FACTORS ASSOCIATED WITH ROAD TRAFFIC ACCIDENTS AMONG YOUNG DRIVERS IN KHOMAS REGION, NAMIBIA

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ABSTRACT

As per the current statistics, road traffic accidents (RTAs) are among the leading causes of deaths and disabilities among young people worldwide. The deaths and injuries attributed by the RTAs are a major public health crisis faced by Namibia, just as in many countries all over world. There is a need to investigate the risk factors contributing to RTAs in Namibia, therefore, this study was conducted with a purpose of determining the factors associated with RTAs among young drivers in Khomas region, Namibia. The study utilised a mixed methods convergent-parallel design to collect data from the National Road Safety Council (NRSC) of Namibia, as well from the traffic law enforcement officers in Khomas region. The relationship between independent variables and dependent variables was analysed using multiple logistic regression analysis based on p-value <0.05, while interviews were analysed using inductive thematic analysis. The quantitative data revealed that a total 21 574 RTAs were recorded in Khomas region between 2017 and 2019, with male young drivers being responsible for the majority (83%) of the RTAs in the region. Most (17.2%) of the recorded RTAs occurred on Fridays. The least (5.7%) RTAs were recorded in the month of December. The study found a strong association between days of the week and no injury (p=0.000), and between visibility of the road due to different weather conditions and RTAs (p=0.000). Risky driving behaviours among young drivers such as driving under the influence of alcohol, speeding, and driving whilst using mobile devices are some of the risk factors revealed by the qualitative data contributing to the high rates of RTAs among young drivers in Khomas region. The study recommends "road safety awareness" as a key measure to reducing the rates of RTAs in Khomas region.

Keywords: Road traffic accident, young drivers, risk factors, Namibia

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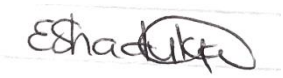
DEDICATION

I dedicate this thesis to my young nephews and nieces. Thank you for being such a great blessing in my life. I hope my success will serve as a motivation to take your education very serious. I love you all.

DECLARATION

I, Emma Shaduka, hereby declare that this study “Factors associated with road traffic accident among young drivers in Khomas region, Namibia” is my work and is a true reflection of my research and that this work or any part thereof has not been submitted for a degree at any other institution.

Name: Emma Shaduka Date: October 2023



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ABBREVIATIONS/ACRONYMS

CBD - Central Business District

MoHSS - Ministry of Health and Social Services

MVA - Motor Vehicle Accident

NAMPOL – Namibian Police Force

NHRU - National Health Research Unit

NRSC - National Road Safety Council

RSIMS - Road Safety Information Management System

RTA - Road traffic accident

SPSS - Statistical Package for the Social Sciences

SADC - Southern African Development Community

UNAM - University of Namibia

WHO - World Health Organization

CHAPTER 1: INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 Introduction

People use roads on a daily basis, to move around from one place to another and to transport their goods (1). On the other hand, driving is a crucial task that requires both physical and cognitive ability to be able to drive the vehicle safely on the road (2). Road traffic accidents (RTAs) are among the leading causes of preventable deaths and disabilities worldwide. An accident is an unfortunate incident that occurs unexpectedly and unintentionally, resulting in unforeseen damage, injury, or death (3). A road traffic accident is defined as an accident that occurs when a mobile vehicle collides with another vehicle, pedestrian, tree, animal, or other obstacles resulting in one person or more people being killed or injured, and/or property damaged (4). While a road traffic injury can be defined as a physical damage of a person because of a road traffic accident (5). Although all road users regardless of their age groups are at a risk of being involved in a RTAs (1). Young people are more prone to RTAs (5). Drivers aged 15 to 30 years are often classified as young drivers. However, this definition of young drivers differs from research to research and country to country. In some countries, young drivers are defined as drivers with less than 3 years of driving experience (2). The legal driving age in Namibia is 17 for motor vehicles with a tare weight not exceeding 3,500 kg and 18 for motor vehicles with a tare weight of over 3,500 kg (6). Globally, young drivers cause about majority of the recorded RTAs (7). This is linked to the young drivers' unsafe driving practices and their risky driving behaviours, such as driving under the influence of alcohol and/or drugs, driving using mobile devices, speeding, fatigue, and driving with peer passenger/s(8).

Young drivers' involvement in majority of the RTAs has also been associated with poor tolerance on the road, getting easily annoyed, being aggressive toward other drivers, and inability to handle stress while driving (9). Injuries and deaths from RTAs are on a rise in low- and middle- income countries, with the rate being twice than those in high- income countries (3). The mortality rates of RTAs are higher in men when compared to women in all regions across all age groups, with younger drivers being three to four times more likely to be involved in RTAs compared to older drivers (1; 9). In Africa young drivers have the highest RTA rates than any other age group (1). This has been associated with various factors such as lack of driving experience, lack of risk perception ability, intentional violation of traffic rules, and their inability to understand different road marks and signs (4; 7). Hazard perception is one of the skills learned overtime and with driving experience (2). Hence, making young drivers vulnerable to RTAs. In Namibia the trend of road traffic injuries and deaths are like those observed in low- and middle- income countries, which is a great public concern (10). This is because the high death and injury rates associated with RTAs constitute serious social and economic impacts on Namibia. A study by Amweelo (11) on the road safety in Namibia with focus on road accidents, concluded that in order to improve the road traffic situation in Namibia and to reduce to occurrence of RTAs resulting in serious injuries and fatalities, considerable attention needs to be prioritised on human factors. Age being one of the human factors identified by literature and with young drivers identified as the main contributors to majority of the recorded accidents in Namibia (6). It is crucial to to study and understand the factors associated with RTAs among young drivers in Namibia. Therefore, based on the findings

of literature above there was a need to carry out the current study as it seems no similar study was carried out in Namibia.

1.2 Background of the study

Injuries caused by RTAs are the leading causes of death and disability among young people in many countries and are a major public health concern (12). Road traffic accidents are on a rise notably in low- and middle- income countries, with the current trends projecting that RTAs will be the fifth leading cause of death by 2030 (3; 5). Around 3400 people are estimated to lose their lives daily on the world's roads and tens of millions of people are injured or disabled annually (13). A quarter of all deaths associated with RTAs is involving young drivers (9). More than 85% of the RTAs occur in low- and middle- income countries (4), and it is estimated that for every ten lives lost in RTA, nine occur in low- and middle- income countries (10). Moreover, deaths and injuries attributed to RTAs are major public health crises faced by Namibia, just as in majority of the other low- and middle- income countries (6). Road traffic accidents have multi-factorial causes. Most of them are due to the conditions of the roads, the roadworthiness of the vehicles, and the driving behaviours of the drivers (4; 9). However, it has been noted that if drivers maintained their vehicles within the roadworthiness standards and behaved appropriately whilst driving the incidences of RTAs could be minimized (1). In addition, motor vehicles with functioning seatbelts, brakes, steering wheel, and tires in perfect conditions could also aid in reducing the occurrence of RTAs. Moreover, road safety is captured among the Sustainable Development Goals (SDG) 11.2, which aims at offering access to safe, affordable, accessible, and sustainable transport system for all by improving road safety by 2030 (10). Road safety programs are key measures in preventing RTAs, improving

driving behaviours, and are powerful solutions in avoiding injuries and preserving lives (14). Despite Namibia having a well-developed road network, RTAs are the third cause of death in the country (15). As mentioned earlier, the young people are responsible for majority of the RTAs in Namibia. Hence, making it essential to sensitize the young drivers about road traffic rules and regulations. In addition, multiple intervention strategies and projects targeting young drivers have contributed significantly to a reduction in the rates of RTAs in many countries, and Namibia can adopt some of those intervention strategies and projects. Some of those interventions are for example extensive enforcement of legislation on speed and alcohol consumption, safer design and use of roads and vehicles.

1.3 Problem statement

Road traffic accident (RTA) is a global public health concern and costing countries productive lives and billion dollars. It has been estimated that by 2030, RTAs will be the fifth leading cause of death worldwide (16). Despite Namibia having a well-developed roadway network, the Namibian roadways are considered some of the deadliest in the world (10), and RTAs are the third leading cause of death in the country with a fatality rate of 23.9 deaths per 100 000 population (6; 15). Khomas region has been reported as the region with the highest RTAs in the country (17). In 2017, the cost on road traffic accident in Namibia was more than N$ 1.3 billion (18). An amount that could be utilized into developmental projects of the country. Moreover, road traffic accidents are the primary leading cause of deaths amongst young drivers, with 49% of total deaths in people under the age of 30 being linked to RTAs (16). A study done by Adanu et al (6), on identification of factors associated with road accidents among functionally classified

transport modes in Namibia found that 75% of all road accidents in the country are caused by young drivers, making it a serious concern and problem in Namibia. Hence, the young people are amongst the worst affected age group in terms of road traffic injuries and death in Namibia (17). Thereby, not only robbing the families of their loved ones and potential breadwinners but also greatly affecting the economic output of the country. Furthermore, it seems there is no research carried out in Namibia investigating and exploring the factors associated with RTA among young drivers in the country. Therefore, there is a need to critically investigate and understand the factors contributing towards the high rate of RTAs among young drivers. It is an obvious case that not all occurring RTAs can be avoided completely. However, if the common causes of these RTAs are well researched, understood, and addressed it is possible to address this problem. Hence, in order contribute towards the gap mentioned above the current study aims to investigate in order to find the factors associated with RTAs among young drivers within the Khomas region.

1.4 Purpose and objectives of the study

Purpose

The purpose of this study was to investigate the factors associated with RTAs among young drivers within the Khomas region, Namibia.

Objectives

1. To determine the factors associated with RTAs among young drivers within the Khomas region.
2. To analyze the RTA data and identify the association between the factors contributing to RTAs among young drivers within the Khomas.
3. To explore the perceptions of traffic enforcement officers on the factors associated with RTAs among young drivers within the Khomas region.

1.5 Significance of the study

This study will be of significance to the Motor Vehicle Accident (MVA) Fund, government of the Republic of Namibia, Road Authority, National Road Safety Council (NRSC), and the public at large. It will help determine the factors associated with RTAs among young drivers within the Khomas region and identify the common causes of RTAs. It will also propose the possible solutions and interventions that may contribute towards reducing and addressing this problem. Moreover, the findings of this study will be of great benefit to the MVA Fund in determining the areas that needs to be focused on, in order to mitigate the effects of RTAs and reduce their incidences in the country, particularly within the Khomas Region. Additionally, the current study will provide insight into the causes of accidents and injuries, which can help inform interventions and policies. This study will also contribute to the body of the existing academic and general knowledge and may be a source of reference to guide decision-making, policy change, and may lead to new road traffic rules and regulations.

1.6 Concepts definition

Accident

An unfortunate incident that happens unexpectedly and unintentionally, typically resulting in damages to something or injuries to someone (3). In this study, it refers to an unplanned and unintended crash involving a mobile motor vehicle which results in damages to another motor vehicle in Khomas region.

Road traffic accident

A collision involving a motor vehicle occurring on the road that is open to traffic and there is at least one person who is injured or killed, and/or another motor vehicle which is damaged (4). In this, study it refers to an accident between one or more vehicles on a public road resulting in one person or more people being killed or injured in Khomas region.

Young Driver

A young person who drives, operates, or is in physical control of a motor vehicle (2). In the context of this study, it refers to someone driving a motor vehicle in Khomas region who is below the age of 30 years.

