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FACTORS CONTRIBUTING TO ROAD TRAFFIC ACCIDENTS AMONG COMMERCIAL VEHICLE DRIVERS IN THE KINTAMPO NORTH MUNICIPALITY, BRONG AHAFO- GHANA

BY

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DECLARATION

I declare that this work is the result of my own effort, and it has not been submitted either in part or whole for any other degree elsewhere, except for the specific references which have been duly acknowledged.

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DEDICATION

I dedicate this work to my parents Mr. Osei Kofi and Mrs. Alice Kokura and to all my siblings.

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ABSTRACT

Background: According to World Health Organization (2015) over 1.2 million people die each year on the world's roads, with millions more sustaining serious injuries and living with long-term adverse health consequences. The road traffic accidents(RTAs) statistics in the Kintampo North Municipality indicated that commercial vehicles were more consistently involved in RTA compared to private vehicles; 144(94.7%) vs. 8(5.3%) in 2015, 63(78.8%) compared to 17(21.2%) in 2016, and 164 (84.9%) against 29(15.1%) in 2017 respectively.

Aim: The aim of the study was to identify the factors contributing to road traffic accident among commercial vehicle drivers in the Kintampo North Municipality.

Method: A cross-sectional study design was used to assess the factors contributing to road traffic accident among commercial vehicle drivers. Simple random sampling technique was used to select some of the drivers from the five main stations in the Municipality. Only drivers who consented to participate in the study were interviewed.

Stata Version 15 was used to analyse the data captured. The Pearson's chi-square test and the Fishers exact test were used in assessing the various factors that are associated with road traffic accident. The simple logistic regression model was used to quantify the factors that influence RTAs whereas the multiple binary logistic regression model was used to determine the significant variables that independently explain the cause of the RTAs. Significance level of less than 0.05 was used for the study.

Result: The total number of drivers interviewed was 227. All the drivers were males. Very few of the drivers (n=9, 3.96%) were below the age of 18. Out of the 227 drivers, 126 (55.5%) reported to have ever been involved in at least one road traffic accident. About half 113 (49.8%) of the drivers operated with Taxi, 105(46.3%) Vans and the remaining 9(4%) were Bus drivers. The measure of association based on the simple logistic regression model

revealed that the Bus drivers had the higher odds of involvement in RTA (UOR: 8.47, 95% CI: 1.0-70.1, p-value: 0.048) followed by the odds of Taxi driver involvement in RTA (UOR: 1.54, 95% CI: 0.9-2.6, p-value: 0.113) compared to that of Van drivers. The following variables were also found to be associated with the RTAs: drink-driving (UOR:2.42, 95% CI:1.17-5.00, p-value: 0.017), red traffic light violation(UOR:5.17, 95% CI:2.06-12.96, p-value<0.001), changing lane without signalling(UOR: 2.92, 95% CI:1.46-5.86, p-value:0.003) , bribing police officers(UOR: 2.02, 95% CI:1.17- 3.48, p-value:0.011) , overloading passengers(UOR:1.93, 95% CI: 1.08- 3.45, p-value:0.026), driving beyond maximum speed limit(UOR: 2.28, 95% CI:1.34- 3.9,p-value: 0.003) and bribing way through at DVLA for driving licences (UOR: 2.74, 95% CI:1.47-5.12, p-value: 0.002). The only variable that was statistically significant in the multiple logistic regression analysis was drivers' violation of the red traffic light signal (AOR: 2.84, 95% CI: 1.06, 7.63, p-value: 0.03).

Conclusion: This study found that driver factors: poor road practices and unprofessionalism were the major factors contributing to the road traffic accidents in the Kintampo North Municipality.

Recommendation: The Kintampo North Municipal Motor Traffic and Transport Department (MTTD) of the police service should intensify the education of the drivers on good road practices and professionalism to change their attitude to reduce the incidence of the RTAs on the roads in the Municipality.

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LIST OF ABBREVIATIONS

CDC	-	Centre for Disease Control
DVLA	-	Driver Vehicle and Licencing Authority
ERC	-	Ethics Review Committee
GBC	-	Ghana Broadcasting Cooperation
GNA	-	Ghana News Agency
GPRTU	-	Ghana Private Road and Transport Union
GSS	-	Ghana Statistical Service
MHD	-	Municipal Health Directorate
MTTD	-	Motor Traffic and Transport Department
PIARC	-	Permanent International Association of Road Congress
PROTOA	-	Progressive Transport Owners Association
RTAs	-	Road Traffic Accidents
WHO	-	World Health Organization

DEFINITION OF TERMS

Bribe	To give somebody money or some other incentive to do something, especially something illegal or dishonest.
Commercial vehicle	Any type of motor vehicle used for transporting goods or paid passengers with the primary objective of making money.
Commercial Vehicle Driver	Someone who drives a vehicle used for transporting goods or paid passengers with the primary objective of making money.
Drink-driving	Driving while under the influence of alcohol.
Driver Factor	Factors contributing to road traffic accidents attributed to the drivers.
Professionalism of drivers	Acquisition of high level of skill or competence prior to driver license acquisition.
Vehicle Factor	Factors contributing to road traffic accidents attributed to the vehicle.
Road Factor	Factors contributing to road traffic accidents attributed to the road and the surroundings of the road.
Road Traffic Accidents	Refers to accidents which happened on roads used for public traffic leading to one or more people losing their lives or sustaining injuries for which one or more vehicles in motion are involved.

CHAPTER ONE

INTRODUCTION

1.1 Background

Road transportation is the commonest means of transportation. It, however, has its own challenges. Statistics from the World Health Organization , 2015 indicates that more that 1.2 million people lose their lives yearly on the roads, with over millions sustaining serious injuries and enduring long-term undesirable health consequences. Similarly, Centre for Disease Control, 2016 indicates that each day, an estimated 3,400 people are killed globally in road traffic accidents involving cars, buses, motorcycles, bicycles, trucks, or pedestrians. Road traffic injuries are estimated to be the eighth leading cause of death globally and the leading cause of death for young people aged 15–29. The report added that the current trend of road traffic accidents show that by 2030, road traffic injuries will become the seventh leading cause of death globally.

Data compiled by the Motor Traffic and Transport Department in Ghana revealed that in the year 2017, 12,843 cases of accidents occurred involving 20,444 vehicles out of which 2,076 people died and 12,166 sustained injuries(NRSC, 2017). In 2016, a total of 8,651 accidents were recorded involving 14,042 vehicles out of which 2,084 people died and 10,438 injured (NRSC, 2016). The records further indicate that in 2015 a total of 10,852 were the accidents recorded involving 16,958 vehicles out of which 1,634 people died and 9,186 injured(NRSC, 2015).

In the year 2017, Brong Ahafo Region recorded a total of 503 RTAs involving 513 vehicles with 190 deaths and 313 injuries and recorded 670 RTAs involving 709 vehicles, 287 deaths,

945 injuries in the year 2016(MTTD-BA, 2017 & 2016). In the year 2015, the Region recorded 645 RTAs involving 711 vehicles, 232 deaths and 868 injuries (MTTD-BA, 2015). The World Health Organization(2015) report on status of road safety provides measures to help reduce road accident and its associated deaths under two headings: legislation and road user behaviour and safer roads. With respect to regulation and behaviour of road users, WHO indicated that nations ought to toughen and implement road safety regulation especially on speed reduction, drink–driving, use of seat-belt, use of child restraint, drug–driving and distracted driving. On the other hand, WHO stipulated that countries need to ensure road designs are safe and the road systems meet the needs of all road users. The report further stated that Sustainable Development Goal (SDG) targets to halve road deaths by 2020, therefore much effort are required from countries to achieve this target.

Paramount among the efforts to half road traffic deaths by 2020 is continuous research into the causes of road accident as well as implementing findings of research works. Most previous works on road traffic accident focused mainly on establishing the association between drivers' behaviour on the road and road accidents. Diversely, this study sought to identify the association between road traffic accident and the driver factors, vehicle factors and the road factors. The study in effect sought to identify the factors contributing to road traffic accidents in the Kintampo North Municipality.

1.2 Problem Statement

Road traffic accident is a major public health challenge underestimated in Ghana. Much focus has been placed on pathological cause of death while silently road traffic accidents and non-communicable diseases reduce life expectancy. Data compiled by the Motor Traffic and Transport Department in Ghana revealed that in 2015 a total of 10,852 accidents were recorded involving 16,958 vehicles out of which 1,634(15.1%) people died and 9,186 injured.

In the year 2016, 8,651 accidents were recorded involving 14,042 vehicles out of which 2,084(24.1%) people died and 10,438 injured. In 2017, 12,843 accidents occurred involving 20,444 vehicles out of which 2,076(16.2%) people perished and 12,166 sustained injuries (NRSC, 2015- 2017).

Similarly, the Brong Ahafo Region recorded a total of 645 accidents involving 711 vehicles, 232(35.9%) deaths and 868 injured persons in 2015. In 2016, 670 accidents occurred involving 709 vehicles, 287(42.8%) deaths and 945 injured persons. 2017, 503 accidents were recorded involving 513 vehicles, 190(37.8%) deaths and 313 injured persons (MTTD-BAR, 2015-2017)

The Kintampo North Municipality also in the year 2015, recorded 98 accidents out of which 30(16.7%) people died and 150(83.3%) got injured. In 2016, 133 accidents were recorded with 36(16.8%) deaths and 178(83.2%) injured. In 2017, 79 accidents, 30(10.5%) deaths and 255(89.5%) persons injured. Commercial vehicles were more consecutively involved in RTAs compared to private vehicles. In 2015, 144(94.7%) commercial vehicles got involved in RTA as against 8(5.3%) private vehicles. In 2016, 63(78.8%) commercial vehicles were involved in RTA compared to 17(21.2%) private vehicles and in 2017, 164 (84.9%) commercial vehicles against 29(15.1%) private ones (MTTD-KPO, 2015- 2017).

The Municipal Assembly, the Health Directorate, MTTD and the DVLA in the Kintampo North Municipality acknowledging the havoc caused by road traffic accident continue to embark on road safety campaigns and law enforcement. The trend of road traffic accidents in the Municipality seem to have declined considering the 2017 RTA statistics against that of 2015 and 2016, however, the contributory factors to the RTAs need to be scientifically determined to develop effective and informed interventions to drastically reduce the trend of the RTAs in the Municipality.

It is against this background that this study was conducted to identify the factors contributing to the road traffic accidents in the Kintampo North Municipality.

1.3 Conceptual Framework

Road Traffic Accident is influenced by several contextual factors. The factors of interest in this study have been shown in the conceptual framework (Figure 1). The framework attempts to explain the influence of various factors contributing to road traffic accident among commercial drivers in Kintampo North Municipality. The proposed framework on factors influencing road traffic accident is categorized into: Driver related factors, Vehicle factors and Road factors.

