University of Zambia
School of Medicine
Department of Public Health

Title:

Trends in Road Traffic Deaths among Motorists in Lusaka from 2010 to 2013

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Submitted in partial fulfilment of the requirements towards the awarding of Masters of Public Health (MPH) Degree in Health Policy and Management

DECLARATION

I hereby declare that the work presented in this Report is for the award of Master of Public Health (MPH) Degree in Health Policy and Management and has not been presented wholly or in part for any other Degree nor is it being submitted for any other Course.

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I, **Mwiya Ikabongo** hereby attest that this Report is entirely an independent research. The numerous sources consulted are clearly cited in the references.

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Signature of Supervisor…….Date ……

CERTIFICATE OF APPROVAL

The University of Zambia approves this dissertation of Mwiya Ikabongo as fulfilling part of the requirement for the award of Master of Public Health (MPH) Degree in Health Policy and Management.

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Examiner 3

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DEDICATION

I dedicate this work to my loving Grandmother, Elizabeth Likando Nawa Mwiya.

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Acronyms and Abbreviations

DALYs	Disability Adjusted Life Years
ERES	Excellence in Research Ethics and Science
EU	European Union
GBD	Global Burn of Disease
GFTAM	Global Fund to Fight Tuberculosis AIDS and Malaria
GHS	Global Health Status
LDCs	Less Developed Countries
RDA	Road Development Agency
RTAs	Road Traffic Accidents
RTSA	Road Traffic and Safety Agency
SAS	Southern African States
SEAR	South East Asia Region
UAE	United Arab Emirates
UN	United Nations
UNECE	United Nations Economic Commission for Europe
WHA	World Health Assembly
WHO	World Health Organization
WPR	Western Pacific Region
ZDHS	Zambia Demographic and Health Survey
ZP	Zambia Police
ZTPS	Zambia Traffic Police Section
ZRA	Zambia Revenue Authority

Abstract

The aim of this study was to determine factors associated with road traffic deaths and trends in traffic deaths among motorists in Lusaka from 2010 to 2013. RTAs are one of the main causes of injuries and deaths in the world today. It is a concern for public health. Third world countries such as Zambia experience large numbers of RTAs and the outcomes are affecting the development and productivity of such economies. This study was conducted in Lusaka, Zambia based on police statistical records of road traffic accidents that took place in the period under review. Simple Systematic Sampling was used to select a total of 400 cases into the sample that were considered for analysis. The Researcher used Logistic Regression Analysis to determine the associations between the Outcome Variable (i.e. dying from a road traffic accident) and other independent variables such as age of driver, sex of driver, road from which the accident took place and time of accident. These associations were analysed at three distinct levels namely, Univariate analysis, Bivariate analysis and the Multivariate analysis which took into account the need to control for confounders. The results indicated that there is a strong association between sex of driver and the probability of dying from a road traffic accident which revealed that male drivers are at a higher risk of dying from an RTA than their female counterparts. Apart from that, odds of dying from an RTA were higher in roads around town and the surrounding areas compared to those on the periphery. These associations that were unravelled from the results were in conformity with studies conducted in the USA, Europe, Asia and parts of Africa that age and sex of driver are statistically significant to determine whether the risk of dying is higher or reduced on the road. Recommendations to the study were in tandem with the results which were that government and the general citizenry should take the matter of deaths from RTAs as important and put in place measures that can address the problem adequately. There is need to work out plans and policies that prioritise RTAs as a relevant Public Health concern in order to save lives and prevent unnecessary injuries. There should also be a strategic framework that stiffens regulations on the road especially to the most affected groups such as young male drivers in Lusaka that have indicated having high vulnerability to the risk of dying from RTAs.

Chapter 1

Introduction

Road Traffic Accidents (RTAs) are one of the main causes of injuries and deaths in the world today and therefore, a global public health concern. Each year a number of people lose their lives or become physically impaired due to RTAs. In the recent past at a global scale RTAs were ranked among the major causes of disability and death. The World Health Report (WHO, 2013) indicates that RTAs have a global death toll of 1.24 million per year and this trend is on course to triple to 3.6 million per year by 2030 if no intervention is undertaken by all the nations.

1.1 Problem statement

Deaths from RTAs are expected to continue rising and likely to make RTAs number three killer by 2020 if no intervention is put in place according to the World Health Organization Report, (WHO, 2010). Despite the high numbers of deaths and injuries resulting from RTAs no known research findings on RTAs in Lusaka and Zambia in its entirety have been published. The World Health Organization (WHO) has been concerned with this issue for over four decades. In 1974, the World Health Assembly (WHA) adopted Resolution (WHA 27.59), declaring RTAs as a major public health issue and calling for member states to address the problem (WHO, 2000). As early as 1962, a WHO Report discussed the nature and dynamics of the problem. For the past two decades, the World Bank has encouraged its borrowers to include road safety components within most of their highways and urban transport projects (IMF Report, 2004).

The effect of a rise in the total number of deaths resulting from road traffic accidents was expected to rise from being number nine on the top ten list of causes of death in 1998 to become number three cause of death by 2020 accounting for a large number of deaths among young male victims (WHO, 2000)*.

RTAs are the leading cause of death by injury, the 10th leading cause of all deaths and the 9th leading contributor to the burden of the disease worldwide.

**See Appendix 2- Global Burden of Disease and Injuries leading to Death*

The total deaths from RTAs, 1,029,037 or 87.9% were in Low and Middle Income countries (LMC) and 1441,656 or 12.1% were in High Income countries (HIC). Deaths from RTAs per 100,000 of population were 20.7% in LMCs and 15.6% in HICs. RTAs death rates were consistently higher in all LMCs than in HICs in the same regions. They constitute a rapidly growing problem, with deaths from injuries projected to rise from 5.1 million in 1990 to 8.4 million in 2020 (Kiran, 2004).

Rapid urbanization and motorization in developing countries will account for much of the rise and the rise will be steeper due to lack of appropriate road engineering and lack of injury prevention programs in public health sector.

In Zambia the situation is not very different as most of the RTAs took place in the urban areas. Lusaka recorded the highest with 50.2% of the overall RTAs that occurred in Zambia and out of these accidents 32.6% led to death (RTSA, 2007). The numbers and rates of RTAs vary by region, age, and gender and road user type. RTAs have enormous health, social and economic impacts on individuals, families, communities and Nations. Besides the direct physical and psychological impact on those directly affected by RTAs, road crashes also place a heavy burden on those involved with the victims. Family, friends and communities of those directly affected by RTAs can also experience short and long term adverse social, physical and psychological outcomes. For example, every year in the European Union more than 50,000 people are killed and more than 150,000 disabled for life by road traffic crashes (Kiran, 2004).

This leaves more than 200,000 families bereaved or with family members disabled for life. It is frequently the bread winner of the family who is disabled or killed as a result of a road crash. Therefore, in addition to the emotional impacts, those affected must cope with reduced family incomes, and frequently have to deal with criminal and /or civil justice systems (ibid).

The economic impact of road traffic injuries is especially damaging, particularly for countries struggling with poverty alleviation and the overall challenges of development, because economically active age groups are the most vulnerable to such injuries. The issue of road traffic safety is relevant to countries that are trying to achieve sustainable development.