1.7 Summary

The chapter provided the introduction and background of road traffic accident (RTAs), it narrated the problem statement, purpose, objectives and significance of the study, and defined the key terms used in this study. Road traffic accidents continue to inflict untold suffering and losses to families and rob the country of its productive citizens. Therefore, recent data on RTAs is vital for the implementation of measures aimed at reducing injuries and deaths associated with RTAs.

The next chapter covers the literature review.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Chapter 1 provided an introduction and the background information related to the study. The problem statement, research purpose and objectives are also contained. Chapter 2 gives an overview of the study's literature review. This chapter provides information on the RTAs globally, in Africa, Southern African Development Community (SADC), and in Namibia. Furthermore, it gives an overview of the risk factors associated with RTAs and emphasizes on the impacts of RTAs to the country, society and family as well provides measures that can be implemented in order to mitigate the rates of RTAs. Worldwide, injuries acquired from RTAs are estimated to be the leading cause of death among young people (3). Consequently, affecting the people entering their most productive years. In Africa, where RTAs are on a rise affects the economic burden as large amounts of money are spent on the management and treatment of the RTA victims (4). Additionally, RTAs may drive families and communities into poverty due to the loss of their breadwinners and may be a burden to family members who will need to care for their loved ones, ones following injury in RTAs (15). Economically, the average annual socio-economic cost of RTAs amounts to 1% of gross national products in low-income countries (20), and therefore subsequently causing economic loss to national budgets. Adding to the burden of the RTAs are the millions of victims enduring long term suffering from their injuries and disabilities (19). In Namibia, regardless of the resources injected into various projects aimed at minimizing RTAs and their impacts, the RTA rate keeps on increasing (14).

2.2 Prevalence of road traffic accidents

Road Traffic accidents constitute a great concern across the globe. They are among the leading causes of death and disability among young people aged 15-29 years (5). Annually, more than 20 million people are injured, and 1.25 million people lose their lives due to RTAs (3). It is predicted that by 2030 RTAs will be the fifth leading cause of death (21). Road traffic accidents reflect global inequity with more than 90% of RTAs occurring in low- and middle-income countries, with highest injuries reported in African countries (22). European and American countries have the lowest RTAs with a rate of 15.6 and 9.3 respectively, while African and Southeast Asian countries are reported to have the highest RTAs related deaths at a rate of 26.6 and 20.7 deaths per 100 000 population respectively (5). The RTA rate is low in the developed world due to effective accident counter measures that are effectively implemented (1). A study done in Saudi Arabia found that 69% of the RTAs in that country were caused by young drivers (<30 years old), while drivers of 50 years and above only contributed 4% of the total RTAs in the same country (23). Without immediate actions to address the current road accidents and fatalities, 12 million people could lose their lives on the world's roads (15). Regionally, Africa is considered a low motorized continent with only 2% of world's vehicles but its road safety situation is the worst in the world, contributing 16% of the global traffic deaths (24). Additionally, the fatality rates attributed to RTAs in African countries ranges from eight to fifty times higher than in the industrialized world (11). In Namibia, the trends of RTAs are similar to the patterns observed globally (10). In 2018 Namibia was ranked first in Africa in road accidents (18), with the RTA rate estimated to be 23.9 per 100 000 populations (6). With regard to gender, more Namibian males when

compared to females are reported to have lost their lives due RTAs (11). The fatality rate in Namibia is 56% and 44%, males and females, respectively (15). It has been reported that drivers between the ages 17-30 years are the main causes of all the reported RTAs in Namibia (6). This could be attributed to factors such as; lack of driving experience among young drivers when compared to older drivers. Hence, the inability to easily identify a potential road or vehicle problem and respond appropriately. The young drivers are also likely to be involved in distracted and risky driving behaviours such as not wearing seatbelt, making calls, texting, eating and drinking while driving increasing their likelihood of being involved in road accidents. Therefore, until effective measures are implemented to address this issue, the increasing RTAs trend will continue. Moreover, RTAs are of great magnitude in urban areas such as in Windhoek district, Khomas region as numerous people spend a large amount of their time in motor vehicles as opposed to rural areas with fewer motor vehicles.

2.3 Factors associated with road traffic accidents

Numerous risk factors are attributed to the increased rate of RTAs. These factors might not act in isolation but often act in combination with one another (1). Although most of the common factors of RTAs maybe interrelated, each factor can also influence the occurrence of a RTA in a different way. The attributed factors are usually classified as human related factors such as passengers, alcohol, speeding, mobile phone, driver's gender, and age; environmental factors such as road, and weather conditions, and vehicle related factors such as defects in the motor vehicle. (3; 7; 8; 11) Human related factors contribute 64-95% of RTAs across the globe (4).

In Namibia minority of the RTAs (17%) are caused by female drives and of the total RTAs, 35% are occurring on two lanes, 15% occurring under low lightning conditions (i.e night, dawn/dask), 12% occurring on one-way roads, 15% happening on unpaved roads, and almost a quarter of the total RTAs recorded during the rainy seasons (6). Moreover, negative attitudes towards traffic rules and regulations reported among young drivers,, un-roadworthy vehicles, bad weather and poor road conditions are amongst the leading cause of RTAs in Namibia (17).

2.3.1 Human related factors

Road traffic accidents are caused by a combination of human related factors which include factors related to the drivers, and other road users. The human related factors that increase the risk of RTAs are the driver's age and gender, the presence of passengers, driver's blood alcohol levels, distractive activities, fatigue, and the speed at which the motor vehicle is being driven (2; 7; 8; 16).

Young drivers are prone to fatal accidents because they are the ones mostly involved in risky driving behaviors and lack proper driving experience. A study done in Saudi Arabia revealed that drivers below the age of 30 years were involved in 60% of the RTAs (22). This might be because young drivers are less likely to have full control a vehicle and less likely to be both conversant with and cognizant of the hazards of the road (1).

Gender is also one of the human factors contributing to the higher rates of RTAs. In a study done in Dar es Salaam on the socio-economic consequences of road traffic accidents to the victims and their families, found that male young drivers are reported to be more involved in a RTAs than young female drivers (21). This could be due to that young male

drivers are inclined to engage in risky driving behaviors such as alcohol consumption, whereas female drivers opt to abstain from drinking alcohol if they know they are going to drive (2). The crash rates being higher in male young drivers than their female peers could also be due to that young female drivers are less likely to have driving licence than their male peers. This can cause the crash risk to be underestimated in female drivers, and overestimated in male drivers (25). In addition, young male drivers, drive more recklessly in the presence of other male peers as a way of showing off their manhood, fearlessness and competency (16). Hence, increasing their likelihood of being involved in car crashes. Moreover, passengers are amongst the human factors that increase the risk of young drivers to crash especially if they are of the same age group (26). Peer passengers may motivate their peer driver to partake in risky driving behaviors such as speeding and racing with nearby cars. Peer presence may also distract the driver by increasing cognitive workload, due to the need to split attention between the driving task and interacting with passengers (8). Hence, the driver may unintentionally disregard a traffic sign. On the other hand, the young driver may intentionally violate a traffic rule simply to prove to the peer passengers that he/she can. In contrast, in a study done in Sultan one factors contributing to crashes among young drivers, reported that young drivers with peer passengers who do not support risky driving behaviors may not be motivated in risk taking while driving (7). The probable reason for this might be that the driver may not want to offend the peer passengers, or that the driver might want to earn the passengers' trust in his/her driving ability.

In addition, driving under the influence of alcohol increases the risk of RTAs among drivers. The risk of being involved in a road traffic accident increases significantly in drivers with blood alcohol concentration of 0.05 g/dl and above (15). This is because driving while intoxicated reduces the driver's ability to observe road signs and be in control of the vehicle in case of emergency (5). Young drivers have a high chance of being involved in RTAs when under the influence of alcohol (7). This could be linked to their lack of driving experienced, coupled with pressure from passengers especially if they are driving peer passengers. Road traffic accidents caused by drivers under the influence of alcohol, or any psychoactive substance are more likely to result in serious injuries or deaths than those caused by sober drivers (1).

Furthermore, distracting driving activities reduces the driver's performance, thereby increasing the risk of the occurrence of road traffic accidents (12). Various distractions can lead to impaired driving. However, there has been a marked increase around the globe in the usage of mobile phones especially by young drivers, which is becoming a growing concern for road safety. Mobile phone usage while driving is reported to increase the risk of RTAs. Drivers who use their mobile phone whilst driving are approximately 4 times more likely to be involved a RTA than drivers not using their mobile phone (24). This is because using a phone while driving impairs driving performance, reduces reaction time, causing the driver to miss traffic signals such as top signs or traffic lights (9). The driver may also find him/herself driving in the wrong lane of the road, endangering other drivers (16).

Exhaustion, especially by long distance drivers increases is also one of the factors contributing to the higher risk of RTAs (17). According to study done in Saudi Arabia on attitudes, driving behavior, and accident involvement among young male, reported that young drivers especially the male young drivers are more likely to continue with their journey despite being overly exhausted (16). This is likely due to the tendency of young drivers trying to prove or perhaps show off their manhood to other people.

Moreover, speeding the most common traffic violation increases the likelihood of RTAs and the severity (5). Every 1% increase in the average speed results in a 4% increase in the fatal risk and 3% increase in the seriousness of the RTA risk (24). This is because speeding reduces the driver's ability to control the vehicle and increases the reaction time (9). Speeding is perceived a socially acceptable behavior especially among the young drivers who might think their peers approve of this behavior (15). It is particularly dangerous to young drivers due to their lack of driving experience, poor hazard detection and response (7; 9). A study by Ranjan (3), found that among its participants who were all young drivers only 55.6% drove their vehicles within the recommended speed limit. This might be influenced by the young drivers' desire test their driving abilities or perhaps to just have fun. Increasing the speed of the car beyond the average speed directly increase the probability of crashing and the severity of the accident (17).

2.3.2 Environmental factors

Environmental factors are among the crucial factors responsible for RTAs, and influence the RTA rates of all drivers. Rainfall intensity, wind speed and nighttime were linked to an increased likelihood of RTAs (6). Poor weather conditions such as heavy rainfall and

slippery road conditions increased the risks of RTAs (15). This might be because rainy weather affects the drivers' sight and makes it difficult for the driver to maintain control of the vehicle since the road become more slippery. On the contrary, a study by Mphekwana (23), found that rainy weather and slippery road conditions reduces RTAs. The study attributed its finding to that rainy weather conditions and slippery roads cause a reduction in the traffic volume and driving speed. Driving at night was significantly associated with an increase in the rate of RTA (5). This might be due to poor visibility at night, and sleepiness of the drivers. In addition, road design defects such as defective geometric design causing inadequate sight distance, inadequate width of road shoulders, improper curve/turns design, poor traffic control devices and lighting can all contribute to serious RTAs (1). A study by Demissie (1) found that 59% of the serious/fatal RTAs occurred on Fridays and Saturdays. The study based its findings on the tendency of people to travel more towards the weekend, which increases the number of vehicles on the road and the likelihood of being involved in a RTA. Higher crash rates involving young drivers are reported to occur during nighttime and over the weekends, than during daytime and weekdays (25).

2.3.3 Vehicle related factors

Vehicle defect is one of the main causes of RTAs. Defective vehicle parts such as tires, brakes, ignition, and other parts of the vehicle lead to increased RTAs (1). A defective vehicle can cause a RTA, such as when the tire bursts, brakes fails, or the ignition cuts off, leading to the driver losing control of the vehicle.

Figure 2.1 below shows the conceptual framework developed from various literature sources for assessing the driver's influence on the prevalence of RTAs.