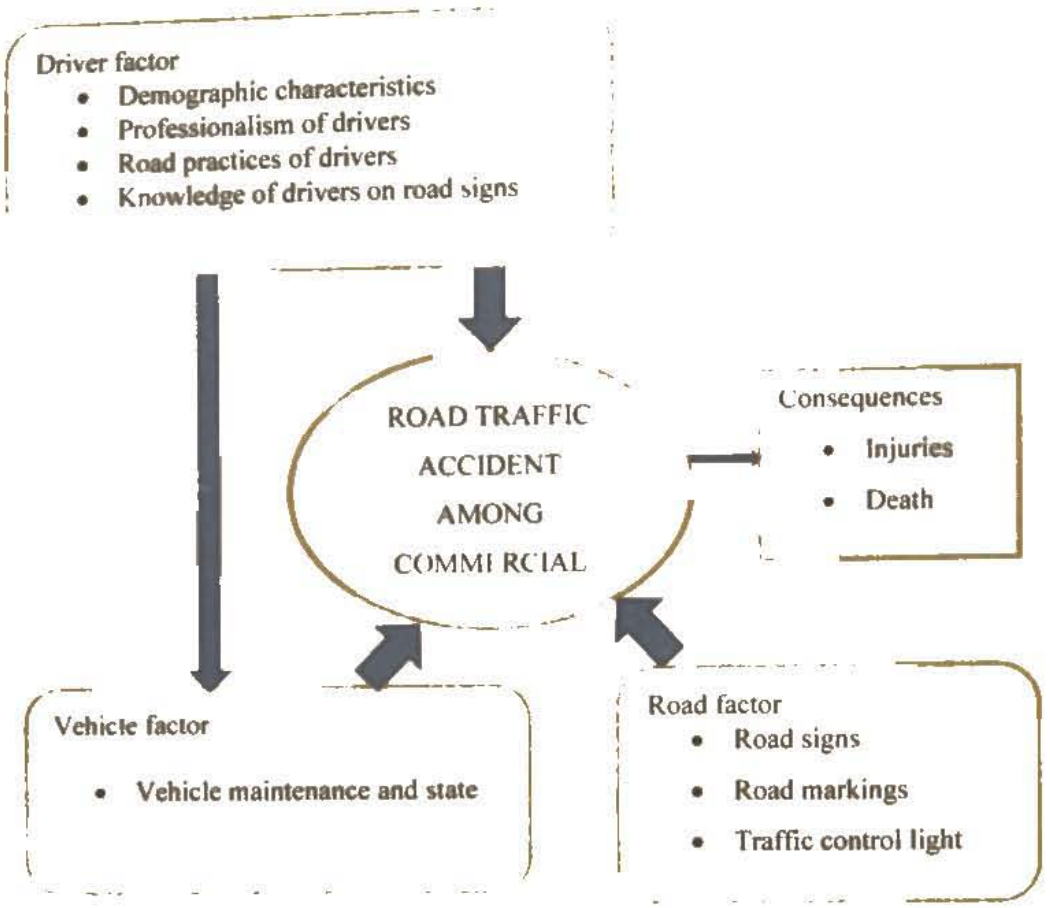


Figure 1. Conceptual frame work on factors influencing road traffic accident

Narration on the Conceptual Framework

There are several facets to the study of road traffic accident. This conceptual framework focus on the interrelationship between the driver factors, vehicle factors, road factors and the health consequences of road traffic accident.

Firstly, the driver who operates the vehicle contributes immensely to road traffic accident in a number of ways as indicated by the conceptual framework. Key driver factors assessed with respect to road traffic accidents are the demographic characteristics, professionalism of drivers, road practices of drivers and knowledge of the driver on road signs. Specific demographic characteristics of drivers considered were: Age, sex, educational level, driver's

union, vehicle type driven, years of driving experience. Professional backgrounds of drivers studied were: licensed, license class, license status, vehicle insured, insurance type, attended driving school, theory examination, underwent driving test, average daily driving hours, vehicle servicing period, believe of main cause of RTA, RTA are preventable and bribed at DVLA for driving licence. With regards to road practices of driver, the following were considered: ever drove while on medication, drink-driving, drives while tired, ever violated red traffic light signal, overtaking in curve, change lanes without signalling, ever stopped at no stopping area, ever bribed police officer, practice overloading etc. The knowledge level of drivers on the road signs was also considered.

Secondly, the framework links the vehicle factors to road traffic accident. The study therefore found out if the state of vehicle has a relationship with road traffic accident.

Thirdly, road factors linked to road traffic accident as portrayed by the conceptual framework were also factored into the study. Road factors considered for the study were availability of road signs on the roads, road markings, traffic control lights and road lighting.

Lastly, road traffic accident often leads to injuries and hospitalization of accident victims. As a result, RTA records of the drivers were ascertained with their corresponding injuries and whether the accident resulted in hospitalization.

1.4 Justification of the study

It is hoped that the findings of the study will be of much assistance to the MTTD, DVLA, Urban Roads Department of Kintampo North Municipality to determine key contributory factors to RTA in the Municipality in order to develop a more informed and effective educational programs to reduce the alarming trend of RTAs. The National Road Safety Commission may take cues from the findings of this study to improve policies on road safety.

Finally, the study aims at contributing to literature and will serve as a reference material for other researchers for further studies.

1.5 Objectives of the Study

1.5.1 Main Objective

To identify the factors contributing to road traffic accident among commercial vehicle drivers in Kintampo North Municipality.

1.5.2 Research Questions

1. Does the driver factor contribute to road traffic accident?
2. Does the vehicle factor have a link to road traffic accident?
3. Is there an association between the road factor and road traffic accident?

1.5.3 Specific Objectives

1. To assess the association between the driver factor and road traffic accident.
2. To determine whether there is a relationship between the vehicle factor and road traffic accident.
3. To evaluate the association between the road factor and road traffic accident.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides relevant information on the study area to enhance the understanding of the topic. As a result, literature in the following areas has been reviewed:

1. Definition of Road Traffic Accident
2. Review of accident trends
3. Factors contributing to road traffic accident
    - The driver factor
    - The vehicle factor
    - The road factor
4. Consequences of road traffic accident
5. Road traffic accident interventions
6. Road traffic accident data availability

2.2 Definition of Road Traffic Accident

The United Nations Economic Commission for Europe (2005), defined road traffic accident as accidents which happened on roads used for public traffic leading to one or more people losing their lives or sustaining injuries for which one or more vehicles in motion is involved. An accident may involve collision between vehicles and either another vehicle, pedestrians, animals and static objects. This definition does not include people who fell when getting unto vehicles and getting down from vehicles.

2.3 Review of Accident Trends

2.3.1 Global accident situation

Globally more than 1.2 million people die each year on the world's roads, making road traffic injuries a leading cause of death globally. Most of these deaths are in low- and middle-income countries where rapid economic growth has been accompanied by increased motorization and road traffic injuries (WHO, 2015). The greatest numbers of RTA deaths rate occur in the African Region. About 60% of road traffic fatality occurs among people aged between 15-44 years. Accidents for which deadly injuries are not involved are not well recorded. Next to HIV/AIDS and Tuberculosis, road traffic accident results in mortalities among people in the productive age worldwide (WHO, 2013).

The World Health Organization (2009) reported that in the coming 10-20 years, yearly individuals perishing due to road traffic accident is likely to go up from one million to three million. The World Health Organization forecasted that if stringent measures are not put in place road traffic accidents may rise up to 2 million by the year 2030.

The Centre for Disease Control,2016 observed that globally taxis, mopeds, cars, buses, trucks, animals, motorcycles, pedestrians and other type of travellers uses the road together. CDC added that socio-economic developments are aided by motor vehicles in lots of nations; however, annually RTAs involving vehicles cause deaths and injuries in millions of peoples. CDC, 2016 further indicated that road accidents associated injuries will emerge as the 7th leading resultant of fatalities worldwide by the year 2030. Injuries as a result of road accident have a big economic impact on developing countries and are projected to amount to $518 billion internationally and $65 billion in developing countries, which is more than the aggregate development aid sum received. Table 1 shows the projected rank of disease burden from 1990 to 2020 and placing road traffic crash (accident) in third position by 2020.

Table 1: Ranking of Projected Burden of Disease from 1990 to 2020

1990		2020
Lower Respiratory Infections	1	Ischaemic heart
Diarrhoea	2	Unipopular Major Depression
Perinatal	3	Road Traffic Crashes
Unipopular Major Depression	4	Cerebrovascular
Ischaemic heart	5	Pulmonary
Cerebrovascular	6	Lower Respiratory Infections
Tuberculosis	7	Tuberculosis
Measels	8	War
Road Traffic Crashes	9	Diarrhoea
Congenital Anornalies	10	HIV

Source: Bekefi (2006)

The mortality rate of as a result of injuries due to road accident in lots of African countries is as great as 24.1 deaths per 100,000 inhabitants. The rate at which individuals die as a result of RTA is disturbing and confusing. Aside mortalities and disabilities associated with road accident, other debilitation is the economic and social effect of RTA on a country (GBC, 2017). It was stated in the second African Road Safety Conference organized in 2011 that developing countries account for about 70 per cent of the world's road fatalities; and that, 28 and 32.2 per cent of deaths in Africa per 100,000 populations, hence the second leading cause of death in 5 to 44 age group of African is through road accidents. The foregoing assertion is truly reflected in the spate of accident in Ghana (NRSS, 2011).

2.3.2 National accident situation

The Ghana Broadcasting Co-operation (GBC), 2017 indicated that Ghana lost 145 million dollars, constituting 1.4% of the Gross Domestic Product (GDP) of the countries. The records indicate that the Greater Accra, Brong Ahafo, Eastern and Ashanti are the regions highly at risk of RTAs, constituting 64% of the 395 national road mortalities. GBC further indicated that six persons lose their lives daily and 2,000 people perish yearly as a result of road traffic

accident in Ghana with ages ranging between 18 and 45 years. Males constitute 75% of the deaths.

Ghana News Agency, 2011 stated in a survey conducted in 2001, the country was rated the second highest road traffic accidents prone among six West African countries. The statistics of the survey indicated that the fatality rate was 73 deaths per 10,000 accidents in the country. It added that the number of car involved in accidents increases every year.

According to Adu (2009), transportation by road makes the carriage of goods, people and services easy. The main facilitator for socio-economic growth is transport. This suggests that, transport by road quickens the development of areas including agriculture, industry, mining, trade and health. This increases the countries' per capita income. Urbanization and number of vehicles has increased in lots of developing countries. The increased number of vehicles has increased road accident due to the fact that the existing roads designed do not commensurate the present number of vehicles and the activities on the road (Mustakim, Yusof, Onn, Rahman, Samad & Salleh, 2008). Mustakim et al. indicated the unexpected urbanization has worsened road accident problem resulting in mismatch of the road system with other uses of the land for instance industries, housing just to mention but a few (Mustakim *et al.*, 2008).According to Mr Noble Appiah, the Acting chief executive of the NRSC; statistics available shows that about 96% of the country freight use road transport. The over dependence on road transport in the nation has resulted in the struggle as how to curb the high road accident rate leading to deaths and grief among families(GNA, 2011). According to Yankson et al (2010), the sharp increase in road accident related injuries causing mortalities and disabilities are due to rise in motorization in lower and middle income countries. It was added that 43% of road accident mortalities in Ghana were as a result of pedestrian accident as in other low and middle income nations.

