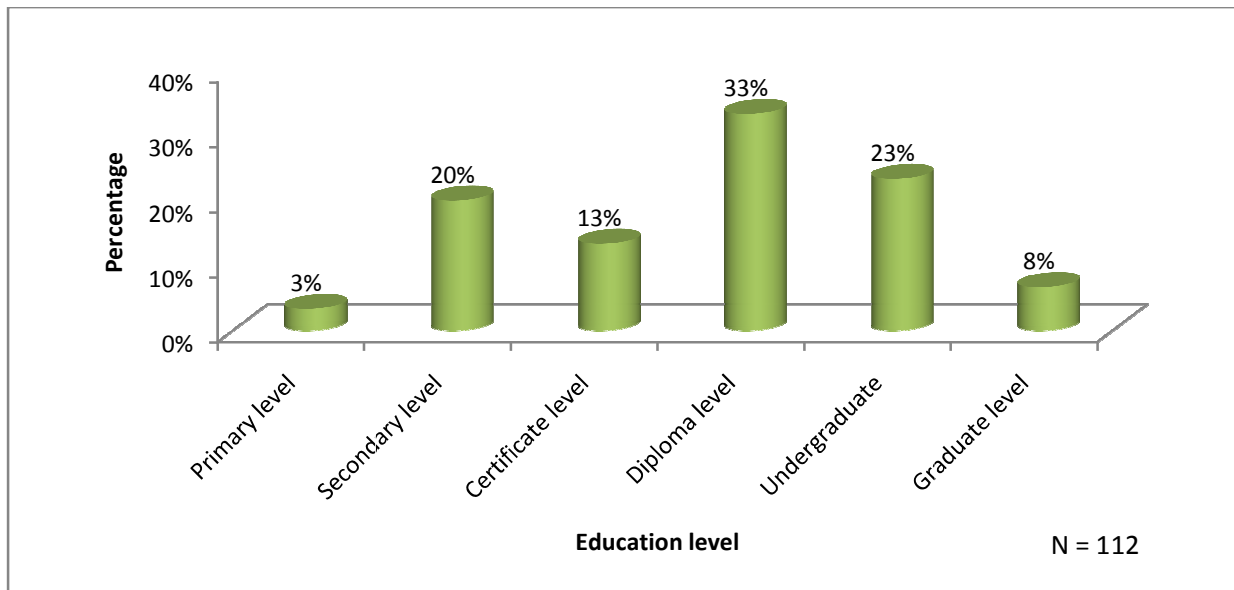


The views given in this study were mainly from respondents between 31-40 years (36%) this can be attributed to the fact that this is the most productive and active age group and thus travel much either for business or leisure, followed by those between the age bracket 21-30 years (27%). The least age group consisted of the elderly who were above 50 years (7%). This can be attributed to the fact that they are no longer in active business thus do not travel much. The age structure of the respondents is a representative of a real population with all ages represented where the active population is observed to be highest for the productive growth stage (between 21-60 years) and inactive where the age is below or above this stage. Thus, the findings are from a normal representative group of the population. This is an indication that the productive population segment of the country mainly uses road transportation in Kenya hence it can be said to be used for enhancing productivity purposes.

4.2.4 Education Level

The level of education of a person shows the expertise of a person. The education level of the passengers is shown in figure 4.4.

Figure 4.4: Distribution by level of education

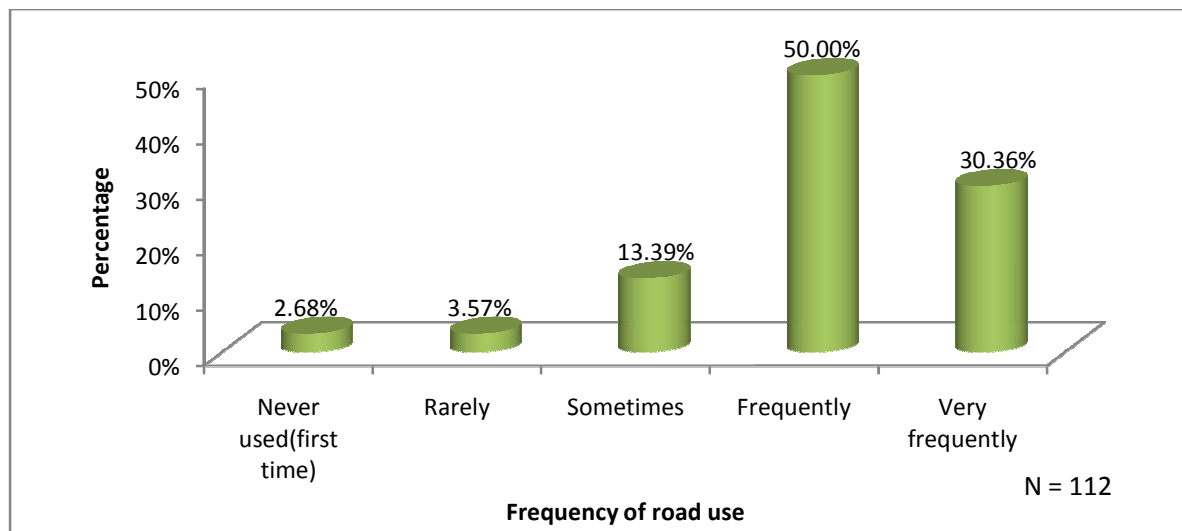


The road users who took part in this study had various education qualifications. Most of them had reached diploma level of education (33%) followed by those who had degrees (23%) and thirdly those who had reached secondary level education (20%). The least had reached primary level of education (3%). This is an indication that there is transfer of skills since most of the road users were observed to be educated. It was observed that those in diploma and undergraduate levels travelled the most while those with very low skills (primary, secondary and certificate levels), had lesser travelling to do. Another key observation is seen where graduate level indicated low representation (8%) as a direct indication of the relatively low number of graduates among the Kenyan population and the observation that most of the graduates own personal vehicles hence rarely use public transport.

