

Factors Contributing to Impair Driving in Ghana. A Case Study of the Ashanti Region of Ghana

Article by Gabriel Opoku
Texila American University
E-mail: gabfaraday74@gmail.com

Abstract

Road safety has become a global issue of concern and concrete effort needs to be espoused at the ground level to dwindle the thousands of lives being lost in road traffic accidents around the world. The present study was conducted to dissect factors contributing to impair driving in Ghana; a case study of the Ashanti region of Ghana and scan the association between impaired driving and road traffic accidents. Cross-sectional study design was used. Questionnaire, alcohol breathalyzer test and focus group discussions were used to collect data. Simple random and convenient sampling methods were used to select participants, who were made up of motor vehicle users, Driver Vehicle and Licensing Authority, Motor Traffic and Transport Department and Ghana Private Road Transport Union. The study participants were 216. 96% of the study participants were males. The average age of the respondents was 45.5. Distracted driving, drugs driving, drunk driving, emotions and fatigue driving were the major causes of impaired driving. 74% of the subjects practice drunk driving. The study found that, drunk driving, fatigue and distracted driving were the major causes of road crashes. Drunk driving causes almost 40% of road traffic accidents and it is related to over speeding. Driving while using a cell phone is the major cause of distracted driving. Most of the motor vehicle users continuously drive more than 8 hours. Loss of lives and property damages are expected to continue if suitable corrective measures are not put in place to peter out the problem.

Keywords: *impaired driving, road crashes, safety measures, enforcement.*

Introduction

According to World Health Organization Global Status report on road safety 2018, approximately 1.35 million people die each year as a result of road traffic accidents. This represents an average of 3,242 people dying each day around the world from road traffic injuries. African Region is the least motorized out of the six world regions but suffers the highest rates of road traffic fatalities. (Salmon, et al; 2012). Washington, January 9, 2018 - A new World Bank study, funded by Bloomberg, Philanthropies, finds that reducing road traffic deaths and injuries could result in substantial long-term income gains for low- and middle-income countries. According to the US National Highway Traffic Safety Administration, (2010) road safety survey, impaired driving was considered as one of the major causes of road traffic accidents. In most of the African countries, which Ghana is not excluded, impaired driving related studies are mostly based on drunk driving. A study conducted by Charles Mock, Godfred Asiamah and Justice Amegashie (1998) "Epidemiology of alcohol impaired driving in an African Nation, Ghana," defined impaired driving as BAC \geq 80 mg/dl. United States National Highway Traffic Safety Administration, (2016) also indicated that, drivers are considered to be alcohol impaired when their blood alcohol concentrations are \geq .08 grams per decilitre (g/dl). In order to reduce road traffic accidents, impaired driving should be treated and studied in a holistic approached. Studies on alcohol impaired driving are not enough to curb the situation. Impaired driving means a lot. NHTSA (2016), defined impaired driving as a decrease in a person's judgment and/or physical ability. From this definition, it is important, however, to emphasize that there are other causes for driving impairment which attention must be drawn to. It is against this background that the current study was conducted to determine factors contributing to impair driving and how they are related to road traffic accidents. Theories and studies on alcohol impaired driving mostly use drivers as subjects and alcohol breathalyzer test as a tool to collect data to make analysis and draw conclusion.

This methodology is not adequate and effective enough to address the problem. Major stakeholders within the field of road safety should be part of the study to get in-depth knowledge and information. The current study used different approach by involving motor vehicle users, Driver Vehicle and Licensing Authority, Motor Traffic and Transport Department, and Ghana Private Road Transport Union in the study. They are the major stakeholders and provided information that are adequate and effective to reduce road traffic accidents.