2.3.3 Brong Ahafo accident situation

The Brong Ahafo Region recorded a total of 645 accidents involving 711 vehicles, 232(35.9%) deaths and 868 injured persons in 2015. In 2016, 670 accidents occurred involving 709 vehicles, 287(42.8%) deaths and 945 injured persons. In 2017, 503 accidents were recorded involving 513 vehicles, 190(37.8%) deaths and 313 injured persons (MTTD-BAR, 2015-2017).

2.3.4 Accident situation in Kintampo North Municipality

In the year 2015 the Kintampo North Municipality recorded 98 accidents out of which 30(16.7%) people died and 150(83.3%) got injured. In 2016, 133 accidents were recorded with 36(16.8%) deaths and 178(83.2%) injured. 2017, 79 accidents, 30(10.5%) deaths and 255(89.5%) people injured. Commercial vehicles were more consecutively involved in RTAs compared to private vehicles. In 2015, 144(94.7%) commercial vehicles got involved in RTA as against 8(5.3%) private vehicles. In 2016, 63(78.8%) commercial vehicles were involved in RTA compared to 17(21.2%) private vehicles and in 2017, 164 (84.9%) commercial vehicles against 29(15.1%) private ones (MTTD-KPO, 2015- 2017).

A typical example of an accident involving commercial vehicles is the tragic one that occurred on the February 17, 2016 in the Kintampo North Municipality involving Metro Mass bus and a truck. Joyonline 2016 indicated that fifty-three people died and twenty-three people sustained severe injuries. Among the deceased was a 3-year old child.

2.4 Road Traffic Accident Factors

2.4.1 The driver factor

Risk factors for involvement in a traffic accident are often classified into three large groups: 'driver dependent (or pedestrian dependent for accidents between a vehicle and a pedestrian),

vehicle related, and environment dependent'. Most authors attribute most accidents to driver dependent factors, which are thought to account for 60% to 90% of all traffic accidents (Oginni, 2008). A survey conducted by Transport Research Laboratory (TRL) consistently reveal that more than 95% road accidents in the USA among motor vehicle or road accidents in European countries are as a result of driver behaviour to some degree in addition to one of other predisposing factors. Vehicle operators at all times endeavour to fault the equipment failure, road conditions, or other vehicle operators for road accidents. However, critical assessment of the cause of the accident indicates the behaviour of drivers primarily is the cause of the accidents. Speeding by drivers causes majority of the road accidents on the roads (WHO, 2009). Findings from the Naturalistic Driving Studies show that accident causation has dramatically with driver-related factors (i.e., error, impairment, fatigue, and distraction) present in almost 90% of accidents. The results also definitively show that distraction is detrimental to driver safety, with handheld electronic devices having high use rates and risk. Factors such as vehicle failures, roadway design or condition, or environment composed lower accident percentages (Dingus et al, 2016). Mariana (2010) noted that in Tanzania careless driving has been found to be the major factor (55%) leading to road accidents. Considering reckless driving commonly tagged as going against road safety regulations because of risk behaviours indulgence, it is obvious that the human factor alongside others factors lead to road accidents.

Some contributory factors to the enormous road accidents in Ghana have been identified. Ghana Broadcasting Co-operation, 2017 indicated that refusal to abide by the regulations on the road undoubtedly is the major cause of road accidents. This assertion is backed by drivers receiving calls whilst driving, parking at unauthorised places, drunk driving, fatigue driving , over-loading, speeding, non-adherence to traffic regulations and rules and poor repairs of

vehicles. GBC added that it is a common knowledge that greater than 90% of road accidents are as a result of errors by humans.

National Road Safety Commission (NRSC), 2009 also mentioned that human error aspect contributes about 70% of road casualties in Ghana. The most common classification of error recorded by the Ghana Police resulting in deaths for the period between 2007 and 2009 were avoidable driver behaviours as seen in Table 2.

Table 2: Persons killed through road accidents as a result of driver errors in Ghana

Driver Errors	2007	2008	2009	Total
None	327	294	316	937
Inexperience	22	15	14	51
Inattentive	442	363	642	1,447
Too fast	444	634	654	1,732
Too close	40	29	14	83
No signal	6	6	4	16
Improper overtaking	40	60	48	148
Fatigue/Sleeplessness	24	3	37	64
Other/Loss of control	649	501	466	1,120

Source: (NRSC, 2009)

Literature available suggests that majority of road accidents are as a result of errors committed humans together with the environmental factors, road design and other road infrastructure problems for instance, poor lightening system. Permanent International Association of Road Congress (PIARC), 2003 indicated that the major contribution of the road system to road accidents is the road use by humans constituting approximately 93%. PIARC portrayed that a relationship of 26% exist between the both behaviour of drivers and road factor and 6% relationship exist between the behaviour of drivers and the vehicle factors

while a link of 4% exit between the three(behaviour of the driver, the vehicle factors and the road factors) with respect to road traffic accidents. Individually, the behaviour of drivers (57%) is highly noteworthy. The users of the road are grouped into pedestrians, motorist, passengers and cyclist. As indicated in the Figure 2 the road factor alone is 3% whereas 13% is only vehicle related factor related to road accidents.

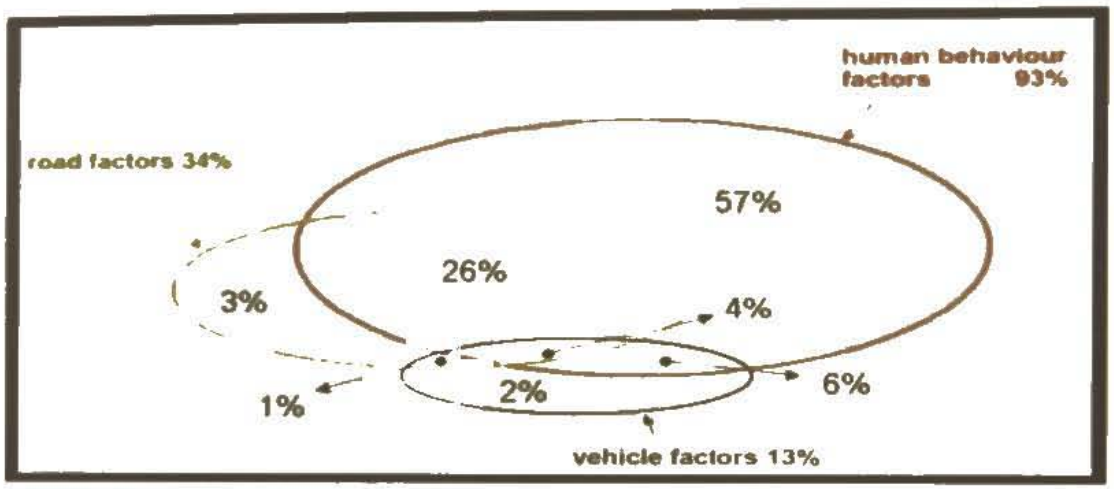


Figure 2: Contributory Factors to Road Traffic Accident.

Source: PIARC (2003)

Speeding is one of the major human behaviour factors to RTA. Local governments and engineers of road have stated the extreme permissible speeds required for travelling safely on the road nationwide. The vehicle drivers are well aware of the consequences of speeding but overlook them. Seventy per cent of drivers confirmed that they habitually speed beyond the speed limits (World Bank, 2009). CitifmOnlined, 2017 indicated that the National Road Safety Commission (NRSC) has said it is seeking to reduce the number of road accident deaths by more than one thousand in 2017. CitifmOnline noted stated that NRSC has identified over-speeding as a major cause of accidents in the country, being responsible for over 60% of them. National Road Safety Commission, 2009 observed that minor distractions

such as searching for something on the seat, talking without keeping eyes on the road, the radio on in the vehicle, trying to fasten seat belt while driving, trying to adjust the position while driving may be major cause of accidents.

2.4.2 Vehicle factor

The increasing numbers of motor vehicles is a major contributing factor in the risin fatalities and injuries from road traffic accidents in poor countries (McGrowder, 20 National Road Safety Commission (NRSC), 2009 indicated from a study that sig proportion of the commercial vehicles in the country is old. NRSC further pointed out

the road, due to faults of which, accidents may occur. At the end come traffic factors. This mainly includes the speed, density, traffic flow parameters that may lead to accidents.

2.5 Consequences of RTAs

According to the World Health Organization, 2009 injuries related to road accidents cost developing nations between 1% and 2% of their gross domestic product (GDP). Almost 1.6% of Ghana's gross domestic product goes waste due to road accidents (Agyemang et al., 2009). Road traffic injuries are a development issue: low- and middle income countries lose approximately 3% of GDP as a result of road traffic accidents (WHO, 2015).

Literature available shows that the greatest percentage of road accident is among pedestrians, next after that is motor cyclists due to direct accident with other users of the road. The cyclists as well do not protect themselves to survive the mass and speed of other users of the road (Nakitto et al., 2008). In a study conducted by Sherafati, etal., 2017, a total of 1,520 people with road traffic accidents were admitted.

2.6 Interventions

A greater number of road accidents are both anticipated and avoidable. World Health Organization, 2015 observed that behaviour modification of road users is a very important element of the holistic "Safe Systems" strategy. To change the behaviour of road users, adoption and implementation of respectable laws on the main predisposing factors association with traffic injuries such as seat-belts, drink–driving, failure to use helmets, speed and child restraints are highly essential to consider.

Ericson, 2008 noted that despite the fact that the impact of RTA injury on casualties and their relatives are worrisome, relief exists knowing that ways to decrease rates of road accident injuries have been identified. Ericson mentioned that the difficulty is to deploy policies and

technology to ensure that tried and tested road safety programmes in the developed nations can be executed in the road safety programmes of under developed countries.

According to World Health Organization (2013) new road safety laws such as reducing urban speed protect pedestrians and cyclists. WHO added that speed limits need stronger enforcement, reducing drinking and driving is also very crucial. Moreover, drink-drive laws need stronger enforcement. Report from the Centre for Disease Control, 2016 indicated the essence to involve civil society groups, community-based organizations and foundations to decrease the effect of injuries in communities and nations.

According to Adoms et al., 2009 researchers on road accident at times make reference to the five Es strategy: Enforcement, Education, Evaluation, Engineering and Encouragement in an effort to decrease RTA.

2.6.1 Education and enforcement

According to Al-Matawah ,2008 enforcement system should be comprehensive because of the variety of violations. Also, enforcement strategies should be designed to target a high-risk behaviour and observed accident locations.