4.2.5 Frequency of Use of the Nairobi - Nakuru Highway

The researcher requested the respondents to indicate the frequency with which they used to ply along the Nairobi-Nakuru highway. The findings are shown in figure 4.5.

Figure 4.5: Distribution by frequency of use of Nairobi - Nakuru highway

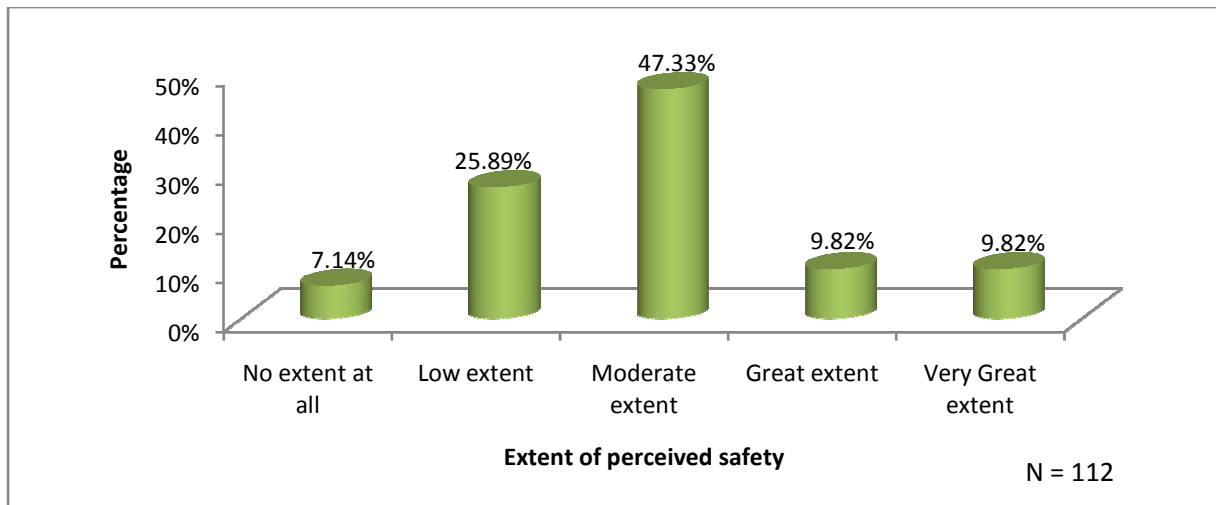


The study found that majority of the respondents who took part in this study used the Nairobi - Nakuru highway frequently (50.00%) followed by those who used the road very frequently (30.36%). The least users were 2.68% of the total respondents and had used the road only once. This is an indication that the respondents assessed in the study are mostly frequent road users and ply this route often. This is also an indication that this is a busy route and confirms the high traffic observed along the route.

4.3 Extent of Perceived Safety

The road users gave an insight on their perception of road safety when using the Nairobi - Nakuru road. From the findings, majority of the road users (53.3%) agreed that they or some of their close relatives had an accident on this road. In addition, the findings indicate that most of these road users feel unsafe (62.1%). This is an indication that most of the road users are aware of the dangers on the road since they have been affected directly or indirectly by accidents and thus felt unsafe when plying along the Nairobi - Nakuru highway. The high number of those directly affected by accidents in the past is an indication of the high rate of accidents occurrence especially along this road. This might be the cause of the observed high percentage of those who feel unsafe along this road. A look at the extent of perceived safety further enhanced these views as shown in figure 4.6.

Figure 4.6: Extent of perceived safety



The study sought to establish the extent of the perceived safety along the Nairobi - Nakuru road. The results indicated that only a small portion of the respondents (7.14%) perceive safety along the road to no extent at all while 25.89% perceive safety along the road to a low extent. Most of the road users (47.33%) perceive the Nairobi - Nakuru road as moderately safe. The respondents who were observed to perceive safety to a great and very great extent were only 19.64%, an indication that they always feel safe when using this road and are sure of their safety when travelling along this road. With 80.36% of the respondents perceiving heightened concern of their safety when using PSVs along this route, it can be expressed that passengers know that there are high chances of occurrence of accidents along this road and are aware of the lack of their safety. However, this might be due to a higher number of women involved in the study. It was observed that more women than men have high perception of safety in public transportation along this road. A key informant in the study claims that this is due to the fact that women are the worst passengers as they tend to be easily frightened. 'They scream just because a tire burst has occurred', an informant observed. However, this perception decreases as the level of education increase, though due to the differences in number of participants involved in the study from different education groups, this cannot be expressly quantified. This might be due to the higher level of comprehension obtained with higher education levels and increased knowledge levels.

4.3.1 Gender and Perceived Road Safety

The researcher cross-tabulated the perception of safety and gender. The results are as shown in table 4.1.