The World Summit on Sustainable development held in the year 2002 recommended that in developing countries where there is rapid motorization, urban development and transportation planning is integrated and that reliance on mass transit and alternative modes of transport be increased. Such efforts should help to mitigate the adverse impacts of increased motorization (ibid).

In an attempt to redress the rise in RTAs occurrence in Zambia, the government has put in place certain measures such as the current projects that the Government is undertaking; the Link 8000 Project by 2016 is a clear indication that Government is a major stakeholder in improving road safety (RDA Report, 2014). The project is aimed at construction of ring roads in Lusaka to decongest the Central Business District (CBD) and the extension and expansion of main roads such as Lumumba, Chilumbulu, Great East, Kafue roads etc. The Ministry of Transport and Communication, through the Road Traffic and Safety Agency (RTSA) has tightened measures of assessing vehicle road worthiness and individual drivers' skill and experience before they can be legally allowed on the road to improve safety of road users (RTSA, 2007).

Zambia over the past fifty years has seen economic growth and thus demand for motor cars has exponentially risen while its road infrastructure development has remained lagging. The growth in number of motor vehicles on the roads and growth in population means that there is need to transform and upgrade the road transport and road network systems in Lusaka in order to protect road users from preventable RTAs. Therefore, there was a need to undertake a thorough research on trends in road traffic deaths among motorists in Lusaka from 2010 to 2013 to get latest data on the situation on trends in deaths.

The deaths among motorists in Lusaka result from a series of factors ranging from poor road infrastructure to a large number of imported second hand cars which in most cases are not road worthy. According to a RTSA report from 2013, there has been an increase in the number of second hand cars entering the country destined to Lusaka and other urban areas in Zambia. Although there have been efforts to upgrade the road infrastructure in cities such as Lusaka, this has had insignificant impact on the efficient flow of traffic with reasons such as blockage of sidewalks due to street vending and careless parking on the roadsides.

Furthermore, there is a shortage of police traffic control staff and even the few that work are subjected to a lot of long hours of work. Lusaka lacks a complete 24 hours traffic control systems such as the installation of high speed cameras and officers to monitor traffic flow throughout the day and night; during the off period the traffic flow is left to coordinate itself without any officers on duty to oversee the situation.

1.2 Rationale of the Study

The rationale of this study was to provide thorough information on the frequency and extent of RTAs and their relation to economic and demographic problems. Furthermore, to work towards informing policy and program planning for government that it comes up with measures that work towards increasing safety on public roads in Lusaka. Another important reason as to why this study was undertaken was to move in line with projections made by the UN in relation to RTAs, when it declared a decade of ensuring and promoting road safety a program running from 2011 to 2020. Therefore, the overall purpose of this study was to assess and establish trends in road traffic deaths over a four year period from 2010 to 2013 in Lusaka, Zambia in order to create a basis for public health policy planning and implementation that can resolve the problem. In addition, the research was intended to focus on how lags in planning for RTAs related outcomes can be addressed and increase emergence preparedness of hospitals so that more lives can be saved. As earlier mentioned, the study was anticipated to serve as a source of valuable data for public health planning and act as a stimulus for provoking subsequent researches in this area of road traffic deaths. Lusaka city was selected for this study as it has been known to record the highest number of accidents in the country as seen from the 2007 RTSA report on deaths resulting from RTAs*.

** See Appendix 3 – RTAs per province of Zambia, 2007*

Chapter 2

Literature Review

This chapter focuses on research works conducted in different parts of the world regarding RTAs. The World Health Report (WHO, 2013) indicates that RTAs have a global death toll of 1.24 million per year and this trend is on course to triple to 3.6 million per year by 2030 if no intervention is undertaken by all the nations. In the developing world, it will become the third leading cause of death, leapfrogging past HIV/AIDS, malaria, tuberculosis and other familiar killers. Further, this is in line with findings according to the most recent Global Burden of Disease (GBD) study which led to the introduction of the initiative of a decade of action for road safety 2011 - 2020, which was declared by the United Nations General Assembly (WHO, 2013). The costs associated with these deaths are a poverty inducing problem, according to a traffic safety specialist at the World Bank. It is costing on average between 1% and 3 % of Gross Domestic Product (GDP) in low and middle income countries, an amount that can offset the billions of dollars in aid money that these countries currently receive (Jose et al., 2011).

Road traffic injuries accounted for 34.3 million disability adjusted life years (DALYs) and deaths in low and middle income countries were 88.3% of global DALYs lost from road traffic injuries. The number of disability adjusted life years lost from road traffic injuries was greatest in the South East Asia Region (SEAR). However, the total disability adjusted life years lost per 100,000 people was highest in Africa, followed by those in low and middle income countries in region of the Americas (WHO, 1999).

According to Gregersen (1999) road traffic injuries are the leading cause of death among young people in the sub Saharan Africa (SSA) region and are predicted to increase in countries with low or medium income as they become more highly motorized.

The British Medical Journal of 11 May 2002 indicated that more people die from the road traffic accidents than from malaria worldwide; and that traffic accidents cause about 1.2 million deaths and injuries account for 10 to 15 million people a year in the world however, many people do not know that RTAs are preventable, (Krug et al., 2002).

The Zambia Traffic Police Section (ZTPS) investigated a total of 29,118 RTAs countrywide out of which 1,851 persons died, 5,489 were seriously injured and 7,175 were slightly injured (RTSA, 2014). The tragic outcomes from RTAs as mentioned include death and injury and these cause people to become worse off economically this is evidenced from increasing poverty levels and deteriorating health in the most affected regions of the world. It's been shown that road accidents and their consequences remain a serious social and public health problem. On average 75 people lose their lives every day on European roads and 750 are seriously injured (UNECE, 2011).

In Africa the situation is not very different especially with the rise in the number of imported vehicles and limited capacity of the roads to withstand the pressure from increased volume of traffic (Nabalamba, 2013). Global statistics indicated that India was at highest risk as reported in 2005; road traffic injuries resulted in the death of an estimated 110,000 persons, 2.5 million hospitalizations, 89 million minor injuries and economic losses to the tune of 3% of GDP. It was estimated that if the then current trend continued, India would witness the deaths of 150,000 persons and hospitalization of 3 million people annually by 2010, increasing further to 200,000 deaths and more than 3.5 million hospitalizations annually by 2015. Nearly 10% to 30% of hospital registrations were due to road traffic injuries and a majority of these people had varying levels of disabilities. The study findings discussed above confirmed that a majority of victims of road traffic injuries are men in the age group of 15 to 44 years and belong to the poorer sections of society (Gururaj, 2006).

The 2013 WHO Global Status Report (GSR), on road safety study conducted at the worldwide level revealed that sub-Saharan Africa (SSA) was at a growing danger of RTAs and unless this was addressed in time, the claim on lives and disability due to accidents is likely to surpass the risk posed by chronic diseases that are already affecting many people in the region (WHO, 2013).

The World Bank and other regional development banks have made road safety a priority however, donor funding lags "very far below" the $24 billion that has been pledged to the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFTAM) (Atkins, 2011).

Study findings indicate that the major human direct causes were improper lookout, excessive speed, inattention, and improper evasive action, and internal distraction leading to RTAs in the United Arab Emirates (UAE) (McCrery at el, 2010). Leading environmental causes were view obstructions and slick roads. The major vehicular causes were brake failure, inadequate tread depth, side-by-side brake imbalance, under inflation, and vehicle related vision obstructions (Hijar et al., 2000).