Statement of the problem

According to Peden et al, (2004) and WHO, (2013), African region is the least motorized out of the six world regions but suffers the highest rates of road traffic fatalities. Ghana like any other developing countries has a high prevalence rate of road traffic accidents. Despite heightened efforts to reduce road traffic accidents over the last decade, the country has lagged behind in achieving agreed target. It is unacceptable for almost 2,000 people to die as a result of road traffic accidents each year. Road transport system is the most important mode of transport in Ghana. Data compiled by Motor Traffic and Transport Department, 2018, estimated that road traffic accidents in Ghana have killed 46,284 people between 1991 and 2018. According to the data, the number of commuters killed rose from 1,212 in the first half of 2018 to 1,252 during the first six months of 2019. (Source: Fieldwork). In Ghana, the link between impaired driving and RTAs has not been properly examined. Relatively minute research on impaired driving related injuries are available in Ghana. The outcome of this study creates awareness among all stakeholders about the various modalities available to reduce RTAs and to inculcate a sense of responsibility toward spreading the message of road safety.

Rationale & need for the study

At the intersection of public safety and public health lies the potential to view road traffic accident prevention through a new lens. Road traffic accidents have emerged as an important public health issue that needs to be addressed by multidisciplinary approach. The trend in RTA injuries and deaths is becoming alarming in Ghana. The number of fatal and disabling road accidents happening is increasing day by day and is a real public health challenge for all concerned agencies to take effective measures to address it.

The approach and strategy to implement the rules and regulations available to prevent road traffic accidents is always ineffective and half-hearted. Awareness creation and strict implementation of impaired driving laws are the need of the hour to prevent this public health issue. Previous studies have not treated impaired driving in much detail. In Ghana, the link between impaired driving and road traffic accidents have not been properly examined. It is therefore necessary to bring the impact of impaired driving on the road safety in Ghana into the public recognition through empirical research. This is expected to evoke policy interest and give rise to the formulation of interventions and countermeasures which might help in scaling down impaired driving related traffic injuries and deaths. The study was intended to come out with holistic factors contributing to impaired driving and create awareness among all stakeholders within road traffic safety.

Research objectives

Mean objective

The mean objective of the study was to ascertain the factors contributing to impair driving in Ghana; a case study of the A Shanti region.

Specific objectives

1. Assess the factors that contribute to impair driving.
2. Determine the relationship between impaired driving and road traffic accidents.
3. To establish the magnitude of RTA in the Ashanti region of Ghana.
4. Identify measures that have been put in place by stakeholders to curb road traffic accidents out of impaired driving.
5. To determine the consequences of road traffic accident on the individuals, families and the country at large.

Null hypothesis

1. There is no relationship between drunk driving and road traffic accident.
2. Drug driving and road traffic accident are independent.
3. There is no correlation between fatigue driving and road traffic accident.
4. Emotion driving does not lead to road traffic accident.
5. Distracted driving and road traffic accident are not related.

Table 1. Conceptual definitions

Variables	Conceptual Definition
Impaired driving	The study defines impaired driving as a decrease in a person’s judgment and/or physical ability while driving or operating a motor vehicle.
Blood alcohol concentration	The concentration of alcohol in the blood, expressed as the weight of alcohol in a fixed volume of blood and used as a measure of the degree of intoxication in an individual.
Drunk driving	It is a blood alcohol concentration level of 0.08. or more
Drug driving	Drugs, both prescription and illegal, that affect road users mental state, so they cannot think clearly or make good decisions. Drugs, both legal and illegal, that affect a person’s physical condition leading to poor physical coordination and slower reactions
Fatigue driving	Driving while weary from too much physical or mental exertion.
Emotions driving	Any strong emotion (positive or negative) such as excitement stress or anger that affects a motor vehicle user to lose concentration or affect his ability to drive.
Distractive driving	It is when a non-driving activity causes a motor vehicle user to lose focus on the task of driving and increases the risk of a crash.