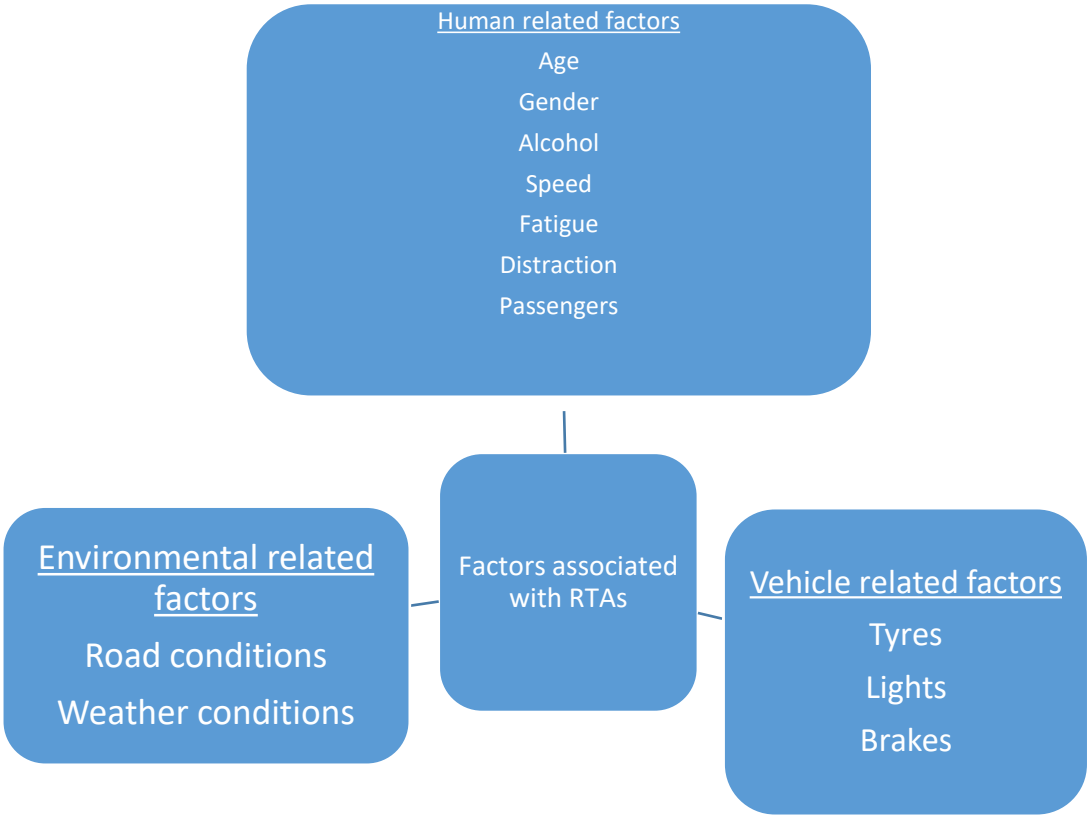

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Figure 2.1: Conceptual framework for road traffic accidents

2.4 Impacts of road traffic accidents

Road traffic accidents lead to direct (medical and rehabilitation costs) and indirect costs (loss of income because of disability or premature death) (20). Numerous families suffer huge loss of income because of injuries or deaths of family members due to RTA (11).

Economically, underprivileged families are most affected by the losses arising from the cost of treatment and reduced productivity for the injured or deceased, and for their family members who require time off to care for the injured. Additionally, RTAs drive families into poverty as they might struggle with the long-term consequences of the event such as rehabilitation of the RTA survivor and too often funeral expenses (5). Furthermore, the impacts of RTAs on victims could also include psychological disturbance such as acute stress disorder, anxiety, depression, post-traumatic stress disorder, and mood disorders (4). Victims could also feel helplessness and loss of control. Moreover, a study by Makuu (20) found that some children of RTAs victims failed to pursue higher education after the RTA because the families could not afford their tuition fees. Another impact of RTAs identified by the same study is that most of the RTAs victims at some point thought of commuting suicide as they found it difficult to live a life they never expected. Additionally, some family members (children/husband/wife) might develop terminal illness like high blood pressure and depression because of elevated stress in providing constant care and support to victims or grief.

Impacts of RTAs drains the scarce financial resources of countries in terms of the carnage, damage to vehicles and infrastructure, medical costs and above all, loss of lives (14). Thus, prioritizing road safety programs reduces the negative impacts of road transport on the lives and health of road users (14).

The annual global economic burden caused by RTAs is reported as 518 billion USD, with a further 100 billion USD estimated to be the economic loss due to RTAs in low- and middle-income countries alone (4; 5). Road traffic accidents account for about 1%, 1.5% and 2% loss of gross domestic products in low-, middle- and high- income countries,

respectively (15). Moreover, in the year 2015 (January-May) the MVAF of Namibia paid approximately N$11 million towards general medical expenses of RTAs victims (15).

2.5 Measures for reduce road traffic accidents

Measures for reduce RTAs in any country require collaborative efforts of the government, stakeholders, and the people (4). The government should ensure that roads are in good conditions and traffic laws are implemented effectively. The stakeholders should ensure that the public is made aware of road safety through different medium of communication. Awareness and practice of road safety measures has been reported to effectively minimize the impacts of RTAs on the lives of people (3; 13). Hence, the incidences of RTAs can be reduced to a large scale if the population most especially the young people are made aware of the road safety measures. These measures should be implemented through public education campaigns using various media such as television, radio, newspapers, and posters on road safety (14). Moreover, the usage of seat belts by drivers reduces the risk of a fatal RTA and minimizes the severity of the effects of the accidents to the passengers (12). In addition, multiple intervention strategies and projects targeting young drivers could contribute significantly to a reduction in the rate of RTAs. These intervention strategies include extensive enforcement of legislation on speed control and alcohol consumption, promotion of seatbelt usage and safer design and use of roads and vehicles (27). Inspection and maintenance of vehicle tires, lights and braking systems are essential in ensuring the road safety for drivers and other road users (1).

In Namibia festive seasonal campaigns which usually ran from end November to mid-January of each year are launched with the overall objective of reducing injuries and

fatalities resulting from RTAs through increased road safety education and information dissemination activities, increased law enforcement intervention and emergency response capacity (10). However, despite festive seasonal campaign being reported to be an effective measure especially in the year 2018-2019 (10), is not a permanent measure as these campaigns usually ran only through a short period of time.

Furthermore, a study by Amweelo (11) has recommended that in order to reduce the incidences of RTA rates in Namibia, an increase in visibility of the traffic officials on the roads need to be prioritized. It further recommended imposing of high fines to the drivers caught violating the traffic rules and regulations. Moreover, it is of paramount that young drivers be encouraged to be highly attentive while driving, and to constantly improve their driving skills (7). Additionally, the WHO recommends designing safer infrastructure and incorporating road safety features into land-use and transport planning, promoting safe walking, cycling and greater use of public transport as measures to reduce RTAs (25).

2.6 Summary

The chapter discussed the literature review on road traffic accidents. It gave an elaboration on how the different factors contribute to RTAs. The impacts which RTAs have of victims, families, and country at larger were explained in details, and the measures needed to reduce RTAs were indicated in this chapter.

The next chapter covers the methodology.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

Chapter 2 provided an overview of the study's literature review. Chapter 3 outlines the research methodology used to conduct this study. It explains the research methods used and gives the rationale for choosing the methodologies. The research designs, the study population, sampling, research instruments, data collection, data analysis, and research ethics are discussed in this chapter.

3.2 Research design

A research design is the use of evidence-based procedures, protocols, and guidelines that provide the tools and framework for conducting a research study (28). In order to gain an in-depth understanding of the research problem this study has been carried out using the convergent parallel, mixed-method design. A mixed method design is a study approach that combines both quantitative and qualitative forms of research within a single study (29). This study had two components. The first component was a review of secondary data, which involved collecting and analysing of RTA records between the years 2017-2019 in order to identify the factors associated with RTAs among young drivers in Khomas region. The second component was a qualitative and involved carrying out in-depth interviews using an interview guide with traffic law enforcement officers in Khomas region in order to obtain their perceptions on the factors associated with RTAs among young drivers.

3.2.1 Convergent parallel design

The purpose of convergent parallel design mixed method is to provide a comprehensive analysis of the research problem through merging quantitative and qualitative data (30). In this design the researcher concurrently conduct the quantitative research and qualitative research in the same research phase, prioritise the methods equally, analyse the data independently, interpret the results together, and determines the convergence, divergence, contradictions or relationships of two sources of data (31). The research process in this study is given in Figure 2 below.

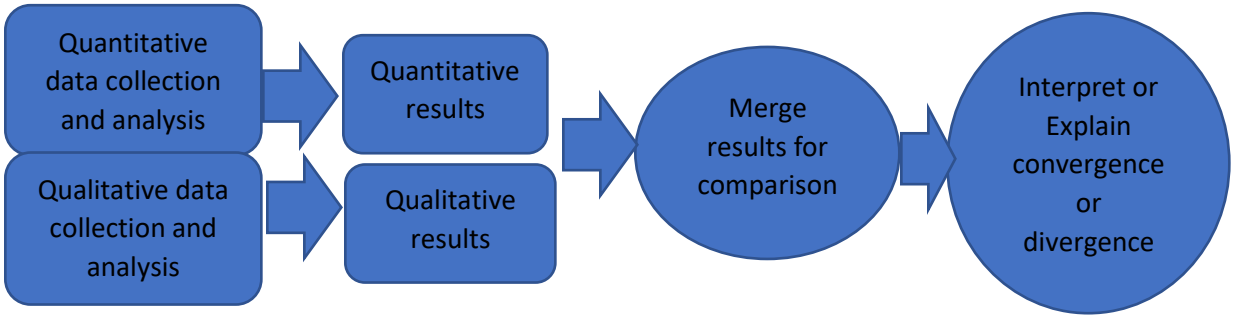

Figure 3.1. The convergent parallel mixed-methods, adopted from a study by Demir (31).

The researcher collected and analysed two independent strands of quantitative and qualitative data in a single phase. The quantitative strand is the test scores from RTA records to identify the factors associated RTAs among young drivers. The qualitative strand is the analysis of the perceptions of traffic law enforcement officers on the associated factors among young drivers contributing to the high rates of RTAs. Afterwards the researcher merged the results for comparison. According to Razali et al, (30) there are three methods to merge data analysis namely; side-by side comparison, data

transformation, and joint display. The current study used the side-by-side comparison method to merge both quantitative and qualitative data. The side-by side comparison method was used in this study as this approach is much easier compared to other approaches. Following the side-by-side comparison, the interpretation of the results was written into a discussion section, a comparison of the results was done, and an elaboration on whether there is convergence or divergence between the quantitative and qualitative data given.

3.3 Population

The study population is defined as the entire group of persons or objects that is of interest to the researcher and meets the criteria of research study (28). In the current study, the population for the quantitative component was all RTAs recorded by the NRSC in Khomas region between January 2017 and December 2019. While the population for the qualitative component were the traffic law enforcement officers working in Khomas region.

3.4 Inclusion and exclusion criteria

Quantitative inclusion and exclusion criteria

This study included all RTAs recorded by the NRSC in Khomas region between January 2017 and December 2019. The exclusion criteria covered RTA records with missing information, and the RTAs recorded outside the study period, and the study region.

Qualitative inclusion and exclusion criteria

The inclusion criteria were the traffic law enforcement officers from Windhoek City police and Namibian Police Force (NAMPOL) in Khomas region, who work within the traffic departments and who were present at the time of data collection, and consented to the study. The exclusion criteria consisted of traffic law enforcement officers outside of Khomas region, those who work outside the traffic department, those who did not consent to the study, and the ones who were off duty at the time of data collection.