Another study on risk factors for fatal RTAs in Udine Italy showed that mortality from road accidents was 37% higher than in the country as a whole. To identify the major risk factors for fatal crashes in this area, they analyzed the Police Reports of 10, 320 RTAs that occurred from 1991 to 1996. Logistic regression was used to evaluate the association of characteristics of drivers and accidents with accident severity. The risk of involvement in fatal rather than non-fatal accidents was lower among females than among males (Valent et al., 2000). In concurrence with the study undertaken in Udine above, another study revealed that road traffic injuries and death pose a significant burden on the health care system in India. The most commonly affected group was young males and pedestrians constitute a large majority of the victims and there was high early mortality in most cases (Garg, 2006). Further findings emphasize the need for addressing road traffic accident problems with right vision evidence based road safety program in which policies are created to strengthen the prevention (Hyder, 2013).

Literature brought out a number of concerns regarding RTAs from a global perspective to specific regions such as sub-Saharan Africa (SSA), and researches carried out in individual countries. Although different researchers mention the increasing occurrence of RTAs especially in Less Developed Countries (LDCs), the main theme has been that there is a number of associations in causal factors such as the age and sex of victims. It has been mentioned in a number of articles that the male drivers and youths were recorded to have a higher chance of being in an accident than any other sub-group. Furthermore, a number of studies have projected that the problem is likely to increase if no proper planning is undertaken and hence one of the main aims of this study was to be an instrument for public health planning by government.

2.1 Conceptual Framework

In order to address the research question and specific objectives of the study, the conceptual framework was developed based on the public health framework. The public health approach is a generic analytical framework that has made it possible for different fields of public health to respond to a wide range of health problems and diseases, including injuries and violence. This approach is not only helpful in the analysis of risk factors, but also provides a framework that guides decision making throughout the entire process, from identifying a problem to implementing an intervention.

The public health approach involves four interrelated steps: The first step is to determine the magnitude, scope and characteristics of the problem. Defining the problem goes beyond simply counting cases; it includes delineating mortality, morbidity, and risk taking behaviour. In the case of road traffic injuries, this step includes obtaining information on the demographic characteristics of the people involved, the temporal and geographical features of the incident, the circumstances under which it occurred, and the severity and cost of the injuries. Quantitative (for example, surveys) and qualitative (for example, focus group discussions) research methods drawn from the behavioural and social sciences are increasingly being used to identify and characterize problems (Mercy, et al., 1993).

The second step is to identify the factors that increase the risk of disease, injury or disability, and to determine which factors are potentially modifiable. It may also be used to define populations at high risk for injuries and violence and to suggest specific interventions (ibid).

The third step is to assess what measures can be taken to prevent the problem by using the information about causes and risk factors to design, pilot test and evaluate interventions. This step aims at developing interventions based upon information obtained from the previous steps and testing these or other extant interventions. Methods for testing include randomized controlled trials, controlled comparisons of populations for occurrence of health outcomes, cohort studies, time series analyses of trends in multiple areas, and observational studies such as case control studies (ibid).

An important component of the evaluation step is to document the processes that contribute to the success or failure of an intervention, in addition to examining the impact of interventions on health outcomes. The final step is the implementation of interventions that have been proven or are highly likely to be effective on a broad scale. In both instances it is important that data are collected to evaluate the program's effectiveness in actually reducing road traffic injuries and fatalities, particularly since an intervention that has been found effective in a clinical trial or a small study may perform differently at the community level, or when expanded to target broader populations or geographical areas (ibid).

Another important component is determining the cost effectiveness of such programs by balancing the costs of a program against the cases prevented by the intervention can be helpful to policy makers in determining optimal public health practice. Implementation also implies health communication, the formation of partnerships and alliances as well as developing methods for community based programs. Though each of the four steps is presented separately, it is important to remember that in reality these steps may overlap in terms of the timing in which they are implemented (ibid).

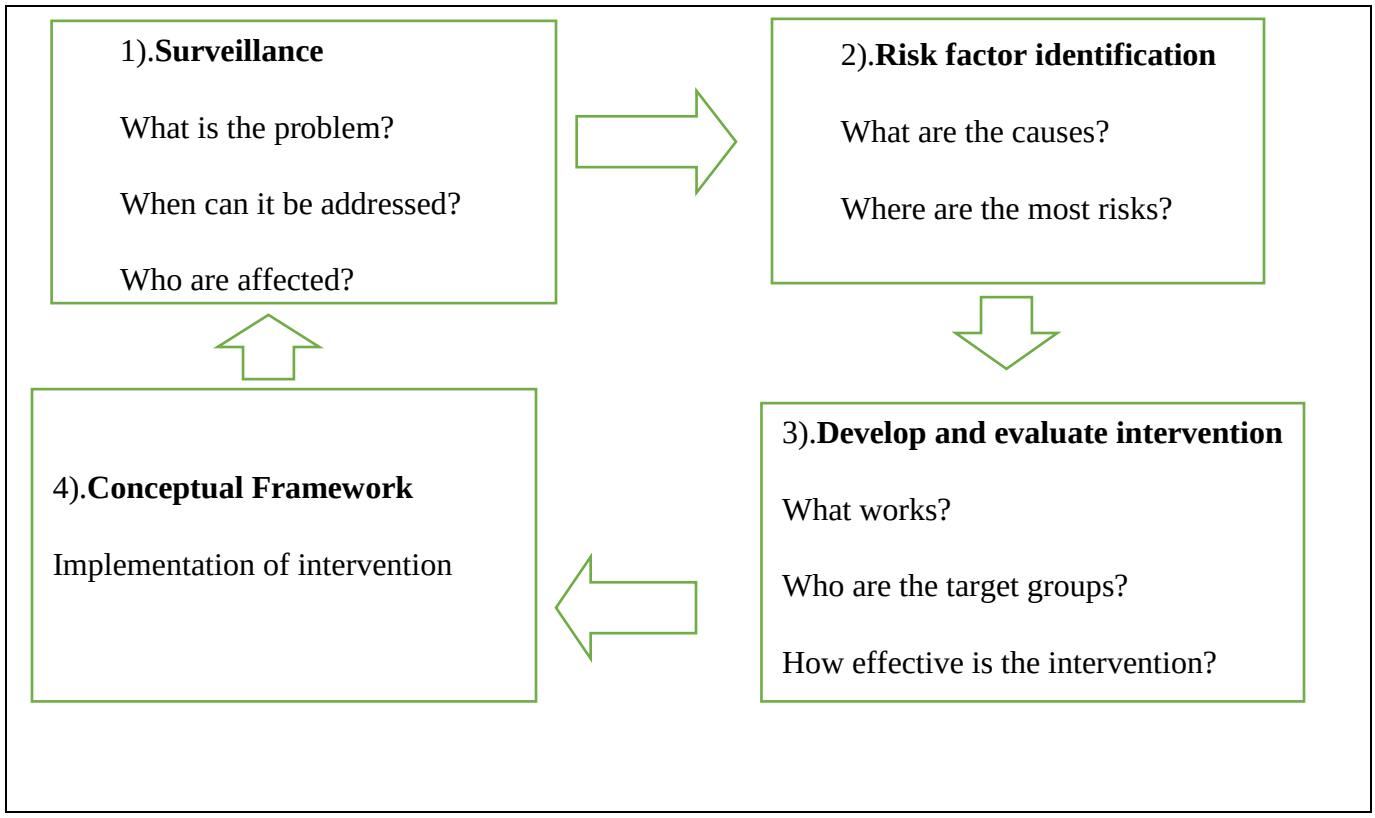

Figure 2.1 Public Health Approach Framework.