Related work

Alcohol impaired driving

The argument of alcohol and road traffic accident is supported by WHO report, 2018. It estimated that, 5 - 35% of all road deaths are reported as alcohol related. In Thailand, alcohol impaired driving was found to be associated with elevated risk of road traffic injuries. (Woratanarat et al, 2019). In a case control study, Woratanarat and colleagues reported that alcohol impaired drivers were 24 times more likely to be involved in an injury related road crashes compared with sober drivers.

Impairment by drug

According to the US National Highway Traffic Safety Administration report,2009, studies have found that drugs are used by 10 - 20 percent of drivers involved in road crashes, often in combination of alcohol. Elliott and colleague investigated the involvement of illicit drugs and alcohol in fatal road crashes among different categories of road users in UK using post-mortem urine and blood sample. They found that, 54% of all fatal road traffic victims were positive for drugs and/or alcohol.

Impairment by fatigue

It is indicated by the United States NHTSA, 2016 that, fatigue leads to drowsy driving and drowsy driving is a serious problem that leads to thousands of automobiles crashes each year. Report of Transport Department for the State Road Safety Council, Government of Tamil Nadu (2012), indicates that, driver fatigue is a very dangerous condition created when a person is suffering of symptoms of fatigue while driving. According to the report, the survey statistics show that, 20% of all the traffic accidents and up to one-quarter of fatal and serious accidents are due to drivers with a diminished vigilance level.

Impairment by emotions

Emotions and impaired driving have been established by the United States National Highway Transportation Safety Administration crashes reports and self-reports of sleep behaviour 2009. EOS Gallup Europe conducted a global study on behalf of the Responsible Young Drivers Foundation with 13,673 driving license holders who have driven a car in the last twelve months. The vast majority of respondents around the world confirmed that other drivers sometimes irritate them.

Impairment by distraction

Drivers using cell phones are approximately 4 times more likely to be involved in crashes than drivers not using cell phones while driving. (WHO report,2017). In 2009, more than 5,400 people were killed and an addition of 448,000 were injured in crashes that were reported to involve driving while distracted. (Action for Road Safety, 2011).

Methodology

Study area

Description of the site

The study was carried out in the Ashanti region of Ghana. The current population of Ghana is estimated to be 30.10 million, up from the official 2010 census figure of 24.2 million. The capital and largest city of Ghana is Accra, which has an urban population of 2.27 million. The Greater Accra Metropolitan Area (GAMA) has about 4 million inhabitants, which makes it the 11th largest metro area in Africa. (Ghana Statistical Service Report, 2018).

The Ashanti Region is located in southern Ghana and is the third largest of 16 administrative regions, occupying a total land surface of 24,389 km² (9,417 sq mi) or 10.2 per cent of the total land area of Ghana. In terms of population, it is the most populated region with a population of 4,780,380 according to the 2010 census, accounting for 19.4% of Ghana's total population. The Ashanti Region is known for its major gold bar and cocoa production. The largest city and regional capital are Kumasi. Ashanti Region has common boundary with Brong Ahafo Region in the north, Central Region in the south, Eastern Region in the east and Western Region in the west. (Ashanti Region Archived August 28, 2010, at the Wayback Machine).

The vegetation is broadly classified into two: Semi deciduous forest and Guinea Savanna woodland. The average annual rainfall is about 166.7cm (66 inches) and the temperature is generally high, 59 averaging over 27 C in the forest zone and 29 C on the northern fringes of the forest zone. The humidity is relatively high, averaging about 85% in the forest area and 65% for the Savannah belt. (Ashanti Region. geohive.com).Ashanti Region has 33 traditional councils, and each is headed by a Paramount Chief. All these Par-amount Chiefs in turn owe allegiance to Otumfuo, the Asantehene. The region is often referred to as the seat of the country's culture due to the fact that several items that portray the Ghanaian culture like pottery, kente weaving, wood carving, traditional sandals, beads, smithing and a lot more can be found in the Region. ("Ashanti Region". Ghana Districts. Retrieved 29 December 2017). The main economic activity in the region is agriculture. Major crops grown include cocoa, oil palm, plantain, maize, yam, cassava, vegetables and citrus.

