# MODELLING THE ROAD TRAFFIC ACCIDENTS AND THE ASSOCIATED RISK FACTORS ALONG KAPIRI MPONSHI AND NDOLA ROAD

BY

**David Phiri** 

**Student Number:** 

20011250

A Research Report Submitted in Partial Fulfillment of the Requirement for the Award of the Degree of Bachelor of Public Health

Chreso University.

May, 2024

# DECLARATION

I Phiri David, do hereby declare that the work presented in this report is entirely my own and that the literature from other sources used in this report has been properly acknowledged and to the best of my knowledge this work has not been presented before at this University or any other institution for academic or other purposes.

Author's Signature...... Date.../..../.... Mr. David Phiri Supervisor: Mr. Boyd Mweemba...... Date..../....

# DEDICATION

This thesis is dedicated to my beloved family members for their love, care and support.

### ABSTRACT

A study was conducted to reduce and prevent road traffic accidents, by determining patterns and identify major risk factors responsible along Kapiri Mponshi and Ndola Road. The road covers between Central Province and Copperbelt Province. The research was carried out in 2023 and 2024. The data were collected using interviews guide from accident victims, government officials, traffic police and review of secondary data at Kapiri Mponshi District Hospital and Ndola Teaching Hospital of about 2018 casualties, were done accordingly. The study has revealed the major risks and trends of motor traffic accidents in these two districts from 2019 to 2024. It shows that the accident occurrence was increasing every year, passengers and pedestrians are always at highest risk of being injured or killed on the road. Young males are highly prone to motor traffic accidents. Males are more involved in road accidents than females; the risk of being involved in an accident during the day shows (59%) is significantly higher than during the night of (41%). Over speeding, reckless driving and inexperienced driving were identified as major factors to motor vehicle crashes. The study has also identified qualitatively that the technical element of the highway construction, corruption, irresponsibility, poor management, driving under the influence of alcohol, driving without training, failure to respect and obey traffic regulations and bad condition of vehicles and the road are the important risk factors associating to the cause of traffic accidents in two districts. In order to reduce traffic accidents, it is recommended that the government should review legislation regarding employment of drivers and driving schools. To allow improved working conditions on both RTSAs and traffic Police officers, improvement and sustainable maintenance of the road, put up proper sign posts and Public road safety campaigns should be intensified.

| DECLARATIONi                                    |
|---|
| DEDICATIONii                                    |
| ACKNOWLEDGEMENTiii                              |
| ABSTRACT iv                                     |
| LIST OF FIGURES vii                             |
| CHAPTER ONE                                     |
| 1.0 INTRODUCTION                                |
| 1.1 Background1                                 |
| 1.2 Problem Statement                           |
| 1.3 Objectives                                  |
| 1.4 Research Question                           |
| 1.5 Justification and Significance of the study |
| CHAPTER TWO                                     |
| 2.0 LITERATURE REVIEW                           |
| 2.1 System Theory                               |
| 2.2 A Model for Traffic Accidents 5             |
| 2.3 Human Behavior                              |
| 2.4 Driving Skills                              |
| 2.6 Gender                                      |
| 2.7 Vehicle Fitness                             |
| 2.8 Environment                                 |
| 2.9 Traffic Laws, Control and Regulations       |
| 2.10 Geographical Approach                      |
| 2.11 Spatial Patterns                           |
| CHAPTER THREE 10                                |
| 3.0 METHODOLOGY 10                              |
| 3.1 Study Area Description10                    |
| 3.2.0 Research Design 11                        |
| 3.2.1 Sampling Method and Justification 11      |

# Table of Contents

| 3.2.2 Selection of Data Collection Sources and Participants12      |
|--|
| 3.3.0 Data Collection12  |
| 3.3.1 Major Causes RTAs12  |
| 3.3.2 Interviews with Main Informants: (RTA victims)13             |
| 3.3.3 Interview with Officials (Key informants)13                  |
| 3.3.4 Interviews with Hospital Staff13                             |
| 3.3.5 Interviews with Traffic Police Officers13                    |
| CHAPTER FOUR14   |
| 4.0 RESULTS14  |
| 4.1 Overview14   |
| 4.2 Temporal and Spatial Patterns of Accidents14                   |
| 4.3 Major Causes of Road Traffic Accidents17                       |
| 4.4 Classification by Age and Gender of Drivers Involved in RTAS18 |
| 4.5.1 The Traffic Police Views on RTAs19                           |
| 4.5.2 Views of other Key Informants19                              |
| CHAPTER FIVE   |
| 5.0 DISCUSSION AND CONCLUSION                                      |
| 5.1 Pattern of Road Traffic Accidents21                            |
| 5.2 Major risk factors of Road Traffic Accidents22                 |
| 5.3 Conclusion   |
| 5.4 Recommendations24  |
| REFFERANCES  |
| APPENDICES   |

# LIST OF FIGURES

| Figure 1: Distribution of road traffic accidents by year                  | 15 |
|---|----|
| Figure 2: Distribution of road traffic accidents by Month                 | 15 |
| Figure 3a: Distribution of road traffic accidents by Day and Night        | 16 |
| Figure 3b: Distribution of road traffic accidents by Days of a Week       | 16 |
| Figure 4: Distribution of road traffic accidents by Location              | 17 |
| Figure 5: Major risk factors of road traffic accidents                    | 17 |
| Figure 6a: Age Distribution of Drivers involved in road traffic accidents | 18 |
| Figure 6b: Gender of drivers involved in road traffic accidents           | 18 |
| Figure 7: Fatalities by category of road users                            | 32 |

#### **CHAPTER ONE**

#### **INTRODUCTION**

#### 1.1 Background

Road traffic accidents (RTAs) are a risk to life in Zambia. Road traffic accidents are increasingly becoming a threat to public health and national development. Road traffic accidents contribute to poverty, causing deaths, injuries, disabilities, grief, loss of productivity and material damages.

The World Health Organization (WHO) strategy of 2015 reported that road traffic accidents were 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. The numbers of deaths resulting from road traffic crashes were projected to reach 8.4 million by 2025.