Table 4.1: Distribution according to gender and extent of perceived road safety

Gender	Extent of perceived road safety		Total	
	No extent at all to Moderate extent	Great extent to Very Great extent		
	Percent	Percent	Percent	N
Male	78.34%	21.66%	100%	51
Female	82.38%	17.62%	100%	61
Average	80.36%	19.64%	100%	112

The table shows that more men (21.66%) than women (17.62%) feel safer when plying along the Nakuru - Nairobi road. In addition, majority of those who feel less safe are women (82.38%) compared to men (78.34%). This generally shows that a significant number of more women than men did not perceive to be safe when plying along the Nakuru - Nairobi road. This may be attributed to the fact that women are a bit more sensitive to safety matters than their male counterparts. A female respondent responded that she never travels with her family in the same matatu unless it is necessary, she feels unsafe as she has heard and seen families perish along this road. A male respondent responded that he doesn't fear travelling in public means along this road because; if one has to die he will die no matter what.

4.3.2 Age and Perceived Road safety

Different generations have different understanding and perceive different phenomena differently. The study cross-tabulated age and the perceived safety as shown in table 4.2.

Table 4.2: Distribution according to age and extent of perceived road safety

Age in years	Extent of Perceived road Safety		Total	
	No extent at all to Moderate extent	Great extent to very great extent		
	Percent	Percent	Percent	N
Below 20	73.33%	26.67%	100%	15
21 -30	89.80%	10.20%	100%	30
31 -40	77.50%	22.50%	100%	40
41 -50	73.68%	26.32%	100%	19
Above 50	87.50%	12.50%	100%	8
Average	80.36%	19.64%	100%	112

It was observed that 87.50% of the eldest passengers above 50 years, those in the age group of 21-30 years (89.80%) and 31-40 years (77.50%) perceived the Nakuru-Nairobi highway to be less safe to ply on. Majority of the respondents regardless of age felt that the road was not safe to travel on (80.36%). A 50 years old respondent observed that for the many years he has been travelling along this road, he has seen many accidents being caused by reckless driving and unroadworthy public service vehicles. Due to this he prefers using a particular company that he deems safe and reliable. An 18 year old respondent who felt the road was safe claimed that he doesn't fear travelling along this road in public service vehicles because he has seen even the personal vehicles have accidents along the road.

4.3.3 Education and Perceived Road Safety

The education level and knowledge differentiates the perception of people on something. The study collected data and cross-tabulated the data between education level and road safety along the Nakuru - Nairobi road.

Table 4.3: Distribution according to level of education and extent of perceived safety

Education level	Perceived safety		Total	
	No extent at all to Moderate extent	Great to very Great extent	Percent	N
	Percent	Percent		
Primary level	66.67%	33.33%	100%	3
Secondary level	69.50%	30.50%	100%	22
Certificate level	86.67%	13.33%	100%	15
Diploma level	94.30%	5.70%	100%	37
Undergraduate	84.65%	15.35%	100%	26
Graduate level	88.89%	11.11%	100%	9
Average	80.36%	19.64%	100%	112

The table shows that out of 112 respondents 80.36% perceive road safety to be low to moderate while 19.64% perceive it to be great to very great extent. Most of the respondents who had primary education perceived that road safety along the road to be low to moderate extent. Similarly, most of the graduates and certificate people perceive the road safety along the road to be low to moderate extent. Diploma and secondary school level respondents had high numbers of respondents who perceived road safety along the route as a low to moderate. Majority of the undergraduate students (84.65%) perceived the road safety as no extent to moderate extent along the route while the rest (15.35%) perceive road safety along the route to be great to very great extent. An undergraduate level respondent who perceived the road to be safe to a moderate extent claimed that if road safety measures (Michuki Rules) were well implemented and adhered to, they might decrease the “madness” along the road. A certificate level respondent observed that the accidents could reduce if the police can stop taking bribes from careless drivers and more so arrest the drivers who drive when they are under influence of alcohol, ‘kazi yao ni hongo tu’, she quipped.

4.4 Evaluation tools and measures for safety

The road users provided information on the different tools and measures they used to evaluate their safety along the Nairobi - Nakuru road. The findings are shown in table 4.4.

Table 4.4: Ranked response of tools and other measures used by respondents to evaluate road safety

Tools and other measures	Rank	Percentage Response		Total	
		Yes	No	Percent	N
Type of driving (Level of Carelessness)	1	96.7%	3.3%	100%	112
The speed of the vehicle (slow/moderate/fast)	2	96.7%	3.3%	100%	112
State of the vehicle (age, type & maintenance)	3	83.3%	16.7%	100%	112
State of the road	4	70.0%	30.0%	100%	112
Police check	5	63.3%	36.7%	100%	112
The presence of safety belts	6	60.0%	40.0%	100%	112
Number of accidents along the road	7	37.9%	62.1%	100%	112

The most common method of assessing the safety along the Nairobi - Nakuru road was the type of driving (96.7%) and the speed of driving (96.7%). The road users also considered the condition of PSV vehicles (83.3%) and condition of the road (70.0%) when assessing their safety along Nairobi - Nakuru road. The road users when determining their safety of road along the Nairobi - Nakuru highway, also considered police check (63.3%) and presence of safety belts (60.0%). However, very few of the road users considered the number of accidents, which had occurred along the road (37.9%) to assess the safety of the road when plying along the Nairobi - Nakuru road. This might be due to the fact that there is no alternative route and therefore the travelers are bound to use the route with or without the accidents, and not as a matter of choice. This indicates that passengers are more concerned with the roadworthiness and safety provided by the vehicle they travel in than the route they use. According to the study's key informants, road safety is perceived as very important by most of the road users but most pointed out that the safety measures put in place are rarely observed.

4.4.1 Gender and measures taken to consider road safety

The researcher cross-tabulated the measures used by the respondents to measure road safety and gender. The results are shown in table 4.5.