2.6.2 Engineering, encouragement and environment

According to the National Road Safety Commission, 2011, governments, educationists, civil societies, agencies and engineers ought to execute their roles while users of the road also take up utmost obligation to adhere to rules and regulation.

2.7 Data Availability

Grimm and Treibich (2010) indicated that dependable and orderly data on road accident injuries and mortalities is rarely available in developing nations. According to Mariana (2010) no apparent relationship exists between hospital and police records. Also, greater part of the data is manually stored and just few of them are entered into computer systems. In addition, the accuracy of the data available is doubtful due to gaps in the data. Ericson, 2008 indicated that report on rate of road traffic victims underrate the magnitude of the road safety issues in lots of nations especially in low and middle income nations. This was attributed at a larger extent to loose process of reporting in the developing nations. Burgut etal., 2010 also stated that road accidents are foreseeable and avoidable, however, quality data is essential to comprehend the means through which road safety measures can be made workable.

In conclusion, lots of findings have been identified on the causes of road traffic accident regarding driver factors, vehicle factors and road factors from the reviewed literatures. However, the association between beliefs of drivers, regulatory bodies (like DVLA, GPRTU and PROTOA) and knowledge of drivers on the road signs and road traffic accident have not been clearly established in most research findings. Also no research work was identified regarding factors contributing to road traffic accident in the Kintampo North Municipality. Related cause of road traffic accidents in different jurisdictions have been established, those findings might not be applicable to address the knowledge on specific causes of road traffic accident in Kintampo North Municipality. Mariana, 2010 stated that no relationship exist between records of the hospital and that of the police. According to Mariana data for just limited number of years are stored on computers, the rest are manually stored. Asumadu, 2012 indicated that the availability of road accident data in Ghana is usually difficult to come by and even if it is obtained, the information on it is normally scanty. Also Chen, 2010 in a

study on road traffic safety in African countries declared that the paucity of surveillance data embedded with under-reporting and underestimation of the issue of traffic safety as a health, social and economic problem is a road safety fundamental problem. Case study (qualitative), also employed by Osei, 2011 on contributory factors to road accidents on Kumasi-Dunkwa trunk road posed challenges in determining quantitatively the cause of RTA such as the association between the dependent and independent variables using chi- square and logistic regression analysis.

Quantitative cross sectional study has therefore proven to be effective in determining the factors associated with RTA; looking at the informative findings from researchers such as (Adejugbagbe, Fatiregun, Rukewe, & Alonge, 2015), (Boateng, 2014), (Burgut et al., 2010), (Ngoc, Lee, Meuleners, & Duong, 2013) among others. As a result, cross sectional study design was employed for this study.

The knowledge gaps identified from the reviewed literatures discussed and suggestion from Chen, 2010 that continued efforts to improve traffic safety with better research design should be encouraged have immensely informed this study to unravel interesting findings to help curb road traffic accident menace in the Kintampo North Municipality.

CHAPTER THREE

METHODS

3.1 Study Design

The cross-sectional study design was used to assess the factors contributing to road traffic accidents.

3.2 Study Area

3.2.1 Municipal Profile

The Kintampo Municipal was created in 1988 under LI 1480. The Kintampo South District was created in 2004 from the Kintampo Municipality. The Kintampo North Municipal happens to be one of the 27 municipal/districts found in the Brong Ahafo Region (MHD-Kpo, 2018)

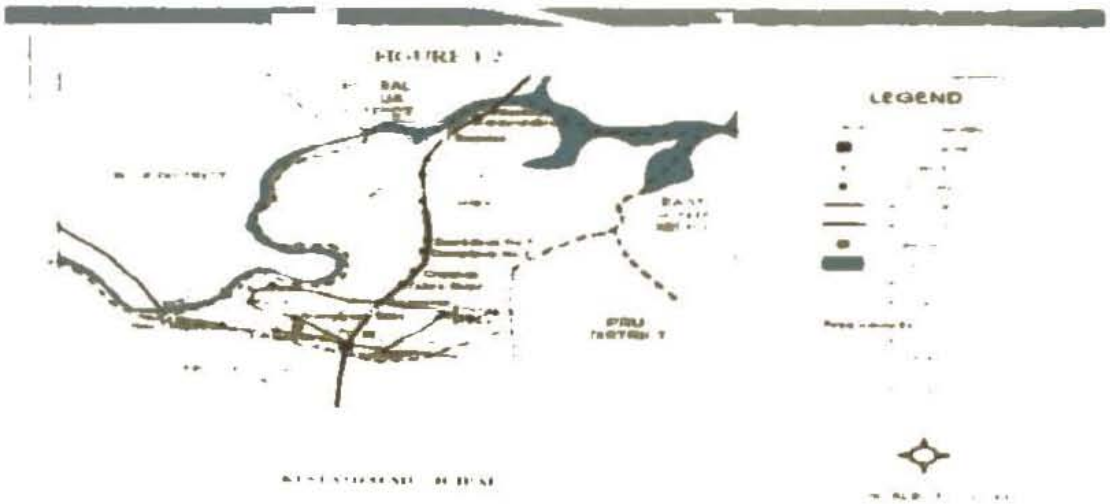


Figure 3: Municipal map

(MHD-Kpo, 2018)

The Kintampo North Municipality is found between latitudes 8°45'N and 7°45'N and Longitudes 1°20'W and 2°1'E. It is bordered by Bole District to the West; Central Gonja

District to the North; East Gonja District to the North-East. The land coverage of the municipality is approximately 5,108km². Strategically the municipality is situated at the middle of Ghana. It is transit point between the southern and northern sectors of Ghana.

3.2.2 Geology

Approximately 80% of the land surface of the Municipality are largely sedimentary and aligned horizontally.

3.2.3 Relief and Drainage

The Municipality is blessed with many water resources. The main water bodies comprise the Nyamba, Fra and Urukwain the rivers. Others rivers include Pumpum, Oyoko, Nante, and Tanfi. The rivers flow via slope which has given rise to the Kintampo the Fuller Falls and Water Falls.

3.2.4 Climate

The type of climate present in the municipality is the Tropical Continental or interior Savannah.

3.2.5 Vegetation

The municipality is surrounded by the interior tree savannah heavily wooded. Many of the trees are short and not big as compared to what found in other forest.

3.2.6 Population Size and Growth Rates

The estimated population of the Municipality is 114,481 in the year 2018. The rate of growth is 2.3% (MHD, 2018).

3.2.7 Occupational Distribution

The major occupations in the municipality include the following: Agriculture, commerce, industry and public service.

3.2.8 Settlement

Close to 73.1% of the population of the Municipality reside in the rural areas. Twenty nine percent (29%) reside in the urban centre only, Kintampo. Also most the houses are mud houses. In the rural part of the Municipality extension services accessibility is poor.

There are abundant vast of lands, human resources in addition to other physical for growth and development.

3.2.9 Ethnicity and Religion

There is a mixture of ethnicity in the Municipality. With respect to religion 62% of the population are Christians followed by Muslim (29.6%). The remaining 8.2% of the inhabitants belong to the Traditional religion.

3.2.10 Festivals

The Mos celebrate Bush burning and Yam festival. Munufie festival by the Nkoranzas, Damba festival of the Dagombas/Mamprushies, Nkyefie festival of the Bonos, and Gonjas, and Krubi festival by the Wangara settlers in Kintampo. During festive season influx of people and vehicles are experienced in the Municipality. This makes the roads crowded and busy increasing chances of RTAs.

3.2.11 Health Insurance Scheme in Kintampo Municipality

The Kintampo Municipal Health Insurance Scheme (KMHIS) is one of the well-established District-wide considering the Brong Ahafo Region. The Scheme came to force in 2004 in response to the Government's effort to make healthcare services affordable and accessible to all residents of Ghana. Table 3 indicates the Health Insurance Accredited Health facilities in the Municipality.

Table 3: Health Insurance Accredited Health Facilities

GOVERNMENT	PRIVATE
Kintampo Municipal Hospital	Annor Asare Memorial Clinic
Dawadawa Health Centre	Yezura Hospital
New Longoro Health Centre	Sunkwa Clinic
Kunsu Health Centre	Glory Prince of Peace Maternity Home
Busuama Rural Clinic	
Kintampo CHPS	
Gulumpe CHPS	
Kadelso CHPS	
Asantekwa CHPS	
Baniantwe CHPS	
Portor CHPS	
Dwere/Gomboi CHPS	
Kurawura CHPS	
Babator CHPS	
Miawani CHPS	
Kobeda CHPS	
Kawumpe CHPS	
Manchalla CHPS	
Ntraban CHPS	

3.2.12 Transportation

Commercial vehicles operating with transport unions in the Municipality as of August, 2017 were 477, out of which 261 were taxis and 216 were vans. These vehicles operate at five different stations namely: Kumasi/Tamale, Apesika, Bomboi and Suamere station. The Municipality has one Central Police Station to maintain law and order and one Municipal Hospital to promote, maintain and restore health. The main stations of vehicles are found at

the Babatorkuma and Kintampo markets. Notwithstanding, a number of the drivers continue to park along the road for passengers to Kumasi, Tamale, Sunyani, Techiman including areas of Ghana. It is mostly tough to find means of transport to the surroundings remote communities due to unfriendly surface nature of the feeder roads.

3.2.13 Road Network

The main road network passing through the Municipality is the Techiman-Tamale road which is tarred. Roads such as Kintampo-Nkoranza road and Kintampo-Newlongoro road linking up to the Municipality are not tarred but are presently under construction. The remaining roads linking up to the Municipality are not tarred. About 80% of the roads in the Municipal capital (Kintampo) are also not tarred. In the rainy season most of the villages are inaccessible except with a four-wheel drive. At the same time, the scattered nature of the population means that a lot of effort is needed to reach a few people. The commonest form of transportation in the Municipality is the motorcycle.

3.3 Variables of the Study

3.3.1 Dependent Variable

The dependent variable for the study was road traffic accident

3.3.2 Independent Variables

The independent variables of interest were the driver factors, vehicle factors and the road factors.

3.4 Study Population

The study population was DVLA licensed passenger commercial vehicle drivers in the Municipality.

3.4.1 Inclusion Criteria

1. Eligible drivers for the study were drivers who operated passenger vehicles for commercial purpose only in the Kintampo North Municipality.
2. The drivers at the time of the study were those who had a vehicle driving and consented to be part of the study.

3.4.2 Exclusion Criteria

Ineligible drivers were drivers who operated private vehicles, goods carrying vehicles or operated passenger vehicles but not for commercial purpose. Example: Cargo car drivers, private car drivers, institutional drivers who do not charge passengers for conveying them.

3.5 Sample Size Determination

Prevalence rate of 15.9% road traffic accident based on the findings of Adejugbagbe, Fatiregun, Rukewe & Alonge (2015) was used as a guide to calculate the sample size for the commercial drivers. The Cochran's formula: $n=z^2\ p\ (1-p)/e^2$ was used for the estimation of the sample size.

n=sample size

Z= Z statistic for a confidence level of 95%

P= prevalence of road traffic accident

e=precision of 5%

In effect, a total sample size of 227 was used for the study assuming 10% non-response rate.