In general, the importance of injury as a public health problem is not well recognized in many developing countries Lie et al (2020). In developing countries the trend has reached an alarming state, but very little attention is paid to the problem Odero et al (2022). Road accidents worldwide were estimated to a total of 20,000,000 victims for a time period between 2020 and 2023 with 70% of them occurring in developing countries. The number of accidents per registered vehicles was 15% to 20% higher in developing countries than in the developed world. The more general reasons for an increase of accidents in developing countries were; (i) rapid urbanization process in these countries, (ii) high growth rates of traffic and (iii) poor road conditions, (iv) reckless driving and (v) nonadherence to the traffic regulations by the motorist and the traffic officers. In developing countries the public transport system such as minibuses had a much higher accident risk than in developed countries. The proportion of injuries and killed casualties were also higher in developing countries than the developed countries. An analysis of cross sectional data on road traffic related deaths by Sonderland et al (2016)) showed the poor countries had the highest road traffic related mortality rates Soderlund et al (2016). Many industrialized countries appeared to have introduced interventions that reduced the incidence of road traffic injuries and improved survival of those injured Soderlund et al (2016). In developing countries there were some peculiarities regarding the accident profiles. A study done in Tanzania, reported that there were human factors such as the behaviour of drivers, pedestrians and cyclists and seasonal factors that contributed to fatal road traffic accidents Komba (2020). Sub-Saharan Africa had the highest frequency of various accidents worldwide Peden et al, (2015). In this problem there are many agents: (1) The police who are interested in legal enforcement (2) The insurance companies and vehicle owners in the monetary cost of road accidents (3) The accident victim and their relatives in those of lives or disability and

related cost of medical care (4) the health care system and medical personnel who are responsible for the emergence treatment and life savings of accident victims Asogwa (2018). In Zambian, Road Traffic Accidents have been ranked the third highest cause of death after HIV/AIDS and Malaria, Mainza (2011). Zambia loses lives and socioeconomic through road accidents. Kapiri Mponshi and Ndola feeds into countries records of increase in the number of road traffic accidents.

### **1.2 Problem Statement**

Road traffic accidents in Zambia are among the ten highest causes of death, claiming a lot of people every year. Patterns and major risk factors of accidents in Kapiri Mponshi and Ndola Road have not been investigated and ranked in order of importance, hence difficulties by the government to plan for appropriate interventions. We need to look at pattern of these road traffic accidents along this road and its major risk factors. It is the reason why we need to take up this research because we cannot afford losing lives through road accidents annually and the socio economic costs.

## **1.3 Research Objective**

# **1.3.1 General objective**

The objective of this study is to reduce and prevent road traffic accidents, by determining patterns and identify major risk factors responsible along Kapiri Mponshi and Ndola Road.

# **1.3.2 Specific Objectives**

- To determine temporal and spatial patterns of road accidents.
- To identify major risk factors responsible for road traffic accidents.

# **1.4 Research Question**

- In which pattern road traffic accidents happens along Kapiri Mponshi and Ndola Road?
- What are the major risk factors of the road traffic accidents along Kapiri Mponshi and Ndola?

# 1.5 Justification and significant of the study.

Going ahead with this study, it's so important because we need to find solutions to these accidents that are happening on our study area road. Lives are lost almost every day, properties are damaged, as a result of that, poverty is increasing to individuals, and sustainable development is affected. In view of this, we need to corroborate as a country to find some of the solutions. It is from this idea that together as a country we need to do investigations in form of research, such as this one to find out and respond to some of these accidents happening on our roads and possibly make preventions which is effective and sustainable.

It is so significant to have this study for understanding of the patterns and major risk factors contributing to the occurrence of these road traffic accidents in our study area. The data which will be obtained in this study will be used to help the road safety authorities for planning and evaluating road safety interventions. It will be utilized by the health authorities for planning health care delivery for victims. It will help Road Development Agency to plan for the future and make corrections on the current observations. The Police officers to act within their powers once the patterns and major risks are determined. The data will be also be used as baseline data in future related research.

#### **CHAPTER TWO**

# LITERATURE REVIEW

#### **2.1 Introduction**

Many more studies have been carried out to identify various factors influencing the major risk factors and patterns of road traffic accidents. Ross Owen Philips (2017) identified that sleepiness of drivers, driving off the road, good road conditions which in turn increases the speed of the vehicles, longer distance driving and less experience in driving were the main risk factors. Road traffic accidents are complex interaction of different factors like road, vehicle, environment and human Mouvid Bin Islam (2018). The visibility, geometry, lane markings, surface condition and street light facilities have the potential to influence drivers to perception and reaction. Road traffic accidents result in serious societal problems with significant individual, property and society costs. The World Health Organization strategy (2020) indicated that road traffic injuries comprised a major, but neglected global public health problem that required action for effective and sustainable prevention. According to the WHO, 1.19 million people were killed worldwide by 2023, due to traffic accidents. Middle-income countries, which are becoming motorized rapidly, are the hardest hit by traffic accidents, with approximately 70% of traffic-related deaths occurring in these countries. This tragic scenario indicates that traffic accidents are a serious public health and welfare concern and can be considered as a global epidemic. The cost of dealing with the consequences of these traffic accidents reaches billions of dollars, which is a large sum that could be used in improving the transportation system to prevent further incidences of traffic accidents. One of the major problems of road safety evaluation research presented by Rune Elvik (2018) in a paper titled "To what extent can theory account for the findings of road safety evaluation studies?" indicated that most research on road safety does not have a strong theoretical basis, which guides the design of the studies and interpretation of such findings.