3.5 Sampling

3.5.1 Sampling methods

Sampling is defined as the procedure of selecting individuals from the sample frame (32). The sample should be a representative of the study population in order to enable statistical inferences of the study population.

Quantitative sampling: There was no sampling undertaken for the quantitative aspect of the study, because the study used secondary data of the recorded RTA cases for the three calendar years. Therefore, all RTA records from January 2017 to December 2019 were retrieved from the NRSC and used. This period was selected as the researcher felt that it would be in the best interest of the study findings to gather recent RTAs data.

Qualitative sampling: Purposive sampling method was utilized to select study participants for the qualitative aspect of the study. Purposive sampling is a widely used sampling technique in qualitative research for the identification and selection of information-rich cases (29). Therefore, the researcher focused on the key informants purposively, as they were the people thought to best provide accurate information on

RTAs. The qualitative data was collected at the City of Windhoek traffic department and NAMPOL headquarters. Prior to the interview the researcher prepared the interview tools, tape recorder, notepad and pen. The traffic law enforcement officers who were present at the time of the data collection were approached by the researcher. The researcher explained the purpose of the study to the participant and informed them of their rights of participation, and those who gave consent were interviewed. During the interview, the researcher lead the interview by asking the participants questions. Each interview was recorded on a tape recorder, and field notes were also taken.

3.5.2 Sample size

Quantitative sample size: A total 19111 complete RTA records from January 2017 and December 2019 were used. All completely recorded RTAs under the study period were used in order to gather sufficient data, and to provide more accurate results.

Qualitative sample size: Fifteen purposively selected traffic law enforcement officers were selected for the current qualitative study. Eleven of the total participants were from the City of Windhoek traffic department, and four were from the Namibia police force traffic department. More participants were selected from the City of Windhoek traffic department, because they are the ones mostly responsible for the traffic control within Windhoek. Hence, they were thought to give accurate information pertaining to the key focus of the study. The sample size was determined by saturation as further participant recruitment was stopped when no knew themes were emerging.

3.6 Research instruments

Quantitative research instrument: Adata extraction tool was developed for the extraction of the factors associated with RTAs among young drivers from the NRSC RTAs records. The following were the variables of interest extracted from the main data; driver's age, gender, year, month, day of the week, suburb of accident, type of injury (no injury, slightly injury, serious injury), weather characteristics (clear, hail, rain, mist, frost, fog, overcast), and type of collision.

Qualitative research instrument: An in-depth interview guide was used as the data collection tool for the qualitative component of the study.

3.7 Reliability and validity of research instruments

Validity and reliability refer to the degrees to which the research instruments are capturing the information they are supposed to capture. To ensure the validity and the reliability of the data extraction tools, previous related studies were investigated and factors associated with RTAs among young drivers were studied. Based on the studied literature the data extraction tools were developed. The tools were reviewed, and approved by the supervisors and the relevant ethical committees, hence ensuring their validities and reliabilities.

3.8 Trustworthiness

Trustworthiness of qualitative data was a priority in this study. The four criteria of trustworthiness namely, credibility, dependability, confirmability and transferability were observed as follow:

Credibility refers to the measure of the truth value of qualitative research, or the degree to which the study's findings are correct and accurate (33). In the current study credibility was attained through prolonged engagement with the participants. The researcher also had the required knowledge and research skills to carry out the data collection process, thereby ensuring credibility.

Dependability refers to the stability of the data over time and that the results will be similar should it be repeated (34). Dependability was maintained through the audit trail of process logs. Adequate contextual information about the precise methods used for data collection, analysis and interpretation was provided in order to enable the study to be theoretically replicated by other researchers and generate consistent results.

Confirmability refers to the neutrality of the study's findings and indicates that the results are based on data generated and are verifiable (34). Confirmability was demonstrated through an audit trail, detailing each step of data analysis.

Transferability refers to the extent to which the study's results are applicable within other contexts or settings (34). The study used a non-probability sampling method which ensured transferability. In a non-probability sampling, not all elements of the target population have an equal opportunity of being included in the sample (35). However, the few selected give information worthy of being generalized to the target population (34).

3.9 Data collection procedure

Data collection is a precise, systematic process of gathering information relevant to the research purpose or the specific objectives, questions, or hypothesis of the study (32).

Quantitative data collection procedure: The RTAs data for the quantitative component was obtained from the NRSC. The data was captured in the Road Safety Information Management System (RSIMS) database. The researcher obtained the data in Microsoft Excel format, and it consisted of all recorded RTAs in Khomas region between 2017 and 2019. The preliminary data showed inconsistency in the information recorded. For example, numeric characters are used in some police stations whereas some police stations used text labels. The data collection tool was used to extract the final dataset with variables of interest.

Qualitative data collection procedure: An in-depth interview guide was used to collect qualitative data. The researcher followed the interview guide and asked all the questions in the guide. Furthermore, probing was utilized depending on the participants' response. Audio recording of participants was done, and field notes were also taken by the researcher during the interview sessions. Additionally, the researcher captured the non-verbal communications. All participants signed the informed consent form.

3.10 Pilot study

A pilot study is trial version of the planned study. In this study a pilot study was conducted using three traffic law enforcement officers from the City of Windhoek traffic department, and these participants did not take part in the main study. The purpose of the pilot study

was to check the overall quality, and feasibility of the data collection tool. The pilot study assessed the clarity of the questions on the in-depth interview guide, the participant's ability to understand and answer the questions, and the time it took to complete the interview. The findings were satisfactory. The participants found the questions to be clear and easy to understand, and they did not identify challenges, flaws or gaps. Hence, no adjustments were made to the data collection tool.

3.11 Data Analysis

Quantitative data analysis: The data collection tool was used as a guide to extract the study's variables from the NRSC database. The collected data was extract in Micro excel format, and further cleaned and sorted with Microsoft excel, and analyzed using Statistical Package for the Social Sciences (SPSS) version 27. The descriptive statistics were used to explore the driver's related characteristics and the occurrence of RTAs. Binary logistic regression was used to assess the associations between RTAs and socio- demographic factors. The variables with a P-value < 0.05 were considered statistically significant.

Qualitative data analysis: A thematic analysis approach was used to analyse the data obtained from the in-depth interviews. Thematic analysis is used to analyse qualitative data, and is typically applied to set of texts such as interviews (35). Therefore, the researcher used the following step by step methods to carry out the qualitative data analysis.

1. The researcher familiarized herself with the data, by listening to the audio recordings over and over, and repeatedly reading the transcripts.
2. Line by line coding of the transcripts was done, and relevant codes were generated.

3. Four themes of description reflecting key variations of meaning emerged from the analysis.
4. The sub-themes were reviewed in relation to the coded data and the data as whole, followed by naming of the main themes.
5. The analysis process was concluded by writing up the analysis into the result section of the thesis.

3.12 Research Ethics

When conducting a scientific research it is essential that the researcher adheres to all the relevant research principles. This is often done in order to protect the dignity, rights and confidentiality of the research participants. Thus, prior to the commencement of this study ethical clearance was sought from the University of Namibia (UNAM) decentralized ethics committee (DEC), permission to collect data from human participants was sought from the Ministry of Health and Social Services (MoHSS) National Health Research Unit (NHRU) through the Executive Director, and access to Khomas region RTA data was obtained from the National Road Safety Council (NRSC) of Namibia.

Qualitative data: The following research principles were applied during the study's qualitative phase of data collection.

Autonomy

The principle of autonomy implies that the participants should voluntarily participate in the study and must not be subjected to any coercion or threat of harm for non-participation (35). Informed consent entails that the researcher should disclose all relevant information

and any possible risks of participation. In the current study all the participants were informed that participation in the study was voluntary, and a written informed consent was obtained from each participant, as an acknowledgement of voluntary participation. The searcher also explained the purpose aim, and significance of the study to the participants. In addition, the participants were informed of their rights to participate, decline, or withdraw at any time of the study without any fine or penalty. On the other hand, in order to maintain anonymity, the participants were informed to not mention their names during the recordings, or note them down onto anything during the data collection process. However, research numbers were allocated to each participant being interviewed. The information obtained from the interviews were stored onto a password protected computer, and the files with questionnaires were kept onto a lockable locker to which only the researcher had access.

Beneficence and non-maleficence

The research principle of non-maleficence implies that no harm should come to participants as a result of their participation in the study, while the principle of beneficence entails the maximizing all the possible benefits of the research while minimizing any potential harm (36). To uphold these principles in this study, the researcher gave adequate information pertaining to the study and that there was no foreseeable harm for participating in this study. She explained the possible benefits to be gained from the study to the participants. Additionally, the questions were formulated in such a way to not cause any emotional distress to the participants, and the participants

were also notified prior to the interview of their rights to stop the interview process if they felt uncomfortable with any questions being asked.

Privacy and justice

The principle of justice pertains to the participants' right to fair treatment and right to privacy (36). This principle ensures that the selection of the study participants needs to be guided by research questions and requirements in order to avoid excluding any group, and to be as representative of the overall target population as possible. This principle demands for the researchers to treat those who declined participation in a study fairly without any prejudice (37). While the principle of privacy requires the researchers to keep any shared information to the outmost confidentiality. In this study, justice was attained by using the inclusion and exclusion criteria to select the study and this ensured an equal selection opportunity for all the participants. Upholding the right to privacy was attained through anonymous data collection. Research numbers were allocated to each participant, and the participants were not required to mention their names during the recording. Hence, the researcher could not connect the participant to their data.

Quantitative data: The following research principles were applied during the study's quantitative phase of data collection.

Anonymity and confidentiality

Anonymity and confidentiality in this study was maintained by ensuring that no personal driver's details such as names, were retrieved from the NRSC records. Instead, research numbers were allocated to each driver's records. Making it difficult to link the results generated to an individual driver. Furthermore, all the extracted data was entered and

kept onto a personal computer, with protected passwords and only the researcher had access to it.

3.13 Summary

This chapter presented the study methodology. It gave a systematical description of the research methods applied during the study. These methods included defining the study population, describing the sampling method, sample size, explaining the data collection procedures, and the data analysis. The applicable ethical principles were discussed. The next chapter will present the study findings.

CHAPTER 4: RESULTS

4.1 Introduction

The previous chapter (chapter 3) discussed the study's methodology that was employed in this study. Chapter 4 presents the study's findings. The study's findings focus primarily on factors contributing to RTAs in Khomas region among young drivers. This chapter also presents the perceptions of traffic law enforcement officers regarding the factors associated with young drivers contributing to the high rates of RTAs in Windhoek, Khomas region.

4.2 Factors associated with road traffic accidents among young drivers

A total 13850 young drivers were responsible for the recorded RTAs in Windhoek, Khomas region between the years 2017-2019. With only 18 drivers below the age of 17 contributing to the total RTAs. Table 4.1 below shows the gender distribution of young drivers in Windhoek from 2017-2019, while table 4.2 below illustrates the frequency distribution of the occurrence of road traffic accident per age group in Windhoek from 2017-2019.

Table 4.1: Gender distribution of young drivers in Windhoek from 2017-2019

Gender	**Frequency (%)**
Male	11495 (83)
Female	2354 (17)
TOTAL	**13850 (100)**

Majority (83%) of the drivers involved in RTAs in Windhoek between the years 2017 to 2019 were male drivers.

