PREVALENCE AND FACTORS ASSOCIATED WITH ROAD TRAFFIC ACCIDENTS AMONG BODA-BODA RIDERS IN GULU CITY, NORTHERN UGANDA

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UGANDA CHRISTIAN UNIVERSITY
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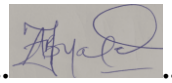
DECLARATION

This research is my own original work and has not been submitted for award of a degree in any other institution of higher learning.

Signature  .....Date 01/05/2024

Chandiga Keneddy

This research work has been submitted for examination with my approval as supervisor to this Student.

Signature  .....Date .....**01/05/ 2024**.....

Mr. Aggrey Byaruhanga

DEDICATION

I dedicate this Research to my beloved children, Lyn, Kyt, Kyn, Jax, Etyn and Davis.

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All glory and praise to God for His unmerited grace and provision, enabling the successful completion of this work. My profound gratitude goes to my research supervisors, especially Mr. Aggrey Byaruhanga, for his guidance, advice, and steadfast support. May God richly bless and protect you.

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LIST OF ABBREVIATIONS

AOR	Adjusted Odds Ratio
COR	Crude Odd Ratio
DHO	District Health Officer
DMC	Dangerous Mechanical Condition
GCA	Gulu City Authority
GCP	Gulu Central police
GRSF	Global Road Safety Facility
LG	Local Government
OECD	Organization for Economic Cooperation and Development
RTA	Road traffic accident
RTC	Road Traffic Crash
RTI	Road traffic injuries
SDG	Sustainable development Goal
UCU	Uganda Christian University
URA	Uganda Revenue Authority
UPF	Uganda Police Force
VIO	Vehicle Inspection Officer
WHO	World Health Organization

DEFINITION OF OPERATION TERMS

Boda-boda accident: Accident involving boda-boda motorcycle.

Boda-Boda: Local name for motorcycles doing business of providing transport services to the members of the public.

Boda-Boda Overloading: Carrying, items or person more than the kg that is required by the manufacturer.

Marungi: A local name for plant eaten by the youths as drug to keep them active both at night and day available in the area,

Boda-Boda Stage: A place where boda-boda cyclists collect to wait for their customer.

ABSTRACT

Background: Road traffic injuries pose a disproportionate public health threat in the low and middle-income countries like Uganda, with 85% of all the fatalities and 90% of all disability-adjusted life years lost reported. Road accidents in Uganda continue to increase and occur from different regions and towns across the country including Gulu city.

Objective: The main objective of this study was to establish the prevalence, and factors associated with road traffic accidents among Boda-boda motorcycle riders in Gulu city, Northern Uganda.

Method: A cross-sectional study utilizing quantitative methods of data collection. A total of 276 randomly selected boda-boda riders were interviewed from 78 Boda-Boda stages in Gulu city. A kobo collect software was used to collect data. Data was analyzed using Stata version 15 software. Logistic regression was used to determine the prevalence of RTAs and the associated factors and obtained adjusted odds ratios (aORs).

Result: The study findings revealed that road traffic accident among the boda-boda riders in Gulu city is (64.1%) and Boda-boda riders carrying passengers and luggage (aOR = 4.5, 95% CI:3.2-6.3, p < 0.001), not owning motorcycles (aOR = 2.9, 95% CI: [1.2-4.8], p = 0.016), consuming alcohol before riding (aOR = 2.5, 95% CI:1.1-3.9], p = 0.042). answering phone calls while riding (aOR =2.2, 95% CI:1.3-3.6], p = 0.026) and not having licenses (aOR =1.72, 95% CI: 0.3 – 0.8] p=0.04) were significantly associated with Road Traffic accident.

Conclusion

The study reveals a high prevalence of road traffic accidents (RTA) among Boda-Boda riders in Gulu City, highlighting the need to implement multi-sectoral interventions aimed at changing riders' behavior. Coordinated efforts should involve the government, law enforcement agencies, and regulatory bodies to strengthen the enforcement of policies that ensure safer road use. Additionally, continuous awareness campaigns and stricter monitoring of compliance with traffic regulations to improve road safety.

CHAPTER ONE: INTRODUCTION

1.1 Background

The Boda-boda road traffic accident occurs when a motorcycle used for business purposes collides with another motorcycle, a pedestrian, an animal, a stationary object, or other road factors. Motorcycles are used in the developing world for transportation, sport, economic, and mobility purposes (Konlan et al., 2020).

About 1.3 million fatal road traffic accidents and 20–50 million non-serious damages happen as a result of road traffic accidents every year globally, despite the risk, most people in developing countries are increasingly choosing motorcycles as their preferred and easiest mode of transportation (Konlan et al., 2020). The use of motorcycle remains the most preferred mode of transportation for many people because of the advantages associated with it.

In Thailand and Cambodia motorcycle mortality reported to be about 73% and 74% deaths in 2016 respectively. Young adults aged 15–34 years of age contribute over 60% of all motorcycles including those with two and three wheels. Mortality contributed by road traffic accident in Africa are the highest in the world and it contributed to 28.3 death per 100,000 people. In Nigeria, the population rate of road traffic accidents is anticipated to be 41 per 1000 people, and about 50% of traffic accidents had happened due to motorcycles (Oltaye et al., 2021b). Other studies conducted in Nigeria found out that motorcycle road traffic accident differ from 12.8% to 60%. (Johnson and Effiong, 2012).Global Road Safety Facility (GRSF, 2020) annual report indicated that, Sub-Saharan Africa's Western, Central, and Eastern regions have the highest mortality rates from road accidents worldwide and Western sub-Saharan Africa has a mortality rate that is triple that of Western Europe and In sub-Saharan Africa, injuries rank as the 8th leading cause of death and the 10th leading cause of lost healthy life years. Nigeria, Ethiopia, South Africa, and Sudan collectively contribute to half of the region's road injury fatalities. Kenya has a very high road crash fatality rate, with over 3000 deaths being recorded annually. Road traffic crashes are the leading traumatic cause of morbidity, mortality, and disability in the country. The prevalence of road traffic crashes in Kenya is over 30 times more than highly motorized countries. In over 75% of

the cases, the casualties are young energetic adults, who are the main contributors to the economic growth of the country (Karau et al., 2015).

In 2020, road traffic accidents in Uganda resulted in 13,012 deaths, accounting for 6.3 percent of all fatalities (WHO, 2020). The same report indicated that Uganda's age-adjusted death rate of 53.60 per 100,000 people ranks it sixth globally. By 2020, Uganda had over 1,361,861 registered motorcycles (URA, 2020). The commercial use of motorcycles has risen significantly over the past decade, bridging the transport system gap due to their availability and flexibility. As Uganda's population and economy grow, the number of boda-bodas on the road has surged, underscoring the urgent need to address major road safety issues associated with this mode of transport, which significantly impacts morbidity and mortality in the country.

The annual health sector performance report 2021-2022 indicated 156,002 cases of patients who reported to health facilities in Uganda due to road traffic injuries, of which 53% are due to motorcycle Road Traffic Injuries RTI. The Acholi sub region has reported 7,450 cases of patients who attended health services due to road traffic injuries mainly from motorcycle related RTI. Annual Health sector report, (2021-2022).

Motorcyclists generally are involved in many dangers and risks on the roads, this occurrence happens from environmental factors, individual factors, motorcycle factors, and behavioral factors. During motorcycle crashes or accidents, it usually happens that motorcycles are thrown far away and any accident occurring is usually deadly and causes serious injuries and deaths (Berecki-Gisolf et al., 2015).

Gulu city is one of the rapidly developing cities in Uganda with a growing in commercial business including the Boda-Boda transport industry Although, boda-bodas have spread to most parts in Gulu City, there is paucity of data about the prevalence and factors associated with Boda-boda road traffic accidents in Gulu City, the literature reviewed in the similar study area conducted by (Pebalo et al., 2012), (Kitara and Surgery, 2011), and (Kitara and Karlsson, 2020), did not come out clearly of this information.

Therefore, this study seeks to establish the prevalence and factors associated with road traffic accidents in Gulu City in relation to Boda-Boda transport system.

1.2 Statement of the Problem

Motorcycle-related Road traffic injuries contribute significantly to deaths and hospital admissions in Uganda, particularly among individuals of productive age, placing a heavy burden on families, communities, and the healthcare system. At Gulu Regional Referral Hospital, 214 patients involved in motorcycle road traffic accidents received treatment from October 2022 to March 2023, according to the Health Management Information System (HMIS, 2023). Additionally, records from Gulu Central Police Station indicate 119 cases of motorcycle-related road traffic accidents during the same period.

Gulu City has an estimated 3,000 registered commercial motorcycles, with this number expected to grow due to the high reliance on boda-boda motorcycles for transportation. Hospital data and police records suggest that road traffic accidents involving boda-bodas are likely to increase, affecting future treatment needs. However, there is limited data on the prevalence of road traffic accidents and associated factors among boda-boda riders in Gulu City. Therefore, this study aims to determine the prevalence and factors contributing to road traffic accidents among boda-boda riders in Gulu City, Northern Uganda.

