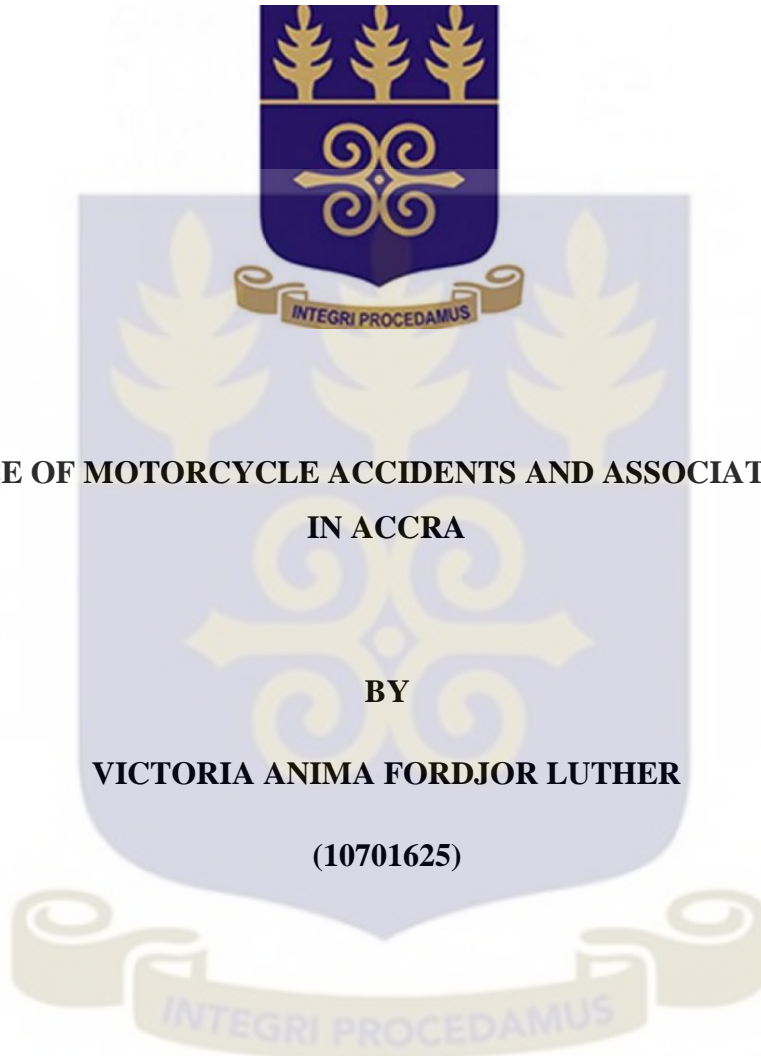


**SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
UNIVERSITY OF GHANA**



**PREVALENCE OF MOTORCYCLE ACCIDENTS AND ASSOCIATED FACTORS
IN ACCRA**

**BY
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**THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA,
LEGON, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE
AWARD OF MASTER OF PUBLIC HEALTH DEGREE.**

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DECLARATION

I, the undersigned certify that Victoria Anima Fordjor Luther, candidate for the degree of MASTER OF PUBLIC HEALTH (MPH) having presented this project paper of the following title:

“Prevalence of Motorcycle Accidents and Associated Factors in Accra”.

...as it appears on the title page and front cover of the project paper, that the project is acceptable in the form and content, and that in the exception of all scholarly materials which have been duly acknowledged, this research is carried out completely by me, under the supervision of Dr. Adolphina Addo-Lartey

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ABSTRACT

Road traffic accidents have numerous public health and economic repercussions to developing countries, of which Ghana is no exception. In addition to death, there is maiming, financial cost and psychological ramifications of road accidents on victims and families. In Accra, the problem of increased numbers of motorcycle accidents along with the increase in the use of motorcycles to help escape traffic congestion is a major source of concern. Thus, this research was designed to investigate the prevalence of motorcycle accidents and associated factors in Accra.

Using a cross-sectional study design, 387 victims of road traffic accidents, age 15 years and above, from Legon, Pentecost, Madina and Kekele hospitals, Motor Transport and Traffic Unit offices in Accra and Kaneshie district court were recruited to participate in this research using simple random sampling. Data were collected using structured questionnaires and analysed using Stata (Version 15.0) and Microsoft Excel (2013). The questionnaire included questions on demographic details of participants, cycling history, type of accident, income level, level of education and maintenance frequency.

Chi-square test of association was used to determine the association between motorcycle accidents and sociodemographic/socioeconomic factors. Logistic regression analysis was used to examine the strength of the associations between the dependent variable (motorcycle accident) and the independent variables (sociodemographic/socioeconomic factors).

The prevalence of motorcycle accidents among road traffic accidents was 37% (95% CI=32.0-42.0). Prevalence among men was 39% while women had 22%. Prevalence among income level (in Ghana cedis per month) of 0 -349 was 65% and that for above 3000 Ghana cedis was 10%. Motorcycle accidents predominantly affected men (39%) and the age groups 15-25 and

26-35 years. Demographic factors like age ($\chi^2=21.11$ $p<0.001$) and sex ($\chi^2=5.03$ $p=0.025$) were significantly associated with motorcycle accident occurrence. After adjusting for potential confounders (age, family size, sex, income level, level of education, maintenance, having license, employment status) factors such as level of education, sex (male/female), maintenance only when motorcycle breaks down, having a licence to ride and income level were significantly associated with motorcycle accidents ($p<0.05$).

Motorcycle accidents remained prevalent (37%) and significantly related to factors such as being a male, license to ride, low income level, level of education and maintenance only when motorcycle breaks down. Policies and regulations aimed at promoting safer road practices for motorcycle and other road users need to be enforced in the Greater Accra Region of Ghana.

DEDICATION

This work is dedicated to my husband: Emmanuel Luther, my mum: Elizabeth Fordjor and my children: Noella, Lemuel and Obed for their love, encouragement and support throughout this program.

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My profound gratitude to the Almighty God for seeing me through this course successfully.

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LIST OF ABBREVIATIONS AND DEFINITION OF TERMS

DVLA	DRIVER AND VEHICLE LICENSING AUTHORITY
NRSC	NATIONAL ROAD SAFETY COMMISSION
GRSP	GLOBAL ROAD SAFETY PARTNERSHIP
RTA	ROAD TRAFFIC ACCIDENT
GNA	GHANA NEWS AGENCY
WHO	WORLD HEALTH ORGANIZATION
MTTD	MOTOR TRANSPORT AND TRAFFIC DIRECTORATE
Road Traffic Accidents:	Accidents involving vehicles and other automobiles
Physical Wellbeing:	A state of absence of diseases, good nutrition, and stable growth
Socio-economic effects:	Consists of the relationship between motorcycle accidents and victims' poverty levels, employability, income/wage, and personal growth and development.
Prevalence:	Rate of occurrence of both old and new motorcycle accident cases in the selected sites.
Motorcycle accident:	Road traffic accident involving one or more motorcycles

CHAPTER ONE

INTRODUCTION

1.1 Background

Transportation has contributed eminently to the economic development of several nations in the world (Rodrigue *et al.*, 2009; Litman, 2010). Among the varied transportation systems invented by humanity, transport by road is considered highly affordable and beneficial for conveying humans and goods over vast distances (Rodrigue *et al.*, 2009; WHO, 2009). Regardless of this, the transport system is plagued with several problems, among which road traffic accident (RTA) is highly predominant (Driss *et al.*, 2011) and according to reports, RTA's are responsible for the majority of deaths in many countries, especially developing nations (Kudebong *et al.*, 2011). Example, an estimated 1.2 million people worldwide were killed in road traffic accidents in the year 2004, and more than forty times the number of people who died were injured the same year due to RTA (WHO, 2004). The estimated deaths spiralled to 1.3 million deaths in 2009 (WHO, 2009). In terms of demographics, RTA is the main cause of death among the 15-29 age groups worldwide (Chauhan *et al.*, 2014). This revealing challenge of transportation, specifically road transport, has given rise to several road safety policies and programs by governments and civil society organizations to help mitigate death and injuries sustained by people using roads for transportation purposes (Driss *et al.*, 2011; Lawson *et al.*, 2009; World Bank, 2009).

A road traffic accident is described by many scholars and policy makers as one of the worse man-made disasters globally (WHO, 2004; GRSP, 2013). RTA is multidimensional, and complicated in its relativity with cultures, geographical area, and institutional policies that are available to address it (Sorensen, 2007; Hosseinlou & Sohradi, 2009).

Out of the several causes of RTAs worldwide, human conducts and/or behaviours are most predominant (Pivoosh & Swarn, 2007). With the rising need for people and goods to be transported from place to place (Urry & Larsen, 2011) for economic, social and political purposes still existing, so does the risk for accidents, injuries and deaths (Peden *et al.*, 2004).

Crashes affecting helpless road users speak to the existing road security issue worldwide (Oxley *et al.*, 2004; WHO, 2013). As stated by Booth (2004), there is an expanding examination of the utilization of different technologies to oversee and plan towards the management of this. Distinguishing the different forms of RTAs on the roads, employing successful methods for data gathering purposes and additionally controlling the data help most countries in the world to identify and examine recurrence and the gravity of RTAs (Zhang, 2010). Numerous countries in the world have depended on gathering and breaking down RTA data for policy making on road transport (Liang *et al.*, 2005). Developed countries, example United States, Belgium (Moon *et al.*, 2008), and other developing countries like Iran (Hosseiniou & Sohradi, 2009) and Algeria (Driss *et al.*, 2011), have designed frameworks for spatio-temporal analysis of RTAs. However these are less often found in most developing countries.

According to Lawson *et al.* (2009) and Bliss (2013) as many as 90% of all RTA cases including injuries take place in peripheral and semi-peripheral countries. Out of this, 12 African nations are ranked as part of top 20 RTA-prone countries in terms of incidence and casualty rates (WHO, 2009). The rising incidence of RTA in peripheral countries usually occurs due to several factors, including over-population, together with increased rates of car ownership through the importation of used vehicles (Siaw, Duodu & Sarkodie, 2013). The death casualty of RTA per every 100,000 people is quite alarming in Africa, with an estimated 24.1 deaths per a 100,000 people (GRSP, 2013). According to Afukaar *et al.*, (2003), people living in developing countries, within the 30 and 49 age-group are those most affected by RTA. They

posited that in Africa, road accident is among the most common causes of death. Unfortunately this affected age - group constitutes an important portion of the working population, thus leading to recurrent under - productivity in these countries. In the report published by Coleman (2014), at least an amount of US \$65 billion is spent on RTA in low and middle-income countries. According to Mwatellah (1994), when juxtaposed with other regional blogs worldwide, Sub-Saharan Africa records the highest rates of RTA and suffers the worse social and economic ramifications of this menace. He also indicated that Africa alone constitutes 11% of the globally reported incidence of fatalities associated with RTAs.

Ironically, the region owns only 4% of the cars and vehicles worldwide. RTAs financially cost countries in the least developed and developing countries millions of dollars. Consequently, instead of channelling revenue into the provision of essential services and basic amenities, countries in this region rather devote a chunk of their resources into catering for RTA victims through healthcare awareness programmes and renovation of dilapidated roads (Mwatelah, 2001).

Motorcycles, popularly known as “Okada” in Nigeria, and now also in Ghana, form part of vehicles involved in RTAs. Motorcycles are a popular means of moving humans and materials from place to place. However, they are also well known for the risk they pose to the general public and road safety (Nungwu & Olatunji, 2012). Particularly, their small size and low price make them useful for road ways that are congested. However, the number of motorcycle accidents are high and a major source of concern: 3,487 motorcycle accidents in Ghana in 2017 (Motor Transport and Traffic Department (MTTD), 2017).

Though a major public health concern, many studies have not been done in this area, particularly in Accra where the burden is high (MTTD, 2017). The few studies that were done in Ghana covered areas like Bolgatanga and Techiman municipalities. The study in Bolgatanga municipality was on the social cost of motorcycle accidents. This study found out that

motorcycle accidents cost the municipality GHC 1,630,979.60 in social cost per annum, in addition to the pain, grief, suffering and in extreme cases permanent disability (Kudebong, 2009). Another study in the Techiman Municipality was on identification of risk factors involved in road accidents in Ghana (Awal, 2013). This study found out that many cases of fatality were caused by human errors that were preventable (Awal, 2013).

This current study sought to determine the prevalence of motorcycle accidents and associated factors in Accra.