Source: Mercy, et al., Public health policy for preventing violence. Health Affairs, 1993:7–29. The public health framework focuses on four main stages in implementation of an intervention; the first one is surveillance which attempts to identify the problem causing a concern. Research works such as this one and other methods are used at this stage. Secondly, risk factors identification such as to find out who are the most affected in a community; this stage can use any type of classifications such as age, sex, geographical location and other socio-economic factors. The next stage looks at options available to address the problem at hand and therefore, select which interventions are most effective to the problem. Lastly, the implementation stage in which the best intervention measure selected is undertaken and applied. In regards to the concern of RTAs leading to death among motorists in Lusaka, it can best be addressed through these four stages and this study is one of the methods as earlier mentioned where the analysis of trends in RTAs among motorists in Lusaka is a part of the problem magnitude identification that can facilitate process effective policy formulation to prevent the scaling up of deaths.

2.2 Research Question

What are the trends in deaths resulting from RTAs and factors associated with these deaths in Lusaka over the period 2010 to 2013 among motorists?

2.3 General Objective

To determine trends in road traffic deaths and factors associated with road traffic deaths among motorists in Lusaka from 2010 to 2013.

2.4 Specific Objectives

i. To determine if the likelihood of dying from a road traffic accident varies by year.
ii. To examine factors associated with road traffic deaths among motorists in Lusaka.
iii. To determine whether sex of a driver is associated with probability of dying in a road traffic accident among motorists.
iv. To establish whether age of the driver is associated with the likelihood of dying in a road traffic accident.

Chapter 3

Methodology

3.1 Study Setting

3.1.1 Study site

This study was conducted in Lusaka (urban), Zambia. Lusaka was selected due to high prevalence and recorded the largest number of motor cars imported per year. Lusaka is capital city centrally located meaning that most of the main roads pass through Lusaka. The link that follows shows the city of Lusaka available online, http://www.mapquest.com/maps?city=Lusaka&country=ZM and thereafter is Map of roads in Lusaka. The map of Lusaka below is adopted from http://www.mapsofworld.com/print_image.php?id=http://www.mapsofworld.com/zambia/maps/lusaka-map.jpg&spid=undefined