1.3 Objectives

1.3.1 Broad objective

The main objective of this study was to establish the prevalence, and factors associated with road traffic accidents among Boda-boda riders in Gulu city, Northern Uganda

1.3.2 Specific objectives

The study seeks to address the following specific objectives.

i. To determine the prevalence of road traffic accidents among the boda-boda riders in Gulu city, northern Uganda
ii. To identify the factors associated with Road traffic accidents among the Boda-boda riders in Gulu city, northern Uganda.

1.4 Research questions

The study intends to address the following research questions.

i. What is the proportion of the boda-boda riders with road traffic accidents in Gulu City Northern Uganda?
ii. What are the factors associated with Road traffic accidents among the Boda-boda riders in Gulu City, Northern Uganda?

1.5 Justification

According to the 2020 URA data, the use of motorcycle for boda-bodas as a mode of transportation has become increasingly prominent in Uganda, with approximately 1,361,861 registered motorcycles primarily used for commercial transport. The rapid growth of the motorcycle industry has directly led to a rise in Road Traffic Accidents (RTA) in the country, as highlighted in the 2020 Annual Crime Police Report. This trend is especially noticeable in cities and towns with high boda-boda activity. As a result, there is a significant impact on the healthcare system, particularly in emergency departments, where many casualties are related to boda-boda RTAs, placing an additional strain on the national health budget.

1.6 Significance of the study

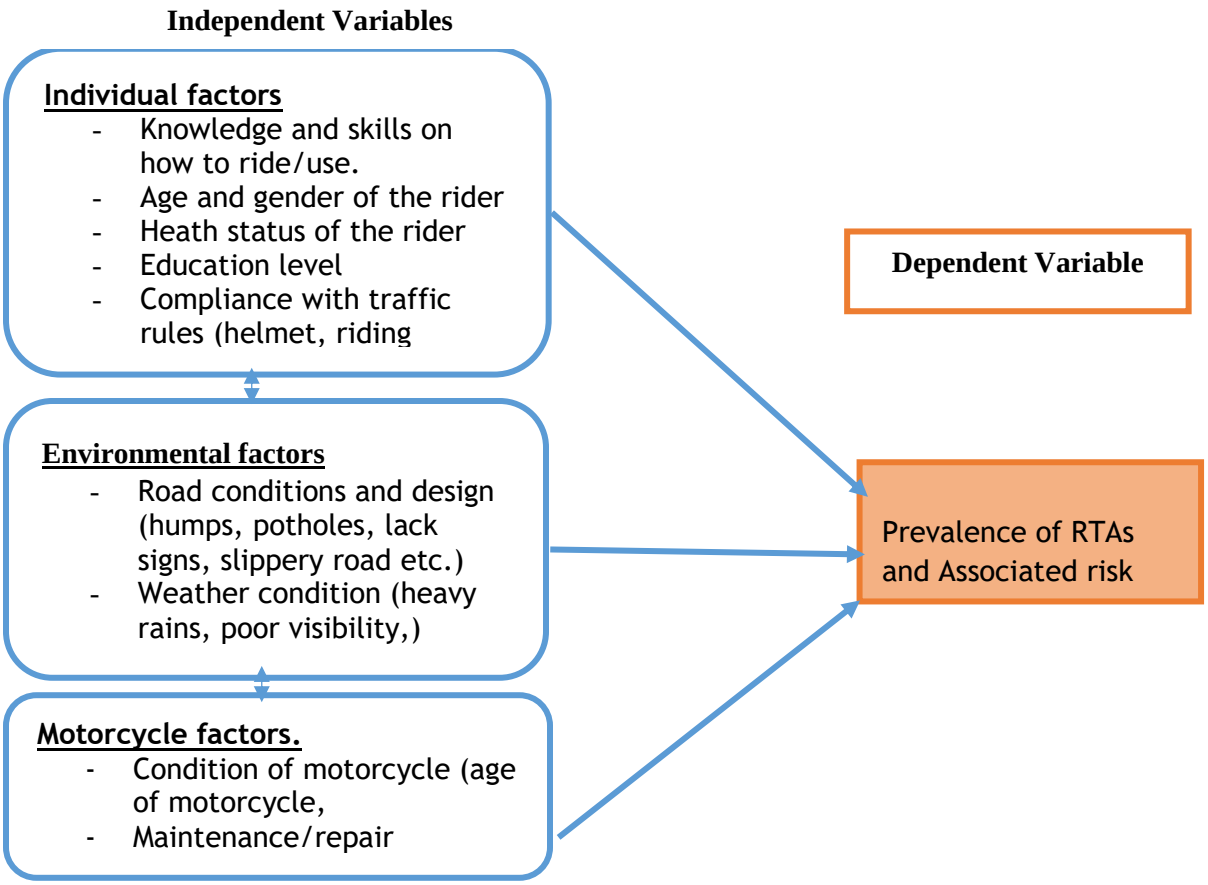
This study aims to generate evidence-based data that will assist the Ugandan government in enhancing and implementing existing road safety and regulation management, specifically for the Boda-Boda transport industry. Additionally, the study seeks to increase policymakers' awareness of preventive measures and mobilize resources for their implementation. Moreover, it will provide accurate information to address road traffic accidents (RTAs) as a pressing public health issue requiring immediate attention. The findings of this study will also support Gulu City authorities, NGOs, and other stakeholders in designing interventions targeted at boda-boda riders in the city. Lastly, the study will contribute valuable insights for future research on RTAs, focusing on the identified gaps and recommendations from this study.

1.6 Scope of the study

The purpose of this research was to ascertain the prevalence and contributing factors of road traffic accidents among boda-boda riders in Gulu City, Northern Uganda. The

study focused on the specific geographic area of Gulu City, outlined a conceptual framework guiding the research approach, and specified the timeframe during which the study was conducted.

Figure 1:Conceptual Framework on RTA among Boda-Boda Riders



1.6 Conceptual framework for motorcycle accidents

Based on the research conducted, various factors contribute to road traffic accidents. These factors are individual, environmental, and motorcycle factors. Individual factors encompass the rider's age, educational level, knowledge and skill in motorcycle riding, and compliance with traffic rules. Environmental factors relate to road conditions and design, such as, potholes, lack of road signs, including weather conditions. Additionally, motorcycle factors include the condition, its age, and maintenance and repair status.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

The purpose of chapter two (Literature review) is to present the analysis of the literature surveyed and reviewed concerning RTAs related to boda-bodas and associated factors and identify the contribution, literature gaps and knowledge gaps that this study can address. This Chapter focused on critical related existing literature on prevalence of RTAs among boda-boda cyclists in Gulu City. This chapter presented the literature review according to the themes developed from this research study. The themes identified are Road traffic accident associated with Boda-Boda cyclists and associated factors.

2.1 Road Traffic Accidents Among Boda-Boda Cyclists

Several studies have been conducted to determine the prevalence of RTAs among boda-boda riders A study conducted in Embu town, Kenya revealed that the prevalence of road traffic accidents among commercial motorcycles riders was 24% (Ngari and Paul Muriithi, 2020). The study identified several gaps, including inadequate sociodemographic profiling. While this study mainly considers age and gender, future studies could take into account more varied sociodemographic factors such as income, education, employment status, and cultural background which might influence road behavior. Furthermore, this study was conducted during working hours, which may not represent the full range of possible conditions for motorcycle accidents. Future research could look into accidents that occur during different times of the day, including nighttime.

Certain factors causing motorcycle accidents might not have been captured due to the limited time frame. Censoring only riders involved in accidents, potentially limiting the scope of data collected on risk factors. A similar study conducted 10 years ago by (Sisimwo et al., 2014). revealed that most accident-related patients admitted to Kitale level IV district hospital in Kenya were a result of Motorcycle accidents contributing to 39.4% of total casualties in the country. The study employed a descriptive cross-sectional methodology to analyze motorcycle injuries. The study collected data only from one hospital (Kitale District Hospital).

According to (Zuma et al., 2021) in their study to determine the prevalence of RTA among commercial motorcycles in Kenya, the prevalence of RTA was found to be 29.2%.

A study conducted in Kindo Kayishi werada, South Ethiopia, found that 65.1% of accidents involved commercial motorcycles (Raga et al., 2023). Similarly, another investigation in the Central Tongu Area, Ghana, focused on the prevalence of road traffic accidents (RTA) among commercial motorcycle riders, revealing a prevalence rate of 64.0% among participants. It should be noted, however, that this study specifically involved 114 commercial motorcyclists in a defined region (Adidome, Central Tongu District of the Volta Region), potentially limiting the applicability of these findings to broader populations or other regions. Future research should consider broader and more diverse geographical settings to corroborate these findings across different contexts (Konlan et al., 2020).

In the Hawassa region of Ethiopia, a study reported a 55.1% prevalence of road traffic accidents (RTA) involving motorcycles. This retrospective study examined accident patients admitted to the hospital. Due to its cross-sectional design, it was challenging to establish a direct cause-and-effect relationship between the observed dependent and independent variables. The data was gathered from the medical records of patients, qualifying as secondary data. this can be limiting as the information contained within these records and the fact that a significant percentage of accident times were not recorded in this study suggests that there may be valuable data being overlooked (Oltaye et al., 2021a).