# 2.1 System Theory

The theoretical approach of the study is the system approach. Explanations of the systems theory are based on man-environment adjustments and maladjustments Muhlrad et al (2015). The components of the theory are the environment, the means of transport (vehicles) and the behavior of man Krug et

al (2020). The environment component comprises of the natural and the built environments and transport networks. The means of transport component comprises of the volume and quality of vehicles. The behavior of man component comprises of demographic characteristic of road users; age, sex, education, socio-economic status and stage in life cycle. Integrated in the systems theory is a system of highway codes and enforcement mechanisms designed to ensure that road users adhere to the controls and regulations of traffic flow for maintaining road traffic safety. Comprehensive traffic management should be sufficient to maintain road traffic safety (Haur, 2015:136; Button, 2018:80). The relevance of Systems Theory in understanding RTAs is at three different levels; First, the theory identifies the system of traffic laws, regulations and mode of enforcement designed to ensure traffic safety, secondly it identifies the multiple causes' interplay of risk factors and prevention of traffic accidents and thirdly identifies major contributory factors of road traffic accident including human, mechanical (vehicle) and road environment factors. This literature will definitely of help to our study.

#### 2.2 A Model for Traffic Accidents

Traffic accidents bear strong elements of man-environment adjustments and maladjustment Muhlrad et al (2015). Based on the logic of a modified human ecological model of a disease the approach can be transferred to studies of road traffic accident. A model for traffic accident as inspired by the ecological model of a disease was developed by Abane (2020) who made a heuristic adjustment of this basic model to suit road traffic accident analysis. The model is characterized by three main components: i) The vehicle (corresponding to the vector in disease ecology) which describes vehicles into its composition, age, technical conditions and safety equipment like seat belts in a car, ii) The environment, comprising the road system and the wider physical and built up environment. The physical environment splits further into different aspects such as; daylight and climate, spatial conditions, Settlement pattern, situation of areas of residence and working areas, Principle of traffic separation, topography and road constructions qualities, and iii) The tendency of the population; including its characteristics such as age and sex as well as attitudes and general traffic behavior. Tendency is further subdivided as; driving experience, driving style and risk driving (influence of alcohol and drugs) Superimposed on this model is a system of traffic laws, regulations and mode of enforcement designed to ensure that the population adheres to the controls and regulations so as to maintain some level of road safety i.e. traffic rules, speed controls and convictions for various road traffic offences.

The model is used as a framework for understanding the multiple causes and prevention of traffic accidents that occur in developing countries like Zambia.

## 2.3 Human Tendency

Behavior is an intrinsic part of people Rundmo et al. (2011). Individuals in a society have different population characteristics like age, sex, education and training. Shibata. (2014). Likewise, their risk taking behavior differs and this may be attributed to the population characteristics of their cultural precepts, economic situation, social norms and cultural practices, Rundmo et al. (2018). The characteristics mentioned above will affect people's perception, attitudes and driving behavior towards traffic accident risk. Some people are more susceptible than others and susceptibility increase by the taking of alcohol and other drugs as well as other physiologic states such as fatigue Graham (2013).

#### 2.4 Driving Skills

Abane (2020) Distinguished between driving skills (Knowledge and training) and driving style which reflects attitudes and traffic risk perception. Training of drivers increases their driver's skills. Study done by Asogwa (2018) in Nigeria revealed that a sizeable proportion of drivers who possessed driving licenses never attended any driving school or but simply bought their licenses. Such untrained drivers often result in high accident rates. Studies done on drivers after being involved in motor accidents reported that although alcohol is the most prevalent source of driver's impairment, other drugs or substance abuse can also contributed to the problem (Violent et al 2016;Kayombo 2015;Broughton 2011; Leon 2016; Shibata 2014). Driving under the influence of alcohol or other drugs is known to impair the driver's ability to judge and control the vehicle (CSA-2013; Orsay et al 2014). Excessive speed is also mentioned as the major contributing factors on road crashes and subsequent injure rates of person injured.

# 2.5 Age

The driver's age is also known to be an important risk factor contributing to occurrence of accidents Adolescents or are frequently involved in traffic accidents than older age groups Bjornskau,(2020). Young drivers are more risk factors and frequent involved in accidents caused by inappropriate speed and loss of control of the vehicle compared to older age group of drivers. The study by Graham (2013) reported that motor accidents were prevalent in certain age groups and they occurred at certain hours of the day and week and in certain locations.

#### 2.6 Gender

14

With regards to gender, it appears that males have higher incidences of motor accidents than females (CSA 2013). Massie (2015) found that males compared to females had a higher risk of experiencing fatal crashes, while women had higher rates of involvement in injury crashes Massie (2015). Rivara (2010) also reported that among the drivers of motor vehicles that struck victims, 69% of them were males and 31% females, controlled for gender exposure level. It appears that males are more at risk than females for all age groups. Odero (2014) found that in developing countries, men were more at risk than women of being injured in crashes, because driving as a profession is mostly dominated by men.

#### 2.7 Vehicle Fitness

According to Dowing et al (2009) and Abane (2010) another major risk factor is the number of not road worthy vehicles operating in developing countries is higher than those in developed countries. Worn out vehicles are more likely to be involved in traffic accidents. Abane (2010) asserted that Vehicles with seatbelts, adequate lights, brakes, good tyres as well as direction indicators among others and in good condition can help to reduce traffic accident.

## 2.8 Environment

Concerning the physical environment, various climatic factors such as heat, fog, high winds, rain and flooding have various effects on roads hence influence traffic accidents, Moen (2015). Bad weather condition such as heavy rainfalls, impacts roadway mobility by increasing travel time delay, reducing traffic volumes and speeds and decreasing roadway capacity. Weather and road conditions in terms of road qualities therefore have a role in the causes of traffic accidents. The buildup physical and social environment with regards to road network, the types of roads, and quality of the road like black sport, road segments, lane width, junction layout, pot holes and other characteristics of the road have strong effects on road safety in any place, Oluwasanmi (2013).

## 2.9 Traffic Laws

Control and Regulations Enforcement and traffic laws are based on government policy regarding road safety. Traffic regulations and enforcement promote safety in the traffic environment. Regulations by traffic sign systems, speed limits and speed controls as well as the existence of police patrols and checkpoints can reduce accidents by influencing the road user's behavior. Abane (2010) argued based on his study in Ghana that traffic regulation schemes were not systematically implemented and the police service is generally less well trained, equipped and not motivated to enforce moving violations, as is evident in cities in developed countries.