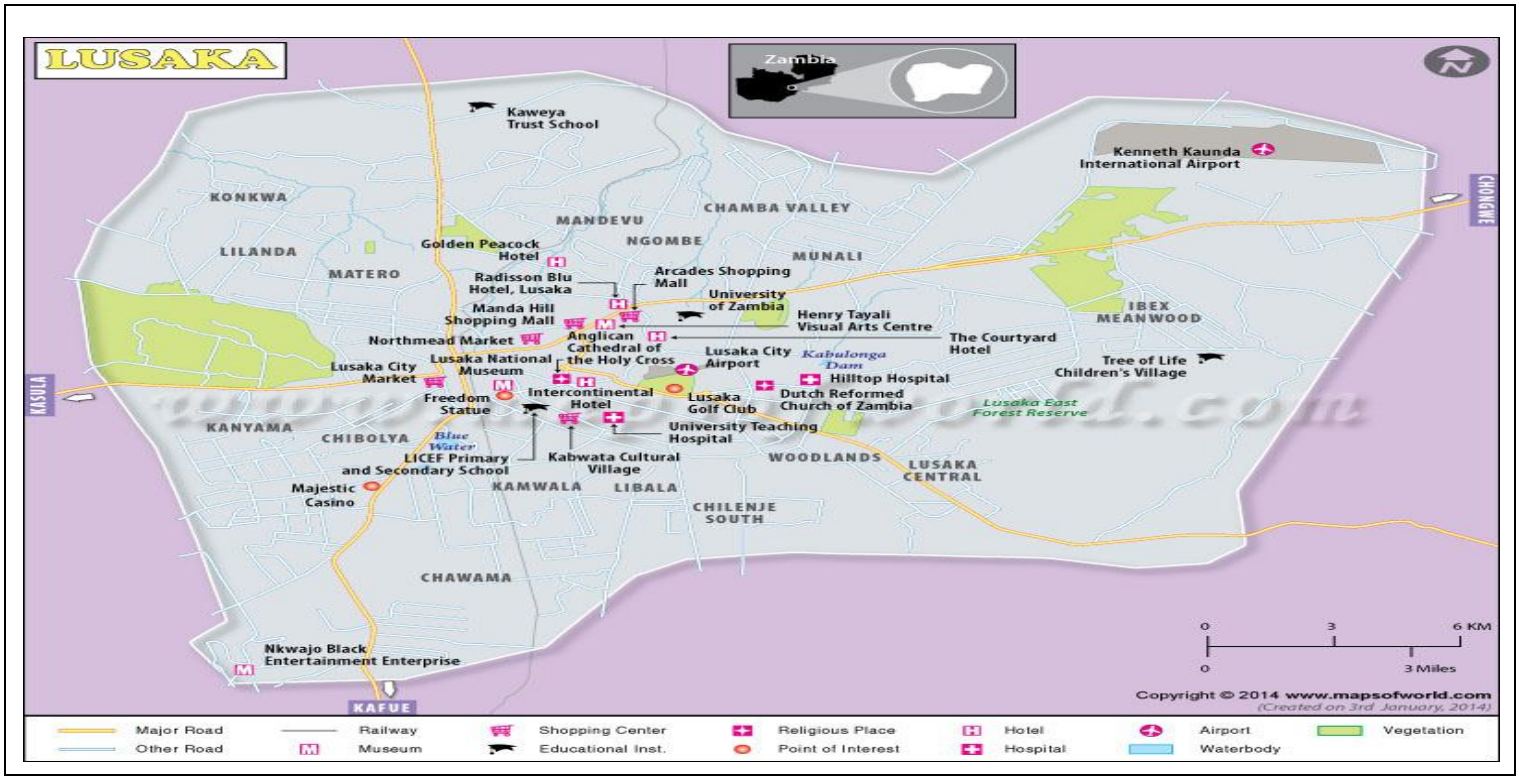

Figure 3.1 Map of Lusaka – Zambia

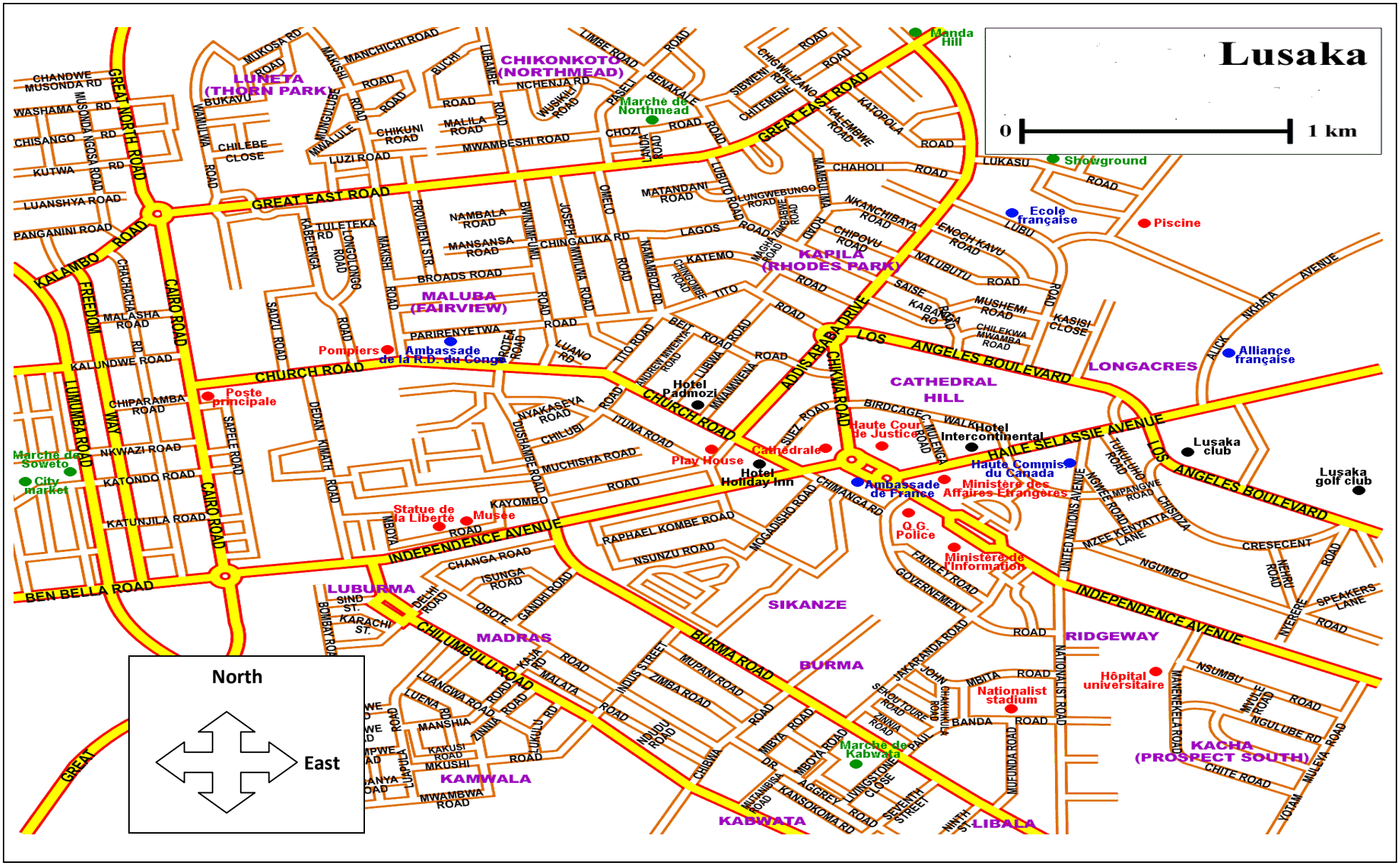

Figure 3.2 Map of roads in Lusaka

3.1.2 Study Population

Motorists aged at least 18 years who were reported having been in a road accident in Lusaka by Zambia Police for the period 2010 – 2013.

Inclusion Criteria

All motorists aged at least 18 years of age in Lusaka and recorded by Zambia Police in Lusaka from 2010 – 2013 as having been in a road traffic accident.

Exclusion Criteria

Cases not within the period 2010 – 2013 from Lusaka and only a 100 cases per year from 2010 to 2013 were systematically selected into the sample, (non selected cases were overlooked).

3.2 Study Design

It was Cross Sectional study which used quantitative methods to analyse Secondary data from Zambia Police (ZP) records on RTAs period from 2010 to 2013.

3.3 Sampling

Simple systematic sampling was used. K=N/n where N is population and n is the sample and K is the interval (first case is randomly selected*)*.

Since there was no known study done in Zambia or within the Southern African States (SAS) that sought exactly the same kind of information a proportion of 50 per cent of the total RTAs in Lusaka for the period under review was collected and analyzed. Further a total of 400 cases were selected into the sample.

Sample size calculations

$n = Z^2 P (1 – P) /d^2$

Where n is the sample size

Z^2= standard deviation above or below the mean = $(1.96)^2$

d^2= degree of error i. e $(0.05)^2$

P = probability of an item being selected i.e. 50% or 0.5 probability

Substituting the values into the formula gave n=384.16 rounded off to the nearest 100^{th} giving 400 RTAs in Lusaka selected into the sample.

Data source

Zambia Police (ZP) yearly records (stored up in hardcopy books) on RTAs in Lusaka which reflected offence dockets information that included the following details: Time of accident, Age of driver at fault, Offenses committed (faults), Deaths, Sex of driver, Injuries, Third party victims and finally the Roads (RTA site).

3.4 Data Analysis

Data analysis was done in STATA 12.0 which was used for the description of baseline characteristics and logistic regression for the association between dying (dependent/outcome variable) from an RTA and independent variables. Analysis was conducted at different levels which took the confidence interval (C.I.) 95% and 5% significance level, P-Values 0.05 cut off.

Table 3.1 Measurements and definition of variables

S/N	Name and Type of Variables	Explanation of variables	Measurement of Variables
1	Dying (Dependent)	Death of driver from an RTA	Categorical
2	Sex (Independent)	Sex of driver	Categorical
3	Age (Independent)	Age in years of driver	Continuous/Categorical
4	Faults leading to RTAs (Independent)	Main (major) faults and Others (Minor)	Categorical
5	Roads (Independent)	Main roads and others (minor)	Categorical
6	Time of RTA (Independent)	Day and Night	Categorical

3.5 Ethical clearance

The sensitivity of the data on RTAs and ethical challenges associated with this study made it imperative for the researcher to seek ethical clearance. Thus, ethical clearance was granted for a period of one year from the Excellence in Research Ethics and Science (ERES) and Zambia Police Head Office (Force Headquarters) as a requirement. In a case where there is no proper handling, the information could jeopardize the Police Confidentiality Clause therefore, efforts to leave out all the names of people involved in RTAs for this study was done to prevent any possible breach of the Confidentiality Clause. Further, the data collected was assigned numeric codes to ensure strict privacy of participants. This research was dealing with human subjects and required consent of participants. However, since the participants were unavailable to sign the consent, the Police Traffic Section granted the researcher permission to use the information without disclosure of any of their identities.