Table 4.2 Frequency distribution of the occurrence of road traffic accident per age group in Windhoek from 2017-2019

Age	**Frequency (%)**
< 17	18 (0.13)
18-23	9422 (68)
24-30	4428 (32)
TOTAL	**13850 (100)**

Most of the RTAs in Windhoek between the years 2017-2019 were caused by the drivers between the ages of 18-23 years.

A total of 21 574 RTAs were recorded in Khomas region between 2017 and 2019. There was a slight decrease in the RTA rates from the year 2017-2019. The months with the least number of recorded RTAs in Khomas region were December (5.7%) and January (7.2%). Table 4.3 below shows factors associated with road traffic accidents among young drivers in Windhoek from 2017-2019

Table 4.3: Factors associated with road traffic accidents among young drivers in Windhoek from 2017-2019

Variables		**Frequency (%)**
Days of the week	Monday	3341 (15.5)
	Tuesday	3276 (15)
	Wednesday	3264 (14.7)
	Thursday	3104 (14.4)
	Friday	3907 (17.2)
	Saturday	2241 (12.8)
	Sunday	2441 (10.4)
	TOTAL	**21574 (100)**
Year	2017	7381 (34.2)
	2018	7231 (33.5)
	2019	6962 (32.5)
	TOTAL	**21574 (100)**
	January	1562 (7.2)
	February	1772 (8.2)
	March	1981 (9.2)
	April	1863 (8.6)
	May	1624 (7.5)

Month	June	2032 (9.4)
	July	2010 (9.3)
	August	1872 (8.7)
	September	1905 (8.8)
	October	1966 (9.1)
	November	1762 (8.2)
	December	1225 (5.7)
	TOTAL	**21574 (100)**

Most of the RTAs were recorded on Fridays and the least RTAs were recorded on Sundays.

Figure 4.1 below on number of young drivers involved in RTAs by colliding with either another driver or persons (2017-2019), shows that 52.8% of the drivers collided with other drivers or persons for the period of three years, 2017 to 2019, and 38.8% of the drivers were involved in RTAs which were not a direct collision between a driver and driver or a person. However, there was 8.4% of data missing from the database.

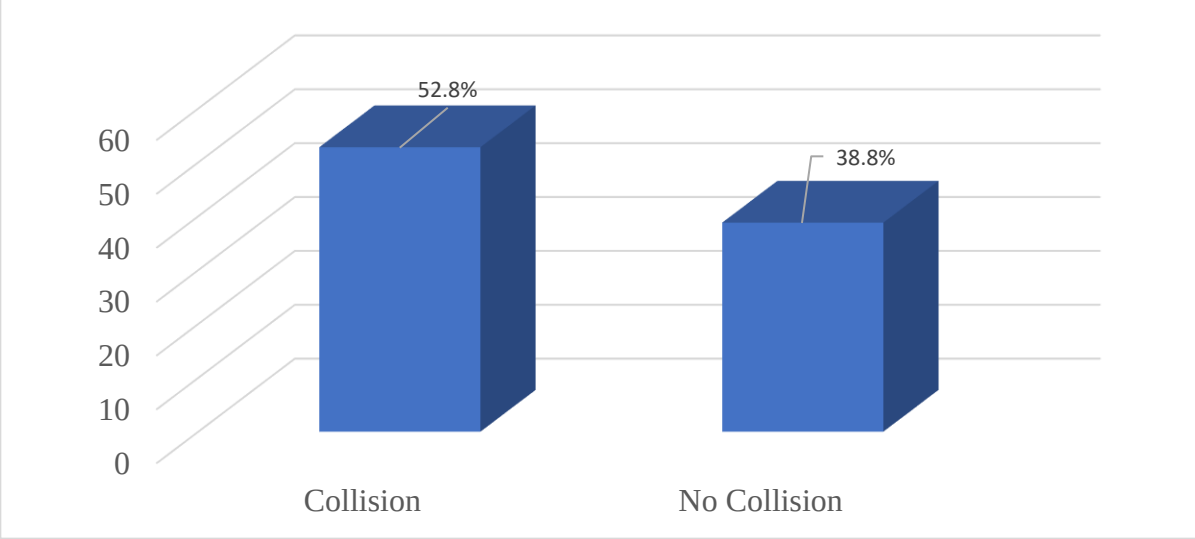

Figure 4.1: Number of young drivers involved in RTAs by colliding with either another driver or persons (2017-2019).

Moreover, the majority of the RTAs (6.1%) happened in Central Business District (CBD) followed by Katutura suburb (5.5%). Table 4.4 below illustrates the number of RTAs in Windhoek suburbs from 2017-2019.

Table 4.4: Number of road traffic accidents in Windhoek per suburbs (2017-2019)

Windhoek Suburb	**Frequency**	**Percentage (%)**
Academia	61	0.3
Auasblick	4	0.0
Aus	6	0.0
Avis	19	0.1
Brakwater	30	0.1
CBD	1314	6.1
Cimbebasia	23	0.1
Dorado Park	49	0.2
Eros Park	73	0.3
Goreangab	156	0.7
Hakahana	100	0.5
Havana	79	0.4
Hochland Park	114	0.5
Katutura	1178	5.5
Khomasdal	444	2.1
Klein Aub	2	0.0
Klein Windhoek	522	2.4
Kleine Kuppe	106	0.5
Lafrenz Ind Area	46	0.2
Nau-aib Extension 1	7	0.0
Nau-aib Proper	12	0.1
Nautilus Proper	1	0.0
Northern Ind Area	212	1.0
Okahandja Extension 1	11	0.1
Okahandja Extension 10	1	0.0
Okahandja Extension 3	7	0.0
Okahandja Extension 4	8	0.0
Okahandja Extension 6	8	0.0
Okahandja Extension 8	5	0.0
Okahandja Proper	9	0.0
Okuryangava	161	0.7

Olympia	118	0.5
Otjomuise	283	1.3
Pioneer Park	135	0.6
Prosperita	61	0.3
Rocky Crest	64	0.3
Suiderhof	80	0.4
Tauben Glen	9	0.0
Veddersdal	2	0.0
Wanaheda	328	1.5
Windhoek	6	0.0
Windhoek North	73	0.3
Windhoek West	139	0.6
Total	**21574**	**100.0**

Table 4.4 above shows that only two cases of road traffic accidents were recorded in Klein Aub and Veddersdal suburbs. Majority of the cases were recorded in the CBD (1314) and Katutura (1178) suburbs.

Furthermore, the association between days of the week against slightly injury, the association between no injury and days of the week, the association between month and serious injury, and the association between the month and no injury were performed using the Chi square test of association. The tables below show the findings on the various associations.

Table 4.5 The association between days of the week against slightly injury

Chi-Square Tests			
	Value	df	Asymptomatic Significance (2-sided)
Pearson Chi-Square	78.135[a]	60	**0.058***
Likelihood Ratio	76.702	60	0.072
N of Valid Cases	21574		
a. 51 cells (66.2%) have expected count less than 5. The minimum expected count is .10.			

The Chi square test was performed to find the association between days of the week against slightly injury as indicated in the table 4.5 above. The finding shows an asymptomatic significance (p value is > 0.05). Hence there is no significant association.

Table 4.6 The association between no injury and days of the week

Chi-Square Tests			
	Value	df	Asymptomatic Significance (2-sided)
Pearson Chi-Square	373.121[a]	168	**0.000***
Likelihood Ratio	345.841	168	0.000
N of Valid Cases	21574		
a. 141 cells (69.5%) have expected count less than 5. The minimum expected count is .10.			

The association of no injury and days of the work was performed in table 4.4 above. The findings shows that there is a strong association between days of the week and no injury ($p<0.05$).

Table 4.7 The association between the month and serious injury

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	99.210[a]	99	0.475
Likelihood Ratio	74.665	99	0.968
Linear-by-Linear Association	0.059	1	0.808
N of Valid Cases	21574		
a. 89 cells (74.2%) have expected count less than 5. The minimum expected count is .06.			

The table 4.7 above shows that there is no association between the month and serious injury on the RTAs (p> 0.475).

Table 4.8 The association results between the month and no injury

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	350.664[a]	308	0.047
Likelihood Ratio	296.331	308	0.673
Linear-by-Linear Association	.150	1	0.698
N of Valid Cases	21574		
a. 264 cells (75.9%) have expected count less than 5. The minimum expected count is .06.			

The findings from the table 4.6 above between the month and no injury, indicates that there is a slightly association between the two ($p < 0.05$).

Table 4.9 The association between visibility of the road due to different weather conditions and RTA

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	525.418[a]	168	**0.000***
Likelihood Ratio	505.472	168	0.000
N of Valid Cases	21574		
a. 162 cells (79.8%) have expected count less than 5. The minimum expected count is .00.			

Visibility of the road due to different weather conditions and RTAs shows that there is a strong statistically significant association between the two as indicated on the table 4.7 above $p < 0.000$.

4.3 Perceptions of traffic enforcement officers on the factors associated with RTAs among young drivers.

4.3.1 Socio demographic characteristics of the participants

Gender

A total of 15 participants were interviewed. Twelve of the total participants were males, while three were females. Eleven of the study participants were traffic law enforcement officers from the Windhoek city police traffic law enforcement department, while the remaining four participants were from the NAMPOL traffic law enforcement department.

Table 4.8 below shows the gender distribution per traffic department of the study participants.

Age

The findings show that out of fifteen participants, their ages ranged between 20-60 years. The majority (46.7%) of the participants were between 31-40 years, followed by participants (26.7%) between the ages of 20-30 years, followed by participants (20%, 6.7%) between the ages of 41-50 years, and above the age of 50 years, respectively. Figure 4.2 below shows the age distribution of the study participants.

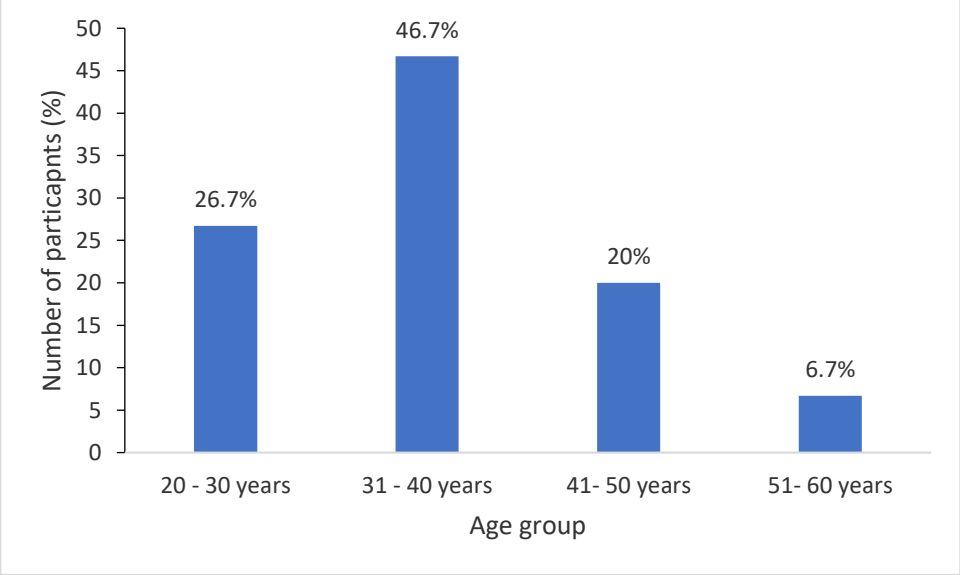

Figure 4.2: Age distribution of the study participants

4.3.2 Themes and sub-themes

A total of 15 participants were interviewed. Four themes and seven sub-themes of description reflecting key variations of meaning emerged from the analysis. The

commonalities and variations in traffic enforcement officers are illustrated. Table 4.9 below shows the main themes and sub-themes.