A retrospective study conducted in Gulu Hospital revealed that Boda-boda injuries constituted 21.9% of all admissions (Kitara and Surgery, 2021). The study was based on retrospective data analysis from clinical records. There could have been bias, as the data used was not collected with the specific intent of this study in mind and might not contain all relevant information. In addition, the study's locality was confined to the Gulu Regional Hospital, potentially limiting the generalizability of its findings.

A study conducted in Burayu Town, Ethiopia from July 2010 to June 2015 reported 533 registered road traffic accidents. Out of these accidents indicated that, 117 (25%) were fatal, while the remaining 75% resulted in injuries. Key findings include the fact that

instances involving a failure to give priority to other vehicles led to a 2.65 times greater likelihood of fatal accidents, However the study had certain limitations such as the difficulty to record accidents that occurred during the night, potential bias in the recording by traffic police, and lack of a standardized and periodic record system (Hordofa et al., 2018)

A cross-sectional mixed methods study involving 300 boda-boda drivers in urban Moshi, Tanzania, found that 49.3% of respondents had experienced a crash in their lifetime. The study utilized convenience sampling from 25 out of 58 registered boda-boda stands and 2 of 31 unregistered stands. It is important to note that this sampling method may not fully represent the entire population of boda-boda drivers in the area. (Nguyen et al., 2018) .

2.2 Factors Associated with Road Traffic Accidents Among Boda-Boda Riders.

There are several factors associated with road traffic accidents among boda-boda cyclists. For Instance, a study conducted in Ghana Adome found that the contributing factor to RTA among commercial Motorcycles was the consumption of alcohol among cyclists (Konlan et al., 2020). A similar study conducted in Ethiopia found that excessive speed and drinking, and use of mobile phones while riding were identified (Raga et al., 2023a).

A cross-sectional study among boda-boda riders in urban Kampala, Uganda, found that competition for passengers with other public transport operators (83%), disregard for road safety regulations (78%), and insufficient helmet usage (62%) were primary factors contributing to boda-boda accidents. Respondents also cited the age of the boda-boda rider (58%) and drug use as significant contributors. However, the study had limitations regarding the scope of factors considered; while behavioral aspects were identified as major causes of accidents, factors such as infrastructure, legislation, and the mechanical condition of motorcycles were not extensively examined. (Siya et al., 2019).

A prospective cohort approach study conducted in Kenya for commercial bike riders in Embu town revealed that alcohol consumption among commercial motorcycle riders directly impacted motorcycle-caused accidents While various independent variables were identified (riders' behaviours, roadworthiness of motorcycles, and road safety

practices), other potential variables like specific road conditions, weather, or traffic density were not examined (Ngari and Paul Muriithi, 2020).

Research conducted in Oyo State, Nigeria, highlighted that demographic factors play a crucial role in influencing the causes of road accidents among commercial motorcycle riders. Significant factors contributing to the rising incidence of commercial motorcycle accidents include over speeding, improper overtaking, poor road conditions, sudden mechanical failures, and alcohol consumption. However, the study did not consider psychological or health factors that could affect riders' driving behavior, such as stress or fatigue. Additionally, an assessment of the impact of different times of day (daytime versus nighttime) on accident rates was also absent from the study (Gboyega et al., 2012).

study in Gulu revealed that common factors associated with road traffic accidents (Raga et al.) among boda-boda are due to reckless driving and riding (49%), poor road design (24%), drug abuse (15%) and overloading (12%). This study was conducted in Four divisions of Gulu Municipality, namely, Layibi, Laroo, Pece, and Bardege, using a cross-sectional research method. the Lack of long-term resident perspectives as those who had lived in Gulu municipality for less than three months were excluded due to their limited knowledge of RTA. There may be gaps in understanding the full range of variables contributing to Road Traffic Accidents (Raga et al.) as the study appears to focus mainly on demographics and road usage characteristics(Pebalo et al., 2012)

A study conducted in Saamu, Southwest Nigeria, investigated risk behaviors related to road traffic accidents and severe crash injuries among commercial motorcycle riders. The findings indicated that a significant risk factor for these accidents was the lack of formal training among most respondents, a conclusion supported by other studies (Salako et al., 2013). The study did not investigate the influence of other variables such as socioeconomic status, education level, or marital status on the incidence of high-risk behaviour or accidents.

study found that the typical use of alcohol, multiple passengers, speed, and riding on poor road conditions are the major contributing factors to road traffic accidents by commercial motorcycles in Bamenda, Cameroon. There was Insufficient examination of

unique risk factors faced by commercial motorcycle riders in low- and middle-income countries such as road conditions, overload of passengers, and lax law enforcement (Wankie et al., 2021)

A scoping review conducted from 2016 to 2022 on factors associated with motorcycle-related road traffic crashes in Africa identified several behavioural factors contributing to these incidents. These factors included alcohol use, smoking, use of illicit drugs, rider fatigue, poor knowledge of traffic regulations, carrying more than one passenger, lack of a rider's license, non-compliance with traffic rules, and failure to use personal protective equipment. Additional contributing factors were identified as poor road networks, unplanned police stops, unlawful vehicle parking, increased urbanization, and slippery road surfaces. (Konlan and Hayford, 2022).

In Tanzania a study conducted in Dar-salaam on the prevalence of RTA associated with commercial motorcycles revealed that risky drinking was associated with close to six times the odds of RTI compared to non-drinkers, and the crude odds ratio of RTI was significantly higher among users of marijuana than non-users. This study recommends addressing hazardous alcohol consumption and marijuana use in preventive strategies to enhance road safety (Kiwango et al., 2021).

An investigative study on the predictors of Road Traffic Accidents (Raga et al.), Road Traffic Injuries (RTI), and death among commercial motorcyclists in Nigeria, particularly within the growing urban slum of Nnewi. The research aimed to gather information that might lead to better control measures for these issues, according to this study, the primary predictors of road traffic accidents among commercial motorcyclists in urban areas include age, education level, and medical conditions coupled with social habits. Younger motorcyclists (under 30 years) experienced higher rates of fatal injuries compared to their older counterparts (over 30 years). Motorcyclists with some level of formal education had lower incidences of road traffic accidents (RTA) and road traffic injuries (RTI) compared to those without formal education. Additionally, motorcyclists with certain medical conditions or those engaging in social vices such as alcohol consumption were more likely to be involved in RTA and RTI and had higher chances of fatal outcomes

Over speeding is a substantive issue often rooted in the economic hardship experienced by the motorcyclists, as they might feel a need to make more trips to provide for their family. The gap identified in this study was Subject Attrition: There is potential for sample size distortion due to the attrition of study subjects, despite the researchers taking this into account in their sample size calculation. The effect of attrition on the study's results is not discussed (Adogu et al., 2009).

The study conducted in Benin City, Nigeria, aimed to evaluate driver-related risk factors contributing to accidents involving Okada drivers (commercial motorcyclists).

The main result of the study is that a significant number of Okada drivers in Benin City, Nigeria, are young, ill-prepared, and ill-equipped with low education levels. Specifically, 45% of the drivers had received no form of training before they began operating, 56.4% owned but irregularly used crash helmets largely due to inconvenience, and 39.8% regularly consumed alcohol. Furthermore, although 73.5% possessed driver's licenses, only 27.2% had taken a road safety test before getting their license. These factors potentially contribute to the high rates of road traffic accidents involving Okada drivers. The limitation identified in this study is that they it did not provide details on the exact selection process of the drivers interviewed or on the design and validation of the questionnaire. also, the research was conducted in 2006. The changing societal and economic context, as well as legislative amendments, might mean the findings are less applicable today.

Compared to regular boda-boda drivers, Safe-Boda drivers were found to have greater job experience, higher education levels, and higher weekly earnings. Regarding safety practices, a higher percentage of Safe-Boda drivers reported owning a driver's license (66.3% versus 33.5%) and wearing a reflective jacket (99.5% versus 50.5%). Additionally, Safe-Boda drivers were less likely to drive towards oncoming traffic (4% versus 45.7%).(Muni et al., 2020).

In January 2014 a cross-sectional survey conducted in Kigali, Rwanda with an objective to investigate the demographics, crash/injury history, and safety practices of 609 commercial motorcyclists, also known as "boda-boda" drivers. All participants were full-time drivers, working a minimum of 8 hours per day for 4 days per week.

Sample Representation was the one of the limitation/gaps in this study as the sample only included daytime riders and did not cover those who exclusively ride at night. This may have left out a specific group of motorcycle drivers which could have different patterns or risks (Nickenig Vissoci et al., 2020).

The study was designed to investigate the incidences of injuries, pattern of crashes, and the risk factors associated with commercial motorcyclists' crashes and injuries in Naivasha town, Kenya. The study involved 166 commercial motorcyclists, all of which were males who consented to participate in the study.

Over speeding: This was found to be the leading cause for road traffic accidents among the motorcyclists, accounting for 42.6% of incidents and Road Design: Narrow roads and poor design features such as sharp curves and unauthorized, illegal road bumps are another major contributor to accidents, with 39.4% of accidents being attributed to this cause in the study, substance abuse was mentioned as a cause of accidents, but there was no direct quantification of the number or percentage of accidents caused by alcohol or drug impairment (Odiwuor et al., 2015).