Chapter 4

Results

Table 4.1 Background characteristics

Variables	Frequency n (%)		Dead n (%)	
Age in years (categorical)				
< 25	69	(17.25)	15	(17.05)
25 - 34	152	(38.00)	35	(39.77)
35 - 44	108	(27.00)	22	(25.00)
45 - 54	51	(12.75)	12	(13.64)
≥ 55	20	(5.00)	4	(4.55)
Sex				
Male	333	83.25	80	(83.25)
Female	67	16.75	8	(16.75)
Time of Accident				
Day	188	(47.00)	42	(47.72)
Night	212	(53.00)	46	(52.27)
Faults associated with road accidents				
Misjudgement	121	(30.25)	33	(37.50)
Excessive speed	30	(5.75)	5	(5.68)
Cutting in/out	80	(20.00)	15	(17.05)
Failure to maintain lane	88	(22.00)	12	(13.64)
Unlicensed driver (inexperienced)	38	(9.50)	13	(14.77)
Others (Minor)	50	(12.50)	10	(11.36)

Continuation of Table 4.1

Roads				
Cairo	70	(17.50)	9	(10.23)
Kafue	40	(10.00)	7	(7.95)
Independence	52	(13.00)	12	(13.64)
Church	47	(11.75)	9	(10.23)
Great East	21	(5.25)	6	(6.82)
Great North	12	(3.00)	1	(1.14)
Lumumba	19	(4.75)	6	(6.82)
Freedom	28	(7.00)	9	(10.23)
Cha-Cha-Cha	20	(5.00)	6	(6.82)
Los Angeles	17	(4.25)	4	(4.55)
Others (minor)	74	(18.50)	19	(21.59)

Table 4.2 Association between dying and year

Year	**C.O.R.[1]**	**C.I.[2] 95%**	**P-Value[3]**
Base year (2010)	1	1	1
2011	0.73	(0.36 1.47)	0.37
2012	1.52	(0.80 2.88)	0.20
2013	0.83	(0.42 1.65)	0.60

[1]Crude (non-adjusted) Odds Ratio.

[2]Confidence Interval 95% and 5% level of Significance

[3]Cut off Statistical Significance at P-Value < 0.05

Table 4.3 Association between dying and year adjusting for all other factors

Variables	A.O.R[1].	C.I. 95%	P Value
Year			
Base year (2010)	1	1	1
2011	0.78	(0.37 1.62)	0.50
2012	1.56	(0.79 3.06)	0.20
2013	0.96	(0.47 1.99)	0.92
Age in category (Years)			
Reference age category			
Below 25	1	1	1
25 – 34	1.03	(0.50 2.15)	0.93
35 – 44	0.81	(0.37 1.80)	0.61
45 – 54	1.13	(0.44 2.86)	0.80
55 and above	0.78	(0.21 2.89)	0.70
Sex			
Male (reference)	1	1	1
Female	0.43	(0.19 0.96)	0.04*
Faults leading to road accidents			
Misjudgement on distance (Reference)	1	1	1
Excessive speed	0.78	(0.25 2.37)	0.65
Cutting in/out	0.54	(0.26 1.13)	0.10
Failure to maintain lane	0.34	(0.16 0.74)	0.01*
Unlicensed Driver (inexperienced driver)	1.37	(0.59 3.16)	0.47
Others (Minor)	0.61	(0.26 1.41)	0.25
Roads in Lusaka			
Cairo (Reference)	1	1	1
Kafue	1.49	(1.00 6.13)	0.48
Independence Avenue	2.14	(0.57 9.290	0.13
Church	1.59	(0.90 10.83)	0.39
Great East	2.11	(0.62 7.15)	0.23
Great North	0.57	(0.06 5.14)	0.61
Lumumba	4.10	(1.17 14.44)	0.03*
Freedom	3.32	(1.086 10.18)	0.04*
Cha-Cha-Cha	3.13	(0.90 10.83)	0.07
Los Angeles	2.30	(0.57 9.29)	0.24
Others	2.49	(1.01 6.13)	0.04*
Time of accident			
Night	1	1	1
Day	1.11	(0.67 1.84)	0.679

[1]Adjusted Odds Ratio, *P-values < 0.05 showing statistical significant association to dying.

Table 4.4 Association between dying and background factors related to traffic accidents.

Variables	C.O.R.	C.I. 95%	P Value
Age in category (Years)			
Reference age category			
≤ 25	1	1	1
25 – 34	1.08	(0.54 2.14)	0.83
35 – 44	0.92	(0.44 1.93)	0.83
45 – 54	0.92	(0.47 2.63)	0.82
≥ 55	0.90	(0.26 3.10)	0.87
Sex			
Male (reference)	1	1	1
Female	0.43	(0.20 0.94)	0.03*
Faults leading to road accidents			
Misjudgement on distance (Reference)	1	1	1
Excessive speed	0.74	(0.25 2.16)	0.58
Cutting in/out	0.62	(0.31 1.23)	0.17
Failure to maintain lane	0.42	(0.20 0.87)	0.02*
Unlicensed Driver (inexperienced driver)	1.39	(0.64 3.03)	0.41
Others (Minor)	0.67	(0.30 1.48)	0.32
Roads in Lusaka			
Cairo (Reference)	1	1	1
Kafue	1.44	(0.49 4.21)	0.51
Independence Avenue	2.03	(0.78 5.27)	0.14
Church	1.61	(0.59 4.40)	0.36
Great East	2.71	(0.84 8.80)	0.10
Great North	0.62	(0.07 5.36)	0.66
Lumumba	3.13	(0.95 10.32)	0.06
Freedom	3.21	(1.11 9.25)	0.03*
Cha-Cha-Cha	2.90	(0.89 9.50)	0.28
Los Angeles	2.09	(0.56 7.82)	0.28
Others	2.34	(0.98 5.60)	0.06
Time of accident			
Night	1	1	1
Day	0.96	(0.60 1.55)	0.88

*P-values < 0.05 showing statistical significant association to dying.