Table 4.10 Main themes and sub themes

Themes	**Sub-themes**
Theme 1: Participants' knowledge on RTAs in Khomas region	Knowledge on RTAs
Theme 2: The risk factors leading to RTAs among young drivers	Human related factors Environmental related factors Vehicle related factors: modern vehicles.
Theme 4: Barriers to reducing RTA rates	Lack of resources Drivers' attitudes
Theme 4: Recommendations for reducing RTA rates	RTAs recommendations

Fifteen (15) participants were asked the way they perceived the factors associated with RTAs among young drivers, the findings were summarised under the themes and sub-themes as follow:

4.3.2.1 Theme 1: Participants' knowledge on RTAs in Khomas region

The study participants were asked about their perceptions regarding the RTAs in Khomas region. The researcher was interested in determining the knowledge of participants regarding the high RTA rates in Khomas region. Their responses are indicated under one sub-theme below.

4.3.2.1.1 Sub theme: Knowledge on RTAs

Participants recognized that RTAs are a great concern in Khomas region, and indicated that majority of the RTAs are caused by younger drivers.

Participant 4 spoke about the higher population rate in Khomas region, and this is what she said *"Road traffic accident rate is high in Khomas region because that is where the capital city is situated, which equites to a higher population, and more people owning cars".* She added that *"Younger male drivers are responsible for majority of the recorded RTAs in the region".* Participant 13 also supported the statement of participant 4, saying "*Khomas region is a small area with more vehicle population. Therefore, more RTAs will be reported due to more vehicles on the road".*

Regarding the high RTA rates in Khomas region Participant 14 spoke about the road structures. This is what he said "*The road structures in Khomas region were not designed to cater for the current traffic flow. The current traffic flow is more than the road can*

accommodate, which contribute to the high RTA rates in Khomas region". This statement from participant 14 was supported by participants 15 who said with a strong feeling that "*Khomas region is the central harbor of the country and it accommodates all people from all work of life especially from various regions, who come with varying purposes. Therefore, the city is having a high influx of people and vehicles, and as of the past 10-15 years nothing much was done in terms of expanding the roads or create more alternative roads that will decongest the current road-vehicle situation. This is one of the main possible reason for Khomas region having a high RTA rate when compared to other regions of Namibia".*

4.3.2.2 Theme 2: The risk factors leading to RTAs among young drivers

The participants were asked to identify the factors contributing to a higher rate of RTAs among young drivers in Khomas region. The researcher wanted to establish an in-depth understanding of the risk factors perceived by the traffic law enforcement officers to contribute highest to the rates of RTAs among younger drivers in Khomas region. The participants' responses were summarized under three sub-themes as noted below.

SUB-THEMES

4.3.2.2.1 Human related factors

When the participants were asked about their knowledge regarding the risk factors among young drivers contributing to the high rates of RTAs, most participants (53%) pointed out the young drivers' ignorance, reckless driving, and their lack of driving experience as the main contributing factors. Below are the responses of some of the participants:

Most of the participants mentioned ignorance and reckless driving as the main cause of the road traffic accidents in Khomas region, which can also be contributed to driving under the influence of alcohol. Participant 2 said this: "*Young people are very ignorant when it comes to traffic rules, they do not adhere to traffic rules and regulations, and the common violated traffic rule is driving under the influence of alcohol".* This was echoed by participant 6 who said, "*Young drivers are very reckless drivers, they do not pay attention to traffic rules, often driving unlicensed and driving under the influence of alcohol. Thereby contributing to the high accident rates in Khomas region.*

Participant 9 indicated that "*young people are too much into entertainment they drink a lot of alcohol whilst socializing and drive afterwards. Which increase their risks of being involved in a RTA".* Participant 3 added that, *"Young drivers are prone to distractive driving behaviors, such as using a mobile device whilst driving. These distractive driving behaviors take away the driver's full driving concentration and might cause the driver to waver into the lane of the oncoming vehicle, which might result into a road traffic accident".* With regard to ignorance participant 10 mentioned that "*Some drivers, especially young drivers have a tendency of disregarding traffic rules and regulations, such as stopping at a "STOP" sign or Yielding for an oncoming vehicle. These driving behaviors consequently result in the increase rates of road traffic accidents".* Participant 13 expanded on ignorance from pedestrians angle by saying "*in Khomas region, numerous pedestrians do not cross the roads at pedestrians' designed crossing which in some instances lead to them being accidently injured or killed by a passing motor vehicle, subsequently increasing the rates of RTA in the region".*

On lack of experience participant 3 said this "*There are many young inexperienced drivers in Khomas region. Young professional people after obtaining their driver's licenses most of them buy cars within months of obtaining their driver's licenses. Which means they will be driving on the roads every other day, because they are a lot of them who do not have sufficient driving experience they are often involved in avoidable RTAs".*

4.3.2.2.2 Environmental related factors

Under this sub-theme participants mentioned bad weather conditions as one of the risk factors contributing to the high rate of RTAs especially among young drivers. This is what Participant 4 said, "*Although there is a speed limit to be driven on the tared roads, during bad weather conditions, especially during the rainy season the roads are usually wet, and young drivers do not often have the mental capacity to think of reducing their speed limits for example from 60KM/HR to 40KM/HR to be able to control the vehicle and reduce the chances of being involved in a RTA.* The statement of Participant 4 was echoed by Participant 8, who also mentioned the effects of weather on driving and this is what he said "*Unfavorable weather conditions especially during the rainy seasons, reduces visibility on the roads. Therefore, most young drivers are very impatient even if they cannot see farther they still do not think of reducing their speed. Thereby escalating the occurrence of RTAs".* There were variations in views of the participants on the risk factors contributing to RTAs among young drivers.

4.3.2.2.3 Vehicle related factors: Fast motor vehicles.

Under this sub-theme participants (27%) responded by pointing out the issue of fast motor vehicles and many motor vehicles in Khomas region which might lead to misreporting or over reporting. Their responses were as follow:

Participant 1 pointed out the issue of young people who own fast motor vehicles. This is what he said *"Young people in Khomas region tend to purchase and drive expensive cars, which are typically fast cars. Many young drivers do not have sufficient experience to control the speed of these modern cars, and they often end up speeding which might lead to a RTA".*

Under the sub-theme of vehicle related factors, participant 8 emphasized on the issue of parents giving their vehicles to their children as a risk factor to higher RTA rates. This is what he said "*The level of civilization is high in the capital city when compared to other regions of Namibia. Here you find parents who do not mind giving their motor vehicles to their children, and they do this because they see other parents giving their cars to their children. This is one of the key factor to high RTAs in Khomas region among the younger drivers".*

On over-reporting or misreporting participant *6 said "There are more cars in Khomas region, compared to other regions in the country. Hence, the rates of RTAs in Khomas region might be overestimated".* Participant 2 supported and said: "*There might be underreporting of RTAs in other regions of Namibia, when compared to Khomas region".* Hence, the higher reported rates of RTA in Khomas region.

4.3.2.3 Theme 3: Barriers to prevention

The participants were asked to identify the barriers they encounter when enforcing the traffic rules and regulations. The researcher wanted to understand the challenges encountered by traffic law enforcement officers when carrying out their daily duties. The participants' responses were classified under two sub-themes below.

4.3.2.3.1 Sub theme: Lack of resources

Lack of resources was one of the key barriers to RTAs prevention identified by some of the participants as follow:

Participant 1 said "*The challenge we are mostly encountering is a countrywide problem, which is budget. The traffic department is no longer receiving sufficient budget so that we can implement all the necessary mechanisms aimed at reducing RTA rates in the region".* Participant 1 was supported by participant 6 who said "*The issue of funds is a key barrier. There is no enough money in our country to support the traffic department in executing their duties efficiently".* Participant 5 added by saying "*Lack of resources, both capital and human resources make it difficult to carry out our duties effectively".*

Participant 3 also emphasized on the issues of lack of resources as key barrier to prevention by saying "*Lack of funds is a big issue, we do not have enough funds to establish all programs that we need in place to reduce RTAs.* He gave an example of how lack of resources affects the implementation strategies of reducing RTAs by saying *"Supposed a speed limit was introduced for a certain highway for example from 120KM/HR to 80K/HR so if there is no money you will not be able to afford purchasing*

and installing all road signs to caution the drivers of the change in the speed limit for that particular highway".

4.3.2.3.2 Drivers' attitudes

Participant 7 pointed out the attitudes of drivers as a hindrance to RTAs prevention by saying "*The traffic law enforcement officers cannot be at every place in the country, in particular within the city of Windhoek or within Khomas region the main challenge boils down to the attitudes of drivers".* He further explained that *"Many drivers do not cooperate with the road safety rules, there are many of them unlicensed operating on the roads which make it challenging to reduce the escalating RTA rate".* The statement of participant 7 was echoed by participant 3and this is what he said "*The driver's behaviors also play a barrier role, you find drivers who do not want to comply with the speed rules. You can have a speed limit of 60 KM/HR yet you find those driving 120KM/HR".*

Participant 4 also indicated the drivers' attitudes as a barrier to prevention saying "*When it comes to drivers it also involve their attitudes, some young drivers think just because they got their driving licenses legally they no longer listen to guidance on how to drive safely on the road, and this is one of the barriers we encounter".*

4.3.2.4 Theme 4: Recommendations for reducing RTA rates

Prior to the conclusion of the interview, the participants were asked to give suggestions on what they think need to be done in order to reduce the RTA rates among the young drivers in Khomas region. Majority of the participants pointed out awareness in terms of

road safety as the key measure of reducing RTAs. Their responses are summarized under the sub-theme "awareness" below.

4.3.2.4.1 RTAs recommendations

Participant 7 suggested awareness about road safety to young people by saying *"What need to be done is information, young people need to be taught the dangers of a car from the primary school level".* He explained that "*Even if you don't drive you should be aware the consequences of speeding. There must be a link of communications between our young people and the traffic department to sensitize young people about road safety".*

The suggestion of participant 7 was supported by participant 6 who also said, *"I would say road safety awareness in schools and work places would help reduce RTA rates".* On awareness participant 5 added by saying, "*Awareness is my key suggestion, and it should target the prime areas such as the drinking spots. This can be achieved by having partnership with the bar owners to promote road safety".* Participant 11 further added that "*During festive seasons, there are often road safety campaigns carried out across the country by motor vehicle fund (MVA) in collaboration with Namibian Police Force (NAMPOL) and other stakeholders. These campaigns are part of the RTAs awareness and preventative strategies and are reported to have significantly reduce the rates of RTAs during the festive seasons. Hence, these campaigns should be extended beyond the festive seasons.*

Participant 8 emphasized on the importance of awareness, as a measure to reduce RTAs through information sharing between the traffic department and the young people and this is what he said, "*We need the communication between our young people and the traffic*

department, there must be a link where there is a sharing of information pertaining to road safety".