The main study focused on boda-boda operators (motorcycle taxi service) in two suburban locations in Kampala District. The operators were surveyed onsite with a questionnaire that addressed issues such as safety, types of equipment, ownership, operator training, profitability, and attitudes towards organized associations, A sudden increase in the number of operators resulted in a spike of road traffic-related injuries, causing safety concerns, The sample size of 37 operators, albeit calculated to be adequate, would not give a comprehensive picture across all boda-boda operators in Kampala District or throughout Uganda (Sebaggala et al., 2017).

A study aimed to identify the underlying factors causing high rates of accidents among commercial motorcyclists, often referred to as "boda-boda," in Kampala city, Uganda. It was initiated due to the increasing rates of death and injuries from road accidents in Uganda. According to the World Health Organization's 2015 road safety report, road traffic accidents in Uganda resulted in a rate of 27.4 deaths per 100,000 population. The study sampled 120 boda-boda riders and conducted in-depth interviews with six key individuals including the boda-boda chairperson of Kampala Central division, a

traffic officer, a hospital ward in-charge and three boda-boda customers. The findings suggested that a significant number of riders (32.5%) used alcohol and/or psychoactive drugs during their work. Moreover, many riders had either learned informally from a friend/relative (54.6%) or taught themselves (37%), with only a small percentage (8.4%) having learned via a driving school. The study also found that riders' desire for quick financial gains led to risky riding behaviour.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

The research methodology was designed to address the purpose and objectives of the study. The study was descriptive cross-sectional in nature and utilized quantitative methods of data collection to establish the prevalence of RTAs and associated factors among the boda-boda riders. It described the study area, study design, study population, sampling methods, data collection methods and instruments, data analysis, encountered limitations of the study, and ethical considerations.

3.1 Study area

Gulu City is found in Gulu district, Gulu district is bordered by Lamwo District in the North, Pader and Omoro District to the east, to the south by Oyam District, to the southwest by Nwoya District, to the west by Amuru District, and to the southwest by Nwoya District. The district headquarters in the city of Gulu are about 333 kilometres (207 miles) north of Kampala, the capital of Uganda, by road. The coordinates of the district are: 02°49'50.0" north, 32°19'13.0" east (longitude: 2.830556; Longitude: 32.320278) The city of Gulu has two divisions that is Pece, Layibi, Bar Dege division.

Figure 2: Map of Uganda showing Gulu city road networks

Major road links in Gulu city with boda-boda stage

3.2 Study design

The study was descriptive cross-sectional in nature and utilized quantitative methods of data collection.

3.3 Study population

The study was conducted among Boda-boda riders who have been operating boda-boda business in Gulu City.

3.4 Selection criteria

3.2.1 Inclusion criteria

Boda-Boda riders who were present at the time of data collection, those willing to participate in the study and Registered boda-bodas at each stage.

3.2.2 Exclusive criteria

Boda-boda riders who declined to participate and those who were not present at the time of the data collection.

3.4.2 Sample size determination

The sample was calculated using Kish Leslie Formula

$$n = \frac{Z2p(1-P)}{d2}$$

n = minimum sample size required.

Z = standard normal deviation set at 95% confidence level corresponding to 1.96.

P = prevalence 21.9% = 0.219 (From previous study conducted in Gulu (Kitara and Surgery, 2011).

d: desired precision, e.g. 5% or 0.05 (allowed error, degree of error)

$$n = \frac{1.96^2 \text{ x } 0.219(1 - 0.219)}{0.05^2} = 262.825$$

$$n \approx 263$$

The sample size is equal to 263 with 5% addition to cater for non-respondent, 276 respondents were interviewed and all the selected boda-boda riders participated fully to the end during the survey

3.4: Sampling Procedure

Gulu City has 78 Boda-Boda stages, according to information from the Boda-Boda association in Gulu City as of September 2023. Each Boda-Boda stage has an average of 35 Boda-Boda cyclists. Simple random sampling techniques were used to select 276 respondents for the study from all 78 stages. Four respondents (riders) were interviewed at each stage.

All Boda-Boda motorcycles present at the stage were listed on pieces of paper according to their registration number plates. The researcher/assistant folded the pieces of paper, placed them in a container (cup), mixed them thoroughly, and randomly picked four pieces of paper one at a time. The number plate on the paper was unfolded and identified. The rider of the motorcycle with the picked number plate was then interviewed. This procedure was repeated at all 78 stages to obtain the 276 respondents in Gulu City

3.6 Data collection tool

A semi-structured questionnaire was used to collect data. The study used questionnaires to interview the 276 respondents (boda-boda cyclists) operating in Gulu City. The survey questionnaires were used for assessing the prevalence of RTAs and associated factors among boda-boda riders. The tool is attached as appendix II.

3.6 Data collection procedure

Trained research assistants/researcher administered the questionnaire, which was pre-tested before the actual data collection date to ensure validity and reliability. Using Kobo collect software on tablet phones, the researcher conducted the interviews at the boda-boda stages. The interviewees were moved to a comfortable and convenient location.

3.7 Study variables

3.7.1 Dependent variable

The prevalence of RTA among boda-boda riders in Gulu City was the dependent variable in this study. The prevalence was determined by asking boda-boda riders through a questionnaire whether they had been involved in an RTA. The prevalence was recorded as a binary outcome (yes, for those who have ever had an RTA, and no, for those who have never had an RTA).

3.7.2 Independent variables

There are several independent variables. These include the individual factor, environmental factors, and motorcycle factors. The individual factors included, age of the rider, health status, educational level, knowledge, and skill how to ride motorcycle and compliance with traffic rules, under environmental road condition and design for example Humps, potholes, lack of road signs and slippery road including weather condition are included. In the motorcycle factor it identifies the state of the machine, age of the motorcycle and maintenance and repair status of the motorcycle as it is use for boda-boda business and other factors identified included poor road network, unplanned stoppage by police, unlawful motorcycle/ vehicle package, and slippery floors (Raga et al., 2023a).

3.7 Data analysis

Data was cleaned, coded Microsoft excel and exported to STATA version 15 for analysis. Univariate data are presented in tables and pie charts and proportions. At bivariate analysis, a logistic regression method was used to establish the significant factors with the dependent variable. Each independent variable was cross tabulated with the dependent variable to obtain significant factors at a 95% confidence interval and p value of < 0.05. All statistically significant variables at bivariate were considered for inclusion in the multivariate model using back ward elimination method to build a model to obtain adjusted odds ratios. Significant variables were also considered at 95% confidence interval and p-value of <0.05.

3.8 Ethical considerations

Ethical approval was obtained from the Ethics and Research Committee at Uganda Christian University (UCU) before conducting this research. Additionally, prior notification was sent to the Uganda Police Force traffic department in Gulu and the Gulu City Authority (GCA). Permission was also obtained from each division's boda-boda association. Informed consent was obtained from all participants using an approved consent form. Participation was voluntary and confidential, with the use of codes instead of names to maintain privacy. Participants had the right to decline participation or choose not to answer certain questions if they were uncomfortable. All these details were included in the questionnaire.

3.9 Dissemination of study results:

The findings of this study on road traffic accidents (RTA) involving Boda-Boda riders in Gulu City will be disseminated to relevant stakeholders, including the Boda-Boda Association and the Traffic Police Department at Gulu Central Police Station, to ensure that these key entities are informed and able to act upon the results. Furthermore, a copy of this report will be deposited in the Uganda Christian University (UCU) Library for archival and reference purposes, facilitating access for future research and potential online publication.

CHAPTER FOUR: STUDY FINDINGS

4.1 Socio -demographic characteristic of the participant

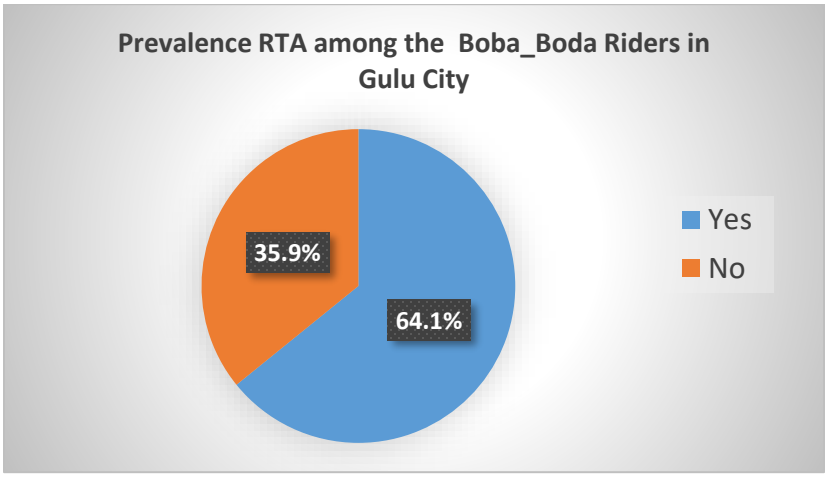
In this study's socio-demographic analysis, the majority of respondents were between 18 to 34 years old, with a significant portion being 35 years and above, while a considerable proportion identified as single and hailed from the Acholi tribe; males were predominant, and Catholics constituted the largest religious group; most individuals had attained at least a secondary level of education and resided predominantly in Layibi; notably, over half of the participants were engaged in other forms of work, and nearly half reported experiencing accidents 2-3 times.