Road network to major towns and villages is comparatively bad. Kumasi, the regional capital, is centrally placed and easily accessible by road from almost all parts of the country. Parts of Sekyere East, Sekyere West, Asante Akim North and Ejura Sekyedumase districts are however inaccessible most of the time, especially during the rainy season. ("Ashanti Region". Ghana Districts. Retrieved 29 December 2017).

Study type

A non-experimental, cross sectional study design was used to collect data to determine factors contributing to an impaired driving in Ghana, a case study of the Ashanti region. A cross-sectional study involves looking at people who differ on one key characteristic at one specific point in time. The data is collected at the same time from people who are similar in other characteristics but different in a key factor of interest such as age, educational background, or a geographic location.

Study population

Sample size was 217. However, 216 participants took part of the study. The study participants were made up of all Motor Vehicle Users, Motor Traffic and Transport Departments, Driver Vehicle and Licensing Authority, Ghana Private Road and Transport Unions. The regional capital (Kumasi) was conveniently selected for the study. Simple random sampling method was used to select 5 municipalities in the region. Systematic sampling method was used to select motor vehicles users.

Study methods

Primary method of data collection was used to collect data from the metropolitan and five (5) municipalities that were selected for the study. The study undertook random roadside breathalyser survey of drivers applying the major municipality roads leading in and out of Kumasi. The study considered the major roads of the selected municipalities that linked the metropolitan (Kumasi). In each of the five (5) major roads, systematic sampling method was used to select 18 drivers for the study. The same method was used to select 18 drivers within the metropolis (Kumasi). In all, at the selected roadblocks, 108 drivers participated in the study. Secondary data from Motor Vehicle and Transport Department of the Ghana Police Service was also used. Focus group discussions were organized for Motor Traffic and Transport Department (MTTD) of Ghana Police Service at each selected municipality and metropolitan to get data on factors contributing to impair driving and impaired driving laws. The study considered 6 Members for each group. Therefore, the total number of people who took part in the focus group discussions were 36. Also focus group discussions was organized at each of the selected municipality and metropolitan Driver Vehicle and Licensing Authority (DVLA) offices. Focus group discussion was done at these offices to collect data from DVLA officials. Convenient sampling method was used to select 6 officers at the selected DVLA offices to collect data on factors contributing to impair driving. A total of 36 DVLA staff part of the study. This served a way to assist the researcher to have data from DVLA officers to know their perception about factors contributing to impaired driving and impaired driving laws in Ghana. Finally, focus group discussions was organized to collect data from GPRTU officers. At each of the main lorry stations of the 5 municipalities and the regional capital. The study considered 6 Members for each group. Therefore, the total number of GPRTU officers who participated in the focus group discussions were 36.

Data collection techniques or tools

Ghana police service operates series of roadblocks, at which the police have possible cause to stop a motor vehicle, search and inspect the papers of any passing vehicle. The primary goal of police officers is to provide a safe motoring environment for the public. They are responsible for enforcing traffic laws and investigating collisions. At the chosen roadblocks, simple random sampling method was used to select the drivers for the interview. The researcher indicated one (1) Yes and one (1) No on Piece of papers, folded and thoroughly mixed. Any vehicle that was stopped by the police, the research assistant explained the purpose of the study to the driver, and the consent of the driver was sought, and he/she was asked to select one of the folded papers. Any driver who picked yes participated in the study. He/she was part of the breath test - also known as the "breathalyzer" test. The breath test required the subject to blow into a tube attached to a machine. That machine chemically separated the alcohol from the rest of the person's breath. At the same time, it made a mark on a test card indicating the percentage of alcohol in the bloodstream at that time. Structured interview guide was also used during the focus group discussions to correct data from DVLA officers, MTTD and Ghana Private Road Transport Units.