Table 4.5: Distribution by gender and measures taken to consider road safety

Measures taken in road safety	Gender and response (Percentage)							
	Male				Female			
	Yes	No	Percent	N	Yes	No	Percent	N
State of vehicles (age/type/maintenance)	73%	27%	100%	51	93%	7%	100%	61
State of the road	77%	23%	100%	51	63%	37%	100%	61
Type of driving (level of carelessness)	93%	7%	100%	51	100%	0%	100%	61
The speed of the vehicle	94%	6%	100%	51	100%	0%	100%	61
Number of accidents along the road	37%	63%	100%	51	49%	51%	100%	61
The presence of safety belts	61%	39%	100%	51	59%	41%	100%	61
Police check	64%	36%	100%	51	63%	37%	100%	61

The result shows that majority of the male respondents considered the safety of the road by the type of driving (93%) and the speed of driving (94%) being exhibited by the driver while all the women agreed that the type of driving and speed of driving were major determinants of their road safety. This shows that more women than men measure their road safety with regard to the type of driving and speed of driving. The other measure of road safety used highly by women was the state of the PSV (93% for women and 73% for men). On the other hand, men considered the road safety by evaluating the condition of the road (77%) with corresponding (63%) of the women approving the same. The differential proportions of men and women about the road safety were probably due to the fact that most of the PSV are driven by men and they have different road experiences. In support of the point that state of the road is a major determinant of safety perception, a female respondent was of the opinion that she “does not travel when it is raining because the roads become slippery and with limited visibility for the driver to see well when driving. Worse still the drivers take advantage and over speed because the police are not there at check points when it’s raining.” A male respondent supported the state of the vehicle views by observing that he does not travel in public service vehicles which do not have speed governors and safety belts because there is high chance of fatalities than when the speed is regulated and safety belts installed.

4.5 Steps used to Ensure Road Safety

The road users used different methods to ensure their safety when using the Nairobi - Nakuru highway. The various ways of ensuring safety was assessed on a five point Likert scale whose outcomes are as presented in Table 4.6.

Table 4.6: Respondents' strength of agreement on the steps passengers take to ensure safety when using Nairobi - Nakuru Road

Steps to ensure safety	Strength of Agreement in Percentage					Total	
	1	2	3	4	5	Percent	N
Don't board vehicles driven by drunkards	0%	1%	6%	28%	65%	100%	112
Don't board overloaded vehicles	1%	3%	8%	28%	60%	100%	112
Inspecting the state of the vehicles	2%	4%	10%	32%	52%	100%	112
Fasten my safety belt	3%	2%	13%	34%	48%	100%	112
Use specific vehicle	7%	7%	12%	36%	38%	100%	112
Protest against the reckless drivers	7%	8%	12%	38%	35%	100%	112
Caution the driver to drive well	11%	14%	17%	25%	33%	100%	112
Report reckless drivers	11%	14%	20%	30%	25%	100%	112
Check whether the vehicle is insured	20%	23%	35%	14%	8%	100%	112
Report corrupt policemen	13%	23%	38%	14%	12%	100%	112

Note:

5=strongly Agree

4=Agree

3=Neutral

2=Disagree

1=Strongly Disagree

The findings indicate that the road users strongly agreed that they do not board vehicles driven by drunkards, since they registered this as a major step which they undertake to ensure safety with most of the respondents (65%) agreeing strongly and (28%) agreeing to the safety step that it is a factor they put into consideration when travelling. This is because a drunken person has less power to make good judgment and to control how he is driving even when plying along a good road with a good car. Others agreed that they ensured their safety by avoiding boarding overloaded vehicles where 61% of the respondents strongly agreed that it is a factor they

consider, inspecting the condition of the PSV before boarding vehicles (52% strongly agreed) or by fastening safety belts (48% of the respondents strongly agreed while 34% agreed). The least used methods were reporting reckless drivers (25% strongly agree and 30% agreed), checking whether the vehicle is insured (with 35% viewing it as having moderate impact on their perception and 25% low extent) and reporting corrupt police officers (with 38% having neutral views and 23% disagreeing). It is therefore observed that the perception of safety is least among passengers when in a vehicle driven by a drunk driver and higher when considering corrupt police officers along the route. This is a lapse in judgment on the side of road users since the enforcement role carried out by police officers has a direct impact as accident deterrent while insurance covers for the risks in case of an accident, reporting misdemeanors on the road enhances the public role in enhancing safety, and cautioning drivers when observed on the wrong would also be direct accident deterrent. However, according to the key informants, these (role carried out by police officers, insurance covers, reporting misdemeanors on the road, and cautioning drivers when observed on the wrong) are all long-term solutions to combating road safety and the road users take into considerations the short-term safety measures for their safety perception and overlook the long-term measures.

4.6 Effectiveness of the Measures Taken to Ensure Safety

The researcher collected data on the effectiveness of the measures taken to ensure safety along the Nairobi - Nakuru road. The effectiveness of safety measures was assessed on a five point Likert scale whose outcomes are as presented in Table 4.7.