Table 1: showing demographic of the boda-boda riders in Gulu City.

Variable	N=276	Percentage %
Age		
18- 24 years	30	10.9
25- 29 years	68	24.6
30- 34 years	58	21.0
35 above years	120	43.4
Marital status		
Single	59	66.7
Married	194	20.3
Separated	35	12.0
Tribe		
Acholi	215	73.9
Langi	49	16.8
Madi	10	3.4
Muganda	10	3.4
Others	6	2.4
Current residence		
Pece	74	25.4
Laroo	60	20.6
Bardege	72	24.7
Layibi	84	28.9
Others	1	0.3
Sex		
Male	279	95.9
Female	12	4.1
Religion		
Catholic	172	59.1
Protestant	74	25.4
Moslem	30	10.3
Others	15	5.2
Education level		
No formal education	26	8.93

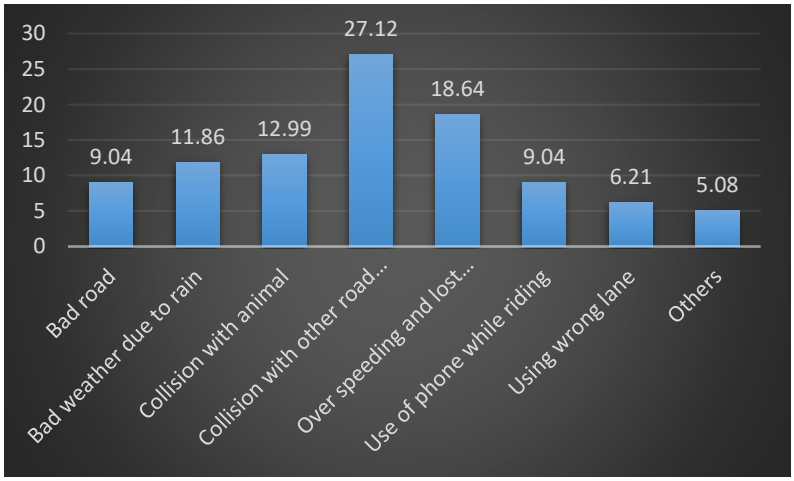
Primary level	84	28.9
Secondary level	165	56.7
Tertiary level	16	5.5
Other form of work		
Yes	159	54.6
No	132	45.4
Accident frequency		
Once	58	32.7
2-3 times	87	49.1
More than 3 times	32	18.0

Figure 3: Pie-chart shows the prevalence of RTA among boda-boda cyclists.



177(64.1%) Boda-boda in Gulu city riders reported that they have ever had road traffic accident where these was recorded as binary yes for those who had RTA and No for those who did not, the finding also revealed that 46% of RTA occur among rider age between 30-34 years old.

Figure 4: Bar graph showing causes of RTA among Boda-Boda Riders.



Results above revealed that collisions with other road users (27.1%), over speeding and loss of control (18.6%), and bad weather due to rain (11.8%) are the top three causes of motorcycle accidents among boda-boda riders. These three factors combined account for 57.6% of all accidents involving boda-boda riders.

Table 2: Bivariable regression analysis on the factors associated with road traffic among boda-boda riders in Gulu City

Variable	Motorcycle RTA		Crude OR	(95% CI)	(P-value)
	No (%)	Yes (%)			
Age of Rider					
18 - 29 years	33(33.7)	65(66.3)			
30- 34 years	34 (28.3)	86(71.7)	1.05	(1.0 – 2.2)	0.04
35 above years	22(37.9)	36(62.1)			
Gender					
Male	90(34.1)	174(65.9)	5.80	(1.8 -1.9)	0.04
Female	9(75.0)	3(25.0)			
Marital Status					
Married	64(34.8)	120(65.2)	0.9	(0.5- 1.7)	0.8
Separated	15(44.1)	19(55.9)			
Single	20(34.5)	38(65.5)			
Do you have License					
Yes	90(57.7)	66(42.3)			
No	33(27.5)	87(72.5)	1.2	(0.3 – 0.8)	0.01
Did road test before been given license.					
Yes	80(78.4)	22(21.6)	1.5	(1.03 –2.2)	0.004
No	7(38.9)	11(61.1)			
Received training before riding?					
Yes	73(76.0)	23(24.0)			
No	10(41.7)	14(58.3)	1.2	(0.07-9.8)	0.08
You Own helmet					
Yes	34(29.1)	83(70.6)			
No	16(27.1)	43(72.9)	1.8	(0.8- 3.5)	0.1
Use alcohol during riding hours					
Yes	27(26.2)	76(73.8)	1.2	(1.1 - 2.4)	0.01
No	101(58.4)	72(41.6)			
Transport more than one passenger					
Yes	37(29.4)	89(70.6)	1.1	(0.5 – 1.2)	0.03
No	88(58.7)	62(41.1)			
Transport passengers with Luggage					
Yes	51(27.3	136(72.7)	1.3	(1.7 – 4.0)	<0.001

No	48(53.9)	41(46.1)			
Riding speed					
Less than 50km/h	50(58.1)	36(41.9)			
50km to 80km/h	51(33.3)	102(66.0)			
More than 80km/h	12(32.4)	25(67.6)	0.9	(0.4- 1.6)	<0.001
Hours of Work					
Less than 8 hours	69(50.4)	68(49.6)			
8 hours to 16 hours	16(34.0)	31(66.0)			
More than 16 hours	14(15.2)	78(84.8)	1.1	(0.4 – 1.0)	0.0003
Receiving a Phone call during riding.					
Answer the call.	22 (25.7)	59(72.8%)	1.3	(1.2 - 3.2)	0.006
Do not answer.	105(64.1)	59(35.9%)			
Motorcycle Ownership					
Owner	107(69.9)	46(30.1)	1.1	(0.3 - 0.7)	0.02
Not owner	53(43.1)	70(56.9)			

Significance *=p-value<0.05, **=p -value<0.01, ***=p-value<0.001

In the bivariate analysis table above, Riders aged 18-24 years were slightly more involved in accidents compared to those aged 30-34 years and above (cOR = 1.1, 95% CI: [1.0- 2.2], p = 0.041), 174 individuals (65.9%) experienced an accident. In comparison, 9 females (75.0%) had no accidents, and 3 females (25.0%), (cOR=5.80 (95% CI: 1.8-1.9, P=0.04) while Riders without licenses were more likely to experience accidents compared to those with licenses (cOR = 1.2, 95% CI: [0.3-0.8], p = 0.011). riders who had taken a road test before being given a license were at a lower risk of accidents compared to those who did not (cOR = 1.5, 95% CI: [1.0- 2.2], p = 0.004), Riders who transport more than one passenger were more involved in RTAs compared to those who don't (cOR = 1.1, 95% CI: [0.5- 1.2], p = 0.032),Those riding at speeds of 50 km/h to 80 km/h were more likely to have accidents than those riding below 50 km/h (cOR = 0.9, 95% CI: [0.4- 1.6], p = 0.000), Riders working more than 16 hours a day were more likely to have accidents compared to those working less than 8 hours (cOR = 1.2, 95% CI: [1.1-2.4], p = 0.0003), Boda-boda riders who transport passengers with luggage were 3.2 times more likely to experience accidents compared to those transporting passengers without luggage (cOR = 3.2, 95% CI: [1.7- 4.0], p < 0.001), Boda-boda riders who did not undergo a road test before obtaining their license were 1.5 times more likely to be involved in accidents compared to those who took a road test (cOR = 1.5, 95% CI: [1.03- 2.2], p = 0.004), Riders who work more than 16 hours a day

were significantly more likely to have accidents compared to those who work less than 8 hours (cOR = 3.0- 95% CI: [1.7-4.1], p < 0.001), Boda-boda riders who drink alcohol during riding hours were 1.2 times more likely to experience accidents compared to those who do not drink while riding (cOR = 1.2, 95% CI: [1.1- 2.4], p = 0.01), Riders who answered phone calls while riding were 1.3 times more likely to be involved in road traffic accidents compared to those who do not answer phone calls (cOR = 1.3, 95% CI: [1.2-3.2], p = 0.006) and Boda-boda riders who own their motorcycle were less likely to have accidents compared to those who do not own their motorcycle (cOR = 1.1, 95% CI: [0.3- 0.7], p = 0.023).