1.2 Problem Statement

Ideally motorcycle usage is expected to make road transportation faster, easier and more convenient. These benefits are however being overshadowed by the reality that precious lives are being lost rendering people fatherless, motherless, widows or widowers through increasing numbers of motorcycle accidents.

Globally, more than half of all road traffic deaths are among vulnerable road users: pedestrians cyclists and motorcyclists (WHO, 2018). Worldwide, the prevalence of motorcycle accidents ranges from 22.8% in China (Zhang et al., 2004) to as high as 62 % in Vietnam (Nantulya & Reich, 2002). Motorcycle accidents are on the ascendency in Ghana, with Accra leading with 699 number of motorcycle accidents (NRSC, 2015). Particularly, the 15-44 years age group, which constitute the most active labour force of the population is being wiped out through this problem of high numbers of motorcycle accidents (Nyarko, 2012).

Motorcycle accidents occurrence is affected or influenced by several factors including age, being male or female, education level and maintenance of motorcycle. The male human population tend to be affected more by motorcycle accidents compared to females (Hughes,

2009). The level of formal education and one's income level also tend to influence motorcycle accident occurrence (Ogunmodede et. al., 2012)

The consequences of motorcycle accidents are untoward and could be physical, social and or economic. Economically, a nation that is plagued with high mortality rates due to motorcycle accidents is unattractive to foreign investments. In other words, such economies cannot guarantee the safety of foreigners whose commercial activities generally involve movements from one place to the other by vehicles or specifically by motorcycles. Socially, loss of lives or disability due to motorcycle accidents could imply that the important social functions or roles played by the affected individuals or deceased before their involvement in accident are left vacant. If steps are not taken to curb this menace, it could lead to financial and economic losses, reduction in productivity, negative effects on health, disability, psychological effects, etc.

There is therefore the need for further research into motorcycle accidents, associated factors and also the need for the formulation and proper implementation of plausible solutions like sanctioning for reckless driving, adequate traffic control and road safety policy enhancement.

Thus this research aims to investigate the prevalence of motorcycle accidents and associated factors in Accra. This will go a long way in providing information that could influence policy makers and road users to help curb motorcycle accidents.

1.3 Objectives

1.3.1 General Objective

To determine the prevalence of motorcycle accidents and associated factors in Accra.

1.3.2 Specific Objectives

1. To determine the prevalence of motorcycle accidents among road traffic accidents in Accra.
2. To determine the socio-demographic factors associated with motorcycle accidents in Accra.

1.4 Research Questions

1. What is the prevalence of motorcycle accidents in Accra?
2. What socio-demographic factors are associated with motorcycle accidents in Accra?

1.5 Justification

This research is highly relevant in making a useful contribution to road transport safety, policy-making and enforcement of the policy.

With limited literary work on motorcycle accidents in Ghana, the findings of this research are expected to provide a platform for updating of existing data on road accidents, and bridging the research gap in this area. Thus there will be a centralised system of collating RTA information which can be made available to government and private institutions, to academic and research institutions for further studies and access to current and previous RTA data.

Specifically, this research will be of importance to all public and legal institutions vested with the mandate to oversee the nation's transportation system as the consumers of the research's findings. For instance, the Ministry of Roads and Transport, the Local Government Authority,

the Motor Transport and Traffic Unit (MTTU), etc. may use the result of this research to influence the development of new regulations. They may also use the result of the study to amend existing regulations to counter the increasing rates of motorcycle accidents in Ghana. This should immensely help to reduce the occurrence of motorcycle accidents and contribute towards saving lives that would have otherwise been lost through these accidents.

Furthermore, the research targets motorcycle users and pedestrians. Thus it is expected that when made available to the public, the findings of this study will educate riders on road usage and the need to comply with all transport regulations to save their lives and the lives of others.

1.6 Conceptual Framework

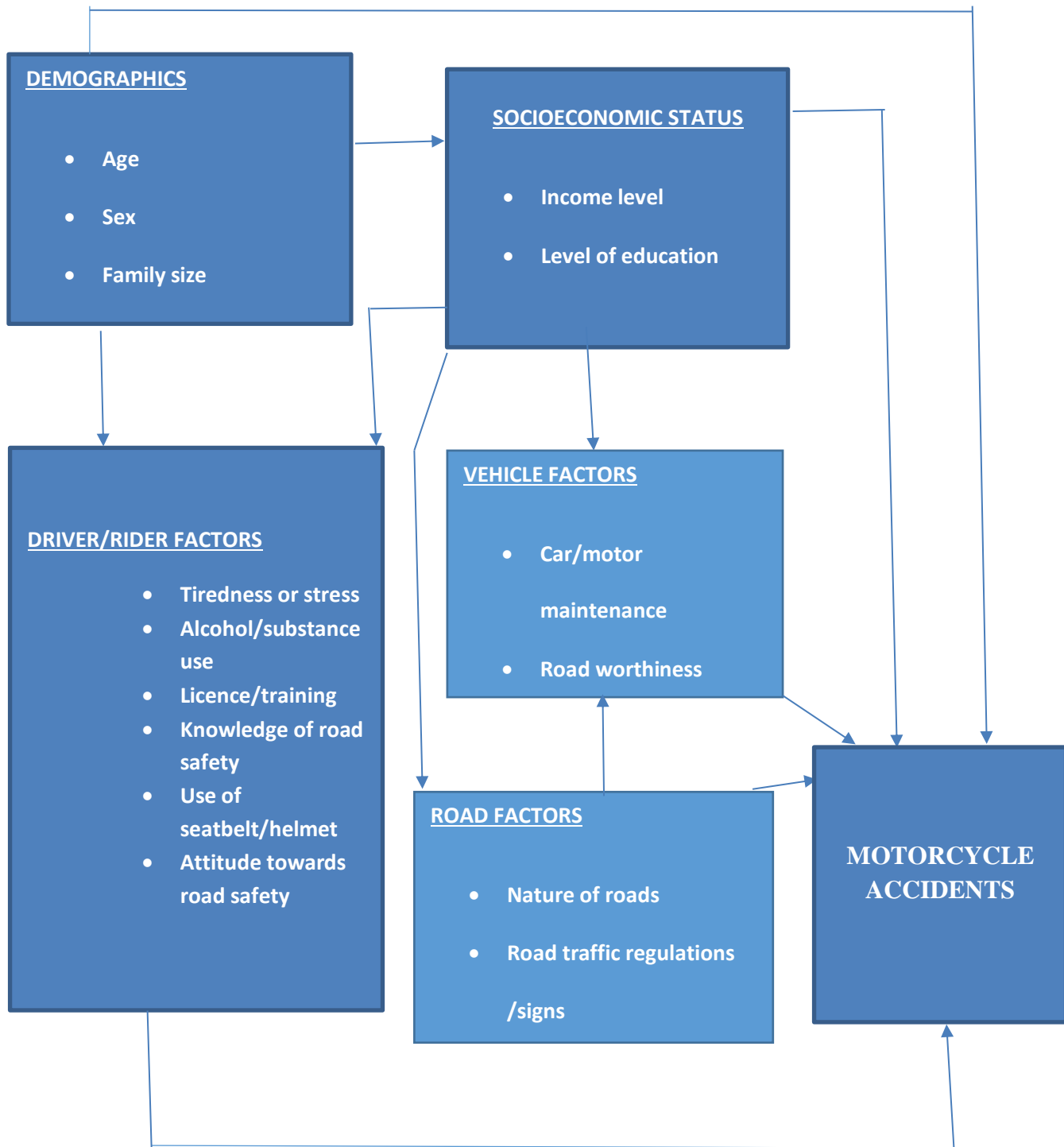


Figure 1: Conceptual framework

1.6.1 Narrative for Conceptual Framework

Several factors are associated with motorcycle accidents. The independent variables are the variables under the broad classifications of demographics, socioeconomic status, vehicle factors, road factors, driver/rider factors. These factors can result in or affect motorcycle accidents. The dependent variable in the conceptual framework is motorcycle accidents. All the independent variables can lead to motorcycle accidents directly or indirectly.

Socioeconomic status can affect vehicle factors like regular car maintenance and road worthiness. Also, socioeconomic factors like level of education can affect driver/ rider factors like attitude towards road safety and helmet use. Road factors like the nature of roads can affect vehicle factors which can in turn affect motorcycle accidents. Socioeconomic status can also influence road factors like nature of roads, which in turn can influence motorcycle accidents. Demographics like age can influence driver/rider factors which can in turn affect or influence motorcycle accidents. Additionally, demographic factors such as family size can also influence socioeconomic status. This can affect motorcycle accidents.

CHAPTER TWO

LITERATURE REVIEW

2.1 Ghana's Road Transport Network

According to McKinnon (2006), as a country develops, there is the added requirement for a corresponding high capacity, high speed and reliable transport system to accommodate the increasing number of vehicles that ply the roads. Bekefi (2006) observed that over the years, Ghana, like other developing countries, has registered an augmentation in demands for motorcycles and other vehicles to pace up with the ongoing economic growth. As such, faster and more reliable cars and motorcycles were imported into the nation to support the growth process. This also called for the expansion of the country's infrastructure, including road networks and traffic control systems to empowered Ghanaians, whom hither-to, were restrained from driving due to bad road networks and the absence of effective control systems, but are now able to buy and drive their own cars. A lot of Ghanaians are currently purchasing and driving their own vehicles without fear of poor road networks as it has improved.

Addo (2006) opined, that economic development in a nation is responsible for the nature of the nation's infrastructural and transportation system. Since Ghana made infrastructural facilities a priority, there was exponential economic growth; especially with directives that tailored transport and infrastructural facilities to match the growth trend and distributed evenly nationwide. Adu (2009) added that transport is an undeniable and indispensable element for the accelerating socio-economic development for Ghana. This presupposes that, with the expansion of the country's road transport system, other sectors, including industry, health, mining, trade and agriculture, also tend to increase, and by extension the per capita productivity. For example, in an attempt by the Nkrumah government to facilitate trades between Ghana and its neighbouring countries, the Accra-Tema Motorway was constructed to

serve as conduit for conveying people, services and goods from Accra and Tema port to other regions within Ghana, and across the territories of Cote D'Ivoire, Togo and Burkina Faso, etc. This claim was corroborated by Addo (2006) who indicated that when a country negotiates the various stages of development, transport and traffic policies are equally set aside at each stage to achieve all anticipated benefits or gains that the process offers.

Thus, in addition to the perceived improvement in road safety regulations in Ghana which has propelled the surge in the use of vehicles, enhanced infrastructure and construction of good road networks have also expanded road transport businesses, creating lucrative employment opportunities for people to prey on (Bekefi, 2006). Road transport has enhanced the movement of people, and trade in goods and services across the country (Adu, 2009).

The Driver and Vehicle Licensing Authority (DVLA) (www.dvla.gov.gh) report shows that 174, 234 vehicles were registered in the year 2012. Between 2012 and 2016, at least 694,656 vehicles were registered by the DVLA. The authority also stated that in 2012 alone the country spent at least US\$2.23 billion on importing trucks, motorcycles, other vehicles and vehicle parts. Also, in January 2017 alone, 5883 cars were registered in Accra, followed by Kumasi with 3006 cars and Tema with 2105. Unfortunately, the country has not been able to adequately match up with the high usage of vehicles in the country. This mismatch has contributed to road accidents in the country. For instance, road networks that are not intended for heavy trucks, are used by them anyway. This has led to rapid deterioration of the roads and many collisions (Mustakim, Yusof, Onn, Rahman, Samad & Salleh, 2008). This problem is further worsened by the unplanned urban growth in the country leading to competition between pedestrians and vehicle users (Mustakim et al., 2008).

2.2 Road Traffic Accidents (RTA) in Ghana

According to Bekefi (2006), Ghana, like other developing country counterparts, have registered numerous vehicular accidents over the past years, including motorcycle accidents. The accident

statistics in 2016 shows an upsurge of 15.6% and 6.77% in fatalities and fatal wounds respectively; but a decrease of 11.7% in accidents over the 2015 figures recorded. There was also an upsurge in lethal crashes by 7.6% in 2016. At the regional level however, the Greater Accra region recorded the most significant decline of - 22.1% in deadly crashes, followed by the Upper West Region with - 2.5%. The rest of the regions recorded increments in lethal accidents; Northern (34.9%), Volta (34.5%), Eastern (30.4%), Brong Ahafo (26.1%), Upper East (20.5%), Central (18.8%), Ashanti (11.3%) and Western (2.2%) (Road Traffic Crash Statistics, 2016).