Participant 15 added by saying, "*We need to go deeper with the road safety educative mechanism in the sense that we need to use the application of community policing through technology, perhaps by sending out road safety information on various social media platforms".* This statement was echoed by participant 12 who said, *"Our drivers need more education and I think it needs to start from school if we include road safety in our schools, we will go the right direction".*

4.3.3 Data integration

In the final stage of data analysis, qualitative and quantitative findings were converged to answer the research objective one: "To determine the factors associated with RTAs among young drivers within the Khomas region". In the quantitative phase of analysis, male young drivers caused majority (83%) of the recorded RTAs. In addition, the quantitative analysis also found most of the RTAs to occur during Fridays when compared to other days of the week. The quantitative analysis also found a strong statistical association ($p<0.000$) between different weather conditions. Whereby the risk of being involved in a RTA increases with unfavorable weather conditions. Furthermore, during the qualitative phase of the study participants were asked on what they perceive to be the common risk factors among young drivers, which contribute to the high rates of RTAs in Khomas region. Similarly, to the quantitative findings age was identified as a risk factor to RTAs. Participants mentioned young drivers to be responsible for most of the RTAs in Khomas region. Unfavorable weather conditions such as during rainy seasons, was also indicated

by participants as one of the risk factors contributing to the increase rates of RTAs among young drivers. Participants explained that young drivers lack the necessary driving experience to drive safely especially when it is raining and the roads are wet or when there is poor visibility due to unfavorable weather conditions.

3.3 Summary

Chapter 4 presented the findings of the study conducted. The findings were presented using a graph and tables. The quantitative and qualitative findings were merged under this chapter. The next chapter will discuss the findings of the study.

CHAPTER 5: DISCUSSION

5.1 Introduction

The previous chapter (chapter 4) presented the results of the study. Chapter 5 presents the discussions of the data presented in chapter 4. The findings of the quantitative and qualitative components will be discussed in greater detail in this chapter. The discussion chapter also explains on how the study's outcomes concur or differ with previous studies as well as indicate any new understanding or fresh insights that emerged from this study. Where possible and relevant, the quantitative and qualitative results will be discussed together.

5.2 Road traffic accident rates in Khomas region (2017-2019)

Road traffic accidents are amongst the leading causes of injuries and death among young people in the world (5; 12). It has been predicted that by 2030, RTAs will be the fifth leading cause of death (20). Which makes RTA a great public health concern in many countries of the world (12; 27). Namibia is of no exception with regard to the burden of RTAs (10). A study by Chatukuta (17) identified Khomas as the region with the highest RTAs in Namibia. This study is the first to investigate the factors associated with RTAs among young drivers in Khomas region, Namibia.

A total 21574 RTAs occurred in Khomas region between the years 2017 to 2019. The participants interviewed mentioned that there are more motor vehicles in Khomas region when compared to the other regions in the country, and farther indicated that the rates of RTAs in Khomas region might be overestimated, whilst might be underreported in other regions of Namibia. Hence, the higher reported rates of RTA in Khomas region.

According to Chatukuta (17), the high RTA rates in Khomas region are not surprising as it is the region with the highest population and density, it contains the capital city Windhoek, and it is the most urbanised region in the country. Participants of the qualitative component of the study also pointed out high population density in Khomas region when compared to other regions of Namibia as the contributing factor to high RTA rates in the region. Moreover, based on the quantitative findings of the current study the RTA rates decreased by 0.7% in 2018 when compared to 2017, and further decreased by 1% in 2019 when compared to 2018. The decline in the rates of RTAs over the years 2017-2019 may be a result of better traffic law enforcements in the region. Such as reduction the introduction of the dual road between Windhoek and Okahandja, and the installation of the speed camera along some of the busy roads of Windhoek.

5.3 Factors associated with RTAs among young drivers

5.3.1 Age and gender

Across the globe, male young drivers are more involved in RTAs (21). This is consistent with the main finding of this study, whereby male young drivers aged 18-23 years caused majority (68%) of the RTAs from the year 2017-2019 in Khomas region. Male young drivers tend to drive under risky driving conditions such as driving at night, which increase their risk of involvement in a RTA (26). The participants of the qualitative aspect of the study expanded on the young drivers' risky driving behaviours. They mentioned that reckless and risky driving behaviors such as driving under the influence of alcohol and other toxic substances, driving using mobile devices, driving without a valid driver's license, driving in the company of peer passenger, and driving motor vehicles which are

not road worthy to be a major problem among young drivers especially male young drivers in Khomas region. Various studies where consistent with the qualitative findings of the current study on why male young drivers are worse affected by RTAs. According to a study by Venter (2) young male drivers are inclined to engage in risky driving behaviors such as alcohol consumption, whereas female drivers opt to abstain from drinking alcohol if they know they are going to drive. Alcohol can have serious effects on driving ability especially among the young drivers. It affects the decision making ability, balance, coordination, hearing and judgement (9). Thereby increasing the risk of RTAs. Similarly, a study by Mohamed (16) indicated that young male drivers, drive more reckless in the presence of other male peer passengers. Contrary to the risky driving behaviours in young male drivers. Young female drivers are less likely to have driving licence in comparison their male peers. This might cause the RTA rates to be underestimated in female drivers, and overestimated in male drivers (25). In addition, the probability of Namibian women to afford purchasing a motor vehicle is less and in those families with just one motor vehicle, they are likely to be denied equal driving access and may be disproportionately at home compared to males (17). Hence, the high involvement of male drivers in RTAs than females drivers.

5.3.2 Day of the week

Most of the RTAs were recorded during the weekdays (Monday to Friday) with the highest RTAs recorded on Fridays (17.2%), and the least RTAs were recorded during the weekends, Sundays (10.4%) and Saturdays (12.8%). The probable reason as to why higher RTA rates occurred during Fridays could be that most people are more likely to leave

their daily routines and travel on Fridays going to places they are less likely to be familiar with, such as new restaurants or visiting family or friends (17). The results from the quantitative analysis are in agreement with the views of traffic law enforcement officers interviewed. Some of the participants interviewed pointed out that most of the RTAs occur during rushing hours, which in most cases are during weekdays. They indicated that a lot of people are always rushing to and from work, and because of frequent rushing, they are likely to cause a RTA. During weekends there few people commuting to work, which means there are fewer motor vehicles on the roads. Hence, low RTA rates recorded during Saturdays and Sundays. The findings of the study had contrasting findings to a study done in South Africa by Mphekgwana (23), which found most of the RTAs occurring during the weekends (Saturday and Sundays), when compared to weekdays. Lower alcohol consumption during weekdays when compared to weekends, might be the associated factor. Thus, it is likely to have high RTA rates in the weekends. In addition in the regression analysis (bivariate analysis), no significant statistical association ($p > 0.05$) was found between days of the week against slightly injury. This implies that being slightly injured was not associated with the day of the week in which the RTA occurred.

5.3.3 Month

Generally there is a slight variation in the RTA rates from month to month. However, December recorded the least (5.7%) of the RTA rates. The reason as to why the least RTAs in Khomas region were recorded in December, is likely to be because December has the festive holidays which are associated with higher volumes of road travel between cities and regions (17). This means more people travel out of Khomas region to other

regions for festive holidays, which means there are few motor vehicles on the road. In the bivariate analysis, there was also no significant statistical association ($p > 0.05$) found between month and serious injury. This indicates that being seriously injured in the current study was not linked to the month into which the RTA has occurred. However, only slight statistical association ($p < 0.05$) was found between month and no injury. This implies that the odds of not being injured when involved in a RTA was lower depending on the month in which the RTA occurred.

5.3.4 Type of collision

The findings on collision illustrate that between the years 2017 to 2019, 52.8% of the young drivers collided with other drivers or persons, and 38.8% was involved in RTAs which was not a direct collision between a driver and driver or a person. The high proportion of collision between young drivers with other drivers or persons, is very alarming because these types of collisions are more likely to result in serious injury and death. The quantitative findings, echoed with the qualitative ones. Participants interviewed mentioned that in Khomas region, numerous pedestrians do not cross the roads at pedestrians' designed crossing which in some instances lead to them being accidently injured or killed by a passing motor vehicle, subsequently increasing the rates of pedestrian collision with a passing vehicle. This might implies that some pedestrians in Khomas region are not sensitized about the safety of crossing at the pedestrian designed areas. This was supported by a study done in Southwestern Nigeria on "knowledge, attitude, practices of road traffic regulations among pedestrians in a university" which found that majority of the pedestrians (63.9%), did not have adequate knowledge of road

traffic regulations and traffic signs in some areas such crossing at pedestrian designated crossing areas (6). In addition, Chatukuta (17) also reported that pedestrians are the most vulnerable road users when compared to drivers and passengers in Namibia as they lack protection from the dangerous encounter with motor vehicles. Furthermore, participants also stated that some drivers, especially young drivers have a tendency of disregarding traffic rules and regulations, such as stopping at a "STOP" sign or Yielding for an oncoming vehicle. According to Kohli (37) most young drivers on the not able to understand the traffic sings, while others they disregard and avoid the traffic signs. These driving behaviors consequently result in the increase rates of collision between drivers with other drivers or a person. The participants highlighted the lack of resources as one of the key barrier to reducing the rates of RTAs. They explained that lack of resources make it challenging for the traffic law enforcement officers in Khomas region to execute their duties efficiently, and to enable recruitment of more traffic law enforcement officers. Having sufficient traffic law enforcement officers in the region will aid in reducing the collision rate, as they can set up many roadblocks across the region to sensitize the drivers and pedestrians on the traffic rules and regulations.

5.3.5 Suburb

The current study provides fresh insight into the distribution of RTAs per suburb in Khomas region. This information is essential into tackling the RTAs in the region. The analysis of RTAs per suburb found that majority of the RTAs happened in CBD (6.1%) followed by Katutura (5.5%). The reason as to why the two suburbs have many RTAs is

possibly link to that many people work and reside within the CBD and Katutura, making them the highly motorized suburbs in the region.

5.3.6 Weather conditions

Weather condition was one of the factors mentioned by participants, which increases the risks of RTAs. Participants indicated that bad weather conditions, especially during the rainy season leads to wet roads and poor visibility. Thereby escalating the occurrence of RTAs. This was in agreement with the results of the bivariate analysis, which found a strong statistical association ($p < 0.00$) between visibility on the road due to weather and RTAs. This shows that visibility on the road was associated with the highest risk of being involved in a RTA. The study's findings on weather conditions correlate with the findings of the study by Yasmin et al. (38), which found weather conditions such as rainy/snowy/windy/dawn/dusk, increasing the occurrence of RTAs. The study attributed its findings to the fact that unfavorable weather conditions lead to risk driving resulting from reduced visibility and reduced friction of the road surface. The study further indicated that under high wind conditions there is a high possibility for drivers to lose control of the vehicle leading to a RTA.

5.3.7 Lack of driving experience

Lack of driving experience was one of the findings from the participants interviewed attributed to the high RTA rates in Khomas region. A higher number of young people own cars in Khomas region and some of these drivers might not be experienced enough to drive in a capital city. Additionally, some of the young drivers on the road might have

just obtained their driving licenses, which means they may not be able have sufficient experience to safely drive and navigate or foresee danger on the road like experienced drivers such as they may lack the ability to detect faulty in their motor vehicles like tire pressures that are not balance and need balancing, or motor vehicle breaks, which are deteriorating and need replacement. Having a high population of drivers on the road with lack of driving experience, the likelihood of them being involved in avoidable RTAs is higher.

5.3.8 Type of motor vehicles

During the interviews, the participants pointed out the issue of the types of motor vehicles driven by the young drivers to play an important role in the occurrence of RTAs. They mentioned that young people in Khomas region as in many other regions of the country often purchase and drive fast motor vehicles, and most drivers especially the young drivers claim to not be aware that they are speeding which often cause them to end up in RTAs. Being able to control the speed of a motor vehicle comes with experience which is lacked by most young drivers. Hence, the likelihood of young drivers being involved in more RTAs when compared to older drivers.