Table 4.7: Measures taken to ensure road safety and strength of agreement that they ensure safety

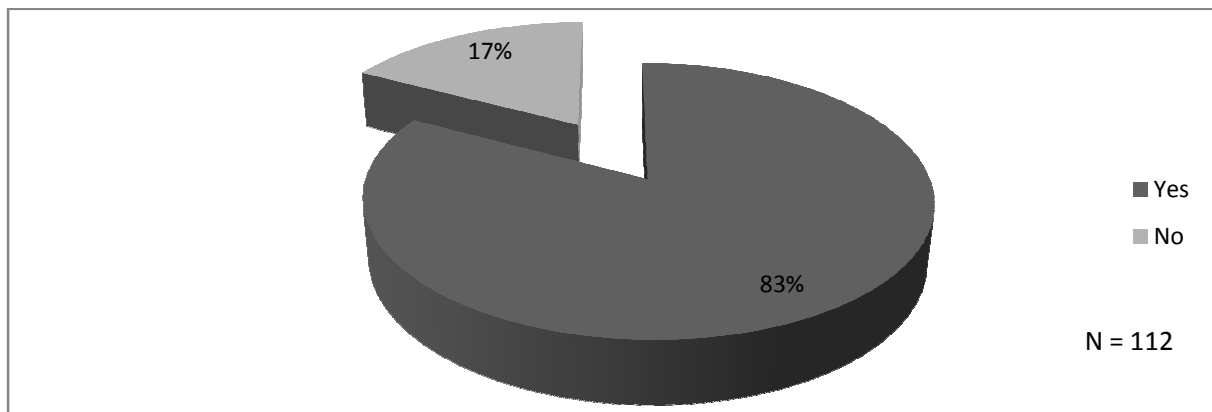
Measures taken	Strength of Agreement in percentage					TOTAL	
	1	2	3	4	5	%	N
Introduction of alcohol blow	0%	2%	11%	43%	44%	100%	112
Use of speed governors	1%	5%	13%	43%	38%	100%	112
Imposing heavy penalties, fines for careless driving	2%	4%	19%	33%	42%	100%	112
Banning of night travels	3%	5%	13%	38%	41%	100%	112
Setting maximum number of driving hours of PSV's	4%	8%	13%	40%	35%	100%	112
Fitting of safety belts	7%	13%	23%	34%	23%	100%	112
Use of CCTV cameras along the roads	21%	23%	31%	13%	12%	100%	112

Note:
5=strongly Agree
4=Agree
3=Neutral
2=Disagree
1=Strongly Disagree

The findings shown in Table 4.7 shows that the most perceived effective measure is use of alcohol blow (with most of the respondents 44% strongly agreeing to this notion while 43% agreed to the notion). Other measures which the road users perceived to be effective to a great extent were use of speed governors (with most of the respondents 43% agreeing to the step and 38% strongly agreeing to this notion). Imposing heavy penalties and fines for careless driving was strongly agreed to by most of the respondents (42%) while 33% agreed to the notion, banning of night travels was strongly agreed to by most of the respondents 41% with 38% of the respondents seeing it as an agreeable option. Setting of maximum number of driving hours for the PSVs was agreed upon by majority of the respondents (40%) while 35% strongly agreed to the application of this measure. However, the fitting of safety belts and the use of CCTV cameras along the roads were observed to be moderately effective. Most of the respondents were of the view that fitting of safety belt is an important road safety measure with 34% agreeing it is effective while 43% viewed the measure as not effective in this sector. Usage of CCTV cameras on the other hand was observed as a futile measure by most of the respondents (75%) with only 25% observing the measure as useful in the transport sector. All these measures have been applied in the past in the transport sector of Kenya but very little have been realized from them.

The rule that introduced mandatory safety belt fitting caused quite an uproar when it was introduced in the transport sector in Kenya and unlike the road users, the police officers involved with the mandate of enforcing the traffic policy viewed them as key to enhanced safety on the road. The police officer key informant claimed that, “the Michuki rules – policy where the speed governors and safety belt usage was mandatory in Kenyan PSVs – led to the greatest reduction in accidents and accident related deaths in our Kenyan roads, including the Nakuru - Nairobi highway”. Most of the interviewed public sector operators observed that if the traffic policies combating careless road usage are well implemented, they will be able to reduce road carnage to the base minimum. The study also considered the effectiveness of these measures whose outcomes are as shown in Figure 4.7.

Figure 4.7: Effectiveness of the measures



The study found that majority of the road users perceive the measures put in place as effective in controlling road carnages (83%) while only (17%) viewed them as ineffective. This is contrary to what a key informant in the sector said that there is no reduction in carnage on the said road as it mainly occurs periodically and is attributed to laxity of the enforcement authorities.

4.7 Excerpts from the Key Informants Interviews

The study also involved eight key informants to inform the study outcomes composed of 2 traffic police officers, 4 transport agencies and 2 Kenya Highway Authority officers. They were interviewed on their perceptions on safety along the road and they gave the following views. The three groups displayed their familiarity with the Nakuru Nairobi road clearly. They had extensive experience in their different outposts along the Nakuru – Nairobi road and had been extensively involved in enhancing road safety among motorists using the highway.

4.7.1 Role on road safety management

The traffic police officers are mandated to enforce road regulations among the road users. They however observed that their role in road safety management is to respond whenever there is a crisis among motorists on the road such as when an accident has occurred, and also to clear traffic jams that occur frequently within the road. It was after being prodded further that they observed that they check the adherence to traffic regulations among the motorists. Kenya Highway Authority officials on the other hand maintained that their role is to basically maintain the road and ensure it is safe for use by motorists. The transport agencies said that their role in road safety management was to ensure that their vehicles are operating efficiently, are roadworthy and have met all the transport sector requirements and regulations. One of the agencies claimed that they even post field officers along the road to find those among their crews who are flouting their code of conduct and regulations. From the key interviews, the only key informants involved as key players on road safety who were observed to be failing in their mandate were the two police officers as it emerged that they were not fully aware of their primary mandate. This might not be the case for the whole police force but the two police officers involved in the study had a problem stipulating their mandate during the interviews.