Notwithstanding the abovementioned, in 2016 the Ashanti Region recorded the most astounding number of fatalities, totalling 403 deaths which made up 19.3% of all fatalities in Ghana. This was closely trailed by Greater Accra Region (367 deaths; 17.6%), Brong Ahafo (299 deaths; 14.3%), Eastern (293 deaths; 14.1%), and Central (213 deaths; 10.2%). These five districts together contributed more than 75.5% of all the road traffic fatalities in Ghana. It is worth noting that, without precedent for a long time, Greater Accra Region has recorded the most number of fatalities, as the main accident inclined region when considering people killed in road crashes, followed by Kumasi. The intensifying traffic safety circumstance in the Ashanti Region, to some degree could be ascribed to the laxity of traffic enforcement, on the Accra-Kumasi roadway. The road user type sustaining the highest rate of fatalities persistently remain to be pedestrians (824; 39.5%), followed by motorcycle users (437; 21%), and then bus occupants (364; 17.5%). The accident statistics show that the rate of by-passers' casualty fell below 40%, bringing about a yearly reduction of - 0.84% in passer-by fatalities in 2015. This, however, contradicts the yearly increment of 59.0% for bus users, 35.3% for motorcycle and 17.5% for vehicle user fatalities. These figures show the need for safety measures for pedestrians to be supported whiles those for bus users are refocused and reinforced to resolve the circumstance (Road Traffic Crash Statistics, 2016).

Thus motorcycle users, stand the serious risk of death in traffic, enlisting the second most outstanding road traffic fatalities (21.0%) after pedestrians, while exceeding fatalities from bus occupants (17.5%) and other vehicle users (10.7%). In spite of the fact that there was a drop of - 9.3% in motorcycle fatalities in 2015, there was an increase of 35.3% in 2016. Like 2015, roughly 60% of road traffic fatalities kept on happening on non-urban segments of road networks in 2016, while the 40% remaining were on the urban road networks. Contrasting 2016 with the year 2015, there was a rise in the number of fatalities for both urban and non-urban road conditions by 12.4% and 17.9% respectively (Road Traffic Crash Statistics, 2016).

Records indicate that December records the greatest rise in monthly fatalities. Considering the national populace pattern, males (78.5%) are most affected by road traffic fatalities and this represents about 3.7 times that of females (Road Traffic Crash Statistics, 2016).

On account of the above, the structural adjustments that are recommended for preventing over speeding and accidents, including speed rumps, traffic regulations, and proper educational campaigns are considered vital. The effect of existing speed rumps on the reduction of casualties on the highways can further be examined for effectiveness (Road Traffic Crash Statistics, 2016).

2.3 Causes of RTAs

By and large, this can be attributed to several contributing factors, and broadly grouped into driver-related, vehicle-related and road-related factors or causes. However, reference can accurately be made to the fact that, the most grounded and significant factor in RTAs is fundamentally the driver/human factor. This factor is closely followed by the environment and the human – road environment interaction effect (Plankermann, 2013). In other words, reasons for RTAs, among a plethora of other reasons, incorporates driver or human blunders, road usability of the vehicles involved, traffic facilities - including building designs, road traffic regulations and more (Bjerre, Kirkebjerg, & Larsen, 2006). The human component alone

causes not less than 90% of all RTAs (Plankermann, 2013). The mentality of drivers/riders, road rage behaviours, disrespectful conduct of the driver when driving, driving under the influence of alcohol and other psychopathic substances, refusal to use seat belts regularly, the overbearing male driver/rider dominance, demography of the driver-population and the like are among the obvious and perceived human factors responsible for the carnages on Ghanaian roads (Smith, 2005). Al-Reesi, Ganguly, Al-Adawi, Laflamme, Hasselberg, & Al-Maniri, (2013) observed that risky driving and infringement of traffic laws are the most significant risk factors that are associated with fatal RTAs. Driver mistakes continue to happen in RTAs. Drivers' mistakes are based on the degree and the seriousness of damages caused, and the nature of casualties involved. These mistakes are sometimes triggered by factors such as the misinterpretation of traffic control devices (example traffic lights), road rage, driver anticipation, driver's age, sexual orientation of driver, their mental workloads, etc. (Smith, 2005).

The conducts of drivers, especially the young ones who are inclined to over-speeding, absent-mindedness, engaging in unlawful stopping, doing inappropriate turning, flaunting of traffic laws, disregarding priority of ways, utilizing cell phones while driving/riding, and more contribute greatly to numerous motorcycle and other vehicular fatalities in the country. Subsequently learning about the attributes of RTAs is critical in the examination and amelioration of traffic accidents in Ghana (Atubi & Onokala, 2009).

On the other hand, road related factors are generally categorized into roadway and environmental factors. This includes negative climatic conditions like fogs and road conditions present in the country. Usually, there is not much that can be done about naturally occurring climatic factors. Poor road conditions including roads that are filled with "pot holes" and dusty untarred roads are preventable contributory factors to this.

Vehicular factors like poor vehicle maintenance and the unlawful usage of vehicles for unintended purposes are to a great extent considered a critical factors in this regard. These factors and their interactions, are however not the same in their contributions to road traffic accidents. Although technology enabled manufacturers to produce more secure vehicles and roadways through different designs, making driving/riding and drivers/riders more secure is still significantly very difficult. The occurrence of RTAs is associated with numerous untoward effects.

2.4 Effects of RTA

Road traffic accidents are dangerous and yet preventable causes of population state of health and mortality, with expensive ramifications to both the victims and national health budgets (Peden, 2005). RTAs, which include motorcycle accidents, contribute extensively to deaths and disabilities. Notwithstanding the fact that the health services are fundamentally concerned with protecting the well-being of the people, the frequency of road fatalities have turned them to be more engrossed with saving victims of RTAs from death, disability, depression and post-traumatic stress disorder (PTSD) (Dahl, 2004; Peden, 2005; Ghanaweb.com, 2005)

In Ghana, three Ghanaian physicians including a prestigious neurology professor were killed a few years ago in road carnage, while in the line of duty of rendering specialist service to deprived regions in the country (Ghanaweb.com, 2005). This dealt a big blow to the medical community and the health ministry. A few other highly skilled personnel and state assets have either been killed or maimed through road accidents (Blows, Ivers, Woodward, Connors, Ameratunga, & Norton, 2000).

The worldwide effect of RTAs on public health provoked the World Health Organization to focus its attention in 2004 on an extensive and all-inclusive “war” to tackle this developing public health canker (WHO & World Bank, 2004). Unfortunately, with just few countries having strict and thorough laws targeting key risk factors for road traffic mishaps, like driving

under the influence of alcohol and over-speeding, it is anticipated that by the year 2020, RTAs will increase exponentially in many developing countries. In least developed countries and semi-peripheral countries, it is expected that RTAs will contribute to the death of not less than 10 million people yearly (WHO, 2010). Additionally, the report indicated that 46% of vulnerable road users, including cyclists, pedestrians and motorcyclists, are most at risk of being killed. The World Health Organization report (2010) also showed that, due to the absence of accessible roads, blatant disregard for traffic regulations and road safety measures in developing nations, road traffic accidents increased by 70%.

The effects of RTAs can also be economic. The economic effect of RTAs is enormous worldwide as indicated by Peden (2005), in his account on traffic damage counteractive actions. It is evaluated that about US \$518 billion is spent globally on RTAs', with US \$65 billion being spent in low and middle income countries alone every year. Ironically, this sum is far more than what these countries generate annually to execute their developmental projects (Peden, 2005). Furthermore, undeniably RTAs usually affect the most energetic and productive portion of the population and contribute most to the death of the 15 - 30 years age-group (WHO, 2010). This leads to loss of productive hours, hospitalization, decreased productivity and low per-capita production in developing countries.

RTAs also have gigantic direct financial effects on victims and their families aside their association with increased rates of casualties and disabilities. Victims and their relatives have to pay for unplanned expensive medical bills for medications, services investigative procedures and even surgeries. In cases of fatality, financial burden spans to cost of funerals and mortuary fees.

The effects of motorcycle and other road traffic accidents can also be psychological or mental. This can cause persons affected by RTAs to live in perpetual fear or cause mental derailment or challenges that have to be managed with the aid of health experts.

2.5 Prevalence Of Motorcycle Accidents

2.5.1 Prevalence Of Motorcycle Accidents Globally

According to the United Nations National Highway Traffic Safety Administration (2019), motorcycles are more likely to be involved in a crash than cars. Again, in the United States, motorcycle fatalities have increased for the second year in a row and are at the highest level since 2008, when 5312 people were killed in motorcycle accidents. In 2016, motorcyclists were 28 times more likely to die in a crash per vehicle mile travelled, than passenger car occupants (National Highway Traffic Safety Administration, 2016).

In Africa and South-East Asia, the rates of road traffic death were highest, with rates of 26.6/100,000 people and 20.7/100,000 people respectively (WHO, 2018).

In Singapore, for example, motorcycle accidents increased by 1.9% to 2216 in the first half of 2018, from 2175 in the same period in 2017 (Singapore Police Force, 2018). A study done in Singapore by Haquea et al. (2008) showed that motorcycles are responsible for 36% of total accidents.

In China, the reported prevalence of motorcycle injuries was 22.8% (Zhang et al., 2004).

That for Vietnam was as high as 62% (Nantulya & Reich, 2002).

2.5.2 Prevalence in Ghana

In Ghana, although motorcycle accident is a major public health concern, few studies have been done on it, particularly in Accra where the problem is pronounced. Among the few studies done include one by Kudabong on social cost of motorcycle accidents in Bolgatanga which found the social cost to be GHS 1,630,979.60 per annum (Kudebong, 2009). Another study was done in Techiman on the identification of risk factors involved in road accidents, which found out that many cases of fatality were caused by preventable human errors (Awal, 2013).

According to the National Road Safety Commission (2016), 2,289 motorcycle accidents were recorded in Ghana in the year 2015.

This number increased to 3,487 motorcycle accidents in Ghana in the year 2017 (Motor Traffic And Transport Department, 2017).

2.6 Sociodemographic Factors Associated With Motorcycle Accidents

There are several factors that are associated with motorcycle accidents, including sociodemographic factors like age, being male or female, level of education, etc.

Being male or female

Although women motorcyclists are becoming more present in the motorcycle world today, men motorcyclists still outnumber women. About 81% of motorcycle owners are men (Motor Industry council, 2019). A study done in Malaysia also showed that more males were involved in motorcycle accidents as compared to females (Sharifah et al., 2012).

Age

Age is thought to play an important role in motorcycle accident occurrence. The youth have the propensity to be more adventurous and to take more risks like engaging in dangerous riding or driving (Steinberg, 2008). This makes them more prone to motorcycle accidents. A study done in Malaysia showed that over a 10 year period of 1999 to 2008, 42.9% of motorcycle accident victims were in the age group of 16 to 25years. This was closely followed by the age group of 26 to 35(Sharifah et al., 2012). Also the world Health Organization (2010), has it that RTAs usually affect the most energetic and productive portion of the population and contribute most to the death of the 15- 30 years age group.

Income Level

The Global Status Report On Road Safety 2018 indicates that there has been no reduction in the number of road traffic deaths occurring in low income countries since 2013 (WHO, 2018). This suggests that income level is associated with motorcycle accidents. People from lower socioeconomic status groups have higher risk of getting involved in road crashes including motorcycle crashes (Berghe, 2017). Those with lower income level have a higher likelihood of being involved in motorcycle accidents probably due to stress and the burden of their status. Such people too may be unable to afford the cost of training and getting a licence, or even the cost of motorcycle maintenance. Again people with low income level tend to patronise motorcycle usage more for purposes of cheaper transportation (Lwin et al., 2016).

Maintenance

A faulty vehicle or motorcycle is likely not to function well and can easily get involved in an accident. Maintenance of vehicle or motorcycle is closely related to income level, as it requires the use of money for regular and proper maintenance.

Having A Licence

Possessing a licence comes at a cost. The cost of obtaining proper training on how to ride and that of obtaining a valid licence could be a deterrent to obtaining one, especially for those with low socio economic status. Such riders without licence, who are new or novices at riding tend to be more prone to motorcycle accidents. According to National Roadside Survey (NCSA) results (2016), 27% of motorcycle riders involved in fatal crashes were riding without the requisite driving licence.