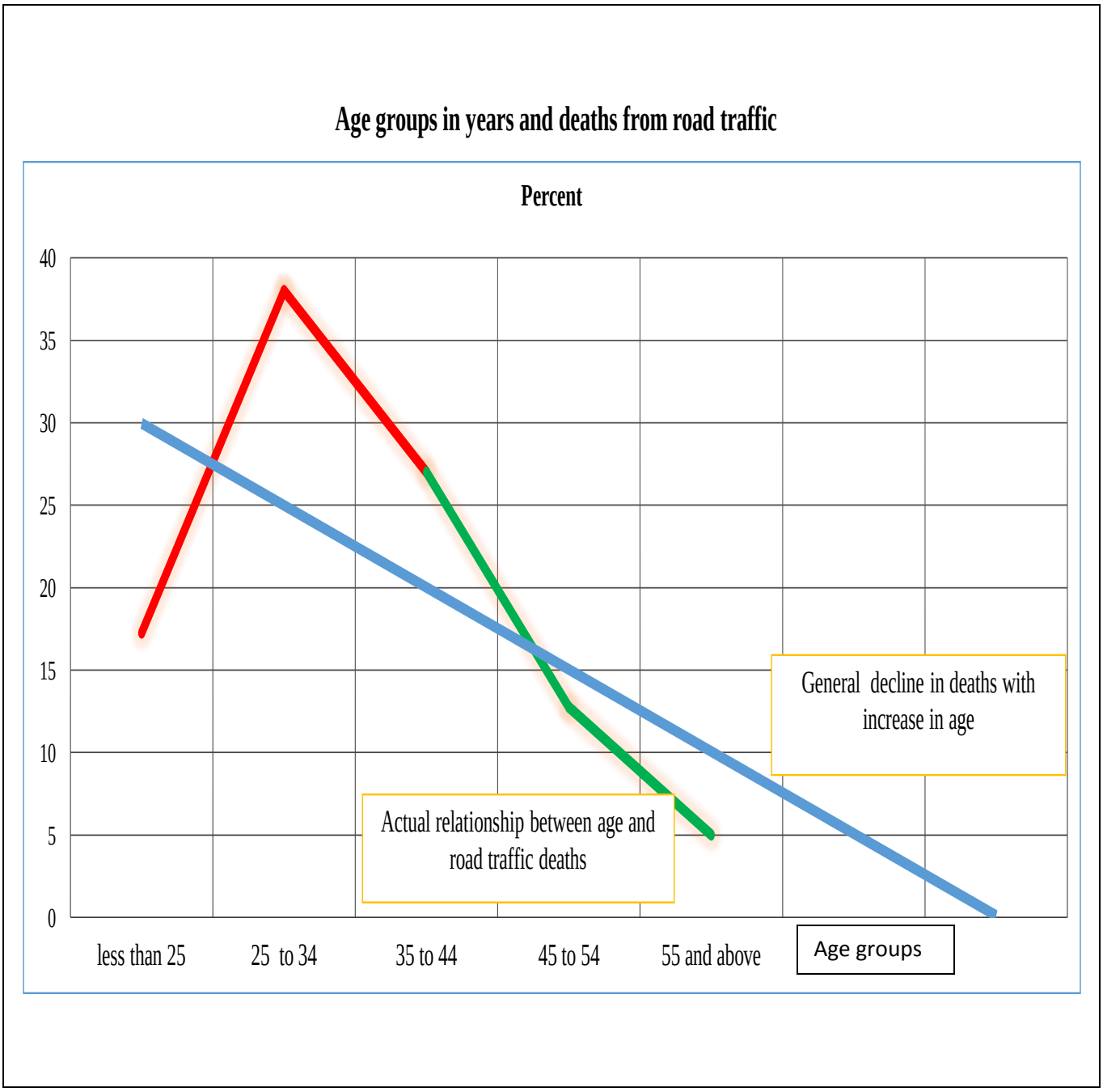

Figure 4.3 Shows association between drivers' age groups in years and deaths from RTAs in Lusaka.

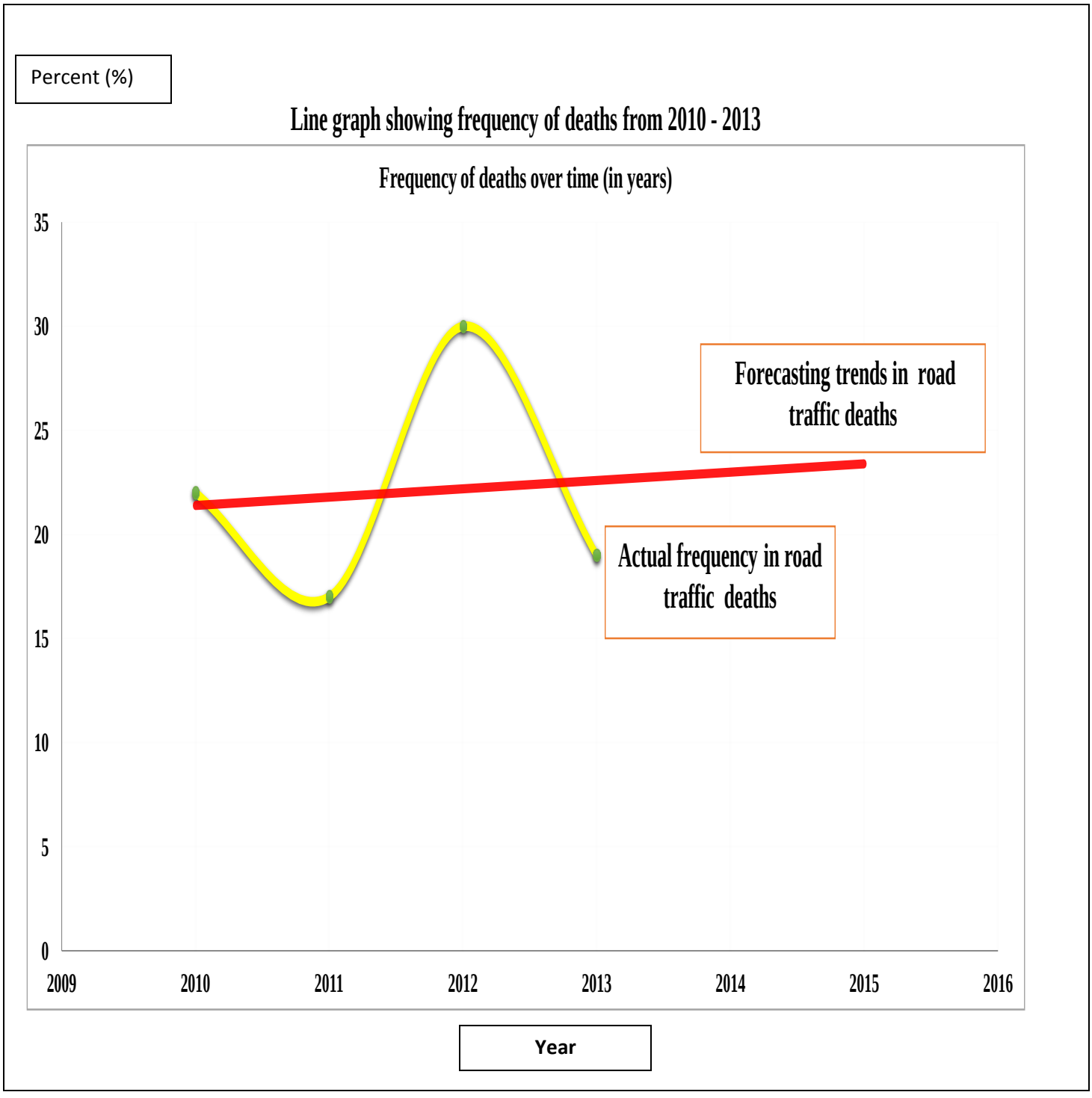

Figure 4.4 Line graph showing trends in deaths among motorists in Lusaka in the period 2010 – 2013.

Chapter 5

Discussion

5.1 Trends in RTA deaths from 2010 – 2013.

The period under review indicated that there was a fluctuation in deaths among drivers in Lusaka. However, the trend forecast indicated that on average without any form of effective intervention the deaths among motorists in Lusaka are likely to increase which is in conformity with the projections made by Gregersen (1999) that road traffic injuries are the leading cause of death among young people in the sub Saharan Africa (SSA) region. The effect was predicted to increase in countries with low or medium income as they become more highly motorized (ibid). Furthermore, World Health Organization (WHO, 2013) Report indicates that RTAs have a global death toll of 1.24 million per year and this trend is on course to triple to 3.6 million per year by 2030 if no intervention is undertaken by all the nations.

5.2 Sex and Age of drivers.

As earlier indicated, empirical findings showed that sex and age are important factors that determine trends in RTAs among motorists. Nearly 10% to 30% of hospital registrations were due to road traffic injuries in India and a majority of these people had varying levels of disabilities and a large number of victims of road traffic injuries are men in the age group of 15 to 44 years and belong to the poorer sections of society (Gururaj, 2006). However, according to the 2013 WHO Global Status Report (GSR), on road safety study conducted at the worldwide level revealed that sub-Saharan Africa (SSA) is at a growing danger of RTAs. In tandem with these findings above, the age groups of 18 – 44 years recorded a higher frequency of deaths among motorists in Lusaka than any other age groups; these are the people that need to contribute much towards economic growth and development in Zambia.