4.7.2 Stakeholders for enhancing safety among the road users

The key informants were asked which stakeholders were responsible for enhancing safety among road users. One key stakeholder mentioned KenHA and Traffic Police. The traffic police informants mentioned the Ministry of transport that offers the regulations and directives to be followed by motorists. According to one of the traffic officers, “the ministry is failing in providing strict guidelines on the usage of the road”. He went on to explain that comparing the time of a former popular Minister for Transport ‘Michuki’, and that of the minister at the time of the study ‘Kamau’, the latter seems to be idling in office. When further prodded on their role in enhancing the Michuki rules, they observed that their role is only to execute the mandate they receive from the government officials and hence their hands were tied. This seemed like they were shifting the blame to others and not themselves. KenHa officials on the other hand applauded the Ministry of Transport as being very vigilant on ensuring that the number of road accidents is reduced. They also observed that the motor vehicle owners associations operating along the route are also responsible and that KenHA is only involved in maintenance of the road. The transport agencies involved in the study on the other hand viewed their role in safety

enhancement as that of oversight of their client's operations and ensuring their vehicles meet the safety standards required by law. They observed that the main role is that of police officers who are supposed to enforce law among road users which they have been absconding while choosing to engage in corruption and bribery. They also observed that the ministry of transport ought to bring in measures that are helpful in safety enhancement not just introducing measures that are useless to road users, and also ensure high level of maintenance of the roads' conditions, especially during the rainy season.

4.7.3 Perception of Safety

When asked how safe the road is, KenHA officials observed that the road has been marked as one of the most dangerous roads in the world. The Highway is notorious for drunk-driving combined with speeding, poor overtaking and pedestrians in the road which has resulted in many deaths on the Highway annually, making the perception of safety on the road to be extremely low. They observed that the situation has been so bad that Kenyan roads have been ranked 9th as most deadly in the world with 34.4 deaths from accidents per 100,000 inhabitants per year. Traffic Police respondents were adamant that from the kind of accidents they have witnessed along the road, they felt that the road is not safe for motorists and they advocated for caution when using the road. However, the transport agencies plying the route were a bit lenient on their perception of safety along the road claiming that the measures taken to curb the traffic accidents were mainly successful. One of them having lost two drivers on duty through road accidents claimed that they have no fear of the road since they instituted measures to minimize the occurrences of accidents. The transport agency observed that it has provided transport services along the route for the last thirty years, and only five fatal accidents have occurred for the agency hence they are adamant that the route is safe for usage.

4.7.4 Preparedness in Combating Road Carnage

The police officers were of the view that they are always prepared to combat the carnage. Though it is a hard task to man the road, one observed that: 'we cannot provide officers for the whole length of the road, so we manage with the few we have and hope they will be able to deal with all arising issues along their area. However, we have a team that can be dispatched to any area along the road where an issue arises'. The KenHA officials observed that the road was in good condition currently and there were plans to expand the road further with better surface

hence there might be lesser casualties in future due to poor road conditions, hence they concluded that they are fully prepared. One KenHA official observed that they have a dispatch team ready to take up any arising issue and respond in the shortest time possible. The transport agencies involved in the study observed that they are always prepared to combat road carnage and also rely on their workforce who act as the “brother’s keeper” and ensure their colleagues are okay throughout the road stretch.

4.7.5 Public Perception on Measures to Curb Accidents

The KenHA officials were the most disturbed by the bad perception of the public on the undertakings that have been put in place to protect them. A key informant observed that whenever they close down a section so as to carry out repairs, some people are always mad at them especially whenever a traffic jam arises from their activities. They see the public as being very arrogant whenever issues to do with road use and control issues come to affect their day to day operations. Similar views were posited by the Traffic Police officers who claimed that the members of the public have no understanding of their operations and always cry foul claiming ‘they are being targeted when they are on the wrong side of law’. Another Police Officer claimed that most of the public are liable to aiding and abetting a traffic offender who is supposed to be jailed for their bad behaviours on the road. The transport agency interviewee observed that the members of the public are the ones who are most non-committal to the rules and regulations of the roads. They have very bad perception concerning the usage of the roads and the measures taken by the government and the transport agency to protect them on the road. One of them claimed that the public at times sees their efforts as ‘a waste of time.’

4.7.6 Perception of Road Safety among Road Users

The study found that the perception of road safety among the users from the views of key informants is moderate. They observed that road users do not perceive safety along the road to be high and neither do they perceive it as low. According to a traffic police officer, the members of the public realize the dangers they face on the road whenever they come face to face with an accident along the road. They seem to be very contented in their hurry to travel from one place to another for them to notice safety issues. Similar views were offered by the other traffic police officer. He claimed that members of the public act very carefree to notice the dangers lurking on that road. When prodded of their own perception of the road, both police officers claimed that

their perception of road safety on the Nairobi –Nakuru Highway was very low. One police officer observed that from his experience on that road, one ought to be extra careful when using it. They claimed the moderate perception of safety among members of the public on safety along the road was mainly due to the carefree nature, their lack of experience of accidents that have happened on that road, and lack of verified information on the probability of accidents on the road to happen. The KenHA officials observed that members of the public observe travelling on the road as dangerous as travelling on any others and hence their perception on safety is moderate. Their views were also backed by the transport agencies who claimed that it is not the duty of the public to mind their safety but the duty of the agency; hence they are the ones whose perception of safety on the road matters. The KenHA officials observed that their own perception of safety on the road is very low. One observed that they have to be extra careful when carrying out maintenance on the road as the chances of an accident are very high. The transport agents offered their own perception of safety as being moderate observing that they have operated along that road for many years and occurrences of accidents is very rare especially when the company has taken the right precautions.