Level Of Education

Higher levels of education have been considered as a factor that promotes personal healthy behaviours, which in turn have been associated with compliance with existing laws such as wearing of helmets and adhering to traffic rules (Dissanyake & Shaheed, 2012). People with lower level of education may tend to not understand road signs and regulations, hence compromising their safety on the road.

2.7 Known Facts About Motorcycle accidents

A number of studies and surveys, according to HG.org Legal Resources (2019) have shown some interesting facts and statistics with regards to motor cycle accidents. They include the following:

- About three-fourth of motorcycle accidents involve collisions with another vehicle, usually a passenger automobile.
- Vehicle failure accounts for less than 3% of motorcycle accidents. Most of them are single vehicle accidents where control was lost due to a tyre puncture cause of motorcycle accidents
- The failure on the part of motorists to detect and recognize motorcycles in traffic and on time, is the predominating cause of motorcycle accidents
- Only one quarter of motorcycle accidents are single vehicle accidents that involve motorcycle collision with the roadway or a fixed object in the road environment.
- In multiple vehicle accidents, about two-thirds of the accidents are due to the other vehicle violating the right-of-way of the motorcycle

- The most likely places for the occurrence of motorcycle accidents are road intersections, and often involve violation of traffic controls, example running the traffic light or stop sign.
- Vehicle defects that are related to accident causation are rare and likely to be due to defective maintenance.
- Motorcycle riders ranging between the ages of 16 and 24 are significantly overrepresented in accidents.
- Craftsmen, students and labourers make up majority of the accident-involved motorcycle riders.
- The riders of motorcycles that are involved in accidents are essentially without training, with about 92% who have learnt on their own or from family and friends.
- Riders with no license or a revoked license, are significantly over-represented in motorcycle accidents.

2.8 What Is Not Known About Motorcycle Accidents

Studies have not shown any relationship of motorcycle colour with accident data. It is however expected to be insignificant since the frontal surfaces of the motorcycles are often presented to the other vehicle during a collision (HG.Org Legal Resources, 2019)

CHAPTER THREE

METHODS

3.1 Study Design

A cross sectional study was conducted in Accra on people aged 15years and above, who had been involved in road traffic accidents (be it by car or motorcycle) between the period of December 2018 to May 2019. All accident victims from MTTU of Accra, Pentecost, Legon, Madina and Kekele hospitals, and Kaneshie district court were eligible to participate.

3.2 Study Location

Accra - This is the capital and largest city of Ghana and the Greater Accra Region. It has an urban population of 2.27 million people (Ghana Statistical Services, 2019). It has an estimated population of 4,010,054 on an area of 238,533 km² (World Population Review, 2019). It is the most populous city in the country of Ghana and one of the most urban. Accra is organized into 10 local government districts which comprise of 9 municipal districts and Accra metropolitan district. Accra metropolitan district is the only district within the capital to be granted city status.

Accra is boarded on the south by the Gulf of Guinea and on the north by the great hall of the University of Ghana. The Nautical College forms the eastern border of Accra. The intersection of the Lafa stream and Mallam junction forms the western border of Accra (World Population Review, 2019).

It is the Greater Accra Region's economic and administrative hub. The main economic activities in Accra include the financial and commercial sectors, fishing, manufacture of processed foods, textiles and clothing. The population of males in Accra is 50.9% of the population in Accra. That for the females is 49.1%. (Birth and Death registry, 2014)



Source: Ghana Statistical Service, GIS

Figure 2: Map of Accra

3.3 Study Variables

The outcome variable in this study was motorcycle accidents. On the other hand, the Independent variables included the respondents' demographic and socioeconomic characteristics (sex, age, employment status, education, family size, marital status, occupation, income levels, etc.), government's policy and regulations on road transports, etc.

3.4 Study Population

The target population for this research was victims of motor accidents (drivers and motorists etc) of above 15 years, capable of narrating their experiences, and who are either currently hospitalised at Legon, Madina, Kekele or Pentecost hospitals, recently discharged victims (1-6months), victims reporting at MTTU and Kaneshie district court over the past 6 months. This was to help to interview respondents who had just experienced the unfortunate event, and hence able to provide up-to-date and relevant responses to the purpose of the study. The approach was also to ensure that respondents were matured enough to share their experiences, could

make informed decisions by themselves, and could contribute meaningfully and effectively to the study.

3.5 Sample Size

A total number of 8893 motor vehicle accidents were recorded for Greater Accra region for the year 2017 (MTTD, 2017). A formula from Cochran (1977) was used to calculate the sample size from the population under study, specifically motor accident victims (Kotrlik, 2001).

A study done in Singapore by Haquea et al (2008), showed that motorcycles are responsible for 36% of total road accidents. Therefore 36% was used to detect statistically significant association within a 5 % margin of error at a 95% confidence interval, a minimum sample size 354.

$$n = (Z^2 * p (1 - p)) / d^2$$

n = sample size

p = proportion = 36% =0.36 from the prevalence of motorcycle accidents in a study done in Singapore by Haquea et al (2008).

Z = 1.96

d = margin of error = 0.05

Therefore $n = (1.96)^2 \times 0.36(1-0.36) / (0.05)^2$

$$n = 354$$

For non-response of 10%:

$$n = 354 + (10/100 \times 354)$$

$$n = 389$$

3.6 Sampling Procedure

A list of all those who had been involved in moto accident (be it by car or motorcycle) over the past six months was obtained from Pentecost, Legon, Madina and Kekele hospitals, MTTU and Kaneshie district court. This included passengers riders/drivers and pedestrians that were involved in road accidents. The numbers corresponding with the names were written on pieces of papers and put together in a container. By randomly picking out the pieces of papers, a total number of 389 participants were selected. Each day, a minimum of 10 participants were interviewed until a total of 389 was obtained. The data collection lasted a period of six weeks between May and June, 2019.

3.7 Inclusion Criteria

1. A victim of road traffic accident
2. Either a driver/rider, a pedestrian or passenger at least 15years old.
3. Be on admission or discharged within the last six months.

3.8 Exclusion Criteria

1. Any other accident outside road traffic accident.
2. Patients in critical conditions.
3. Patients 14 years and below.

3.9 Data Collection Procedure

Primary data was captured using questionnaires designed around the set research objectives. Pretesting was done to ascertain the reliability of the research instrument. Reliability was determined using the Cronbach's alpha (α) to measure the internal consistency or the relatedness of variables used in the study. The pretesting was conducted on a random subset of discharged victims of motorcycle accidents in Accra (n= 20).

The primary data for this study consisted of information collected from drivers/riders, passengers and pedestrians who were victims of motor accidents, and who agreed to participate

in the research. The questions were structured to provide the requisite statistical description and prediction on the phenomenon under consideration. The questionnaire had sections on demographic details and cycling history, type of accident, causes, road safety awareness campaigns and policy recommendations. The instrument used was organized into four sections: Section A represented the Bio-data of victims of motor accidents; Section B had to do with the associated factors and risk factors; Section C probed into the effectiveness of road safety awareness campaigns in the country, and the final section, Section D, requested that the respondents suggest policy recommendations to address the problem.

3.10 Data Processing and Analysis

Following the collection of questionnaires from respondents, the data was first entered and managed in Microsoft Excel (2013) and subsequently imported and analysis with Stata (version 15). Descriptive statistical tables were then used to create demographic profile for the respondents; and the findings from other variables presented using frequencies, percentages and Standard Deviations. The associations between motorcycle accidents and demographic/socio-economic factors were determined using Chi-square tests. The strength of associations that were significant were tested using binary logistic regression after dichotomizing participants into those who were involved in motorcycle accident and car accident. Variables that were significant ($p\text{-value} < 0.05$) were included into multivariate logistic regression. The total number of accidents due to motorcycles was noted. The total number of all other road accidents that had occurred was also determined. Prevalence was then determined using the formula:

$$\text{Prevalence} = \frac{\text{(number of motorcycle accidents in sample)}}{\text{(Total number of other road accidents in sample)}} * 100$$

3.11 Ethical Considerations

The following ethical issues were upheld in this study, to ensure compliance with laid down ethical regulations for conducting academic research.

Ethical approval: Ethical approval was sought from the Ghana Health Service Ethical Review Committee of the Research and Development Division in Accra, before conducting the study. Approval from the School of Public Health was also be sought.

Permission from the study site: Letters of introduction and permission from the School of Public Health to the La-Nkwantanang Madina Municipal Assembly, the MTTU, Kaneshie District Court and the Greater Accra Regional Health Directorate were used to seek approval to conduct the research. This was done before the commencement of data collection.

Consent of participants: Consent of participants (18years and above) were sought before their participation in the study. This was done both verbally and written consent using the consent form in the Appendix. In addition, the purpose of the study was explained to participants before their inclusion in the study.

Assent for adolescents age 15-17years: Assent was to be obtained from parents or guardians of participants who were age 15 to 17 years and signed by a witness who observed the process of reading or translation, explanations and voluntary assent.

Confidentiality and anonymity: All information from participants were kept confidential and anonymous. Names of respondents were replaced with codes for easy identification and to ensure that the true identity of the respondents was protected.

Voluntary withdrawal: Participation in the study was not compulsory, but rather voluntary. At any point in time during the study, a participant had the freedom to quit without any

penalty. This was clearly explained to the participants. A parent or guardian could freely decide to let ward participate or withdraw from the study at any time.

Compensation: In the wake of this research being for academic purposes, no compensation was paid to participants, and this was clearly explained to all participants and or parents/guardians before their participation. Only the research assistants were compensated for their time and services.

Data storage and usage: Filled questionnaires were locked up with the key in a locker that is assessable to only the researcher. Any such information on the computer has been protected by use of a password that is highly confidential. Filled questionnaires will be kept for up to five years under strict lock with key in the locker assessable to only the researcher, after which it will be discarded by burning in an incinerator. During the five year period, if there is the need to use the data, approval will be sought from the Ethical Review Committee of Ghana Health Service.

Risks and benefits: The research did not pose any imminent lethal risk or physical pain to people who will take part in it. It was however expected that some participants may experience some slight discomfort when responding to questions that reminded them of past unresolved negative experiences with accidents or deaths. The benefits included the education of participants through the study with regards to the importance of road signs and traffic regulations. Participants also got to understand the need to help prevent road traffic accidents.

Results dissemination: The results of this study were made available to the School of Public Health, the University of Ghana for archiving and publication. Results will also be made available to the Ghana Health Service Ethical Review Committee and the Municipal Health Directorate when requested. Complete or portions of the research may be published or used in

academic presentations by the researcher. Participants were informed of the progress and outcome of the research when requested.

Protocol amendments: Where there was the need for amendment of protocol, approval was duly sought from the school of Public Health and the Ghana Health Service Ethical Review Committee.

CHAPTER FOUR

RESULTS

4.1 Demographic Characteristics- Sociodemographic And Socioeconomics.

A total of three hundred and eighty-seven road traffic accident victims took part in the study. About eighty-eight percent (88%) of the study population of accident victims were males. The majority of the participants interviewed fell in the age group of 26-35 years (40%). Majority of participants had secondary/ vocational education (41%) and were self-employed (52%). The unemployed were 6%.

Table 1: Sociodemographic And Socioeconomic Characteristics

Variables	Frequency(n)	Percentage (%)
Age		
15-25	49	12.66
26-35	156	40.31
36-45	127	32.82
46-55	47	12.14
above 55	8	2.07
Sex		
female	46	11.89
male	341	88.11
Education level		
tertiary	112	28.94
secondary/vocational	158	40.83
middle/JHS	75	19.38
primary/elementary	27	6.98
none	15	3.88
Employment status		
formal employment	79	20.41
self-employed	198	51.16
wage/seasonal employment	86	22.22
unemployed	24	6.2
Income level		
0-349	57	14.73
350-649	138	35.66
650-949	56	14.47
950-1299	88	22.74
above 3000	48	12.4
Family size		
1 to 2	82	21.19
3 to 4	176	45.48
5 to 6	97	25.06
9 to 10	2	0.52
more than 10	14	3.62

4.2 Prevalence Of Motorcycle Accidents

Motorcycle accident is a road traffic accident involving one or more motorcycles

Out of the total three hundred and eighty-seven (387) participants, about one hundred and forty-two (142), representing thirty-seven percent 37% (95% CI=32.0-42.0) were involved in motorcycle accidents. This represents more than one-third of the victims involved in the study.

The table below shows this representation.