#### 2.10 Geographical Approach

Land use pattern, types of roads and network, local business and activity pattern influence the system risk in an area as well as the health risk of the population. In urban areas for instance, there are more accidents but with lower degree of injury while in rural areas there are fewer accidents levels with more serious fatalities, Astrom (2016). Time factor in the analysis of road accident pattern is also vital as it will be relevant to know trends in the accident patterns as well as time in a more specific way related to hours of the day, month, or season that people are more at risk of the traffic accident. In Zambia for instance, it has been observed that traffic accidents increase during festive occasion especially during Christmas season and it is also during rainy season.

#### **2.11 Spatial Patterns**

In the past, road traffic accidents were a problem of industrialized countries but now it is becoming an epidemic in developing countries (Sunderland et al 2016; Vasconcellos 2019). The patterns in road traffic accidents in Nigeria, New Papua Guinea and Tanzania as reported by Asogwa (2018; Jayasuria 2019; Kayombo 2015) illustrate that road traffic accidents is a rapidly growing problem for Developing Countries. In the U.S.A Graham (2013) and Broughton (2011) reported a significant decline in traffic fatality rates as a result of improved road safety measures. They noted that there was previously an increasing rate in the occurrence of casualties followed by decline in recent years, a pattern that was similar to most developed countries Broughton (2011).

Between 2016 and 2018 injuries were the second leading cause of death among American Indians and Alaskan natives. The injuries accounted for 22% of all deaths. Motor vehicle related injuries were threefold higher than among the total United States of America Population WHO (2020). Bener et al (2011) reported that in Saudi Arabia motor traffic injures, were becoming a public health epidemic and yet relative to causes of morbidity and mortality, the amount of attention have received from public health professions and scientific community was minimal Bener et al (2011). In Zambian, Road Traffic Accidents have been ranked the third highest cause of death after HIV/AIDS and Malaria, Mainza (2011). Zambia loses an average of 1,000 lives through road accidents annually and the socio economic costs of these injuries are estimated at between 1 and 7 percent of the gross domestic product (GDP). Road deaths and injuries represent a huge burden on Zambia's health systems and an obstacle to government efforts to overcome poverty. With emergency care costly and hard to come by, people injured on Zambia's roads often experience needless complications and lifelong disabilities (www.zambianroadsafety.org).

#### **CHAPTER THREE**

#### METHODOLOGY

#### 3.1 Study Area Description

The study was carried out on the road between Kapiri Mponshi and Ndola District which is located in the Central Province and Copper belt Province of Zambia. It covers a stretch of 112 kilometers. Geographically it lies at an altitude of 1,320 meters above sea level. All the feeder roads are made of gravel and not user-friendly during the rainy season apart from Mpongwe and Tug-Argan Roads.

#### **3.2.0 Research Design**

Data collection was done in a period of five weeks in the months of December, 2023 and January, 2024. Data was collected from Kapiri Mponshi District Hospital, Ndola Teaching Hospital, Road Traffic and Safety Agency, Traffic Police, Roads Development Agency and some Insurance companies. This was because these are the departments that attend to RTAs victims and RDA for road constructions and maintenances.

The methodology and procedure for data collection employed in the field was based on both qualitative and quantitative methodologies within a framework of a case study approach. Interviews and review of secondary data were done accordingly. In this study qualitative approach has been used to collect the primary source of data through interviews with the accident victims, Officials from the Ministry of Health, the Police officers, the Hospital, RTSA officers and some Insurance companies. In this study quantitative source of data which was collected through review of Hospital records of patients admitted to the hospital as accident victims of all accidents happened in the area between 2019 and 2024, a checklist form as questionnaire guide was developed to collect individuals information through a hospital card or form of admittance as a secondary source of information, The purpose of collecting this information is to assess the pattern and major risk factors of motor vehicle casualties that occurred in the study area.

#### 3.2.1 Sampling Method and Justification

The difference between non probability and probability sampling is that, non-probability sampling does not involve random selection whiles probability sampling does. This implies that the usage of non-probability samples cannot depend upon the rationale of probability theory. Researchers have observed that in applied social research, there may be circumstances where it is not feasible or practical to use probability samples Flick (2015). Baker (2016) notes in her book Doing Social Research that there are two major goals that sampling can achieve. The first is to establish representatives of what is being studied and conversely to reduce bias, The second is to be able to

make inferences from findings based on a sample to a larger population from which that sample was drawn. A study based on a sample that does not conform to the above conditions has to use non probability sampling considering the aim of the study and the respondents to be interviewed. Probability sampling is not feasible hence the use of non-probability sampling was the best option available for this study.

#### **3.2.2 Selection of Data Collection Sources and Participants**

In relation to the discussion outlined above the two Hospitals, RTSA and Traffic police officers were chosen purposively for the study. The reason is that, the hospitals are within the study area and are the only hospitals that provide emergency services to Road traffic accident victims. The Traffic Police officers and RTSA in these districts are another data collection points because they are the one responsible for the traffic safety, controls, ensuring traffic rules and regulation are followed, they also record and evaluate the causal factor of all traffic accidents in an area. In an interview study, sampling is connected to the decision of about which persons should be interviewed, which of the interviews should be transcribed and interpreted and which cases of text can best be used to demonstrate the findings, Patton, (2013). The sample of respondents included in this study considered the balance between men and women though not equally but both participated representatively. The choice to interview the accident victims and government officials only and not others like pedestrians or other members of the community is due to the lack of sufficient time. The available information also from the annual report from RTSA in Zambia (2020) show that, the most people who experience the effects of road traffic accidents first are the accident victims, second is the government who is responsible for the security, the third are the owners of the vehicles who experiences the property damage. It should also be noted that accident victims includes drivers, pedestrians, officials, and every kind of person regardless of his or her category, therefore, accident victims stands as a sample of every person in a community in these districts.