4.7.7 Ways of Improving the Perception of Road Safety

The Traffic police observed that improved adherence to traffic rules would help. They also observed that there are many black spots which ought to be highlighted so that the occurrences of accidents would be lowered and road users would feel safer along that road. The KenHA officials on the other hand observed that improvement in training of drivers using the road might be important as most of those drivers using the road are incompetent and culpable of causing major road accidents. They also observed that any undertakings that can minimize the accidents happening along that road would help to improve safety perception. The transport agency respondents were of the view that better enforcement of ‘Michuki’ rules would suffice. They added that taking of bribes by police would need to cease for the perception to improve since they allow breaking of rules and regulations on the road. They also observed that for the perception to improve, the fatal accidents occurrences along the road ought to decrease so that the people may feel safer in vehicles they are travelling in. They observed that this feat cannot be achieved in the near future and therefore the perception will be remaining the way it is currently, at least in the next few years.

CHAPTER FIVE: DISCUSSION OF THE FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This study was motivated by the need to evaluate the perceived road safety among the passengers plying along the Nairobi - Nakuru road. The study sought to establish what public service vehicles passengers think of road safety measures that have been put in place. The study also sought to find out the actions passengers were taking to ensure their road safety and the effectiveness of the road safety measures put in place along the Nairobi – Nakuru road. This chapter presents the discussions of the study findings, conclusions, recommendations and lastly the suggestions for further study.

5.2 Summary of Findings

The data were collected from passengers who ply the Nairobi - Nakuru road. Thus they had good information about the road and could reliably provide relevant information needed by the researcher for the study. Most of the respondents or their close relatives had at one time been involved in road accident. They had been victims of road accident or had been affected by them through their close relatives. Road safety was therefore confirmed as a social issue affecting many in the society, directly or indirectly. This confirms the observation by a WHO report (2008) that road crashes are a major social cost to most societies in the world. More importantly, the study found that most of the road users perceive to be unsafe when plying along the Nairobi - Nakuru road. The study observed that there is a negative perception of safety among the road users plying along the highway. Therefore, the extent of perceived road safety along the Nairobi - Nakuru highway is low among the passengers who frequently use the road.

The study found that passengers used different methods to determine the safety of the Nairobi-Nakuru road. The most common methods used by the passengers to gauge their safety when plying along the road was the type of driving and the speed with which they were being driven with by the PSV drivers. Others consider the condition of the PSV vehicle, the condition of the road, the extent to which the traffic police were inspecting the vehicles plying along the road while others inspected the presence of safety belts. More importantly, very few passengers agreed (37.9%) considered the number of accidents that had occurred to determine the safety of the road. Ogotu (2012) asserted that if everybody fastened their seatbelt, respected speed limits

and did not drive under the influence of alcohol, it is estimated that more than 12,000 lives could be saved each year on major roads.

To ensure their road safety, the passengers have taken some precautionary measures so as to avert the likelihood of road accidents. Majority of the passengers, do not board vehicles, which are driven by drunkards. This is a safe precaution since a sober driver is less likely to cause accidents with the view that he has a good mental and physical control of his or her driving. Some passengers ensure their road safety by not boarding overloaded vehicles, others by inspecting the condition of the PSV before boarding the vehicles while others fasten their safety belts. However, reporting reckless drivers and reporting corrupt policemen were not common methods the passengers took to ensure their road safety along the road.

On the effectiveness of the measures which the transport ministry has put in place, the passengers rated the use of alcohol blow as the most effective method to curb road accidents, followed by the use of speed governors. The other methods, which the passengers felt were effective in reducing the cases of road accidents, included imposing heavy penalties and fines for reckless driving, banning of night travels, and setting the maximum numbers of driving hours for the PSV vehicles. The passengers stated that the fitting of safety belts and use of CCTV cameras along the roads were not effective in reducing the road carnage along the road. However, in general, the road users felt that the measures put in place would be effective in controlling road safety if they would be reinforced and implemented well by the relevant road authorities.

5.3 Conclusions

The study concludes that road accidents are rampant and there is general perception of the road being unsafe among the passengers who frequently used the Nairobi-Nakuru highway. The passengers feel unsafe and consider the highway a risky road prone to road accidents. The passengers used different methods to assess their safety when plying along the Nairobi - Nakuru road. The study noted that passengers assess the type of driving, speed of driving, PSV vehicle, the condition of the road, police checks, and fittings of safety belts in PSVs to consider their safety level. The study found that passengers mind about their road safety by not boarding vehicles driven by drunkards, avoiding boarding overloaded vehicles, inspecting the condition of the PSV before boarding and by fastening their safety belts. The study concludes that road users perceive the following measures to be effective in the control of road carnages along the Nairobi

- Nakuru road: use of alcohol blow, use of speed governors, imposing heavy penalties and fines for the reckless drivers, banning of night travels and setting maximum number of driving hours for the PSVs. The study concludes that a decrease in perceived road safety was accompanied by a corresponding increase of precautions taken by the passengers. The increased precaution by the passengers in turn leads to increased effectiveness in the control of road safety along the Nairobi - Nakuru highway.

5.4 Recommendations

5.4.1 Policy Recommendations

The study found that the perception of safety among the Nakuru Nairobi Road users is very low. However, it was observed that key stakeholders in the sector such as police officers, KeNHA officials and Public Service Vehicle agencies view their perception as being moderate. This indicates a disconnect – indicating lack of information - that ought to be addressed by the key sector stakeholders in the country in order to improve this perception among road users of the Nairobi – Nakuru road. The study therefore recommends a joint discourse among the key stakeholders of the transport industry in Kenya comprising of road users, traffic police department, KeNHA, PSV agencies, and ministry of transport to deliberate on ways to improve the perception and trade their views on the matter.