Table 2: Prevalence Of Motorcycle Accidents

Type of accidents	Frequency no=387	Percentage (%)
Motorcycle accident	142	36.7
Car accident	245	63.3

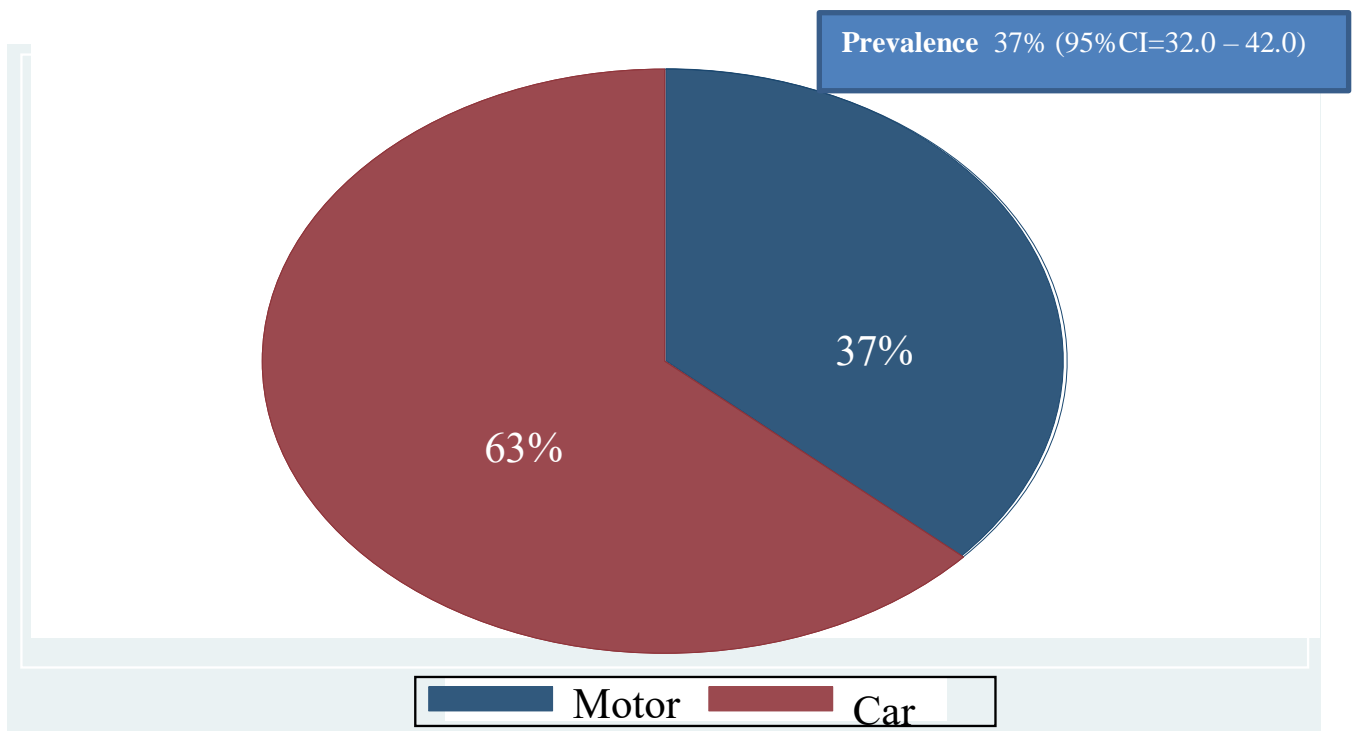


Figure 3: Prevalence of motorcycle accidents in study done in Accra.

The prevalence of motorcycle accidents among males was 39%. That for females was 22%.

The prevalence of motorcycle accidents among the age group 15-25 years was 61% and that

among the age group 26-35 years was 40%. Amongst those with no education, the prevalence was 80%.

Prevalence among those with tertiary education was 12% and prevalence among those with middle/ Junior High School level of education was 47%. Those whose income level was in the range of 0 – 349 Ghana cedis per month, had motorcycle accident prevalence of 65%. However, among individuals whose income level per month was above 3000 Ghana cedis, the prevalence of motorcycle accidents among road traffic accidents was 10%.

4.3 Association of Demographics and Socioeconomic Factors with Motorcycle Accidents (Chi-square test)

Table 3 shows the association between demographic and socioeconomic factors with motorcycle accidents.

The results of the chi-square test of association as in table 3, showed that age, income, family size, licence, maintenance frequency and sex (male or female), education level and employment were significantly associated with motorcycle accidents.

There was a significant association between the sex of participants and motorcycle accidents. Out of the males involved in accidents, about thirty-nine percent (39%) were involved in motorcycle accidents. Among females, about twenty-two percent (22%) were involved in motorcycle accidents. Out of the females who were involve in road traffic accidents, about seventy-eight percent (78%) were involved in car accidents. These included both passengers and riders.

There was a significant association between age group in years and motorcycle accidents ($\chi^2=21.11$ p-value <0.001). Among the age group, 15-25 years about sixty-one percent (61%) had motorcycle accidents. This was followed by age group 26-35years with about forty percent (40%) in that age group of accident victims. Among motorcycle accident victims however, age

group 26-35years had highest motorcycle accidents (44%), followed by 36-45 years (27%) and then 15-25years (21%)

A significant association between the highest education level and motorcycle accidents was found. ($\chi^2 = 50.30$ $p = 0.001$). For those with no education in the study about eighty percent (80%) were involved in motorcycle accidents. Out of the accidents victims interviewed, about eighty-eight percent (88%) were involved in car accidents.

From the analysis, those who were self-employed and those who were unemployed had more motorcycle accidents with percentages of about forty-seven (47%) and forty-six (46%) respectively. Those with formal employment who were interviewed had about eighty-four percent (84%) car accidents.

Income Level

Similarly, income level was associated with motorcycle accidents and this was significant ($\chi^2 = 60.08$ $p < 0.001$). Those with income level in the range of 0-349 Ghana cedis had about sixty-five percent (65%) of motorcycle accidents.

Family Size

Family size was significantly associated with motorcycle accidents ($\chi^2 = 22.49$ $p < 0.001$). Among family size of more than 10, about eighty-six percent (86%) were involved in motorcycle accidents.

Maintenance Frequency

There was a significant association between maintenance frequency and motorcycle accidents ($\chi^2 = 58.49$ $p < 0.001$). Those participants who performed maintenance only when there was a breakdown, accounted for about seventy-seven percent (77%) of motorcycle accidents.

License To Drive/Ride

Worth noting was the association seen between license to ride and motorcycle accidents. This association was significant ($\chi^2 = 27.63$ $p < 0.001$).

Table 3: Association of sociodemographic/socioeconomic factors with motorcycle accidents

Variables	Motorcycle accidents (%)	Other road traffic accidents (%)	χ^2	p-value
Age			21.11	< 0.001*
15-25	30(61.2)	19(38.8)		
26-35	62(39.7)	94(60.3)		
36-45	38(29.9)	89(70.1)		
46-55	10(21.3)	37(78.7)		
Above 55	2(25)	6(75)		
Sex			5.03	0.025*
female	10(21.7)	36(78.3)		
male	132(38.7)	209(61.29)		
Educational level			50.3	0.001*
tertiary	13(11.6)	99(88.4)		
secondary/vocational	70(44.3)	88(55.7)		
middle/JHS	35(46.7)	40(53.3)		
primary/elementary	12(44.4)	15(55.6)		
None	12(80.0)	3(20.0)		
Employment status			25.95	< 0.001*
formal employment	13(16.5)	66(83.5)		
self-employed	93(47)	105(53)		
wage/seasonal				
employment	25(29.1)	61(70.9)		
unemployed	11(45.8)	13(54.2)		
Income level			60.08	< 0.001*
0-349	37(64.9)	20(35.1)		
350-649	68(49.3)	70(50.7)		
650-949	18(32.1)	38(67.9)		
950-1299	14(15.9)	74(84.9)		
above 3000	5(10.4)	43(89.6)		
Family size			22.49	< 0.001*
1 to 2	37(45.1)	45(54.9)		
3 to 4	62(35.2)	114(64.8)		
5 to 6	25(25.8)	72(74.2)		
7 to 8	5(31.3)	11(68.7)		
9 to 10	1(50)	1(50)		
more than 10	12(85.7)	2(14.3)		
Driving/riding experience			10.55	0.06
not applicable	10(50)	10(50)		
1 to 5	80(42.1)	110(57.9)		
6 to 10	34(32.4)	71(67.6)		
11 to 15	11(30.6)	25(69.4)		
16-20	5(16.7)	25(83.3)		
above 20 year	2(33.3)	4(66.7)		
Owning of motorcycle/car			63.31	0.06
no	37(29.8)	87(70.2)		
yes	105(39.9)	158(60.1)		
Insurance			3.55	0.06
no	26(48.2)	28(51.9)		
yes	116(34.8)	217(65.2)		
Maintenance frequency			58.49	< 0.001*
never	15(41.7)	21(58.3)		
monthly	44(29.1)	107(70.9)		
every three months	17(18.3)	76(81.2)		
every six months	21(43.8)	27(56.3)		
annually	6(75)	2(25)		
when car/bike breaks	39(76.5)	12(23.5)		
License to drive/ride			27.63	< 0.001*
no	30(68.18)	14(31.82)		
yes	102(31.2)	225(68.8)		

4.4 Logistic Regression Analysis

Tables 4 and 5 show results for simple and multiple logistic regression analysis

Simple Logistics Regression

When the variables that showed significant association from the chi square test were individually analysed using simple logistic regression, the following were observed as shown in the crude odds ratio section of the table 4. Being male, age in years except above 55years, education level and having a licence were significantly associated with motorcycle accidents ($p < 0.05$). Employment status with the exception of wage/seasonal employment, family size of more than 10 and 5 to 6 members were also significantly associated with motorcycle accidents ($p < 0.05$). Again, maintenance every three months and maintenance only when motorcycle breaks down were associated significantly with motorcycle accidents ($p < 0.05$).

Multiple Logistics Regression

For the factors sex, education level and ownership, after adjusting for age in years, the associations with motorcycle accidents were still significant (p values < 0.05).

For income level, when education level was adjusted for, all the income ranges maintained significant association with motorcycle accidents ($p < 0.05$).

Having a licence remained significant after adjusting for income level (AOR =0.27 $p < 0.001$).

For maintenance frequency, having adjusted for income level, there was still significant association with motorcycle accident for maintenance every 3 months and maintenance upon break down. (AOR=0.34 $p=0.022$: AOR=5.29 $p < 0.0001$) respectively.

Adjusting for education level, being self-employed was still significantly associated with motorcycle (AOR=2.63 $p < 0.0001$). For the unemployed, adjusting for education level, significant association with motorcycle accidents was maintained (AOR=3.04 $p < 0.05$).

In a multiple logistic regression model, education level, sex, income level, having a licence and maintaining bike only when it breaks down were significantly associated with motorcycle accidents ($p < 0.05$).

Table 4: logistic regression for association of motorcycle accidents with sociodemographic/ socioeconomic factors (adjusting for age, education level and income level)

variables	COR	95% CI	P-Value	AOR	95% CI	P-Value
Sex						
female	1					
male	2.27	1.09-4.74	0.028	2.6	1.21-5.51	0.013
Highest educational level						
tertiary	1			1		
secondary/vocational	6.06	3.14-11.70	<0.001	5.41	2.78-10.54	<0.001
middle/JHS	6.66	3.20-13.90	<0.001	6.76	3.20-14.25	<0.001
primary/elementary	6.09	2.35-15.82	<0.001	5.89	2.21-15.67	<0.001
none	30.46	7.58-122.42	<0.001	28.19	6.93-114.68	<0.001
Employment status						
formal employment	1			1		
self-employed	4.5	2.33-8.67	<0.001	2.63	1.30-5.32	0.007
wage/seasonal employment	2.08	0.98-4.43	0.057	1.43	0.65-3.16	0.373
unemployed	4.3	1.58-11.67	0.004	3.04	1.08-8.56	0.035
Income level						
0-349	1			1		
350-649	0.53	0.28-0.99	0.048	0.46	0.24-0.88	0.019
650-949	0.26	0.12-0.56	0.001	0.22	0.10-0.50	<0.001
950-1299	0.1	0.05-0.23	<0.001	0.11	0.05-0.25	<0.001
above 3000	0.06	0.02-0.18	<0.001	0.09	0.03-0.28	<0.001
Family size						
1 to 2	1			1		
more than 10	7.3	1.54-34.69	0.012	6.6	1.37-31.83	0.019
Ownership						
no	1			1		
yes	1.56	0.99-2.47	0.056	2.02	1.24-3.28	0.004
Maintenance frequency						
never	1			1		
monthly	0.58	0.27-1.22	0.149	0.95	0.42-2.17	0.909
every three months	0.31	0.13-0.73	0.007	0.34	0.14-0.86	0.022
every six months	1.09	0.45-2.61	0.849	0.72	0.28-1.84	0.493
annually	4.2	0.74-23.74	0.104	1.94	0.33-11.55	0.467
when car/bike breaks down	4.55	1.80-11.49	0.001	5.29	1.96-14.31	0.001
License						
no	1			1		
yes	0.21	0.11-0.42	<0.001	0.27	0.13-0.56	<0.001
expired	0.78	0.24-2.57	0.68	0.76	0.21-2.67	0.664

*COR= crude odds ratio, AOR = adjusted odds ratio, CI=confidence interval. S Sex, education, ownership were adjusted for age. Employment and income level were adjusted for education.