#### **3.3.0 Data Collection**

### **3.3.1 Major risk factors RTAs**

The quantitative data which was collected from the review of hospital and traffic records was analyzed by using an excel software. The programs were extensively used to produce different statistical figures of varying kinds, and in simple statistical computations. Furthermore, the quantitative data were frequently employed to substantiate my descriptive qualitative information obtained from interviews, informal discussions and observations. To determine the patterns of road traffic accidents in our study area, 673 records of RTAs were collected from RTSA, Traffic Police,

and Insurance companies. The data included Distribution of Accidents by days of the week, by day and night, by months and years and by locations. 2026 records of RTAs victims were collected from the Hospitals, which included age group, gender, date of accident, place of where accident happened and what caused the accident.

To determine the major causes of RTAs, 673 records of RTAs were collected from Traffic Police and RTSA which included distribution of causes of accidents by years, season, time, place, age and sex of drivers involved and fatality rate by groups of road users.

# 3.3.2 Interviews with Main Informants: (RTA victims)

In this group, a total of twenty (20) respondents were interviewed. This was done with the accident victims who attended the districts hospital within a period of my field work which was approximately five weeks, the interviews to these accident victims were done after having their consent to participate in the study. An interview guide with a total of fifteen questions was used (See Appendix II) Where the victims were not able to answer the questions because of his or her conditions, surrogate information was obtained from a 'helper' or anybody who brought him/her to hospital.

#### **3.3.3 Interview with Officials (Key informants)**

### 3.3.4 Interviews with Hospital Staff

Five officials from both Hospitals were interviewed. These were the Hospital Superintendent, Matron of the hospital, Sister in-charge of casualty, Laboratory technician in charge of the blood transfusion unit and the Radiographer in-charge of the X-ray department. (See Appendix I) Each key informant was interviewed separately on a different day or time following a scheduled appointment, each interview took between 20 to 35 minutes, and it was conducted by using a semi structured interview guide. Additional probing questions were asked.

## 3.3.5 Interviews with Traffic Police Officers

There were two interviews with key informant from the Police Officers; the plan was to interview five respondents with the preference of Traffic Police department and licensing department (See Appendix III). The interviews were done with the Officer In charge of Traffic department and the Station manager at RTSA offices. The guiding questions aimed at getting information on how police collect road accident data, problems encountered in dealing with accidents and victims, how rules and regulations are implemented. It also had a provision for them to give opinions on how motor traffic accidents can be prevented.

#### **CHAPTER FOUR**

#### 4.0 RESULTS

#### 4.1 Overview

This chapter analyses the findings on the review of hospitals data (Kapiri Mponshi and Ndola Hospital), Traffic Police, and RTSA records. The review is basically a reflection of road traffic accidents that occurred in the study area and their risk actors. A review of records was done systematically and all records were manually sorted out starting from 2019 to 2024. These findings represent only accidents that occurred between the stretch of our study area and accident victims whose accidents were within the two districts and whom were admitted in both hospitals. In general this Chapter demonstrates patterns of RTAs and Major risk factors of RTAs within the study area.

#### 4.2 Temporal and Spatial Patterns of Accidents

There was a significant increase in the number of road traffic accidents during the period 2019 to 2024 (Figure 3). Overall there were a total of 673 accidents with an average of 135 accidents per year. The percentage of reported road traffic accidents in area of our study was increasing with an average of 25.2 accidents annually.

Most of the accidents happened in December (23%) followed by January, October and November at 11% each (Figure 4). A large number of accident occurred during the day (59%) than at night (41%) and the highest were on Mondays, Saturday, Friday and Sunday respectively (Figure 5a & b).

The stretch had the highest number of road traffic accident respectively (Figure 6).



Figure 1: Distribution of road traffic accidents by year



Figure 2: Distribution of road traffic accidents by Month



Figure 3a: Distribution of road traffic accidents by Day and Night. (06:00-19:00 & 19:00-06:00)



Figure 3b: Distribution of road traffic accidents by Days of a Week



Figure 4: Distribution of road traffic accidents by Location

# Above graph

**Key:** KTG = Kafulafuta Toll Gate NT = Ndola Town KMWB = Kapiri Mponshi Way Bridge <u>MTO = Mpongwe Turn Off</u>

# 4.0 Major risk factors of Road Traffic Accidents

Major risk factors of accidents have been identified and classified in order of importance: Over speeding, wrongly Overtaking, Unlicensed driving, Alcohol and Drug Abuse and

overloading respectively.



Figure 5: major risk factors of road traffic accidents

# 4.0 Classification by Age and Gender of Drivers Involved in RTAS

The age group of drivers that were mostly involved in road accidents was between the ages of 18-30 years old (69%) followed by those above 51 years old (19%) and between 31-50 years old (12%). Adolescents or young drivers were frequently involved in traffic accidents than other age groups (Figure 6a). Mostly male drivers were involved in road traffic accidents than the female drivers (Figure 6b).



Figure 6a: Age Distribution of Drivers involved in road traffic accidents



Figure 6b: Gender of drivers involved in road traffic accidents

#### **4.5.0 Views of Key Informants**

#### 4.5.1 The Traffic Police Views on RTAs

The Officer in Charge of Traffic Police in kapiri Mponshi felt that the number of motor traffic accident on this road has been increasing since 2019. He stated that the main contributing factors are over speeding, careless driving and drunken driving among other. He made a recommendation that in order to reduce road accident casualties: Passengers should be motivated not to board a vehicle, which has exceeded its passenger's carrying capacity. Passenger should report over speeding drivers to police immediately. He also mentioned that the road under study is narrow and it accommodates only two lines, this situation cannot allow overtaking, the landscape is another factor facilitating traffic accidents, in most areas the road has uneven condition, pot holes and provision of road signs is not enough.

# 4.5.2 Views of other Key Informants

According to interviews done with victims of RTAs, Hospital Officials, insurance company's personnel and RDA, the following issues were identified as factors facilitating the occurrence of road traffic accidents on this road.

I. The highway road is below standard and it accommodates high traffic volume without being equipped with traffic safety measures such as traffic separation and appropriate road signs alongside the road.