The study also observed application of various safety measures by road users, one of them being enforcement of road usage rules and regulations. It was observed that a key cause of accidents is the lack of diligence of traffic police in enforcement. However, hardly do the passengers report corrupt police officers along the roads as they are not seen as a direct cause to road carnage. Therefore, the study recommends that reporting of corrupt police officers by the public would go a long way in combating accident risk in Kenya and therefore should be encouraged so as to decrease road accidents and improve the perception of safety among the road users.

The study found that road users inspected the condition of the vehicle before boarding since it has an impact on their perception of safety. Thus, the study recommend that public service vehicle owners and agencies should ensure that their vehicles are in good working condition so as to enjoy more business from passengers who have better safety perception.

The study also recommend that all the transportation sector stakeholders should consider the mitigation factors that are thought to influence perception of safety among road users such as: type of driving and obedience to the traffic rules, corruption among policemen, the condition of the road, use of alcohol blow, setting of the maximum number of hours for the PSV drivers, in their bid to reduce road carnage along the Nairobi - Nakuru route and at the same time restore safety perception among the road users.

5.4.2 Suggestions for Further Studies

The study was done among the passengers plying along the Nairobi - Nakuru road. However, the data and findings of the study could be different in other roads, which the study did not cover. Therefore, similar study should be conducted in other roads to establish the perceived road safety among the passengers using other roads in Kenya. The data for this study were related to the perceived safety among the road users plying the Nairobi - Nakuru road. The actual figures and statistics in time series format related to road carnage and their effects on safety perception along the road have not been taken into account in this study. A more comprehensive study, which encompasses both statistical figures and the data from the road users therefore need to be done to have more concrete and informative findings.

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APPENDICES

Appendix i: Questionnaire (for Users of Public Transport)

Section A: Demographic information

1. Indicate your gender.

Male Female

2. Indicate your age bracket.

Below 20 years

21-30 years

31-40 years

41-50 years

Above 50 years

3. Indicate the highest level of education

Primary education

Secondary education

Certificate level

Diploma level

Undergraduate

Graduate level

4. Frequency with which you use Nakuru-Nairobi highway?

Very frequently []

Frequently []

Sometimes []

Rarely []

Never used (first time) []

Section B: Information on Road Safety

5. Have you ever had an accident or have a close relative ever been involved in one?

Yes [] **No** []

6. Do you feel safe when travelling through Nakuru-Nairobi highway?

Yes [] **No** []

7. To what extent are you safe from road accidents when using PSV vehicles along Nakuru-Nairobi highway?

Very great extent []

Great extent []

Moderate extent []

Low extent []

No extent at all []

8. What do you use to evaluate your road safety when travelling along Nairobi-Nakuru road?

Evaluation tools for safety	Yes	No
The condition of the PSV vehicles		
The condition of the road		
The type of driving		
The speed being driven with		
The number of accidents along the road		
The presence of safety belts		
The police check		

9. What else do you use to assess the safety of your travel when using Nairobi-Nakuru road?

.....

10. Do you use the following steps to ensure your safety when plying along Nairobi-Nakuru road?

Steps used to ensure safety	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Inspect the condition of the PSV vehicles					
I caution the driver to drive well					
I check whether the vehicle is insured					
I protest against drivers who drive while smoking, taking miraa, or even alcohol					
I report reckless drivers to the management					
I don't board vehicles driven by drunkards					
I fasten my safety belts					
I use a specific vehicle which is safe					
I report corrupt policemen					
I don't board on overloaded vehicles					

11. What other measures have you taken to ensure your safety when plying along the road?

.....

12. What measures have been put in place by the government to address road carnage along the Kenyan roads?

.....

.....

.....

13. To what extent have the following measures been effective in ensuring safety along Kenyan roads?

Measures taken to ensure safety	Very great extent	Great extent	Moderate extent	Low extent	Not at all
Introduction of alcohol blow					
Use of speed governors					
Fitting of safety belts					
Banning of night travels					
Setting maximum number of driving hours of PSVs					
Imposing heavy penalties fines for careless driving					
Use of CCTV cameras along the roads					

14. What other measures do you think have been effective in addressing road safety issues along Nairobi-Nakuru road?

.....

.....

.....

15. Are measures put in place effective in controlling road carnages along the Nairobi-Nakuru road?

Yes [] No []

16. Explain how these measures have been or have not been effective in controlling road carnage along Nairobi-Nakuru road?

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

17. What other measures can be put in place to control road carnages along the Nairobi-Nakuru road?

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

Thank you for your time

Appendix ii: Interview Guide (Key informant interview guide)

Interview Guide for the Key Informants

- 1) Please describe your relationship with the road safety management and familiarity with Nairobi – Nakuru road?
- 2) What is your role on road safety?
- 3) How safe is the road in question to the road users?
- 4) Who (stakeholders) is responsible for enhancing safety for road users along this road?
- 5) How well prepared is the country in combating road carnage along this road?
- 6) On your experiences, what is the public perception on measures put in place in a bid to lower the road carnage?
- 7) What is the general perception on road safety among the road users of Nairobi - Nakuru road?
- 8) What may have caused this perception in your views?
- 9) How can the observed perception on road safety among PSV users be improved?
- 10) How do you foresee the future in terms of road users' perception along this road?

Thank You for Your Participation and Keep up the Good Work