Table 5: Logistic regression analysis after adjusting for all other variables in the study

variables	Crude odds ratio		Adjusted odds ratio			P-Value
	COR	95% CI	P-Value	AOR	95% CI	
Sex						
male	2.27	1.09-4.74	0.028*	0.39	0.18 - 0.820	0.013*
Age group in years						
15-25	1					
26-35	0.42	0.22-0.81	0.009*	0.54	0.23 - 1.30	0.172
36-45	0.27	0.14-0.54	< 0.001*	0.6	0.23 - 1.53	0.282
46-55	0.17	0.07-0.42	< 0.001*	0.52	0.16 - 1.67	0.273
above 55	0.21	0.04-1.16	0.073	1.54	0.19 - 12.20	0.685
Family size						
1 to 2	1			1		
3 to 4	0.66	0.39-1.13	0.129	0.65	0.33-1.30	0.221
5 to 6	0.42	0.23-0.79	0.007*	0.55	0.23-1.30	0.175
7 to 8	0.55	0.18-1.73	0.31	0.36	0.09-1.50	0.162
9 to 10	1.22	0.07-20.12	0.891	2.49	0.13-49.19	0.548
more than 10	7.3	1.54-34.69	0.012*	5.07	0.44-58.11	0.192
Highest educational level						
tertiary	1			1		
secondary/vocational	6.06	3.14 - 11.70	< 0.001*	3.32	1.37 -8.03	0.008*
middle/JHS	6.66	3.20 - 13.90	< 0.001*	4.12	1.54 -11.01	0.005*
primary/elementary	6.09	2.35 -15.82	< 0.001*	2.96	0.82 -10.70	0.098
none	30.46	7.58 -122.42	< 0.001*	19.32	3.46 -107.90	0.001*
Employment status						
formal employment	1			1		
self-employed	4.5	2.33-8.67	< 0.001*	1.53	0.64-3.65	0.341
wage/seasonal employment	2.08	0.98 -4.43	0.057	1.05	0.39-2.80	0.92
unemployed	4.3	1.58-11.67	0.004*	0.96	0.26-3.54	0.95
Income level						
0-349	1			1		
350-649	0.53	0.28-0.99	0.048*	0.41	0.18-0.88	0.023*
650-949	0.26	0.12-0.56	0.001*	0.2	0.08-0.54	0.001*
950-1299	0.1	0.05-0.23	< 0.001*	0.11	0.04-0.31	< 0.001*
above 3000	0.06	0.02-0.18	< 0.001*	0.17	0.04-0.69	0.013*
Maintenance frequency						
never	1			1		
monthly	0.58	0.27-1.22	0.149	1.38	0.41-4.63	0.603
every three months	0.31	0.13-0.73	0.007*	0.63	0.17-2.31	0.481
annually	4.2	0.74-23.74	0.104	3.55	0.44-28.48	0.233
when car/bike breaks down	4.55	1.80-11.49	0.001*	7.73	2.05-29.17	0.003*
License						
no	1			1		
yes	0.21	0.11 - 0.42	< 0.001*	0.29	0.09- 0.97	0.045*
expired	0.78	0.24 2.56	0.68	0.77	0.16-3.66	0.739

*COR= crude odds ratio, AOR = adjusted odds ratio, CI =confidence interval. Adjustment was done for all the variables in the study

CHAPTER FIVE

DISCUSSIONS

The results of the study show that, the majority of motor accident victims were males (88%). This is similar to the study findings of the Global Road Safety Partnership (G R S P) indicating that from 2002 – 2005, the majority of persons involved in road accidents were males. Males, being the main bread winners of their families, tend to be affected more and this can adversely affect their role and consequently their dependents, when such accidents occur. Males, being the most affected, can be explained by the risk-taking behaviour of males as compared to females, who generally tend to be more cautious (Psychological Consultancy Limited, 2016). Those that experienced motorcycle accidents more were within the age groups of 15-25years (61%) and 26-35years (44%). This falls within the range of the age group given by Nyarko (2012) and Peden et al (2002). This may be due to the propensity of the youth to be more adventurous and to take more risks like engaging in dangerous driving (Steinberg, 2008). It implies that the youth, who are the future of the nation, are more involved in motorcycle accidents. Hence stringent steps ought to be taken to curb this menace.

5.1 Prevalence

From the results of this study, the prevalence of motorcycle accidents in Accra for the past 6 months was about thirty-seven percent (37%). This is comparable to a study done in Singapore by Haquea et al. (2008) that showed that motorcycles are responsible for 36% of total accidents. All over the world, the reported prevalence of motorcycle injuries vary from 22.8% in China (Zhang et al., 2004) to even as high as 62% in Vietnam (Nantulya & Reich, 2002).

The prevalence obtained for this study implies that more than one-third of the road accident cases were attributable to motorcycle accidents. This can be explained by the increasing use of motorcycles as a means of transportation to escape traffic jams and for commercial purposes, as a means of employment. Among males, the prevalence of motorcycle accidents was close

to two times compared to the prevalence among females (males= 39%: females=22%). This compares to a study done by Alessandro et al. (2013) that showed that men were two times more likely to suffer motorcycle accidents compared to women. Again, this trend can be attributed to women being more cautious than men and the fact that more men own or use motorcycles compared to women, as shown in the study.

5.2 Associations with motorcycle accidents

The significant association between motorcycle accidents and most of the sociodemographic/ socioeconomic factors, as shown in the results is comparable to many studies including that conducted in Belgium by Berghe (2017). This showed that people from lower socioeconomic status groups have a higher risk of being involved in road crashes thus socioeconomic and sociodemographic factors were associated with motorcycle accidents (Berghe, 2017). The reason for this similarity could be that, persons in low socioeconomic settings may not regard the risk of motorcycle accidents, basically because they are affected by other existing more serious risks persistently (Rundmo & Iversen, 2004).

The association between family size and motorcycle accidents could be explained by the fact that the larger the family size of a person, the more the financial requirement to cater for them. Thus, the financial need tends to put a strain on individuals, increasing stress and hence more prone to accidents. Those with lower socioeconomic status, example lower income levels, less maintenance frequency and the unemployed have a higher likelihood of being involved in motorcycle accidents probably due to stress and the burden of their status. They may tend to be more worried about their plight and more prone to mistakes that could possibly cause accidents. People with low socioeconomic status may not be able to afford the cost of training and obtaining a license, or the cost of motorcycle maintenance. They may usually have minimal or no education, low-income levels and unemployed/self-employed/seasonally employed. Such people, more often than not are those who may get involved in motorcycle accidents, as they

patronise its usage more for cheaper transportation. This is in line with a study done in Myanmar (Lwin et al., 2016).

For the factors sex (male or female), education level and ownership, after adjusting for age in years, the associations with motorcycle accidents were still significant ($p, 0.05$). This is similar to findings of studies done in New Zealand which indicated that adjusting for age, motorcycle accidents risk was still associated with education level and occupational status, $p=0.007$ (Whitlock et al., 2003). Other comparable studies were in Italy and Israel respectively Michelozzi et al. (1999) and Factor et al. (2008). Generally, men tend to own and use motorcycles more than women (Hughes, 2009). Also, the less educated are usually not gainfully employed, less financially sound and tend to find transportation by motorcycle cheaper. These reasons may explain why the similarity is observed in the association of motorcycle accidents with sex, education level and ownership, for these studies. Additionally, a low level of formal education may account for a higher level of ignorance, hence the poor interpretation of road signs and higher chances of motorcycle accidents (Ogunmodede et. al., 2012).

For income level, when education level was adjusted for, all the income ranges maintained significant association with motorcycle accidents ($p<0.05$). This compares favourably with findings of research done in Belgium (Berghe, 2017) and studies in Italy by Camilloni et al. (2013). This similarity may be due to the fact that one requires more income to own a car as compared to a motorcycle.

Having a license remained significant after adjusting for income level (AOR =3.65 $p=0.001$).

For maintenance frequency, having adjusted for income level, there was still a significant association with motorcycle accident for maintenance every 3 months and maintenance upon break down. (AOR=2.7 $p=0.022$: AOR=0.19 $p=0.001$) respectively. This is similar to studies

done by Berghe (2017). Ideally, before one is legally issued a license there is a test to prove the person is trained and capable of riding safely and interpret road signs (Gibbs, 2019). Hence those with a license may tend to be better trained and less prone to accidents.

Adjusting for education level, employment status showed significant association with motorcycle accidents for self-employed and unemployed groups of people (AOR=0.2 p=0.001: AOR=0.3 p=0.011). Swedish publication by Hasselberg et al. (2001) shows similar studies. Also a New Zealand study shows that there is a relationship between high and intermediate salaried employers, salaried workers and motorcycle accidents (Whitlock et al., 2003). The reason could be that, those who go to work are more exposed to the risk of being involved in a crash on their way to or from work (Ngunu, 2013).

However adjusting for all other factors in the study, only education level, sex, maintenance when motorcycle breaks down, having a license to ride and income level were still significantly associated with motorcycle accidents ($p < 0.05$). The remaining variables (ownership, employment status, family size) were no longer significantly associated with motorcycle accidents as shown in all the studies indicated above. This is because they are independent predictors. This is in accordance with many works that show that sex, having a license, income level and maintenance are associated with motorcycle accidents. For example a study conducted in Malaysia showed that more males were involved in motorcycle accidents as compared to females (Sharifah *et al.*, 2012). Men tend to own and use motorcycles more than women (Hughes, 2009). Also Income level being significant is in line with many studies, including one that showed that people from lower socioeconomic status groups had higher risk of getting involved in road crashes including motorcycle crashes (Berghe, 2017). Also those with lower income levels, generally find motorcycle use more affordable in terms of fuel efficiency and transport fare (Budget Direct Insurance, 2019). For having a licence, a study done by NCSA (2016), also showed that licence affects motorcycle accidents. Ideally, before

one is legally issued a license there is a test to prove the person is trained and capable of riding safely and interpret road signs (Gibbs, 2019). Hence those with a license may tend to be better trained and less prone to accidents.

5.3 Limitations of the Study

One limitation of the study was the possibility of recall bias, since participants had to recall incidence in the past. However, steps were taken to reduce it to an extent by using only participants who had been involved in a road accident not more than six months ago. Another limitation is that with cross sectional study, the timing of collecting the data (snapshot) is not guaranteed to be representative. Also, it is not helpful in determining cause and effects

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

The prevalence of motorcycle accidents in Accra was high (37%). The prevalence of motorcycle accidents among males was higher and that for females. Motorcycle accidents

predominantly affected the youth. Prevalence among the non-educated was highest, followed by among those with middle/Junior high school level of education. That for people with tertiary education was least. Individuals higher income level (above GHC 3000) had the lowest prevalence while those with low income level (GHC 0-349), had a high prevalence of motorcycle accidents.

Demographic factors like age and sex affected motorcycle accident occurrence.

Without controlling for potential confounders, factors such as age income level, family size, license, maintenance frequency, sex, education level and employment status were significantly associated with motorcycle accidents. Adjusting for all other variables, socioeconomic and sociodemographic factors such as educational level, income level, sex, maintenance only when motorcycle breaks down and possession of license were significantly associated with motorcycle accidents.

This implies that if nothing is done to curb this, those who are not rich (financially), most bread winners of families, the less educated, and the economically active work force (who form the majority of the population), will continue to be adversely plagued with motorcycle accidents and ultimately lead to their death.