Table 3: Multivariate regression of the factors associate with road traffic accidents among boda-boda riders in Gulu City

Variable	Motorcycle RTA		aOR	(95% CI)	(95% CI	P-value
	No (%)	Yes (%)				
Age of Rider						
18 - 24 years	33(37.9)	54(62.1)				
30- 34 years	34(28.3)	86(71.7)	1.09	(1.034 – 2.257	(0.99 – 1.20)	0.061
35 above years	22(37.9)	36(62.1)				
Gender						
Male	90(34.1)	174(65.9)	6.80	(1.8 -1.9)	(2.53 – 2.73)	0.001
Female	9(75.0)	3(25.0)				
Do you have License						
Yes	90(57.7)	66(42.3)				
No	33(27.5)	87(72.5)	1.72	(0.370 – 0.851)	(0.98 – 1.50)	0.04
Did road test before been given license.						
Yes	80(78.4)	22(21.6)	0.49	(1.034 – 2.257)	(1.29 – 1.70)	0.69
No	7(38.9)	11(61.1)				
Use alcohol during riding hours						
Yes	27(26.2)	76(73.8)	2.46	(1.084 - 2.493)	(1.113 – 1.83)	0.04
No	101(58.4)	72(41.3)				
Transport more than one passenger						
Yes	37(29.4)	89(70.6)	1.39	(0.522 – 1.168)	(1.19 – 1.40)	0.13
No	88(62.7)	62(41.3)				
Transport passengers with Luggage						
Yes	51(27.3)	136(72.7)	4.46	(1.689 – 4.000)	(1.23 – 2.73)	<0.001
No	48(53.9)	41(46.1)				
Hours of Work						
Less than 8 hours	69(50.4)	68(49.6)				

8 hours to 16 hours	16(34.0)	31(66.0)	1.07	(0.428 – 1.046)	(0.98 – 1.17)	0.12
More than 16 hours	14(15.2)	78(84.8)				
Receive Phone call on riding.						
Answer the call.	22 (25.7)	59(72.8%)	3.21	(1.218 - 3.298)	(1.103 – 2.13)	0.02
Do not answer.	105(64.1)	59(35.9%)				
Motorcycle Ownership						
Owner	107(69.9)	46(30.1)				
Not owner	53(19.5)	70(80.5)	2.21	(0.279 - 0.756)	(1.78 – 2.18)	0.01

Significance *=p-value<0.05, **=p -value<0.01, ***=p-value<0.001

In the Multivariate regression analysis table 3, boda-boda riders carrying passengers with luggage were 4.5 times more likely to experience accidents compared to those carrying passengers without luggage (aOR = 4.5, 95% CI: [3.2- 6.3], p < 0.001), Male riders have 6.8 times likely to experience RTA than female counter part (aOR = 6.8, 95% CI: (2.53 – 2.73) p=0,001) for motorcycle road traffic accidents compared to female riders. The p-value is 0.001, indicating a statistically significant association. Boda boda riders Not owning a motorcycle (aOR = 2.9, 95% CI: [1.2-4.8], p = 0.016). drinking alcoholic before riding 2.5 times likely to experienced RTA compared to boda-boda riders who were not drinking before riding (aOR = 2.5, 95% CI: [1.1- 3.9], p = 0.042), answering phone calls while riding were 2.2 likely to be involved in RTA compared to boda-boda-riders who were not answering phone call (aOR = 3.2, 95% CI: [1.3-3.6], p = 0.026), Boda -boda Riders who do not have License were 1.7 likely to experienced RTA compared those who have license (aOR =1.7, 95% CI: [1.1- 2.6], p=0.047).

CHAPTER FIVE: DISCUSSION

5.1 Discussion

5.1.1 Prevalence of Road Traffic Accident among boda- boda riders

The study established the prevalence of Boda-boda road traffic accidents and associated factors among boda-boda riders. The study findings revealed that road traffic accident among the boda-boda riders is at 64.1%. These findings are higher than study conducted in Kenya Embu town which revealed prevalence of 24%, this difference might be due to the methodology in the two studies. Where prospective cohort study design was used which involves following a group of individuals (the cohort) over time to observe outcomes for the study conducted in Kenya (Ngari and Paul Muriithi, 2020) while cross sectional study designed was the research methodology which I used in this study. The result as well varies with the study conducted in Tanzania in urban Moshi which revealed the prevalence among the respondents slightly lower than the one obtained in this study thought the same methodology of cross-sectional design was used (Nguyen et al., 2018).

The study's findings on the prevalence of RTAs are consistent with two studies: one conducted in Ethiopia's Kindo Kayishi werada, which found a prevalence of 65.1% (Raga et al., 2023), and another conducted in Ghana's Central Tongue Area, which found a prevalence of 64.0% among respondents (Konlan et al., 2020).

5.1.2 Factor associated with RTA among the Boda-Boda rider in Gulu city.

The findings of this study highlight several key factors associated with the increased risk of road traffic accidents (RTAs) among Boda-Boda riders in Gulu City. One significant result is that riders carrying passengers with luggage were 4.5 times more likely to experience accidents compared to those carrying passengers without luggage (aOR = 4.5, 95% CI: [3.2-6.3], $p < 0.001$).This study found that Boda-boda carrying passenger with their luggage were significantly associated with RTA, this study to greater extend agrees with study published by (Asante et al., 2015). As luggage adds weight and bulk to the motorcycle, making it more difficult to balance and control, this is especially true when luggage is not properly secured or disturbed or sudden manoeuvres can easily destabilize the motorcycle leading to accident, further more

securing and adjusting luggage by the passenger while riding can distract the rider attention from road and traffic, this can lead to delayed reactions, poor judgement and increase accident risk.

Answering phone calls while riding was found to increase the likelihood of being involved in an RTA by 2.2 times compared to those who did not use their phones while riding (aOR = 3.2, 95% CI: [1.3-3.6], p = 0.026).The study also revealed that boda-boda Motorcycle riders who used their phones while riding were more likely to have an accident than those who did not use their phones while riding. This is in line with research conducted in Ethiopia (Raga et al. 2023), this might be through either answering calls with one hand or utilizing earphones, which causes diverted attention, a core tenet of distraction theory, suggests that phone use consumes cognitive resources needed for safe driving/ riding leading to impaired judgment and delayed reaction times. Additionally, external factors like social or personal issues discussed during phone conversations can further exacerbate distraction and cognitive load. Furthermore, the physical act of using a phone can negatively impact riding skills. Operating the motorcycle with one hand reduces control and stability, particularly during manoeuvres or in emergency situations. Additionally, balancing the phone while riding can introduce additional physical demands, potentially leading to fatigue and reduced reaction time. Beyond the immediate risks associated with phone use, riders who habitually engage in phone use while riding might develop a false sense of security and underestimate the inherent risks involved. This overconfidence can lead to riskier riding behaviours, further increasing the likelihood of accidents.

The findings indicate a significant gender disparity in the likelihood of motorcycle road traffic accidents (RTAs). Specifically, male riders are 6.8 times more likely to be involved in an RTA compared to their female counterparts (aOR = 6.8, 95% CI: 2.53 – 2.73, p = 0.001). This suggests that gender may be an important factor in understanding the risk of motorcycle accidents, potentially due to differences in behavior, risk perception, or exposure to high-risk situations. Further investigation is necessary to explore the underlying reasons for this disparity and to develop targeted interventions that address the higher vulnerability of male riders.

Alcohol consumption before riding was also a significant risk factor, with riders who drank before riding being 2.5 times more likely to experience an RTA compared to those who did not drink (aOR = 2.5, 95% CI: [1.1-3.9], p = 0.042). Alcohol consumption was significantly associated with Boda-Boda road traffic accidents (RTAs). Riders who reported alcohol consumption were times more likely to be involved in an RTA Notably, 74% of Boda-Boda riders reporting alcohol use were involved in accidents, highlighting the substantial risk associated with this behaviour. While this finding aligns with numerous research studies demonstrating the detrimental effects of riding under the influence, it differs in magnitude compared to a study conducted in Kenya, which reported a 39.4% involvement rate among substance-using riders. This discrepancy suggests potential regional variations alcohol consumption as reported by the World Health Organization (WHO) data for 2023 which indicates that Ugandans consume an average of 12.21 Liters of pure alcohol annually, making Uganda the top consumer of alcohol in Africa. In comparison, Kenyans consume an average of 3.4 litres of alcohol per year. Several factors could contribute to the observed differences. Firstly, cultural norms and societal attitudes towards alcohol consumption might influence riders' willingness to openly disclose their alcohol use, potentially leading to underreporting in certain in alcohol usage as this is self-reported research interview questions.

Boda-Boda riders who do not own their motorcycles were nearly 3 times more likely to be involved in an RTA compared to those who own their motorcycles (aOR = 2.9, 95% CI: [1.2-4.8], p = 0.016). This study revealed that owning a motorcycle statistically reduces the risk of being involved in a traffic accident for Boda-Boda riders. Riders who own their own vehicles exhibit a significantly lower risk compared to those who rent or borrow motorcycles. This finding aligns with a previous study conducted in Ethiopian (Raga et al. 2023), the reason for this might be a potential protective effect associated with motorcycle ownership. Owning a motorcycle may foster a sense of responsibility and attachment, leading riders to adopt more cautious driving practices. This could manifest in adhering to speed limits, maintaining the motorcycle in good condition, and prioritizing safety over short-term financial gain. Riders who own their motorcycles might be more invested in providing quality service to retain their clients. This could

translate into a greater focus on safe riding practices and maintaining a positive reputation for reliability and safety.