II. Most informants mentioned that lack of traffic separation accounts for highest possibility of being at risk of an accident all the time.

III. Driving without training is another risk factor which was identified by the Officer in Charge of Traffic Department.

IV. The road designers and construction engineers have no legal and formal obligation to be responsible for the road traffic safety consequences of their transport planners and construction engineers are not in principle, prosecuted for road traffic accidents occurring as a result of their negligence. Instead, the built environment is technically assumed to be good and, any accidents that occur are blamed either on faults by humans or the vehicles.

V. According to interviews done with the accident victims, all mentioned some weaknesses in traffic regulation enforcement by the traffic police. To be specific, corruption, irresponsibility and poor management of traffic police officers as an authorized body to govern, control and implement traffic safety measures as per required country's regulations, were identified as a problem and among the risk factors associated to the prolonging traffic accidents in our study area. It was mentioned that, the

performance of the traffic police, as an agency that is supposed to enforce road traffic regulations, is not so much efficient and sufficient. It was mentioned that, the traffic police give priority to corruption and tips other than following the traffic laws and regulations, One of the accident victims emphasized that, "It is clearly observed, the police in most cases tend to negotiate openly with the drivers an alternative means to avoid paying the penalty or fine or being prosecuted by demanding drivers to pay some amount of money to them which is less compared to the penalty or fine required".

VI. Most of the vehicles traversing on the roads are in bad condition of service; since most of them are imported as used vehicles with ages varying from 3 years to 10 years. Most of vehicles imported to Zambia are used to the extent that some of them are not road worthy. This is due to the fact that the majority of Zambians cannot afford to buy new cars. The increase in the number of vehicles has therefore resulted into a corresponding increase in road accidents leading to loss of life and property. VII. According to interviews done with the traffic police, they declared that, the current vehicle inspection carried by police is primarily a visual examination which is inadequate to arrest the present situation.

VIII. It has been identified by the respondents that road traffic accidents is a result of critical combination of several factors, there is no single factor that is identified as a cause of these accidents.

#### **CHAPTER FIVE**

#### **5.0 DISCUSSION AND CONCLUSION**

The study has revealed the pattern and the major risk factors of the road traffic accidents on our stretch road of 112 km (Kapiri Mponshi, Ndola Road). Road traffic accidents have been increasing for the past five (5) years. The increases in road traffic accidents are attributed to heavy traffic caused by vehicles coming and going to Copperbelt and neighboring districts and other provinces (Central and North Western). Casualties of road traffic accidents impose a heavy burden on the health care services. In addition, the cost of repair and replacement of damaged vehicles and demand resources that otherwise could be devoted to other high priority human development sectors such as education, food production and health. Pattern and major risk factors of accidents have been investigated and ranked in older of importance.

# 5.1 Pattern of Road Traffic Accidents

The pattern of accident occurrence was increasing for almost every year in a period from 2019 to 2024 studied. The percentage of reported accidents in our area of study was increasing with an average of 25.2% annually. Information obtained from interview with the officer in charge of traffic department reviewed that accidents have been increasing every year and that there are many accidents which are not reported. In most cases police have been receiving information of unreported accidents through insurance companies when seeking to verifying occurrences of these accidents from their clients claiming for compensations. The findings show that 23% of all accidents from 2019 to 2024 happened in December followed by January, October and November at 11% each, February, March and July each with 8%. The contributing factors are that, at the beginning and towards the end of the year is festival period hence many people travel to celebrate Christmas and new-years. July is a peak period for famers harvesting and selling their crops, therefore such time is also considered as business periods. This results into high traffic hence more accidents happened. Driving at the beginning and towards the end of the year is more risk than at the middle of the year. The findings can also be interpreted as during the months of rain season, it is more risks to drive than in other moths.

The study also revealed that the risk of being involved in an accident during the day (59%) was significantly higher than during the night (41%). This is possible because trucks are not allowed to operate in roads beyond 21hrs. This results in less traffic at night than during the day. Some

motorists interviewed said that, drivers during the day take a lot of risks by overtaking even when there could be another vehicle coming from the opposite direction despite the distance. At night they would not risk overtaking once they see lights of another vehicle from the opposite direction. There were more RTAs on Mondays, Saturdays and Fridays than the other days of a week. Most of the RTAs happened on Mondays. On average 48 RTAs occurred on Mondays every year, followed by Saturdays and Fridays respectively. The reason is that, these days are considered as vital to move for different businesses. Some people come from the North Western, Copper belt, Democratic Republic of Congo, Central, Lusaka provinces etc. They usually travel to see their families over the weekends and returns on Mondays. Another reason is that, mine workers mostly spend weekend in Lusaka town whenever they are off and drive back on Mondays. The highest number of RTAs occurred between Mpongwe Turn off and Kafulafuta Toll gate, followed by Kapiri Mponshi Way Bridge and Mpongwe Turn off and Kafulafuta Toll Gate to Ndola Town respectively. This road has a lot of variations of major risk factors. Information obtained from the officer in charge of traffic patrols, reviewed that it is along this road where they have identified some black spots despite there is no sign to warn motorists. It is also the busiest segment of the road because all vehicles to and from Copperbelt, DRC, Luapula, passes through.

### 5.2 Major risk factors of Road Traffic Accidents

Over speeding was the leading cause of RTAs followed by wrongly Overtaking and Unlicensed driving with 47, 29 & 20 average road traffic accidents every year respectively. Alcohol & Drug Abuse and Overloading have the same number of RTAs on average with each 14% every year between the period of 2019-2024 followed by Other causes such as tire burst, potholes etc. Over speeding and wrongfully overtaking were the major causes of accidents between Mpongwe Turn off and Kafulafuta Toll gate where the road is in bad condition unlike from Kapiri Mponshi Way Bridge and Mpongwe Turn were the road has a lot of potholes.