6.2 Recommendations

- The government should ensure exposure reduction, by encouraging motorcycle riders and users to use a safer mode of transport.
- Motorcyclists who get involved in accidents due to their own doing should be banned from riding for life by the law-making and enforcement bodies.

- The socioeconomic status of motorcyclists, men and the youth should be boosted by private individuals and the government to help reduce this menace.
- Unlicensed riders should be arrested by the law enforcement bodies and fined heavily in addition to their motorcycles being impounded.

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APPENDICES

APPENDIX 1: PARTICIPANT INFORMATION, CONSENT AND ASSENT

SCHOOL OF PUBLIC HEALTH

UNIVERSITY OF GHANA

PARTICIPANT INFORMATION SHEET (18years and above)

Title of study: Prevalence Of Motorcycle Accidents And Associated Factors In Accra

Introduction

My name is VICTORIA FORDJOR LUTHER, I am a student of University of Ghana, conducting a study on Prevalence of Motorcycle Accidents and Associated Factors in Accra. The research forms part of my academic work, for the award of Master of Science Degree.

Background

Road traffic accident (RTA) is the main cause of death among the 15-29 age groups in the world (Chauhan et al., 2014). Motorcycles, popularly known as “okada” in Nigeria and Ghana, form part of vehicles involved in RTAs. Though motorcycles are a popular means of transportation, they are notorious for the risk they pose to public and road safety (Nungwu, Olatunji, 2012). According to the Motor Traffic And Transport Department (2017), in Ghana, 3,487 motorcycle accidents were recorded in the year 2017. This study seeks to determine the prevalence of motorcycle accidents and associated factors at selected hospitals in Accra.

Purpose Of The Research

This research is mainly for academic purposes and is intended to expose the prevalence of motorcycle accidents in Accra, Ghana in spite of the numerous regulatory measures implemented by the government of Ghana to curb the menace. The findings will give the government of Ghana and other key stakeholders the insight required to pass new laws and/or amend existing ones to help address the problem of motorcycle accidents.

Nature Of The Research

This study will use questionnaires to get information from drivers/riders and pedestrians aged 15 and above who are victims of road traffic accidents from selected hospitals in Accra. This information will be analysed and a report written as part of academic requirements.

Participant Involvement

Your participation in this study is voluntary and as such you have the right to withdraw anytime you feel any discomfort during the data collection process of filling questionnaire within few minutes. If you decide to withdraw from the study, the data provided by you will be destroyed.

Duration / What Is Involved

Participants will be required to answer questions in a questionnaire voluntarily. This is expected to last for a couple of minutes. Information obtained will be kept confidential and used for academic purposes.

Potential Risks

You may feel some discomfort about remembering past events during the study. Confidentiality is highly guaranteed for you to feel free to talk to the researchers.

Benefits

The study will be beneficial in that it can inform policy makers in strengthening existing policies that promote road safety.

Costs

There is no cost incurrence on the part of the participants

Compensation

There is no compensation in this study.

Confidentiality

All personal identifying information about yourself will remain confidential and will not be included in the final write up. Any quotations to be used in reporting the findings will not include names or any identifying data, to ensure anonymity. All recordings and transcripts will only be accessible to the researcher.

Voluntary Participation/Withdrawal

Participation in this study is voluntary. You have the right to decline to participate and also to withdraw from the study at any time without penalty and without having to give any reasons.

Outcome And Feedback

Data obtained from the study will be kept in a locker under key and lock. It will be treated as confidential. Information on computer will be kept secure with a password that is also confidential. Outcome of the study may be used for planning or policy making without disclosure of individual participants' identity. Copies of the findings will be made available to the district assembly, School of Public Health and Ghana Health Service Ethical Review Committee. Feedback on findings will be made available through any of these institutions when requested for.

Appropriate Alternative Procedures And Treatment

This study does not involve treatment of any kind.

Funding Information

This research is solely self-funded.

Sharing Of Participants Information/Data

Information obtained in the study is strictly confidential and for academic purposes. Copies of the findings will be made available to the district assembly, School of Public Health and Ghana Health Service Ethical Review Committee. Identities of participants will not be disclosed. Outcome of the study may be used for planning or policy making without disclosure of individual participants' identities.

Contact For Further Clarifications

If you have any questions about the study or the procedures involved, you may contact me (Victoria F. Luther) on +233544220334, Department of Epidemiology, School of Public Health University of Ghana, Legon.

Any concerns relating to ethics and your right as a participant can be addressed to

Hannah Frimpong

The administrator

Ethical Review Committee

Mobile number: +233507041223

Consent Form For Adult Participants 18 Years And Above

Study Title: Prevalence of Motorcycle Accidents and Associated Factors in Accra.

Participant's Statement

I acknowledge that I have read or have had the purpose and contents of the participants' information sheet read and satisfactorily explained to me in a language I understand (English□/Twi□/Ga□). I fully understand the contents and any potential implications as well as my right to change my mind (ie to withdraw from the research) even after I have signed this form.

I voluntarily agree to be part of this research.

Name or initials of participant.....

ID Code.....

Participant's SignatureOR Thumbprint.....OR Mark (please specify).....

Date.....

Interpreter's Statement

I declare that I interpreted the purpose and contents of the participants information sheet to the afore named participant to the best of my ability in the(English□/Twi□/Ga□) language to his/her proper understanding.

All questions, appropriate clarifications sort by the participant and answers were also duly interpreted to his/her satisfaction.

Name of interpreter.....

Signature of interpreter.....

Date.....

Contact details.....

Statement Of Witness

I was present when the purpose and contents of the Participant information sheet was read and explained satisfactorily to the participants in the language he/she understood (English□/Twi□/Ga□)

I confirm that he/she was given the opportunity to ask questions/seek clarifications and same were duly answered to his/her satisfaction before voluntarily agreeing to be part of the research.

Name.....

Signature.....ORThumbprint.....OR Mark (please specify).....

Date.....

Investigator Statement And Signature

I certify that the participant has been given ample time to read and learn about the study. All questions and clarifications raised by the participant have been addressed.

Researcher's name.....

Signature.....

Date.....

SCHOOL OF PUBLIC HEALTH

UNIVERSITY OF GHANA

PARTICIPANT INFORMATION SHEET (15 – 17years)

Title Of Study: Prevalence Of Motorcycle Accidents And Associated Factors In Accra

Introduction

My name is VICTORIA FORDJOR LUTHER, I am a student of University of Ghana, conducting a study on Prevalence of Motorcycle Accidents and Associated Factors in Accra. The research forms part of my academic work, for the award of Master of Science Degree.

Background

Road traffic accident (RTA) is the main cause of death among the 15-29 age groups in the world (Chauhan et al., 2014). Motorcycles, popularly known as “okada” in Nigeria and Ghana, form part of vehicles involved in RTAs. Though motorcycles are a popular means of transportation, they are notorious for the risk they pose to public and road safety (Nungwu, Olatunji, 2012). According to the Motor Traffic and Transport Department (2017), in Ghana, 3,487 motorcycle accidents were recorded in the year 2017. This study seeks to determine the prevalence of motorcycle accidents and associated factors at selected hospitals in Accra.

Purpose Of The Research

This research is mainly for academic purposes and is intended to expose the prevalence of motorcycle accidents in Accra, Ghana in spite of the numerous regulatory measures implemented by the government of Ghana to curb the menace. The findings will give the government of Ghana and other key stakeholders the insight required to pass new laws and/or amend existing ones to help address the problem of motorcycle accidents.

Nature Of The Research

This study will use questionnaires to get information from drivers/riders and pedestrians aged 15 and above who are victims of road traffic accidents from selected hospitals in Accra. This information will be analysed and a report written as part of academic requirements.

Participant Involvement

Your participation in this study is voluntary and as such you have the right to withdraw anytime you feel any discomfort during the data collection process of filling questionnaire within few minutes. If you decide to withdraw from the study, the data provided by you will be destroyed.

Duration / What Is Involved

Participants will be required to answer questions in a questionnaire voluntarily. This is expected to last for a couple of minutes. Information obtained will be kept confidential and used for academic purposes.

Potential Risks

You may feel some discomfort about remembering past events during the study. Confidentiality is highly guaranteed for you to feel free to talk to the researchers.

Benefits

The study will be beneficial in that it can inform policy makers in strengthening existing policies that promote road safety.

Costs:

There is no cost incurment on the part of the participants

Compensation

There is no compensation in this study.

Confidentiality

All personal identifying information about yourself will remain confidential and will not be included in the final write up. Any quotations to be used in reporting the findings will not include names or any identifying data, to ensure anonymity. All recordings and transcripts will only be accessible to the researcher.

Voluntary Participation/Withdrawal

Participation in this study is voluntary. You have the right to decline to participate and also to withdraw from the study at any time without penalty and without having to give any reasons.

Outcome And Feedback

Data obtained from the study will be kept in a locker under key and lock. It will be treated as confidential. Information on computer will be kept secure with a password that is also confidential. Outcome of the study may be used for planning or policy making without disclosure of individual participants' identity. Copies of the findings will be made available to the district assembly, School of Public Health and Ghana Health Service Ethical Review

Committee. Feedback on findings will be made available through any of these institutions when requested for.

Appropriate Alternative Procedures And Treatment

This study does not involve treatment of any kind.

Funding Information

This research is solely self-funded.

Sharing Of Participants Information/Data

Information obtained in the study is strictly confidential and for academic purposes. Copies of the findings will be made available to the district assembly, School of Public Health and Ghana Health Service Ethical Review Committee. Identities of participants will not be disclosed. Outcome of the study may be used for planning or policy making without disclosure of individual participants' identities.

Contact For Further Clarifications

If you have any questions about the study or the procedures involved, you may contact me (Victoria F. Luther) on +233544220334, Department of Epidemiology, School of Public Health University of Ghana, Legon.

Any concerns relating to ethics and your right as a participant can be addressed to

Hannah Frimpong

The administrator

Ethical Review Committee

Mobile number: +233507041223

Assent For Adolescent Participants (15 -17years)

Study Title: Prevalence Of Motorcycle Accidents And Associated Factors In Accra

Participant's Statement

I acknowledge that I have read or have had the purpose and contents of the participants' information sheet read and satisfactorily explained to me in a language I understand (English/Twi/Ga) I fully understand the contents and any potential implications as well as my right to change my mind (ie to withdraw from the research) even after I have signed this form.

I voluntarily agree to be part of this research.

Name or initials of participant..... ID Code.....

Participant's SignatureOR Thumbprint.....OR Mark (please specify).....

Date.....

Interpreter's Statement

I declare that I interpreted the purpose and contents of the participants information sheet to the afore named participant and parent/guardian of participant to the best of my ability in the (English/Twi/Ga) language to his/her proper understanding.

All questions, appropriate clarifications sort by the participant/guardian/parent and answers were also duly interpreted to their satisfaction.

Name of interpreter.....

Signature of interpreter.....

Date.....

Statement of Witness

I was present when the purpose and contents of the Participant information sheet was read and explained satisfactorily to the participant/parent/guardian in the language he/she understood (English/Twi/Ga)

I confirm that they were given the opportunity to ask questions/seek clarifications and same were duly answered to their satisfaction before voluntarily agreeing to be part of the research.

Name.....

Signature.....ORThumbprint.....OR

Mark.....

Date.....

Investigator Statement And Signature

I certify that the participant has been given ample time to read and learn about the study. All questions and clarifications raised by the participant have been addressed.

Researcher's name.....

Signature.....

Date.....

SCHOOL OF PUBLIC HEALTH

UNIVERSITY OF GHANA

**PARTICIPANT INFORMATION SHEET FOR GUARDIAN/PARENT OF
ADOLESCENT PARTICIPANT (15 – 17years)**

Title Of Study : Prevalence Of Motorcycle Accidents And Associated Factors In Accra

Introduction

My name is VICTORIA FORDJOR LUTHER, I am a student of University of Ghana, conducting a study on Prevalence of Motorcycle Accidents and Associated Factors in Accra. The research forms part of my academic work, for the award of Master of Science Degree.

Background

Road traffic accident (RTA) is the main cause of death among the 15-29 age groups in the world (Chauhan et al., 2014). Motorcycles, popularly known as “okada” in Nigeria and Ghana, form part of vehicles involved in RTAs. Though motorcycles are a popular means of transportation, they are notorious for the risk they pose to public and road safety (Nungwu & Olatunji, 2012). According to the Motor Transport and Traffic Department (2017), in Ghana, 3,487 motorcycle accidents were recorded in the year 2017. This study seeks to determine the prevalence of motorcycle accidents and associated factors at selected hospitals in Accra.