3.6 Sampling Method

Stratified random sampling technique was used to for the study. The five main commercial vehicle stations (Kumasi, Tamale, Apesika, Bomboi and Suamere station) formed the strata. At each station the total number of drivers was identified from the station chairman. The total number of drivers at each station was used to determine the proportion of drivers interviewed from the total sample size of the study. Simple random sampling technique was used to select some of the drivers from each of the stations for the study. This was done by writing the vehicle numbers of the drivers on pieces of papers. The papers were folded and put into an opaque container. The container was vigorously shaken to ensure that the papers mixed thoroughly. The pieces of papers bearing a vehicle number were picked one after the other until the proportion allotted to the station was reached. The drivers whose vehicle numbers were found on the pieces of papers picked were interviewed.

3.7 Data Collection Method and Tool

Face-to-face interview technique was used to collect data from the drivers on their demographic characteristics, the driver factors (professionalism, road practices and knowledge on road signs), the vehicle factor and the road factor associated with RTA. Structured interview guide made up of open-ended and close-ended question was used as the tool for the data collection. The data was captured with the help of Laptops with Epi info installed containing the structured interview guide.

3.8 Data Management and Analysis

The data captured with the Epi info was exported in Microsoft Excel and imported into Stata version15 which was used for the data management and analysis. The analysed data was presented using tables and figures. The descriptive analysis was done using frequencies and

percentages. The Pearson's chi-square test and the Fishers exact test were employed in assessing the various factors that are associated with road traffic accident. The Fishers exact test was used in place of the Pearson's chi-square test in testing for association between involvement of RTA and the independent characteristics or variables where the Pearson's chi square test assumptions of at most 20% of the expected count in the cells is less than 5 is violated.

In quantifying the factors that influence road traffic accidents, simple binary logistic regression was employed. The simple logistic regression model was used to determine the unadjusted odds of the factors that influence road traffic accident whereas the multiple logistic regression model was used to quantify the factors that influence road traffic accident.

3.9 Quality Control

To achieve quality data collection and accuracy, research assistants were trained on the rational for the data collection, the need to abstain from influencing respondents' response and the need to ensure consistency. Effective supervision was carried out to enhance the implementation of the methodology. The research assistants were involved in the pre-test of the questionnaire and sampling method. They were observed in their initial administration of the questionnaire to the respondents during the actual data collection. Also, daily debriefing was done by the research assistants after each day's work. Finally, the data was reviewed daily throughout the period of the data collection.

3.10 Ethical Consideration

Ethical approval was obtained from the Ethics Review Committee (ERC) of Ghana Health Service. The ERC approval number is GHS-ERC: 058/12/17. Consent was sought from the

drivers' union and the vehicle operators, MTTD and Kintampo Municipal Hospital before the study was conducted.

Assurance of privacy was given to the participants before inclusion in the research. The participants were made aware of the benefits, procedures, purpose and risks of taking part in the study. The researcher assistants read the form for consent and clarified it to the respondents. Drivers who accepted to partake in the study were made to thumbprint or sign the form for consent indicating their readiness to partake in the study. The information collected from the participants was stored privately and used accordingly. No name of the participant was used for the storage of the information. The file was secured and it was only the researcher that could have access to the information. Each name was assigned an ID code and kept confidential. The results of the study will be disseminated in such a way that no information will be linked to identity of a particular participant.

Data collected based on the questionnaire would be under key and lock for five years after the end of the study. These will be only accessible by the principal investigator. All records will be destroyed afterwards in an environmentally friendly manner in the presence of a witnesses and photographic evidence

No risk was identified related to involvement of the participants in the study. The participants were, however, informed of possible minor trivial inconvenience providing answers to some questions. Notwithstanding, they had the option to refuse to respond to the question if they so wished. They were further notified that involvement was not compulsory and no sanction will be applied if they decide to opt out from the study. None of the respondent was forced into being part the research and there was no compensation as well for participation. Participants were asked questions about themselves, and their knowledge regarding the factors contributing to road traffic accident. Participants were informed that their participation in the study will enable them to learn more about road traffic accident and the reasons why driver

get involved in accidents. The researcher had no conflict of interest in the study and all the cost involved in the study was borne by the researcher.

CHAPTER FOUR

RESULTS

4.1 Characteristics of study participants

A total of 227 drivers participated in the study with all of them being males. A very few of the drivers (n=9, 3.96%) were below 18 years of age. The drivers within the age group18 to 27 constituted 11.45%. About 3 out of 10 of the drivers who participated in the study were within the age group 28 to 37 years inclusive while only 8.4% (n=19) of them were older than 57 years of age. About 4 out of ten of them had JHS or middle school as their highest level of education while 16.3% (n=37) of them had no level of education with only 4.9% (n=11) had tertiary education as their highest level of education. Majority (n=135, 59.5%) of the drivers who participated in the study were with GPRTU transport union with the remaining being members of the PROTOA drivers' union. About half (n=113, 49.8%) of the drivers operated taxi, 46.3% (n=105) operated vans while the remaining 4% (n=9) operated buses. About 3 out of every 10 of the drivers interviewed had 6 to 10 years of driving experience. Table 4 contains detail descriptive of the study participants.

Table 4: Demographic characteristics of study participants

Characteristics	Frequency (N= 227)	Percentage
Age of driver		
<18 years	9	3.96
18-27 years	26	11.45
28-37 years	68	29.96
38-47 years	56	24.67
48-57 years	49	21.59
>57 years	19	8.37
Highest educational level		
None	37	16.3
Primary	49	21.59
JHS/Middle School	87	38.33
Secondary	43	18.94
Tertiary	11	4.85
Driver Union		
GPRTU	135	59.47
PROTOA	92	40.53
Vehicle type		
Van	105	46.26
Taxi	113	49.78
Bus	9	3.96
Years of driving experience		
<5 years	44	19.38
6-10 years	65	28.63
11-15 years	44	19.38
16-20 years	40	17.62
>20 years	34	14.98

4.2 Road Traffic Accidents among study participants

Among the 227 drivers interviewed, 126 (55.5%) of them reported to have ever been involved in at least one road traffic accident. A 95% confidence interval for the 55.5% percentage of road traffic accidents reported among the study participants was estimated to be between 48.8% and 62.1%.

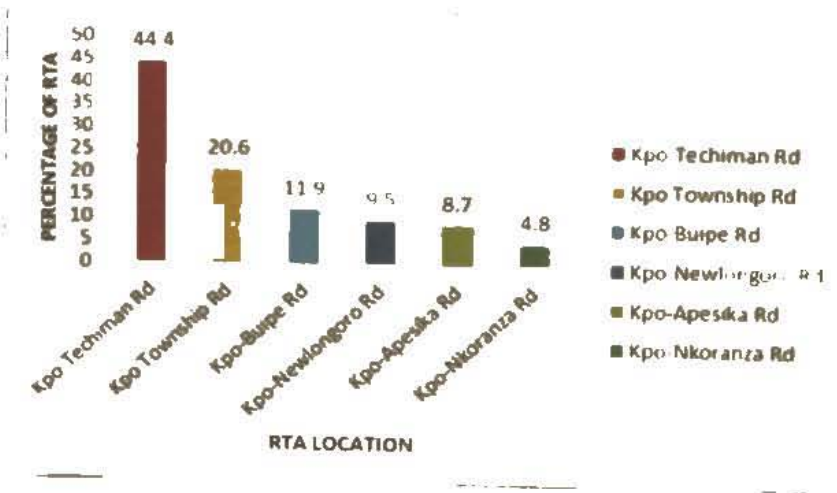
Among the 126 drivers reported to have been involved in road traffic accident before, 70.6% (n=89) of them reported to have been involved only once in road traffic accident, 27.8% of

them reported to have sustained injury in the road traffic accident while 21.4% of them reported to have been hospitalized as a result of the road traffic accident. Table 5 reports on characteristics of road traffic accidents among the study participants.

Table 5: Characteristics of Road Traffic Accident among study participants

Characteristics	Frequency	Percentage
Number of times involved in RTA (N=126)		
Once	89	70.63
Twice	27	21.43
More than twice	10	7.94
Sustained injury in RTA (N=126)		
No	91	72.22
Yes	35	27.78
Hospitalized in RTA (N=126)		
No	99	78.57
Yes	27	21.43

Most (44.4%) of the drivers who indicated have ever been involved in RTA mentioned that the accident occurred on the Kintampo-Techiman road. The Kintampo-Nkoranza road recorded the least (4.8%) accidents. Figure 4 provides the details on the location of the road traffic accidents.



Key: %: percentage, RTA: Road Traffic Accident, Kpo: Kintampo, Rd: Road

Figure 4: Location of Road Traffic Accident

4.3 Factors Associated with Road Traffic Accident (RTA)

4.3.1 Association between Demographic characteristics and RTA

The only demographic characteristics that showed statistical significant association with drivers' involvement in road traffic accident was the type of vehicle driven by the drivers. Majority (n = 67, 53.2%) of those who reported to have ever been involved in road traffic accident operated with taxi, 40.5% (n=51) of them operated with van while 6.4% (n=8) of them operated with buses (χ^2 = 6.76, p-value = 0.034). Table 6 contains the detailed association between the demographic characteristics and RTA involvement.

Table 6: Association between demographic characteristics and RTA

Characteristics	Total	Involved in RTA		χ^2	P-value
		No (%)	Yes (%)		
Age of driver				4.13	0.531
<18 years	9 (3.96)	2 (1.98)	7 (5.56)		
18-27 years	26 (11.45)	13 (12.87)	13 (10.32)		
28-37 years	68 (29.96)	33 (32.67)	35 (27.78)		
38-47 years	56 (24.67)	21 (20.79)	35 (27.78)		
48-57 years	49 (21.59)	24 (23.76)	25 (19.84)		
>57 years	19 (8.37)	8 (7.92)	11 (8.73)		
Highest educational level				6.73	0.151
None	37 (16.3)	21 (20.79)	16 (12.7)		
Primary	49 (21.59)	22 (21.78)	27 (21.43)		
JHS/Middle School	87 (38.33)	31 (30.69)	56 (44.44)		
Secondary	43 (18.94)	23 (22.77)	20 (15.87)		
Tertiary	11 (4.85)	4 (3.96)	7 (5.56)		
Driver union				0.06	0.799
GPRTU	135 (59.47)	61 (60.4)	74 (58.73)		
PROTOA	92 (40.53)	40 (39.6)	52 (41.27)		
Vehicle type				6.76	0.034*
Van	105 (46.26)	54 (53.47)	51 (40.48)		
Taxi	113 (49.78)	46 (45.54)	67 (53.17)		
Bus	9 (3.96)	1 (0.99)	8 (6.35)		
Years of driving experience				3.28	0.509
<=5 years	44 (19.38)	18 (17.82)	26 (20.63)		
6-10 years	65 (28.63)	33 (32.67)	32 (25.4)		
11-15 years	44 (19.38)	22 (21.78)	22 (17.46)		
16-20 years	40 (17.62)	16 (15.84)	24 (19.05)		
>20 years	34 (14.98)	12 (11.88)	22 (17.46)		

χ^2: Pearson's chi-square value. %: column percentage. *: p-value <0.05. RTA: road traffic accident. GPRTU: Ghana Private Road Transport Union. PROTOA: Progressive Transport Owners Association.