Drivers mostly involved in road accidents were of the age between 18 and 30 (69%) years old followed by those above 51 (19%) years. Those whose age were between 31 and 50 (12%) had the least number of accidents. Adolescents or young drivers were frequently involved in road accidents than other age groups because of inappropriate speed and loss of control coupled with other factors. The road users who were always at risk of dying on the road were found to be Passengers and pedestrians and that male drivers were more involved in accidents than females. This is because driving as a profession is mostly dominated by men. Road traffic accidents are a result of critical

combination of several factors, there is no single factor that is identified as a cause of an accident or accidents.

# 5.3 Conclusion

This study has reviewed that there was a significant increases in road traffic accidents and variations in the patterns of road traffic accidents in our area of study for the past five (5) years (2019-2024).

## **5.4 Recommendations**

In order to reduce traffic accidents in this area and the whole country at large, I will recommend based on my studies the following measures to rectify the problem:

1. The government should improve the living standards of people. High living standards will affect the public and government view on risk and safety culture and also reduce bribery and corruption among law enforcers.

2. All drivers Private and Public service vehicles should be having refresher drivers training courses at the middle of the year so that the bad habits acquired can be reduced at a relatively early state.

3. The Government under responsible ministries should make sure road signs are repaired and replaced every time when needed.

4. The National Bureau of Standards should inspect all imported used vehicles if they are road wealth according to the national standards before they are accepted to be used in the country.

5. The government should review legislation regarding employment of drivers both in government, parastatal and private companies. Drivers employed must be well trained or those already employed should be trained at relevant institutions.

6. The Road Transport and Safety Agency should be given a statutory mandate to train the aspirants of instructorship, and accordingly, the relevant provisions in the act should be amended to incorporate a mandatory pre-registration training as a condition before one applies for driver instructorship.

7. The government should improve the conditions of Police officers and RATSA, instituting better working conditions and pay them well (to deter corruption), they should also be provided with and maintained modern equipment such as breathalyzers, video and speed camera.

29

#### REFFERANCES

1. Astrom, J. S, Kent, M.P. and Jovin, R. D. (2016) Signatures of Four Generations of Road Safety Planning in Nairobi City, Kenya In: Journal of Eastern African Research and Development. Vo. 120, pp. 186-201.

2. Banyikwa, W.F. (2015). The Catchments Areas of Municipal Markets in Mbeya Municipality, Tanzania. In: UTAFITI – Journal of the Faculty of Arts and Social Sciences, University of Dar es Salaam. Vol: 6, No. 1, pp 1-35.

3. Bjornskau, M., Gafni, D. (2014).Globalization in road safety. Explaining the downward trend in road accident rates in a single country (Israel).Accid Anal Prev; 32(1):71-4.

4. Deus Damian Komba (2013) Risk Factors and Road Traffic Accidents

5. Gatrell, A. C. (2015). Geographies of Health. An Introduction. United Kingdom: Blackwell Publishers.

6. Holt-Jensen, A. (2015). Geography: History and Concepts. (3rd Edition). London: Sage Publications

7. IPP Media, http://www.ippmedia.com/. 15th December, 2018.

8. Johnston, R et al. (2020). The Dictionary of Human Geography: oxford, Blackwell

9. Krug, E. G, Sharma, G. K, Lozano, R. (2020). The global burden of injuries. American Journal of public health, 90:523-526.

10. Krug, E. (2017). How can road safety be improved? The BMJ asked four experts for their views. British medical journal. 324, 1116, retrieved January march 10 2006 from http://bmjjournal.com/cgi/content/full/324/7346/1116

 Malekela, F.R. (2015), Improvement of Hazardous Locations (Black Spot Areas). In: Proceedings of Tanzania Roads Association – Annual Roads Convention, November 24- 25, pp 42-55.

12. Moen, B.E. and T. Rundmo (2015), worrying about Transport Risks In: Rundmo, T. and B.E. Moen (eds). Risk Judgement and Safety in Transport. Rotunde Publication Number 87, Trondheim.

13. Peden, M. (Ed), (2014), World Report on Road Traffic Injury Prevention. World Health Organisation, Geneva.

14. RATSA Reports 2019-2023

15. Silverman, D. (2020). Doing qualitative research: A practical handbook. Thousand Oaks, CA: Sage.

16. Traffic reports-2019-2023

17. World Health Organization (2011). A 5-year Health Organisation Strategy for Road Traffic Injury Prevention. Geneva Switzerland. Retrieved October 3, 2015 from Norwegian University of Science and Technology Library Database.

18. World Health Organization (2011). Evidence, Information and Policy report. Geneva. Switzerland 19. www.zambianroadsafety.org

20. www.healthmetricsandevaluation.org

21. www.cdc.gov/globalhealth

22. Web: www.ministryofhealth.org

# APPENDICES Appendix I: Interview guides INTERVIEW GUIDE QUESTIONS WITH HOSPITAL INFORMANTS

| Date of an interview                                      | Personal partic                     | ulars: Age           | Sex             | Rank                  |
|---|-------------------------------------|----------------------|-----------------|-----------------------|
| Profession  |                                     | Working exper        | ience in Kapi   | ri Mponshi, Ndola     |
| Q1. Do you think motor traffic                            | accident injuries                   | are a problem at I   | Kapiri/Ndola I  | Hospital?             |
| Q2. What problems do you get                              | t in receiving mot                  | or accident victim   | s?              |                       |
| Q3. Do you have enough treat                              | ment rooms to ac                    | commodate all inj    | ured people?    |                       |
| Q4. According to your experie                             | ences do you thinl                  | k people fear traffi | ic accidents ir | 1 Kapiri/Ndola Road?  |
| Q5.What risk factors do you t                             | think facilitate the                | e occurrence of ro   | ad traffic acc  | ident in Kapiri/Ndola |
| Road? 1. In terms of Vehicles -                           |                                     |                      |                 |                       |
| 2. In terms of (environment) ro                           | ad network                          |                      |                 |                       |
| 3. In terms of Peoples behavior                           | ur                                  |                      |                 |                       |
| 4. In terms of legislation and re                         | egulations                          |                      |                 |                       |
| Q6.What kind of measures sho                              | ould be taken to re                 | educe traffic accide | ents in this ro | ad?                   |
| Q7.Who do you think should b                              | be responsible for                  | traffic accident? -  |                 |                       |
| Q8.What is your recommenda accident victims in Kapiri/Ndo | ations/opinions o<br>bla hospitals? | n how to improve     | e medical ser   | vice to motor traffic |

# Appendix II: Questionnaire Form for Reviewing Individual Particulars QUESTIONNAIRE FORM FOR REVIEWING INDIVIDUAL PARTICULARS OF MOTOR TRAFFIC ACCIDENT VICTIMS FROM THE HOSPITAL RECORDS.