Quality control

Data collectors for both alcohol breathalyzer test, questionnaire administration and focus group discussions were recruited and trained. The details of the study procedures regarding the selection criteria, the interpretation of items in the instruments were thoroughly discussed. This was done to ensure that there is uniformity in understanding and translating of the questions in the tools so as to strengthen its reliability and validity. Data was collected and completed tools examined, and kept with the researcher under lock and key.

Data processing and analysis

In the quantitative analysis, data was entered into the computer and checked for completeness through cleaning. Quantitative data was entered into the computer using the Statistical Package for Social Science (SPSS) version 19. Chi-Square was used to analyze data. Data was analyzed to identify factors contributing to impair driving and established the association between impaired driving and road traffic accidents in Ashanti region of Ghana. Quantitative data was transcribed into an excel spreadsheet for analysis. Quantitative data was organized and analyzed within the framework of the objectives of the study.

Ethical consideration

Ethical clearance was obtained from the Ethical Review Committee of the school. Permission to undertake the study in the region was sought and granted by the regional metropolitan police headquarters of the Motor Traffic Transport Department. The subjects under study were provided with informed consent forms before they were recruited into the study.

Pre-test

The instruments were pre-tested on 15 drivers, 10 passengers and 10 transport officers who were not part of the main study in one of the municipalities before the instruments were administered at the study areas. This helped in identifying problems in the data collection tools/instruments and the necessary corrections were made before final administration to the actual study group.

Results

The present study was designed to determine factors contributing to impaired driving in Ghana; a case study of the Ashanti region of Ghana. This section outlines the findings of the 216 respondents interviewed, of which 108 were both commercial and private motor vehicle users and 108 respondents made up of DVLA officers, MTTD and GPRTU who were also interviewed through the use of focus group discussion on issues relating to factors contributing to impaired driving. The presentation of the results is based on the objectives of the study. The following metropolitan and the municipalities were selected for the study and they include Kumasi, Agona, Konongo, Mampong, Obuasi, and Bekwai.

Table 2. Demographic characteristics of motor vehicle users

Parameter	Frequency (n=108)	Percentage (%)
Age		
20-24	18	16.67
35-49	47	43.52
50-64	43	39.81
Gender		
Male	104	96.30
Female	4	3.70
Marital status		
Single	15	13.89
Married	78	72.22
Widowed	4	3.70
Separated/Divorced	11	10.19
Educational status		
No formal education	1	0.93
Basic/Middle school	82	79.92
Secondary/SHS	18	16.67
Tertiary	7	6.48
Ethnicity		

Akan	85	78.70
Ga/Adangbe	2	1.85
Ewe	11	10.19
Guan	2	1.85
Grussi	5	4.63
Others	3	2.78
Average age	45.52	

Table 2 above indicates that, out of the 108 motor vehicle users who took part of the study, majority 104(96.30%) were males and only 4(3.70%) were females. Most 78(72.22%) were married and only 3(3.70%) were widowed. Also looking at Table 2 above, another interesting finding was that, out of 108 respondents, majority 75(69.44%) had basic education (middle/JHS) and only 1(0.93%) had no formal education respectively.

On the issue of ethnicity, majority 85(78.70%) were Akans. A possible explanation for this result may be due to the study area mainly dominated by Akans. Table 2 further indicates that the average age of motor vehicle users was approximately 46 with the majority 47(43.5%) were between 35 and 49 years.