Another study on risk factors for fatal RTAs in Udine Italy showed that risk of involvement in fatal rather than non-fatal accidents was lower among females than among males (Valent et al., 2000). In conformity with the study undertaken in Udine above, another study in India reviewed that road traffic injuries are a significant burden on the health care system in India and the most

commonly affected group is young males (Garg, 2006). Further findings emphasize the need for addressing road traffic accident problems with right vision evidence based road safety program in which policies are created to strengthen the prevention (Hyder, 2013). In the same vein this study found a significant association between sex of a driver and the likelihood of dying from a road traffic accident; female drivers in Lusaka have 67% odds of not being involved in a fatal road traffic accident compared to their male counterparts with statistically significant results (P-value = 0.03).

5.3 Roads and Faults leading traffic accidents.

Most accidents took place in the night compared to day time however, after adjusting for confounders it was found that day time driving in Lusaka had higher odds of traffic deaths compared to night time due to the traffic congestion apparent in the day compared to night time. Another, factor that could have made this trend to be this way is the street lighting installed in most of the major roads to reduce accidents at night and the lack of street vending in the night compared to day time.

Further, the results indicated that most accidents happened in Cairo Road which is the main road passing through the Central Business District (CBD) of Lusaka. Government allowed street vending in the main business area and this made the risk of dying from an RTA increase in the roads around the CBD. As such the move made it more risky for both pedestrians and motorists to manoeuvre around those roads. Unlawful street vending, Unlicensed vendors who sell various items (e.g., bottled water, newspapers, window washing services) to motorists in streets or from medians risk being hit by a car because they move quickly across traffic lanes and around stopped cars (Moafian, et al., 2013).

The effect of the pronouncement made by the late president of Zambia his excellence Mr. Michael Sata in 2012 to allow trading in the CBD has impacted negatively on RTAs in Cairo road and others around. For an accident to occur on the road it takes faults with the vehicle and environmental factors, these faults are categorized according the Police investigations. The Zambia Police (ZP) identified the main ones as, misjudgement on clearance distance, cutting in and out, excessive speed, failure to maintain lane, experienced driving (unlicensed) and others (such as alcohol, use of phones, etc.) from 2010 to 2013 the data showed that RTAs that

happened due to Misjudgement recorded 30.25%, followed by cutting in and out with 22%, then failure to maintain lane with 20% and the lowest was death or injury due to excessive speed with 5.25%.

Chapter 6

Conclusion and Recommendations

6.1 Conclusion

The purpose of this study was to determine factors associated with road traffic deaths and trends in traffic deaths among motorists in Lusaka from 2010 to 2013 and it found out that deaths in RTAs are still high and at an increase each year. There is a significant association between the age of driver and odds of dying from an RTA in Lusaka; the probability of being involved in a fatal accident for Male drivers is higher than that of Female drivers. Age is also a factor that indicated an interesting association with odds of dying from an RTA; drivers in the age groups 18 to 44 are at a higher risk compared to the older ones. This is attributed to a number of factors such as older drivers tend to be more careful on the road and in most instances driver safer vehicles and are less likely to be on the roads more often compared to those in age groups with a higher risk. There was little variation in the number of RTAs that happened during day and night times in Lusaka; although the risk increased during the day due to congestion in the main roads. In order to address the problem, there is need to formulate and implement effective Polices that prioritize RTAs as a public health concern.

6.2 Recommendations

There are research and policy implications to this study; the need to advise policy on the matter so as to reduce the rising trends in RTAs in Zambia and the Southern Africa region is important as this part of the world is the poorest and worst hit by disease that claim millions of lives. Government through its mandated departments like RTSA, ZP and the Lusaka City Council should come up with a strategic plan to organize and control the behaviour of motorists especially those operating in CBD such as Mini-Buses, Cabs and others. This will see a significant reduction in RTAs in Lusaka.

Furthermore, the conduct of those offering transport services to commuters as mentioned earlier can be put in right order if government ensures that metro transport system is handled by government itself. Government can own its fleet of Buses and Cubs through Lusaka City Council that work within schedule. Further, government can reintroduce the commuter train to reduce on stress faced by commuters in Lusaka through long queues and congested roads. The private transporters can lease their buses to government or make operations outside the CBD to ensure safety of both pedestrians and motorists. These actions if implemented can lead to a remarkable reduction in RTAs especially in central city area. Another recommendation is that the road traffic authority should ensure that it modernises its communication and monitoring system through the installation of high speed cameras in main high ways to monitor and identify

perpetrators of traffic offences in order to reduce the risk of RTAs. It should also upgrade its drivers training and testing farcicalities so as to prevent corruption in the process of issuing and renewal of driving licenses for drivers.

6.3 Limitations

Police records for traffic accidents are meant for administration purpose only, hence have limitations and mostly contain incomplete data. This meant that the best way of sampling was through simple systematic sampling. Further, the data was not specific on what comprises certain faults such as unlicensed driving. The researcher had to customize the data to fit the analysis requirement.

Chapter 7

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Appendix 1 – Data Collection Form

S/N	Year	Location	Time	Age of Driver	Sex of Driver	Road	Faults	Number Injured	Driver dead/ survived	3rd Party Victims	3rd Party Dead	3rd Party Injured
1	2010	1	Night	37	Male	Cairo	Excessive speed	0	1	1	0	1
2	2010	1	Day	33	Male	Kafue	Misjudgement	1	0	1	0	1
3	2010	1	Night	34	Female	Cairo	Cutting in/out	0	1	3	0	3
4	2010	1	Night	28	Male	GE Rd	Failure to maintain lane	1	0	5	0	5
5	2010	1	Day	75	Female	GN Rd	Other (Minor)	0	1	2	0	2

Urban Yes Urban = 1

No Urban (Rural)= 0

Driver dead = 1

No dead Driver (Survived) = 0

GE/N Great East/North Roads

Appendix 2 - Global Burden of Disease and Injuries leading to death

Global Burden of Disease and Injuries leading to death			
Year 1998 statistics		**Year 2020 projections**	
1	Respiratory Infections	1	Ischaematic Heart Diseases
2	Perinatal Conditions	2	Unipolar Major Depression
3	Diarrhoeal diseases	3	Road Traffic Injuries
4	HIV/AIDS	4	Cerebrovascular Diseases
5	Unipolar Major Depression	5	Pulmonary Diseases
6	Ischaematic Heart Diseases	6	Respiratory Infections
7	Cerebrovascular Diseases	7	Tuberculosis
8	Malaria	8	War
9	Road Traffic Injuries	9	Diarrhoeal Diseases
10	Tuberculosis	10	HIV/AIDS

Source: WHO, 2000

Appendix 3 – 2007 RTAs per Province of Zambia

DIVISION	NUMBER OF HABITANTS	NO. OF ACCIDENTS	NO. OF FATALITIES	NO. OF ACCIDENTS PER 100000 HABITANTS	NO. OF FATALITIES PER 100000 HABITANTS
LUSAKA	1660070	10889	413	656	25
C/BELT	1927576	5400	301	280	16
CENTRAL	1260491	1382	158	110	13
SOUTHERN	1499462	1431	105	95	7
EASTERN	1601500	693	85	43	5
NORTHERN	1534170	569	71	37	5
LUAPULA	965605	190	51	20	5
N/WESTERN	731351	735	56	100	8
WESTERN	912226	401	26	44	3
TOTAL	12092451	21690	1266	1385	87

Source, 2007 RTSA Annual Report