4.3.2 Association between the Driver factors and RTA

Association between Professionalism of drivers and RTA

In terms of professionalism of the drivers who participated in the study, the factors that showed statistical significant association with drivers' involvement in road traffic accident was bribe at DVLA for driving licence. Majority (62.7%, n=79) of those drivers reported to have been involved in at least one road traffic accident reported to have bribed their way through at DVLA before being licensed (χ^2 = 10.4, p-value <0.001). Table 7 reports more on the association between drivers' professionalism and involvement in road traffic accident.

Table 7: Association between drivers' professionalism and RTA

Characteristics	Total	Involved in RTA		χ^2	P-value
		No (%)	Yes (%)		
Have licensed				0.04	0.84
No	12 (5.29)	5 (4.95)	7 (5.56)		
Yes	215 (94.71)	96 (95.05)	119 (94.44)		
License Class (n = 215)				1.88	0.599
B	54 (25.12)	21 (21.88)	33 (27.73)		
C	117 (54.42)	57 (59.38)	60 (50.42)		
D	28 (13.02)	12 (12.5)	16 (13.45)		
F	16 (7.44)	6 (6.25)	10 (8.4)		
License status (n=215)				Ψ	0.734
Active	207 (96.28)	93 (96.88)	114 (95.8)		
Expired	8 (3.72)	3 (3.13)	5 (4.2)		
Vehicle insured				0.47	0.495
No	14 (6.17)	5 (4.95)	9 (7.14)		
Yes	213 (93.83)	96 (95.05)	117 (92.86)		
Insurance type				2.71	0.1
Comprehensive	13 (6.1)	3 (3.13)	10 (8.55)		
Third party	200 (93.9)	93 (96.88)	107 (91.45)		
Attended driving school				0.01	0.918
No	204 (89.87)	91 (90.1)	113 (89.68)		
Yes	23 (10.13)	10 (9.9)	13 (10.32)		
Wrote driving Exams				0.24	0.624
No	112 (49.34)	48 (47.52)	64 (50.79)		
Yes	115 (50.66)	53 (52.48)	62 (49.21)		
Underwent driving test				0	0.958
No	25 (11.01)	11 (10.89)	14 (11.11)		
Yes	202 (88.99)	90 (89.11)	112 (88.89)		
Average daily driving hours				Ψ	0.12

<5 hours	57 (25.11)	33 (32 67)	24 (19.05)		
5-8 hours	133 (58.59)	54 (53 47)	79 (62.7)		
9-12 hours	30 (13.22)	12 (11.88)	18 (14.29)		
> 12 hours	7 (3.08)	2 (1.98)	5 (3.97)		
Vehicle servicing period				4.51	0.105
≤ 1 months	119 (52.42)	51 (50.5)	68 (53.97)		
>1 months	17 (7.49)	4 (3.96)	13 (10.32)		
When needed	91 (40.09)	46 (45.54)	45 (35.71)		
Believe of main cause of RTA				Ψ	0.582
Drivers attitude	176 (77.53)	82 (81.19)	94 (74.6)		
Car condition	11 (4.85)	4 (3.96)	7 (5.56)		
Road condition	35 (15.42)	14 (13.86)	21 (16.67)		
Others	5 (2.2)	1 (0.99)	4 (3.17)		
RTA are preventable				0.61	0.433
No	69 (30.4)	28 (27.72)	41 (32.54)		
Yes	158 (69.6)	73 (72.28)	85 (67.46)		
Bribed at DVLA for driving license				10.41	0.001**
No	162 (71.37)	83 (82 18)	79 (62.7)		
Yes	65 (28.63)	18 (17 82)	47 (37.3)		

χ^2: Pearson's chi-square value Ψ: Fishers' exact test %: column percentage.**:p-value<0.01. RTA: road traffic accident.

Association between Road practices of Drivers and RTA

In terms of road practices of drivers, drink-driving, violation of red traffic light signal, changing of lanes without signalling, bribing of police officers, overloading practices and driving beyond the maximum speed limits were the factors that had significant association with involvement in road traffic accident.

Out of the 55.5% (n=126) drivers who have been involved in road traffic accident, 24% (n=31) reported to have ever taken alcohol and driven before (χ^2 = 5.9, p-value = 0.015). Similarly, 24.6(n=31) of the drivers reported to have ever violated the red traffic light (χ^2 = 14.3, p-value <0.001). In addition, a high majority of 69.1% (n=87) of the driver reported to have ever bribed a police officer before. Table 8 reports more on the association between road practices and involvement in road traffic accident.

Table 8: Association between road practices and RTA

Characteristics	Total	Involved in RTA		χ^2	P-value
		No (%)	Yes (%)		
Ever drove while on medication				2.21	0.137
No	157 (69.16)	75 (74.26)	82 (65.08)		
Yes	70 (30.84)	26 (25.74)	44 (34.92)		
Ever drink and drive				5.91	0.015*
No	184 (81.06)	89 (88.12)	95 (75.4)		
Yes	43 (18.94)	12 (11.88)	31 (24.6)		
Drives while tired				0.18	0.673
No	34 (14.98)	14 (13.86)	20 (15.87)		
Yes	193 (85.02)	87 (86.14)	106 (84.13)		
Ever violated road traffic				14.31	<0.001***
No	190 (83.7)	95 (94.06)	95 (75.4)		
Yes	37 (16.3)	6 (5.94)	31 (24.6)		
Does curve overtaking				3.55	0.06
No	183 (80.62)	87 (86.14)	96 (76.19)		
Yes	44 (19.38)	14 (13.86)	30 (23.81)		
Change lanes without signalling				9.62	0.002**
No	176 (77.53)	88 (87.13)	88 (69.84)		
Yes	51 (22.47)	13 (12.87)	38 (30.16)		
Ever stopped at no stop area				3.37	0.067
No	191 (84.14)	90 (89.11)	101 (80.16)		
Yes	36 (15.86)	11 (10.89)	25 (19.84)		
Ever bribed police officer				6.51	0.011*
No	87 (38.33)	48 (47.52)	39 (30.95)		
Yes	140 (61.67)	53 (52.48)	87 (69.05)		
Practice overloading				5.04	0.025*
No	66 (29.07)	37 (36.63)	29 (23.02)		
Yes	161 (70.93)	64 (63.37)	97 (76.98)		
Drive beyond maximum speed limit				9.26	0.002**
No	116 (51.1)	63 (62.38)	53 (42.06)		
Yes	111 (48.9)	38 (37.62)	73 (57.94)		
Ever received traffic summons				0.18	0.673
No	193 (85.02)	87 (86.14)	106 (84.13)		
Yes	34 (14.98)	14 (13.86)	20 (15.87)		

χ^2: Pearson's chi-square value. %: column percentage. *: p-value <0.05. **: p-value<0.01. ***: p-value <0.001. RTA: road traffic accident.

Association between Knowledge of drivers on road signs and Road traffic accident

With respect to the knowledge of drivers on the road signs, none of the variables studied was found to be statistically significant. The details on the association between drivers' knowledge on road signs and involvement in road traffic accident are in table 9.

Table 9: Association between drivers' knowledge on road signs and RTA

Characteristics	Total	Involved in RTA		χ^2	P-value
		No (%)	Yes (%)		
No entry road sign				1.55	0.214
Correct answer	27 (11.89)	9 (8.91)	18 (14.29)		
Don't know/wrong answer	200 (88.11)	92 (91.09)	108 (85.71)		
No overtaking road sign				0.48	0.487
Correct answer	161 (70.93)	74 (73.27)	87 (69.05)		
Don't know/wrong answer	66 (29.07)	27 (26.73)	39 (30.95)		
No right turn road sign				1.86	0.173
Correct answer	76 (33.48)	29 (28.71)	47 (37.3)		
Don't know/wrong answer	151 (66.52)	72 (71.29)	79 (62.7)		
No waiting road sign				0.97	0.325
Correct answer	18 (7.93)	10 (9.9)	8 (6.35)		
Don't know/wrong answer	209 (92.07)	91 (90.1)	118 (93.65)		
Straight or right road sign				0.13	0.715
Correct answer	169 (74.45)	74 (73.27)	95 (75.4)		
Don't know/wrong answer	58 (25.55)	27 (26.73)	31 (24.6)		
Narrow road sign				0.08	0.784
Correct answer	52 (22.91)	24 (23.76)	28 (22.22)		
Don't know/wrong answer	175 (77.09)	77 (76.24)	98 (77.78)		
SRC road sign				1.51	0.219
Correct answer	136 (59.91)	56 (55.45)	80 (63.49)		
Don't know/wrong answer	91 (40.09)	45 (44.55)	46 (36.51)		
Roundabout road sign				0.63	0.427
Correct answer	128 (56.39)	54 (53.47)	74 (58.73)		
Don't know/wrong answer	99 (43.61)	47 (46.53)	52 (41.27)		
LCG road sign				0.28	0.597
Correct answer	37 (16.3)	15 (14.85)	22 (17.46)		
Don't know/wrong answer	190 (83.7)	86 (85.15)	104 (82.54)		

χ^2: Pearson's chi-square value. %: column percentage. RTA: road traffic accident. SRC: Sharp Reverse Curve. LCG: Level Crossing Guarded.

4.3.3 Association between Vehicle characteristics and Road Traffic Accident

Again, in terms of vehicle characteristics, none of the factors showed statistical significant association with involvement in road traffic accidents from both the Pearson's chi-square test and Fisher's exact chi-square test of association as portrayed in Table 10.