In contrast, Boda-Boda riders who rent or borrow motorcycles might face different pressures and motivations. The need to maximize income and meet rental fees could incentivize risk-taking behaviours, such as exceeding speed limits or disregarding traffic rules. Additionally, the lack of personal ownership might lead to less investment in maintaining the vehicle's condition, potentially increasing the risk of mechanical failures and accidents.

This study further revealed a crucial finding on Boda-Boda riders without a valid riding license are significantly more likely to be involved in road traffic accidents compared to those who hold a license. Riders lacking proper training and authorization greater risk of accidents highlighting the critical role of licensing in promoting Boda-Boda safety. This finding aligns with a previous study conducted in Sawula and Bulky town, Busia district, which observed a clear association between licensing and safe riding practices. Licensed Boda-Boda riders were found to be more compliant with traffic rules, exhibit greater patience while navigating traffic, and consistently wear helmets, significantly reducing their risk of accidents.

CHAPTER SIX:

6.0 CONCLUSION, STUDY LIMITATIONS AND RECOMMEDATION

6.1: Conclusion

The study findings revealed that road traffic accident among the boda-boda riders is at 64.1%. and factors associated with RTA includes Carrying passengers with luggage, absence of motorcycle ownership, engaging in behaviours such as consuming alcoholic beverages or answering phone calls while riding, and licensing status were significantly associated with Road Traffic accident.

6.2: Limitation.

Study limitations include its cross-sectional design, hindering causal relationship establishment between factors and accidents. Recall bias and Relying on self-reported data, notably for alcohol consumption and helmet use, may introduce underreporting and bias, impacting accuracy. Additionally, results may lack generalizability to other populations due to specific participant demographics and context.

6.3: Recommendations

Based on the study findings on boda-boda riders and their associated risk factors for accidents, below are some of my key recommendations that can enhance road safety.

The traffic police department to Implement stricter regulations and enforcement measures, particularly focusing on licensing criteria and carrying passenger and luggage overload through strict adherence to weight limits and giving penalties for violations should be prioritized to deter unsafe practices and ensure compliance.

The traffic police should conduct interventions to address issues of alcohol consumption among boda-boda riders. Efforts should be made to educate riders about the dangers of riding under the influence and to provide support services for those struggling with alcohol addiction. Additionally, educating passengers on adhering to safety protocols, along with imposing penalties for those found intoxicated while riding, should be prioritized by relevant authorities through use of media.

Awareness and education initiatives targeting boda-boda riders, and the public are necessary to promote safe riding practices and adherence to traffic regulations. Comprehensive awareness programs should cover topics such as safe riding techniques, phone use while riding and the importance of following traffic rules.

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APPENDICES

Appendix I: Informed Consent

Title of the study: Prevalence and factors associated with RTA among Boda-boda riders in Gulu city, northern Uganda.

Investigator; Chandiga Keneddy

Study introduction

There is a high number of traffic accidents occurring daily in Gulu city, northern Uganda, with a significant proportion involving Boda-boda riders. These accidents result in injuries, fatalities, and property damage. Multiple factors are believed to contribute to these road accidents among Boda-boda riders. In order to conduct a study on this issue, the investigator kindly requests volunteers to go through the information provided in this document and sign the consent form. Your participation in this study is completely voluntary, and you have the right to withdraw at any time, providing a reason for your decision.

Purpose of the study

The purpose of this project is to determine prevalence and factor contributing to rising road traffic accident among boda-boda riders in Gulu city northern Uganda.

Benefits

This study will help to understand factor associated with RTA among Boda-boda riders in Gulu city and how it can be reduced.

Risk

The only risk to the respondent is the loss of a few minutes taken during the interview using the questionnaire.

Compensation

There will be no compensation for participating in this study except if the researcher deems it important.

Voluntary participation

Your participation in this study is completely voluntary you are therefore free not to participate in this study, withdrawal at any time is without any loss or benefit.

Specimen

This study will not involve collection of specimens in any way from the respondent.

Confidentiality

All information about you obtained during the interview shall be kept private

Additional information

For any information you require for clarification, feel free to ask the researcher on 0782666279.

CONSENT FORM FOR THE MOTORCYCLE OPERATORS

I the undersigned, willingly undertake to participate in this study whose purpose has been explained to me, I understand that any information obtained for the purpose of this study will be held in strict confidentiality.

Name---------- signature---------- date ----------

Witness by

Name---------- signature---------- date ----------

Note: you are not giving up any of your legal right by signing this informed consent document.

Appendix II: Quantitative Questionnaire

Part 1: Socio-demographic characteristics

1. What is your age in Years? (Mention in years)
   _____
2. Gender of the respondent?
   a. Male
   b. Female
3. Current Residence division (tick the appropriate)
   a. Pece
   b. Laroo
   c. Bar Dege
   d. Layibi
   e. Others (Specify)_____
4. What is your tribe (tick the appropriate)
   a. Acholi
   b. Madi
   c. Langi
   d. Lugbara
   e. Muganda
   f. others _____
5. What is your Marital Status? (Tick the appropriate)
   a. Single
   b. Married
   c. Separated
6. What is your religion? (Tick the appropriate)
   a. Christian
   b. Protestant
   c. Muslim
   d. Others _____
7. What is your highest level of Education? (Tick the appropriate)
   a. No formal Education
   b. Primary Education

c. Secondary Education
d. Tertiary Education

8. Do you have any other form of employment or income-generating activity other than motorcycle riding? (Tick the appropriate)
    a. Yes
    b. No

    If Yes, Which One?
    a. Farming
    b. Teaching
    c. Casual work
    d. Business
    e. Other
9. Do you own this motorcycle?
    a. Yes
    b. No
10. If no, who owns the motorcycle? (Tick the appropriate)
    a. My relative
    b. Hire
    c. Friend
    d. Others specify_____

PART 2: Individual factors

11. Do you have a valid driving license? (Tick the appropriate response)
    a. Yes
    b. No
12. If yes show me the license (Tick the appropriate response)
    a. available
    b. not available

13. Have you taken road test before been given license? (Tick the appropriate response)
    a. Yes
    b. No
14. Did you undergo formal training before joining boda-boda industry? (Tick the appropriate response)
    a. Yes
    b. No
15. If yes, where did you train from? (Tick the appropriate response)
    a. from friend
    b. training school
    c. At home

    If no, why?.....
16. For how long did you train? (if no in Q14, skip this question)- (Tick the appropriate response)
    a. less than 2 weeks
    b. More than 2 weeks
17. What is your average riding speed in Km/h, during your day-to-day activities? (Acceptable speed within city/town is less than 50KM/h) (Tick the appropriate response)
    a. Less than 50km/h
    b. More than 50km/h
    c. More than 80km/h
18. Do you have a reflector jacket? (Tick the appropriate response)
    a. Yes
    b. No

    If no

    why?.....
    .....

19. Do you have a helmet? (Tick the appropriate response)

a. Yes
b. No

If no why?_____

20. Do you Transport more than one passenger at a time? (Tick the appropriate response)
    a. Yes
    b. No

    If yes, why?_____

21. Do you Transport passengers together with their luggage? (Tick the appropriate response)
    a. Yes
    b. No
22. Do you wear protective boots and gloves during riding (Tick the appropriate response)
    a. Yes
    b. No

    If no, why?_____
23. How many hours do you work in 24 hours? (Tick the appropriate response)
    a. Less than 8 hours
    b. 8 hours to 16 hours
    c. More than 16 hours
24. Do you have a mobile phone? (Tick the appropriate response)
    a. yes
    b. No
25. How do you answer phone call while riding? (Tick the appropriate response)
    a. stop and answer phone call
    b. Answer the call while riding.
    c. Use of earphone

d. I do not pick a phone while riding

Alcohol and drug use

26. During the past 1month, on average how often, did you drink alcoholic beverages?' (Tick the appropriate response)
    a. Everyday
    b. once a week
    c. 2–3 times/week,
    d. 4–6 times/week
27. Did you take alcohol in the previous 24 hours? (Tick the appropriate response)
    a. Yes
    b. No
28. Have you ever ridden motorcycle after taking Alcohol or drugs? (Tick the appropriate response)
    a. Yes
    b. No
29. Do you use Marungi? (Tick the appropriate response)
    a. Yes
    b. No
30. If yes, do you chew while riding (Tick the appropriate response)
    a. Yes
    b. No

Motorcycle factors

31. When was the motorcycle purchased? (Tick the appropriate response)
    a. less than 1 year
    b. 1 year to 2 years
    c. More than 2 Years
32. How often do you service your motorcycle? (Tick the appropriate response)
    a. Once a week
    b. Once a month
    c. when it develops problem.