Purpose Of The Research

This research is mainly for academic purposes and is intended to expose the prevalence of motorcycle accidents in Accra, Ghana in spite of the numerous regulatory measures implemented by the government of Ghana to curb the menace. The findings will give the government of Ghana and other key stakeholders the insight required to pass new laws and/or amend existing ones to help address the problem of motorcycle accidents.

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This study will use questionnaires to get information from drivers/riders and pedestrians aged 15 and above who are victims of road traffic accidents from selected hospitals in Accra. This information will be analysed and a report written as part of academic requirements.

Participant Involvement

Your participation in this study is voluntary and as such you have the right to withdraw anytime you feel any discomfort during the data collection process of filling questionnaire within few minutes. If you decide to withdraw from the study, the data provided by you will be destroyed.

Duration / What Is Involved

Participants will be required to answer questions in a questionnaire voluntarily. This is expected to last for a couple of minutes. Information obtained will be kept confidential and used for academic purposes.

Potential Risks

You may feel some discomfort about remembering past events during the study. Confidentiality is highly guaranteed for you to feel free to talk to the researchers.

Benefits

The study will be beneficial in that it can inform policy makers in strengthening existing policies that promote road safety.

Costs

There is no cost incurment on the part of the participants

Compensation

There is no compensation in this study.

Confidentiality

All personal identifying information about yourself will remain confidential and will not be included in the final write up. Any quotations to be used in reporting the findings will not include names or any identifying data, to ensure anonymity. All recordings and transcripts will only be accessible to the researcher.

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Data obtained from the study will be kept in a locker under key and lock. It will be treated as confidential. Information on computer will be kept secure with a password that is also confidential. Outcome of the study may be used for planning or policy making without disclosure of individual participants' identity. Copies of the findings will be made available to the district assembly, School of Public Health and Ghana Health Service Ethical Review

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Any concerns relating to ethics and your right as a participant can be addressed to

Hannah Frimpong

The administrator

Ethical Review Committee

Mobile number: +233507041223

Parental/Guardian Form For Adolescent Participants (15 -17years)

Study Title: Prevalence Of Motorcycle Accidents And Associated Factors In Accra

Participant's Statement

I acknowledge that I have read or have had the purpose and contents of the participants' information sheet read and that all questions have been satisfactorily explained to me in a language I understand (English/Twi/Ga) I fully understand the contents and any potential implications as well as my right to change my mind (ie to withdraw from the research) even after I have signed this form.

I voluntarily agree for my ward to be part of this research.

Name or initials of participant..... ID Code.....

Participant's SignatureOR Thumbprint.....OR Mark (please specify).....

Date.....

Interpreter's Statement

I declare that I interpreted the purpose and contents of the participants information sheet to the afore named participant and parent/guardian of participant to the best of my ability in the (English/Twi/Ga) language to his/her proper understanding.

All questions, appropriate clarifications sort by the participant/guardian/parent and answers were also duly interpreted to their satisfaction.

Name of interpreter.....

Signature of interpreter.....

Date.....

Statement Of Witness

I was present when the purpose and contents of the Participant information sheet was read and explained satisfactorily to the participant/parent/guardian in the language he/she understood (English/Twi/Ga)I confirm that they were given the opportunity to ask questions/seek clarifications and same were duly answered to their satisfaction before voluntarily agreeing to be part of the research.

Name.....

Signature.....ORThumbprint.....ORMark.....

.... Date.....

Investigator Statement And Signature

I certify that the participant has been given ample time to read and learn about the study. All questions and clarifications raised by the participant have been addressed.

Researcher's name.....

Signature.....

Date.....

APPENDIX 2: QUESTIONNAIRE

PREVALENCE OF MOTORCYCLE ACCIDENTS AND ASSOCIATED FACTORS IN ACCRA.

Instruction: Please **CIRCLE** the correct code in column three (CODE) that answers the questions in column one (NO.) below. The last column (SKIP/REMARKS) provides additional directives on questions - **ONLY** when applicable.

SETION A: BIOGRAPHICAL DETAILS AND CYCLING HISTORY

NO	QUESTIONS	CODE	REMARKS
A1	Sex	1. Male 2. Female	

A2	Age	<ol style="list-style-type: none"> 1. 15-25 2. 26-35 3. 36-45 4. 46-55 5. Above 55 	
A3	What is your highest education level?	<ol style="list-style-type: none"> 1. Tertiary 2. Secondary/Vocational 3. Middle or JHS 4. Primary/Elementary 5. None 	
A4	Employment Status	<ol style="list-style-type: none"> 1. Formal Employment 2. Self-employed 3. Wage/seasonal employment 4. Unemployed 	
A5	Income Level (GHC)	<ol style="list-style-type: none"> 1. 0 – 349 monthly 2. 350 – 649 monthly 3. 650 – 949 monthly 4. 950 – 1299 monthly 5. Above 3000 	
A6	Family Size	<ol style="list-style-type: none"> 1. 1-2 2. 3-4 3. 5-6 4. 7-8 5. 9-10 6. More than 10 	
A7	How long have you been driving/riding a vehicle/motorcycle?	<ol style="list-style-type: none"> 1. 1-5 years 2. 6-10 years 3. 11-15 years 4. 16-20 years 5. Above 20 years 	
A8	Do you own the car/motorcycle	<ol style="list-style-type: none"> 1. Yes 2. No 	
A9	Are you insured?	<ol style="list-style-type: none"> 1. Yes 2. No 	

SECTION B: ACCIDENT CAUSES AND RISKS

NO	QUESTIONS	CODE	REMARKS
B1	Nature of your accident	<ol style="list-style-type: none"> 1. Collision with another motorcycle/car 2. Knocked down a pedestrian 3. Lost control 4. Mechanical fault 5. Knocked down by a motorcycle 	

		6. I don't remember 7. Other (specify).....	
B2	How often do you take your motorcycle to the workshop?	1. Never 2. Monthly 3. Every three months 4. Every six months 5. Annually 6. Only When the bike/breaks down	
B3	Do you have the licence to ride/drive?	1. Yes 2. No 3. Expired	
B4	How many hours do you ride in a day?	1. 1-4 hrs 2. 5-10 hrs 3. 11-15 hrs 4. 16-20 hrs 5. 21-24 hrs	
B5	How often do you wear your seatbelt (driver) or Helmet (motor cyclist)?	1. Never 2. Very Rarely 3. Rarely 4. Sometimes 5. Often 6. Nearly Always	
B6	How often would you cross a junction knowing that the traffic lights have already turned against you?	1. Never 2. Very Rarely 3. Rarely 4. Sometimes 5. Often 6. Nearly Always	
B7	How often do you fail to notice that a vehicle/pedestrian is coming when you are crossing from one side of road into the other side?	1. Never 2. Very Rarely 3. Rarely 4. Sometimes 5. Often 6. Nearly Always	
B8	Sometimes it is important to bend the traffic rules to arrive in time.	1. Never 2. Very Rarely 3. Rarely 4. Sometimes 5. Often 6. Nearly Always	
B9	How often do you drive/ride motorcycles under the influence of alcohol/narcotics?	1. Never 2. Very Rarely 3. Rarely 4. Sometimes 5. Often 6. Nearly Always	
B10	In your opinion, how is the attitude of pedestrians in Ghana?	1. Very Poor 2. Poor 3. Average	

		4. Good 5. Excellent	
B11	In your opinion, how is the driving attitude of motorcyclists and drivers in Ghana?	1. Very Poor 2. Poor 3. Average 4. Good 5. Excellent	
B12	In your opinion, how will you describe the road traffic regulations/signs in Ghana	1. Very Poor 2. Poor 3. Average 4. Good 5. Excellent	
B13	How good are the roads you ply	1. Very Poor 2. Poor 3. Average 4. Good 5. Excellent	
B14	In your opinion, how effective is policing on major roads/highways	1. Very Poor 2. Poor 3. Average 4. Good 5. Excellent	

SECTION C: ROAD SAFETY AWARENESS CAMPAIGNS

CODES	QUESTIONS	RESPONSE	REMARKS
C1	How often do you receive/hear/read new advertisements/information on road safety?	1. Never 2. Very Rarely 3. Rarely 4. Sometimes 5. Often 6. Nearly Always	
C2	Where do you normally get road safety information/advertisements from?	1. TV 2. Radio 3. Newspapers 4. Internet 5. Signpost 6. Other (Specify).....	
C3	Do you think you have all the necessary information for your safety on Ghanaian roads?	1. Yes 2. No	(If 'YES' Continue from question D1)
C4	If 'No' what information are missing on the road?	a)..... b)..... c).....	

SECTION D: POLICY RECOMMENDATIONS

D1	Restrictions for learner and provisional drivers/riders	1. Absolutely necessary 2. Necessary 3. Not sure 4. Not very necessary 5. Very Unnecessary	
D2	Do you suggest that the severity of penalties for breaking traffic laws should be intensified? (prison sentence and fines)	1. Absolutely necessary 2. Necessary 3. Not sure 4. Not very necessary 1. Very Unnecessary	
D3	Loss of licence for serious offences, (eg. Over- speeding or drink driving)	1. Absolutely necessary 2. Necessary 3. Not sure 4. Not very necessary 5. Very Unnecessary	
D4	Police patrols	1. Absolutely necessary 2. Necessary 3. Not sure 4. Not very necessary 5. Very Unnecessary	
D5	Random checks for vehicles that are not roadworthy	1. Absolutely necessary 2. Necessary 3. Not sure 4. Not very necessary 5. Very Unnecessary	
D6	Better roads, (e.g. sealed shoulders, wide lanes)	1. Absolutely necessary 2. Necessary 3. Not sure 4. Not very necessary 5. Very Unnecessary	
D7	Identifying and fixing road/traffic hazards	1. Absolutely necessary 2. Necessary 3. Not sure 4. Not very necessary 5. Very Unnecessary	
D8	Overtaking lanes	1. Absolutely necessary 2. Necessary 3. Not sure 4. Not very necessary 5. Very Unnecessary	
D9	Roadside rest facilities	1. Absolutely necessary 2. Necessary 3. Not sure 4. Not very necessary 5. Very Unnecessary	
D10	Road-based fatigue initiatives, (eg. Rumble strips / audible edge lines)	1. Absolutely necessary 2. Necessary 3. Not sure	

		4. Not very necessary 5. Very Unnecessary	
D11	Driver education on how to share the road safely, (eg. Different types of automobiles sharing the road with pedestrians and cyclists)	1. Absolutely necessary 2. Necessary 3. Not sure 4. Not very necessary 5. Very Unnecessary	
D12	Do you think the overall amount of speed enforcement (including cameras) should be changed?	1. Absolutely necessary 2. Necessary 3. Not sure 4. Not very necessary 5. Very Unnecessary	

THANK YOU FOR YOUR TIME

APwPENDIX 3: ETHICAL CLEARANCE

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

In case of reply the number and date of this Letter should be quoted.

*MyRef.ghs/rdd/erc/Admin/amend/app18
Your Ref. No.*



Research & Development Division
Ghana Health Service
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18th June, 2019

Victoria Fordjor Luther
School of Public Health
University of Ghana
Legon-Accra

RE: REQUEST FOR AMENDMENT of STUDY PROTOCOL –Version 1 Dated: 31st May, 2019

Reference is made to your letter dated 31st May, 2019 on the above subject matter.

The Ghana Health Service Ethics Review Committee (GHS-ERC) has reviewed the documents submitted, and the rationale for the request for amendment. The GHS-ERC has given approval for the amendment to be implemented.

GHS-ERC Number	GHSERC: 040/02/19
Project Title	“Prevalence of motorcycle accidents and associated factors in Accra”
Effective Date for Approval of Amendment	17 th June, 2019
GHS-ERC Decision	Amendment Version 1 dated 31st May, 2019 Approved

The approval covers the following only:

- **Study sites:** Inclusion of additional two sites namely: Kaneshie District Court and Motor Traffic and Transport Unit, Accra to the existing four sites.
- **Study title:** Change of original study title from “Prevalence of motorcycle accidents and associated factors at selected hospitals in Accra” to **“Prevalence of motorcycle accidents and associated factors in Accra”**

The following applies:

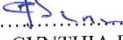
- Submission of yearly progress report of the study to the Ethics Review Committee (ERC).
- Renewal of ethical approval if the study lasts for more than 12 months.

- 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 is discontinued and reasons why.
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.

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

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

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

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

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