Table 10: Association between vehicle characteristics and RTA

		Involved in RTA			
Characteristics	Total	No (%)	Yes (%)	χ^2	P-value
Knows year tyres were manufactured				0.08	0.777
No	171 (75.33)	77 (76.24)	94 (74.6)		
Yes	56 (24.67)	24 (23.76)	32 (25.4)		
Functioning horn				Ψ	1
No	5 (2.2)	2 (1.98)	3 (2.38)		
Yes	222 (97.8)	99 (98.02)	123 (97.62)		
Functioning mirror				Ψ	0.385
No	5 (2.2)	1 (0.99)	4 (3.17)		
Yes	222 (97.8)	100 (99.01)	122 (96.83)		
Functioning speedometer				0.1	0.747
No	79 (34.8)	34 (33.66)	45 (35.71)		
Yes	148 (65.2)	67 (66.34)	81 (64.29)		
Functioning Wiper				Ψ	1
No	3 (1.32)	1 (0.99)	2 (1.59)		
Yes	224 (98.68)	100 (99.01)	124 (98.41)		
Functioning lights				Ψ	0.466
No	7 (3.08)	2 (1.98)	5 (3.97)		
Yes	220 (96.92)	99 (98.02)	121 (96.03)		
Functioning seatbelts				0	0.962
No	20 (8.81)	9 (8.91)	11 (8.73)		
Yes	207 (91.19)	92 (91.09)	115 (91.27)		
Functioning reflectors				0.02	0.901
No	13 (5.73)	6 (5.94)	7 (5.56)		
Yes	214 (94.27)	95 (94.06)	119 (94.44)		
Knows years tyres expires				Ψ	0.735
No	218 (96.04)	98 (97.03)	120 (95.24)		
Yes	9 (3.96)	3 (2.97)	6 (4.76)		

χ^2: Pearson's chi-square value. Ψ: Fishers' exact test. %: column percentage. RTA: road traffic accident.

4.3.4 Association between the Road factors and Road Traffic Accident

Similar to the vehicle characteristics, none of the road factors showed statistical significant association with involvement in road traffic accidents from the Pearson's chi-square test of association as showed in table 11.

Table 11: Association between the road factors and RTA

Characteristics	Total	Involved in RTA		χ^2	P-value
		No (%)	Yes (%)		
RTA reduced by Road signs				0.35	0.557
No	164 (72.25)	71 (70.3)	93 (73.81)		
Yes	63 (27.75)	30 (29.7)	33 (26.19)		
RTA reduced by road marks				0.05	0.825
No	176 (77.53)	79 (78.22)	97 (76.98)		
Yes	51 (22.47)	22 (21.78)	29 (23.02)		
RTA reduced by traffic light				0.01	0.927
No	195 (85.9)	87 (86.14)	108 (85.71)		
Yes	32 (14.1)	14 (13.86)	18 (14.29)		
RTA reduced by street light				1.75	0.186
No	156 (68.72)	74 (73.27)	82 (65.08)		
Yes	71 (31.28)	27 (26.73)	44 (34.92)		

χ^2: Pearson's chi-square value. %: column percentage. RTA: road traffic accident.

4.4 Quantifying factors influencing road traffic accident

In quantifying the factors that influence road traffic accidents, the binary logistic regression model was employed. The simple logistic regression model was used to determine the unadjusted odds of the factors that influence road traffic accident whereas the multiple binary logistic regression model was used to quantify the factors that influence road traffic accident. From the multiple logistics regression model only violation of the red traffic light signal independently explained the cause of road traffic accident (AOR: 2.84, 95% CI: 1.06-7.63, p-value: 0.03)

From the simple logistic regression model (unadjusted model), the odds of a bus drivers being involved in road traffic accident was 8.5 times the odds of a van driver being involved in road traffic accident (UOR: 8.47, 95% CI: 1.0-70.1, p-value: 0.048) whereas the odds of a taxi driver being involved in road traffic accident was 1.5 times that of the van driver (UOR: 1.54, 95% CI: 0.9-2.6, p-value: 0.113). The unadjusted odds of a driver who have ever drank while driving being involved in road traffic accident was 2.4 times the odds of the driver who had never drank while driving (UOR: 2.42, 95% CI: 1.2-5.0, p-value = 0.017).

The unadjusted odds of a driver who have ever violated the red traffic signal being involved in road traffic accident was 5.2 times that of the driver who have never violated red traffic signal (UOR: 5.17, 95% CI: 2.1-13.0, p-value<0.001). The unadjusted odds of being involved in road traffic accident for those drivers who reported to have driven beyond the speed limit on the road was 2.3 times that of the drivers who reported to never have drove beyond speed limit on the road (UOR: 2.28, 95% CI: 1.3-3.9, p-value = 0.003). More details on the factors influencing road traffic accident can be read from Table 12.

Table 12: Factors influencing road traffic accident

Characteristics	Simple binary logistic		Multiple binary logistics	
	UOR (95% CI)	P-value	AOR (95% CI)	P-value
Vehicle driven				
Van	Ref		Ref	
Taxi	1.54 (0.9, 2.64)	0.113	1.24(0.69, 2.23)	0.476
Bus	8.47 (1.02, 70.13)	0.048*	8.17(0.89,74.62)	0.063
Drink and drive				
No	Ref		Ref	
Yes	2.42 (1.17, 5.00)	0.017*	1.57(0.71,3.48)	0.27
Violated red traffic signal				
No	Ref		Ref	
Yes	5.17 (2.06, 12.96)	<0.001***	2.84(1.06,7.63)	0.03*
Changed lane without signalling				
No	Ref		Ref	
Yes	2.92 (1.46, 5.86)	0.003**	1.98(0.91,4.32)	0.083
Ever bribed police officer				
No	Ref		Ref	
Yes	2.02 (1.17, 3.48)	0.011*	1.54(0.84,2.82)	0.16
Overloaded passenger				
No	Ref		Ref	
Yes	1.93 (1.08, 3.45)	0.026*	1.39(0.73,2.67)	0.32
Drove beyond maximum speed limit				
No	Ref		Ref	
Yes	2.28 (1.34, 3.9)	0.003**	1.56(0.86,2.84)	0.142
Bribed at DVLA for driving license				
No	Ref		Ref	
Yes	2.74 (1.47, 5.12)	0.002**	1.73(0.87,3.43)	0.118

UOR: unadjusted odds ratio. AOR: Adjusted odds ratio. CI: confidence interval: ref: reference category. *: p-value <0.05. **: p-value <0.01. ***: p-value< 0.001.

CHAPTER FIVE

DISCUSSION

The study sought to assess factors contributing to road traffic accident in the Kintampo North Municipality. All the drivers who participated in the study were males and very few (3.96%) of them were below 18 years of age. These findings are similar to that of Gumah, 2015 which indicated that 99.2% of the vehicle operators were made up of males. Contrary to the findings of this study, Gumah indicated that only 0.8% of the drivers were above 55 years. The difference in the findings might be due to the diverse nature of the populations in the study areas.

This study indicated about half (49.8%) of the drivers operated taxi. Gumah, 2015 found that 33% of the drivers operated taxi compared to the 49.8% of the driver in this study who were taxi drivers. On the other hand, 28.6% of the drivers of this study had 6 to 10 years of driving experience contrary to what Gumah observed (55%). The disparities in drivers who operated taxi as well as the driving experience observed from the comparison might be due to the unique transport needs in the study areas.

A result from this study indicated that 27.8% out of the driver involved in road traffic accident sustained injury while 21.4% of them were hospitalized as a result of the accident. Similarly, Sherafati, etal., 2017 indicated that an overall 1,520 patients with road traffic accidents were admitted and that severity of accident and time to admission had relationship with death. World Health Organization, 2015 also indicated that road traffic injuries impact on development. Low- and middle income countries lose approximately 3% of GDP as a result of road traffic accidents. Comparison of the findings on the RTA injuries suggests that injuries are by-product of RTA leading to deaths which impede the growth of countries, especially, low and middle income countries.

As noted from the study, 53.2% of the driver involved in RTA operated taxi which contradicts the study finding of Asefa, Ingale, Shumey & Yang, 2014 which indicated that 26.4% of taxi drivers were involved in a road traffic accident. The difference in the findings might be due to the difference in training received by the drivers and other specific risk factors in the study areas.

The process of acquiring driving license from DVLA requires that individuals seeking the licence pay for the services rendered at the DVLA. It was identified that majority (62.7%) of the drivers involved in at least one road traffic accident paid illegal monies at DVLA before being issued with a driving license. According to Mervis,2012 corruption in issuing of driver's license has been noted in Zimbabwe. Mervis added that a driver without proper training is one of the factors that also contribute to RTAs in Zimbabwe. Corruption among DVLA Officers resulting in improper training of drivers as noted by Mervis heightens the reason why majority of the drivers interviewed got involved in at least one road traffic accident in the Kintampo Municipality.

This study found that the road practice of drivers such as drink-driving, violation of road traffic light, changing lanes without signalling, bribing of police officers, overloading practices and driving beyond the maximum speed limits were the factors that had statistically significant association with involvement in road traffic accident. World Bank, 2009 also indicated that 90% of all licensed drivers speed at some point in their driving career; 75% admit to committing this offense regularly. Odame, 2014 indicated that traffic police accept bribe and renege on their duties; drivers contribute to police corruption; drivers escape prosecution when they offer bribes to the police after violating the rule. Nyoni, 2012 also indicated that bribery adds to road carnage. Collection of bribe by Police Officers seems to be a norm as it has been a common practice for drivers to be seen giving bribes to police officers

at road blocks. This practice affects the responsibility of the Police as law enforcers leading to the increase in the number of road traffic accidents.

The finding on the road signs indicated that the most of drivers did not know Six (55.6%) out of the Nine road signs on the interview guide used for this study. This finding is close to that of Okafor,Odeyemi & Dolapo(2013) that the drivers had poor knowledge of road signs (59.0%). Though none of the results on the road signs was statistically significant, the inadequate knowledge of the drivers on the road signs might be a supportive factor in the cause of road traffic accident in the Kintampo Municipality.

As portrayed in the result of this study, none of the vehicle characteristics showed statistically significant association with involvement in road traffic accidents. This finding conforms to that of Hashmi et al (2012) which indicated that more than 90% accidents occurred due to human errors. This suggests that though vehicle characteristics might lead to RTA, it is not that much prominent as compared to drivers' errors.

Again, none of the road factors was statistically significant with respect to association with involvement in road traffic accident. This finding is contrary to that of Mohanty & Gupta(2015) which indicated that the road geometric factors contributing to road traffic accident include the type of junction or intersection, the horizontal slope, curves, etc. present on the road. This contradiction might be due to the fact that the features of the road in the Kintampo North Municipality have seen some improved over the years.

Limitations of the Study

The cross-sectional study design used for the study due to limited time and financial constraints is not strong enough to establish the true cause of road traffic accident compare to study design like prospective cohort studies. The associations found in this study might have

been influenced by survival and recall bias. The assessment of the relationship between the use of mobile phone while driving and road traffic accident was an oversight in this study. Data scarcity at the Kintampo MTTD and Hospital rendered the records review for this study futile.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATION

6.1 Conclusions

The type of vehicle operated by drivers, drink-driving, red traffic light violation, changing lane without signalling, bribing police officers, overloading passengers, driving beyond the maximum speed limit, bribing way through at DVLA for driving licence were the statistically significant determinants of road traffic accident. The only variable that was statistically significant at the multiple logistic regression test of significance was the drivers' violation of the red traffic light signal. In effect, the statistically significant independent variables indicate that the driver factor (road practices of drivers and unprofessionalism) is the factor most contributing to the road traffic accidents in the Kintampo North Municipality.