5.3.9 Recommendations for reducing RTA rates

Awareness in terms of road safety was the main recommendation given by participants as measures to reduce the RTAs rates in Khomas region. Road safety awareness should be taught in schools from the lower grades, and should be a topic of discussion in the work places. Having young people sensitized about road safety, it will compel them to take the

right procedures prior driving on the public road. For example, they might want to obtain their valid driving licences instead of diving unlicensed. In addition, the participants also suggested that road safety awareness should target the prime areas and platforms such as the drinking spots and social media platforms. This is because most young people when socializing with friends often drink alcohol and use drugs, and afterward they drive (16). Most young people also use social media as a medium of information. Hence, targeting prime areas and platforms will contribute to the reduction of RTAs.

5.4 Summary

The previous chapter discussed the results of the study in details. The next chapter (Chapter 6) will discuss the conclusion, limitations, and recommendations of the study.

CHAPTER 6: CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

6.1 Introduction

The conclusion drawn from the findings of the study are presented in this chapter. Limitations encountered during the study period are explained in this chapter. In addition, the study's recommendations are given under this chapter.

6.2 Conclusion

The purpose of this study was to investigate the factors associated with RTA among young drivers in Khomas region, Namibia.

The objectives were:

1. To determine the factors associated with RTAs among young drivers within the Khomas region.
2. To explore the perceptions of traffic enforcement officers on the factors associated with RTAs among young drivers within the Khomas region.

Guided by the study's purpose and objectives, the following conclusions drawn were made.

- Road traffic accidents affect young people worldwide, and are considered one of the main causes of morbidity and mortality around the world with young people being the main victim of the RTAs (37). The current study identified the following as contributing factors to the increase rate of RTAs in Khomas region: age, gender, day of the week, and month of the year into which the RTA occurred. Hence, measures aimed at reducing the RTAs in the region and country at larger need to be prioritised. The present study further identified no association between being slightly injured, and the day of the week into

which the accident occur, neither did any association found between being seriously injured and the month of the accident. However, it is still necessary to institute road safety educational campaigns targeting drivers of all ages, and pedestrians across the country. This is because including pedestrians in road safety educational campaigns could reduce road traffic injuries if well implemented.

- Regarding the perceptions of traffic law enforcement officers on the factors associated with RTAs. The study concluded that risky driving behaviours among young drivers such as driving under the influence of alcohol, speeding, and driving whilst using mobile devices are some of the risk factors contributing to the high rates of RTAs among young drivers in Khomas region. Therefore, strategies targeting young drivers aimed at reducing RTAs should be explored and implemented as soon as possible. The study further concludes that the government needs to allocate more funds to the police traffic department to enable the traffic law enforcement officers to execute their duties especially those pertaining to the reduction of RTAs efficiently.

6.3 Limitations

1. The study only included RTAs data for Khomas region between the years 2017 to 2019. Therefore, the findings could not be generalized to other years.
2. The study was only conducted in Khomas region, which is only one of the 14 regions of Namibia. Therefore, findings cannot be generalized to other regions of Namibia.

6.4 Recommendations

In order to reduce the rates of RTAs involving young drivers in Khomas region. The study recommends the following ministries and stakeholders:

1. Ministry of Education; Ministry of Information, Communication and Technology: Road safety awareness should be incorporate into the school curriculum from primary level of education up to tertiary level of education. Therefore, Ministry of Education should work in close corroboration with Ministry of Information, Communication and Technology to disseminate road safety information across all social media platforms as young people are the frequent social media users. Hence, information relating to road safety should be made available to all road users, and should be targeting young drivers. For example, there should be billboards on school premises, across the roads, and busy areas such as malls.
2. NAMPOL and Windhoek City police traffic departments: Young drivers are the biggest traffic offenders in Khomas region. Therefore, the study recommends that drivers caught violating more than one traffic rule, for example driving under the influence of alcohol and speeding the traffic law enforcement officers should be highly fined. This might discourage other drivers from violating the traffic rules and regulations. Subsequently, reducing the rates of RTAs.
3. Ministry of Finance: One of the challenges indicated by the participants is lack of resources. Therefore, the study recommends that the Ministry of Finance should allocate more funds to the traffic departments. This will enable recruitments of more traffic law enforcement officers. In addition, more funds will also enable procurement of more violation recording camera, which can be set up around the region, especially within the

busy streets and roads to capture the speed limits of drivers. This will help reduce speeding.

4. Other stakeholders: The study recommends funding of RTA related research by stakeholders. This is because without research the magnitude of the RTAs problem might not be fully known and understood. Hence, constant research on RTAs will aid in increasing awareness relating to RTAs, and might contribute to policy amendments and new policy implementations.
5. Recommendations to the Young Drivers: Public health initiatives fail because they don't include the target population in programme design and decision making. Hence, the study recommends that young drivers should be involved in programme design, and decision making related to RTAs reduction.

6.5 Summary

The chapter presented the conclusions and limitations of the study. The recommendations from the study findings were also given under this chapter.

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APPENDICES

Appendix 1: UNAM Permission

UNAM

UNIVERSITY OF NAMIBIA

ETHICAL CLEARANCE CERTIFICATE

04 October 2021

Ethical Clearance Reference Number: DEC/ OSH/86/2021

This Ethical Clearance Certificate is issued on behalf of the University of Namibia Research Ethics Committee (UREC) by the Oshakati Campus Decentralized Ethics Committee (DEC) in accordance with the University of Namibia's Research Ethics Policy and Guidelines. Ethical approval is given in respect of undertakings contained in the Research Project outlined below. This Certificate is issued on the recommendations of the ethical evaluation done by the Faculty/Centre/Campus Research & Publications Committee sitting with the Postgraduate Studies Committee.

OSHAKATI CAMPUS
DECENTRALIZED ETHICS COMMITTEE [DEC]

Title of Project: Factors associated with road traffic accidents among young drivers in Khomas Region, Namibia

Student: EMMA SHADUKA

Student Number: 201118467

Supervisor(s): Dr Hermine Iita
Mr. Abed O. Kaundjwa

Take note of the following:

1. Any significant changes in the conditions or undertakings outlined in the approved Proposal must be communicated to the DEC. An application to make amendments may be necessary.
2. Any breaches of ethical undertakings or practices that have an impact on ethical conduct of the research must be reported to the DEC
3. The Principal Researcher must report issues of ethical compliance to the DEC(through the Chairperson of the Faculty/Centre/Campus Research & Publications Committee) at the end of the Project or as may be requested by HREC-H
4. The HREC-H retains the right to:
   i) Withdraw or amend this Ethical Clearance if any unethical practices (as outlined in the Research Ethics Policy) have been detected or suspected,
   ii) Request for an ethical compliance report at any point during the course of the research.

DEC wishes you the best in your research

Dr Hans J Amukugo (Chairperson)

Dr Lahya T Nghipandulwa (Secretary)

Appendix 2: MoHSS Approval

REPUBLIC OF NAMIBIA

MINISTRY OF HEALTH AND SOCIAL SERVICES

OFFICE OF THE EXECUTIVE DIRECTOR

Ministerial Building
Harvey Street
Private Bag 13198, Windhoek

Tel No: 061-203 2567
Fax No: 061-222 558
Andreas.Shipanga@mhss.gov.na

Ref: 17/3/3/UES001
Enquiries: Mr. A. Shipanga

Date: 06 January 2022

Ms. Emma N. Shaduka
PO Box 62200
Katutura, Windhoek

Dear Ms. Shaduka

Re: Factors associated with road traffic accidents among young drivers in Khomas Region, Namibia

1. Reference is made to your application to conduct the above-mentioned study.
2. The proposal has been evaluated and found to have merit.
3. **Kindly be informed that permission to conduct the study has been granted under the following conditions:**
   - 3.1 The data to be collected must only be used for academic purpose;
   - 3.2 No other data should be collected other than the data stated in the proposal;
   - 3.3 Stipulated ethical considerations in the protocol related to the protection of Human Subjects should be observed and adhered to, any violation thereof will lead to termination of the study at any stage;
   - 3.4 Preliminary findings to be submitted upon completion of the study;
   - 3.5 Final report to be submitted upon completion of the study;
   - 3.6 Separate permission should be sought from the Ministry for the publication of the findings.
4. The ministry cannot assign a Social Worker specifically for the study, research participants requiring counselling and therapy support must be referred to the nearest health facility.
5. All the cost implications that will result from this study will be the responsibility of the applicant and not of the MoHSS.

Yours sincerely,

BEN NANGOMBE
EXECUTIVE DIRECTOR

All official correspondence must be addressed to the Executive Director.

Appendix 3: NRSC Approval

Information usage Disclaimer

The National Road Safety Council (NRSC) was established in 1996 in terms of the Section 2 of the National Road Safety Act 9 of 1972. The functions of the NRSC include amongst others the collection and analysis the road accident data to assess associated risks and disseminate appropriate information to road users by any means deemed fit for such purpose.

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Signature

Chief Liaison Officer

Sub Division Road Safety Research

Receiver Details

Emma Shezi (MPH student)

Appendix 4: In-Depth Interview Guide

In-depth Interview Guide

TOPIC: FACTORS ASSOCIATED WITH ROAD TRAFFIC ACCIDENTS AMONG YOUNG DRIVERS IN KHOMAS REGION, NAMIBIA.

STUDENT NUMBER: 201118467

PRINCIPAL INVESTIGATOR: EMMA SHADUKA (92081500841)

ADDRESS: P.O BOX 41020, AUSSPANNPLATZ, WINDHOEK, NAMIBIA**.**

EMAIL: SHADUKAE@GMAIL.COM

CONTACT NUMBER: 0813777192

My Name is Emma N. Shaduka, student number 20111847, a Master in Public Health student at the University of Namibia. I am carrying out a study on "Factors associated with road traffic accidents among young drivers in Khomas region, Namibia". I hereby ask for your time to partake in my study mentioned above. Participation is entirely voluntary, and you may feel free to withdraw from the interview at any time if you are feeling uncomfortable to continue. Kindly be assured that the information you are providing will be treated with outmost confidentiality, and will only be used for the purpose of this study.

Instructions: The study will take approximately 5-10 minutes. Please note that you do not have to mention you name during the recording.

Section A: Demographic information

1. **Gender**

2. **Age**

3. **Name of Traffic Department**

City of Windhoek	

NAMPOL	

Section B: Perceptions of traffic law enforcement officers

4. **Main Question:**

Tell me about your perception regarding the current RTA rate in Khomas region?

5. **Specific Questions:**

(i) In your opinion, what are the common risk factors among young drivers which contribute to the high rates of RTAs?

(ii) What do you think are the barriers in preventing the occurrences of RTAs?

(iii) What are your recommendations for reducing the rates of RTAs?

Thank you for taking part in this study!

Appendix 5: Data extraction tool

Data Extraction Tool

Topic: Factors associated with road traffic accidents among young drivers in Khomas region, Namibia.

Student name: Emma Shaduka **Student Number**: 201118467

Course: Master in public health **Year**: 2022

Supervisor: Dr Hermine Iita **Core-supervisor**: Mr. Abed O. Kaundjwa

Factors associated with RTAs	
Accident identification number	
Age	
<17	
18-23	
24-30	
Gender	
Male	
Female	
Day of the week	
Monday	
Tuesday	
Wednesday	
Thursday	

Friday	
Saturday	
Sunday	
Month	
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	
Suburb of accident	
Type of injury	
No injury	
Slight injury	
Serious injury	
Weather characteristics	

Clear	
Hail	
Rain	
Mist	
Frost	
Fog	
Overcast	
Type of collision	
No collision	
Collision with another vehicle	
Collision with pedestrian	
Collision with other objects	