33. When was your last motorcycle service done? _____
    a. this week
    b. a month ago
    c. more than 2 months ago

Prevalence of RTA among Boda-boda riders

34. Have you ever had motorcycle accident since you started doing Boda-Boda transport business? (Tick the appropriate response)
    a. Yes
    b. No
35. If yes, how many times where you involved in accident? (Tick the appropriate response)
    a. once
    b. 2-3 times
    c. more than 3 times
36. When was the last time you had accident while riding? (Tick the appropriate response)
    a. less than a month ago
    b. Within the last five Months
    c. More than six months ago
37. What was the course of the accident? (Tick the appropriate response)
    a. Over speeding and lost control
    b. Collisions with other road users.
    c. Bad weather due to rain
    d. Bad road
    e. Collision with animal
    f. use of phone while riding
    g. using wrong lane
    h. others (specify)
38. What was the time of the accident? (Tick the appropriate response)
    a. Day time
    b. Nighttime

39. what was the date of the accident??
    a. Week day
    b. Weekend
40. At which area did the accident happened? (Tick the appropriate response)
    a. At traffic light
    b. At round about
    c. On highway
    d. Near Road Sign Post
    e. at Road hump
41. Were you carrying anything at the time of the accident (Tick the appropriate response)
42. If yes, what where you carrying at time of the accident (Tick the appropriate response)
    a. Passenger
    b. Luggage
    c. Passenger plus luggage
43. Was the accident reported to the police? (Tick the appropriate response)
    a. Yes
    b. No
44. If no, why_____
45. Have you sought medication attention after accident? (Tick the appropriate response).
    a. Yes
    b. No
46. If yes, where did you got for medical attention?
    a. clinic
    b. Hospital
    c. self-medication
47. If no in Q 44, why did you not seek medical attention?

“Thank you so much for your time.”

Appendix III: Approval by UCU REC

UGANDA CHRISTIAN UNIVERSITY

A Centre of Excellence in the Heart of Africa

07/09/2023

To: Keneddy Chandiga

Ugandan Christian University (UCU)
+256782666279

Type: Initial Review

Re: UCUREC-2023-635: PREVALENCE AND FACTORS ASSOCIATED WITH ROAD TRAFFIC ACCIDENTS AMONG BODA-BODA RIDERS IN GULU CITY -NORTHERN UGANDA

I am pleased to inform you that the Uganda Christian University REC, through expedited review held on **31/08/2023** approved the above referenced study.
Approval of the research is for the period of **07/09/2023** to **07/09/2024.**

As Principal Investigator of the research, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and addenda to the protocol or the consent form must be submitted to the REC for re-review and approval **prior** to the activation of the changes.
3. Reports of unanticipated problems involving risks to participants or any new information which could change the risk benefit: ratio must be submitted to the REC.
4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by participants and/or witnesses should be retained on file. The REC may conduct audits of all study records, and consent documentation may be part of such audits.
5. Continuing review application must be submitted to the REC **eight weeks** prior to the expiration date of **07/09/2024** in order to continue the study beyond the approved period. Failure to submit a continuing review application in a timely fashion may result in suspension or termination of the study.
6. The REC application number assigned to the research should be cited in any correspondence with the REC of record.
7. You are required to register the research protocol with the Uganda National Council for Science and Technology (UNCST) for final clearance to undertake the study in Uganda.

The following is the list of all documents approved in this application by Uganda Christian University REC:

No.	Document Title	Language	Version Number	Version Date
1	Informed consent form for the recruitment of research participants	English	1	2023-08-16
2	Data collection tools	English	1	2023-08-16
3	Protocol	English	1	2023-08-16

Yours Sincerely

Peter Waiswa
For: Uganda Christian University REC

APPEND IV: Introduction Letter for Principal Investigator

UGANDA CHRISTIAN UNIVERSITY
A Centre of Excellence in the Heart of Africa

8th September, 2023

TO WHOM IT MIGHT CONCERN

Dear Sir/Madam,

RE: INTRODUCTORY LETTER FOR CHANDIGA KENNEDY

Warm greetings from the School of Research and Post-Graduate Studies (UCU)

This serves to introduce the above named; **Chandiga Kennedy,** as our student pursuing a Master's degree of Public Health registration number **RJ20M21/071**

Kennedy is conducting a research as a requirement for the award of the above mentioned degree entitled: **Prevalence and Factors Associated with Road Traffic Accidents Among Boda-Boda riders in Gulu city Northern Uganda**
He has fulfilled all clearance requirements such as getting faculty and Research Ethics Approval from UCUREC; accredited by Uganda National Council for Science and Technology (UNCST). His work has minimal risks and is deemed not harmful to both individual participants and the institution.

Any assistance given to him to achieve this goal will be highly welcome.

Thank you so much.

Yours faithfully,

UGANDA CHRISTIAN UNIVERSITY ★ 08 SEP 2023 DIRECTORATE OF POSTGRADUATE STUDIES

.....

Dr. Owor Joseph
Head, Postgraduate Studies
Directorate of Post-Graduate Studies
jowor.ucu.ac.ug

Appendix V: Introduction letter from Boda Boda Riders association

GULU EASTERN CITY BODA - BODA ASSOCIATION

P.O. Box: _____ Laroo-Pece Gulu City, Uganda

Tel.: +256 772 784 983/+256 772 538 517/+256 781 451 990

Email: gulueasterncityboda@gmail.com

Date: 22nd/09/2023

TO WHOM IT MAY CONCERN

Dear Sir/ Madam,

REF: INTRODUCTORY LETTER

1) Kinyera Ivan	0775 754 737
2) Acaa Evelyn	0783 260 807
3) Lajara Irene	0774 219 467
4) Adangpiny Caroline	0789 704 723
5) Akumu Scovia	0779 470 461

The above named people are the individual who will be assisting Mr. Chandiga Kennedy in collection of his research data.

Chandiga Kennedy currently studying at Uganda Christian University in MPH program.

They are conducting research on the **"Prevalence and factors associated with Road Traffic Accidents among Boda Boda in Gulu City"**.

I recommend the above team to conduct research on the said topic in our area.

Thanks

Mr. Ojok Godffrey
0781 451 990

GULU EASTERN CITY BODA BODA ASSOCIATION
27 SEP 2023
GENERAL SECRETARY

Appendix V: Workplan for The Research

PREVALENCE AND FACTORS ASSOCIATED WITH ROAD TRAFFIC ACCIDENTS AMONG BODA-BODA RIDERS IN GULU CITY -NORTHERN UGANDA

Activity	Schedule time
Research Topic selection	Sept- December 2021
Concept presentation	Jan- March 2022
Finding of research supervisor	March -April 2023
Sharing of supervisor CV with University	March April 2023
Proposal development	April -July
Proposal submission to the REC after supervisor approval	August 2023
Approval of research proposal UCU (REC)	August 2023
Data collection	September 2023
Report writing	October 2023
Approval of research by supervisor	October 2023
Printing of the research report	October 2023
Submission of research for defending	October 2023
Defending of research report	November 2023

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SCHOOL OF RESEARCH & POSTGRADUATE STUDIES

DISSERTATION CORRECTION COMPLIANCE REPORT BY THE CANDIDATE (POST VIVA FORM)

Date: 09 September 2024

Name of Candidate. Chandiga Keneddy Reg. REG NO: RJ20M21/071.

Title of: PREVALENCE AND FACTORS ASSOCIATED WITH ROAD TRAFFIC ACCIDENTS AMONG BODA-BODA RIDERS IN GULU CITY, NORTHERN UGANDA

SN	COMMENTS BY EXTERNAL EXAMINER	ACTION TAKEN
1	Also, a number of studies were referred to but not paper or citations indicated. The publications should be reflected in the report	All paper referred to; citations are now indicated in the report
2	There is a contradiction between the statement made at the introduction part of the methods section on page 15 saying that "The study used qualitative research methodology to establish the prevalence of RTAs and associated factors among the boda-boda riders	The contradiction in the statement has been addressed on page 15: "The study was descriptive cross-sectional in nature and used quantitative methods of data collection to determine the prevalence of RTAs and associated factors among boda-boda riders.".
3	Dissemination of study results:	This has been included in the report now page 19 of the report
4	Furthermore, no analysis made to show prevalence of RTA by sex (male and females).	The analysis of RTA by gender (male and Female is included page in the bivariate analysis page 23 and 24 of the report
5	The list excludes some of the citations reflected in the body of the report. For example, on page 14 of the report, there is a citation "According to the World Health Organization's 2015 road safety report, road traffic accidents in Uganda resulted in a rate of 27.4 deaths per 100,000 population"	This has been included in bibliography

6	Adjustment of some of the citation, page, 7, 9 and other	This has been corrected in page 7, 9
	VIVAS RECOMMENDATION	
8	1. What is the weight of the significant factors (what are you exactly measuring and how did you eliminate those that were less significant 2. Show the level of comparison among factors that cause accidents 3. You merged factors that are conflicting on phone call and accidents 4. What is the relevance of the study 5. What is unique about your findings 6. Did you capture female boda bod riders	The level of comparison has been clarified in the discussion, and the issue regarding the phone call conflict has been resolved by recoding the relevant variables and reanalyzing the data. The relevance of the study has been addressed, and a gender analysis of boda-boda riders and road traffic accidents (RTA) among them has been included. (Adjusted)

Candidate's Name: Chandiga Keneddy. Signature

upervisor's Name: Mr. Aggrey Byaruhanga

ignature..... 27/09/24