# **SECTION ONE** (tick/cross your option)

## Individual background

1. Age in years: (a) below 18, (b) 18 - 24, (c) 25 - 34, (d) 35 - 44, (e) 45+

2. Sex: (1) Male (2) Female

3. Occupation: (1) Peasant (2) Civil servant (3) Businessman/woman (4) Others (specify).....

4. Residence: (1) Kapiri Mponshi/Ndola District (2) Outside Kapiri/Ndola district

# **SECTION TWO About the accident**

5. When did accident happen? (a) Month...... (b) Day of a week.....

- (c) Time period, Day or night.....
- 6. How many vehicles were involved in accident.....
- 7. Type of vehicle involved (used by the victim):
- (1) Small car (2) Bus (3) Truck (4) Motorcycle (5) Bicycle (6) Minibus
- 8. Ownership of the vehicle: (1) Private (2) Government

9. Class of the accident victim: (1) Driver (2) Passenger (3) Pedestrian (4) Motorcyclist (5) Cyclist

- 10. Where did the accident occur? (Location).....
- 11. What was the condition of the road? (1) Dry (2) Wet (3) No information

12. Special conditions at the site just before accident? .....

- (1) Vehicle on the way (2) Overtaking (3) Heavy rainfall (4) Heavy Wind
- (5) Others (specify).....

# Appendix iii: Interview Guide

# INTERVIEW GUIDE QUESTIONS WITH POLICE TRAFFIC OFFICERS

Personal particulars Date ------ Age ------ Sex ------Working experience -----Q1. Do you think motor traffic accidents are a problem in Kapiri Mponshi / Ndola? -----\_\_\_\_\_ Q2. How do you compare the magnitude of motor traffic accidents in Kapiri Mponshi / Ndola to those of other Districts in Copper belt Province? -----\_\_\_\_\_ Q3. How do you normally get information after the motor accident has occurred? ------\_\_\_\_\_ Q4. Are there any problems in getting immediate information after the motor accident has occurred? (1) Yes (2) No. If yes, what are the problems? -----Q5. How do you transport injured people from the site of accident to hospital? (1) By police vehicle. (2) By ambulance. (3) By requesting other motorists to help. (4) Accident victims hire vehicles themselves. (5) Others (specify) ------\_\_\_\_\_ Q6. From your experience, which period of the year do road traffic accidents occurs frequently in terms of months and days?-----\_\_\_\_\_

Q7. Is there any problem of getting accurate report/information on motor accidents occurring in Kapiri Mponshi/Ndola road? -----\_\_\_\_\_ Q8. Do you face any problem in keeping motor traffic accident reports in your office? ------\_\_\_\_\_ Q9.What is your recommendations and opinions on strategies of reducing the motor accident in Kapiri Mponshi/Ndola road? -----\_\_\_\_\_ Q10. What measures do you take to reduce traffic accidents in Kapiri Mponshi / Ndola road? ------\_\_\_\_\_ Q11. Are there any problems on implementing traffic safety measures in Kapiri Mponshi / Ndola road? -----Q12. Who do you think should be responsible for traffic accident? -----\_\_\_\_\_ Q13. Do you think the available traffic rules and regulations can reduce accidents? ------\_\_\_\_\_ Q14. What Major risk factors do you think facilitate the occurrence of road traffic accident in Kapiri Mponshi/Ndola road? -----\_\_\_\_\_

# Appendix iv: Interview Guide

# INTERVIEW GUIDE QUESTIONS WITH ACCIDENT VICTIMS

| Date of an interview  |
|---|
| 1. Age 2. Sex 3. Occupation 4. Residence 5. What do                                     |
| you think was the main cause of your accident in Kapiri Mponshi / Ndola road?           |
| 6. Was there any possibility to escape the accident?                                    |
| 7. Can you tell us the real situation of the following parts just before your accident? |
| a. What was the condition of the car?   |
| b. What was the condition of a day? Rain, Wet, Dry, Wind or Fog                         |
| c. Speed of the car?  |
| d. Was a driver sober or Drunk?   |
| e. Did passengers applied seatbelt?   |
| f. Was the car overloaded?  |
| g. Did the driver follow the road signs when driving?                                   |
| h. Was the driver stopping when pedestrians wanted to cross the road at zebra cross?    |

i. Did you meet any traffic Police officer on the road before accident? ------\_\_\_\_\_ j. How was the situation of the road in that day? -----8. Just one day before accident day, did you think if there is a possibility of getting an accident when you are travelling? ------**9.** Just when you started your journey, did you feel a possibility of getting an accident on journey? \_\_\_\_\_ **10**. What kind of safety measures did you take just before you started travelling? ------\_\_\_\_\_ **11**. What is your recommendation to other people concerning road traffic accident in Kapiri Mponshi / Ndola District? -----\_\_\_\_\_ 12. What risk factors do you think facilitate the occurrence of road traffic accident in Kapiri Mponshi / Ndola road? a. In terms of Vehicles-----b. In terms of (environment) road network ----c. In terms of Peoples behavior ----d. In terms of legislation and regulations------13. What kind of measures should be taken to reduce traffic accidents in Kapiri Mponshi / Ndola district? -----\_\_\_\_\_ 14. Who do you think should be responsible for traffic accident? ------\_\_\_\_\_ **15.** What are your recommendations/opinions on how to improve medical service to motor traffic accident victims in Kapiri Mponshi / Ndola Hospital? -----\_\_\_\_\_

Appendix V: Fatalities by category of road users



Figure 8: Fatalities by category of road users