6.2 Recommendations

1. The Kintampo North Municipal MTTD of the police service should intensify the education of the drivers, especially Bus and Taxi drivers on the consequences of drink-driving, red traffic light violation, changing lane without signalling, bribing police officers, overloading passengers, driving beyond the maximum speed limit and bribing way through at DVLA for driving licence.
2. The Kintampo North Municipal DVLA should enforce the regulations regarding license acquisition.
3. The Kintampo North MTTD should take legal actions without fear or favour against drivers who break road traffic regulations.
4. The Kintampo North Municipal Police Commander should ensure that Police Officers who take bribe from drivers are sanctioned.

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APPENDIX A

Appendix 1: Consent Form for Participation in the study

Title: Factors Contributing to Road Traffic Accidents among Commercial Drivers in Kintampo North Municipality, Brong Ahafo Region-Ghana.

Principal Investigator: Samuel Adusi Poku

Address: School of Public Heath, University of Ghana, Legon

General Information about Research

Greetings, I am a student from the School of Public Health, University of Ghana(**Principal Investigator**) my name is .....and I am conducting this interview on behalf of Samuel Adusi Poku, an MPH student of School of Public Health, University of Ghana(**Research Assistant**). I am conducting a study on **factors contributing to road traffic accidents among commercial drivers in the Kintampo North Municipality**. Records available to the MTTD of the Kintampo North Municipality indicate that cases of road traffic accident have increased over the couple of years and this is a public health concern to the Kintampo North Municipality and Ghana as a whole. This study therefore seeks to determine the association between the road traffic accidents and the driver factors, vehicle factors, road factors as well as identify the number of injuries recorded from the accidents. I would like you to be part of the study. If you agree to participate in this study, I would ask you a few questions centred on factors contributing to RTA. The interview will take about 30 minutes of your time. You have the right to refuse to participate. You are also at liberty to withdraw from this study at any stage of your participation. However, I would be happy to see you participate to the end.

Procedures

The study will involve answering questions and record review on driver factors, vehicle factors, road factors, injuries related to road traffic accident. This is an academic research which forms part of my work for the award of a Master Degree in Public Health.

Risks and Benefits

The results of the study will be used by policy makers and healthcare providers as well as other stakeholders in designing road safety interventions. It will also help in further research. There are no known related risks in participating in this study.

Right to refuse participation

Participation in this study is voluntary and you can choose not to answer any individual question or all the questions. You are at liberty to withdraw from the study at any time. However, your views and contributions in the study would be very much appreciated.

Anonymity and Confidentiality

I would like to assure you that whatever information you will provide will be handled with strict confidentiality and will be used purely for research purposes. Your responses will not be shared with anybody who is not part of the study team. You will not be identified by name in any dissemination of reports or publications resulting from this study. Data analysis will be done at the aggregate level to ensure anonymity. The Ghana Health Service Ethics Review Committee has reviewed and given ethical approval for this study to be conducted.

Prior to consenting

Is there any question on the study that that you will like ask?

Yes [ ] No [ ]

(If yes, note the questions below)

.....

.....

However, If you have any further questions regarding this study, which I could not satisfy you with the appropriate answer, you may contact Samuel Adusi Poku on telephone number: 0547801800 or e-mail address: adusis@yahoo.com, Dr. Adolphina Addo-Lartey (Supervisor) lecturer- School of Public Health, University of Ghana on Tel. 0544 132 970 or e-mail: aaddo.lartey@gmail.com and Hannah Frimpong, Ghana Health Service Ethics review Committee on Tel. 0507041223 or email: ghserc@gmail.com.

Participant Consent

I have been sufficiently educated regarding the benefits, purpose, potential risks and procedure of this research. Opportunity was offered me to make inquiries. I have been provided answers to my satisfaction. I know that I can refuse to participate in this study without any loss of benefit for which I would be entitled. I understand that even if I agree or as I have agreed, I can withdraw my consent at any time without losing any benefits or services to which I am entitled. I also understand that the information collected will be treated confidentially and will be used only for the purpose informed. Finally findings/results may assist in developing effective road safety interventions and policy to reduce the cases of road traffic accident in the Kintampo North Municipality. I at will decided to participate in this research.

Participant's ID.

Participant's Right Thumb Print or Signature

Date .....

If participant are illiterate, a witness is obliged to sign here: .....

WITNESS

I was there while the procedures, benefits and risks were read and /or interpreted to the comprehension of the participant. All questions will be responded to and the participant will accept to partake in the study.

Date. .....

Right thumb print or Signature. .....

Appendix 2: Interview Guide

Title of Work: Factors Contributing to Road Traffic Accidents among Commercial Vehicle Drivers in Kintampo North Municipality, Brong Ahafo Region-Ghana.

INTERVIEW GUIDE FOR DRIVERS

Serial number of questionnaire:_____

Date of interview: Day: ___ __ ____Month:_____Year:_____

Start time (24hr format): _____: _____

Location of interview (station) :_____

Number plate of vehicle_____

Instruction for completing the questionnaire:

1. Circle the letter corresponding to the response of the respondent where letters are the options,
2. Tick the box corresponding to the response where boxes have been provided and write the response where space has been provided for the response.
3. For question 32, indicate C(Correct), W(Wrong), D(Don't know) in the boxes provided under the road signs

A. Background Characteristics

1. How old were you at your last birthday?
   a. <18 years
   b. 18-27 years
   c. 28-37 years

d. 38-47 years

e. 48-57 years

f. >57 years

2. Sex of driver

Male [ ] Female [ ]

3. What is your highest educational level?

a. Tertiary

b. Secondary

c. Middle or Junior High School

d. Primary education

e. None

4. Are you a Union registered driver in the Municipality? If no, skip to question 6.

Yes [ ] No [ ]

5. What is the name of the transport union?

a. GPRTU

b. PROTOA

6. What type of vehicle do you drive?

a. Van

b. Taxi

c. Bus

7. How long have you been driving?

a. ≤5 years

b. 6-10 years

c. 11-15 years

d. 16-20 years

e. > 20 years

8. Have you ever been involved in a road traffic accident? If No, skip to question 13

Yes [ ] No [ ]

9. How many times?

.....

10. Where did the most recent accident happen?

a. Kintampo-Buipe

b. kintampo-Techiman

c. Kintampo-Nkoranza

d. Kintampo-Apesika

e. Kintampo-Newlongoro

f. Kintampo township

g. Other (specify).....

11. Did you sustain any injuries? If No, skip to question 13

Yes [ ] No [ ]

12. Were you hospitalized?

Yes [ ] No [ ]

B. DRIVER FACTOR

i. Professionalism of drivers

13. Do you have a driving licence? If No, skip to question 16

Yes [ ] No [ ]

14. What is the class of your driving licence?

A [ ] B [ ] C [ ] D [ ] E [ ] F [ ]

15. What is the status of your license?

Active [ ] Expired [ ]

16. Is the vehicle insured? If No, skip to question 18.

Yes [ ] No [ ]

17. Type of insurance policy

a. Comprehensive

b. Third party

18. Did you attend driving school?

Yes [ ] No [ ] NA [ ]

19. Did you write an exam before you were given the driving license by DVLA?

Yes [ ] No [ ] NA [ ]

20. Did DVLA conduct in-traffic test for you before you were given the licence?

Yes [ ] No [ ] NA [ ]

21. How many hours do you driver a day?

a. <5 hours

b. 5-8 hours

c. 9-12 hours

d. > 12 hours

22. How often do you service your vehicle?

a. ≤ 1 months

b. >1 months

c. When needed

23. What do you believe is the main cause of RTA

a. Drivers attitude

b. Car condition

c. Road condition

d. Others

24. Do you believe that road traffic accident can be prevented?

Yes [ ] No [ ]

25. Did you bribe your through at DVLA before being licensed?

Yes [ ] No [ ]

ii. **Road practice of drivers**

26. Have you ever taken any medication and driven a vehicle?

Yes [ ] No [ ]

27. Have you ever drunk alcohol and driven a vehicle?

Yes [ ] No [ ]

28. Have you ever driven tired?

Yes [ ] No [ ]

29. Have you ever engaged in any of the following traffic offences?

a. Violated the red traffic light signal Yes [ ] No [ ]

b. Overtaking a vehicle in a curve Yes [ ] No [ ]

c. Changed lanes without signalling Yes [ ] No [ ]

d. Stopped at no stop sign Yes [ ] No [ ]

e. Bribed a police officer after infringement of road traffic regulations

Yes [ ] No [ ]

f. Picked passengers more than the required number of passengers for the vehicle

Yes [ ] No [ ]

g. Driven beyond the maximum speed limit Yes [ ] No [ ]

30. Have you ever received any traffic summons before?

Yes [ ] No [ ]

Knowledge of driver on road signs

31. How old is your most recently bought tyre?

32. What is the meaning of the following road signs as spelt out by the National Road Safety Commission (NSRC)?

A [ ] B [ ] C [ ] D [ ]

F [ ] G [ ] H [ ] I [ ]

C. VEHICLE FACTORS

33. Do you know the year your tyres were manufactured?

Yes [ ] No [ ]

34. Do you know the year your tyres will expire?

Yes [ ] No [ ]

35. Are the following items in place and working in your vehicle?

a. Horn? Yes [ ] No [ ]

b. Interior and exterior mirrors? Yes [ ] No [ ]

c. Speedometer? Yes [ ] No [ ]

d. Wiper? Yes [ ] No [ ]

e. Lights (headlights, indicator and brake lights)? Yes [ ] No [ ]

f. Seat belts? Yes [ ] No [ ]

g. Reflectors? Yes [ ] No [ ]

D. ROAD FACTORS

Road Signs

36. Are the road signs on the road enough to minimize road traffic accident?

Yes [ ] No [ ]

37. Are the road markings enough to minimize road traffic accident?

Yes [ ] No [ ]

38. Are the traffic control lights enough to minimize road accident?

Yes [ ] No [ ]

39. Are the streetlights enough to minimize road accident?

Yes [ ] No [ ]

End time (24hr format): _____: _ _

Thank You for the Cooperation.

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

ase of reply the
aber and date of this
ter should be quoted

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Ref GHS/RDD/ERC/Admin/App/17/193
ur Ref No

20th April, 2018

nuel Adusi Poku
iversity of Ghana
ool of Public Health
gon, Accra

Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of ur Study Protocol.

IS-ERC Number	**GHS-ERC: 058/12/17**
ject Title	Factors Contributing to Road Traffic Accidents among Commercial Vehicle Drivers in Kintampo North Municipality, Brong Ahafo-Ghana
proval Date	20th April, 2018
piry Date	19th April, 2019
IS-ERC Decision	**Approved**

is approval requires the following from the Principal Investigator

- Submission of yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report after completion of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.

ase note that any modification of the study without ERC approval of the amendment is invalid.

s ERC may observe or cause to be observed procedures and records of the study during and after plementation.

ally quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....
DR. CYNTHIA BANNERMAN
(GHS-ERC CHAIRPERSON)

The Director, Research & Development Division, Ghana Health Service, Accra