Table 3. Distribution of motor vehicle users by knowledge on impaired driving

Parameter	Frequency(n=108)	Percentage (%)
Causes of impaired driving		
Drunk driving	15	13.89
Drug driving	4	3.70
Fatigue driving	34	31.48
Impaired by emotion	39	36.11
Distracted driving	16	14.81
Major causes of road traffic accidents		
Distracted driving	3	2.78
Drunk driving	43	39.81
Impaired by emotions	5	4.63
Fatigue driving	9	8.33
Drug driving	3	2.78
Over speeding	34	31.48
Poor road net work	11	10.19
Consequences of impaired driving		
Road traffic accident	108	100
Prescription or illegal drug can impaired driving		
Yes	87	80.56
No	21	19.44
Reaching destination safely depends on		
Performance behind the wheel	88	81.48
Time of the day	20	18.52

Table 3 indicates that when drivers were asked of ways drivers become impaired, majority 39(36.11%) said that emotions are the major cause of impaired driving followed by fatigue 34(31.48%) and drunk driving 15(13.89%) and the least was drug driving 4(3.7%). It is also indicated in the same table that, the respondent's perception on the major causes of road traffic accidents in the region are drunk driving 43(39.81%) and over speeding 34(31.48%). When the respondents were asked of the consequences of impaired driving, all the participants 108(100%) said it contributes to road traffic accidents.

Also 87(80.56%) of the respondents were aware that both prescription and over the counter drugs can impaired driving. It is also outlined in table 3 that, most of the respondents 88(81.48%) said reaching destination safely depends on performance behind the wheel and only 20(18.52%) said time of the day.

Table 4. Distribution of respondents by knowledge on alcohol impaired driving

Parameter	Total Population (n=108)	Percentage (%)
Drink alcohol		
Yes	80	74.07
No	28	25.93
Reason behind drunk driving (n=80)		
Addiction	19	23.75
Bold and confident on the road	45	56.25
Family problems	16	20.00
Alcohol is a central nervous depressant		
Yes	100	92.59
No	8	7.41
Meaning of driving with a BAC level of 0.08 (n=108)		
Driving intoxicated	62	57.41
Impaired driving	30	27.78
Don't know	16	14.81
BAC level in Ghana		
08	11	10.19
Don't know	97	89.81
Laws that prohibit drunk driving		
Yes	107	99.07
Don't know	1	0.93
Detection of alcohol impaired driving by police officer		
Use of alcohol breathalyzer test	71	65.74
Behaviour of the driver	37	34.26
Alcohol breathalyzer test results		
0.00	52	48.15
0.01-0.03	9	8.33
0.04-0.06	30	27.78
0.07-0.08	17	15.74

It is established in table 4 that 74.07 of the motor vehicle users who were interviewed drink alcohol and involved in drunk driving. When they were asked reasons behind drunk driving, majority 56.25% said drunk driving helps them to become bold and confident on the road whilst only 20% said they drink alcohol because of family problems. Almost 93% were aware that alcohol is a central nervous system depressant. All the respondents were aware that the consequence of impaired driving is road traffic accident. It is clearly found in the same table that, most 107(99.07%) of the respondents were aware that there are laws in Ghana that prohibit drunk driving. However, majority 97(89.81%) did not know Blood Alcohol Concentration at which it is an offence to drive/operate a motor vehicle in Ghana. The current study found that, most of the respondents 71(65.74%) said that police officer detects drunk driving through the use of alcohol breathalyzer test. Table 4 also indicates Blood Alcohol Concentration level for the 108 motor vehicle users who took part of the alcohol test. In all, 51.75% of the drivers tested positive and 48.15% tested negative. For drivers who tested positive to the results, most (53.57%) Blood Alcohol Concentration was between 0.04 - 0.06 and 0.07 - 0.09 was 30.36%. Majority (53.70%) of the private motor vehicle users tested positive.

Table 5. Drunk driving and road traffic accident

Parameter	Frequency(n=108)	Percentage (%)
Involved in drunk driving		
Involved	80	74.07
Do not involved	28	25.93
Drunk driving and road traffic accident (n=80)		

Accident	59	73.75
No accident	21	26.25
Don't involve in drunk driving (n=28)		
Accident	6	21.43
No accident	22	78.57
Age distribution of drivers involved in accident (n=65)		
26-35	24	36.92
36-45	32	49.23
46-55	9	13.85
Vehicular involvement in road crashes		
Minibus	25	38.46
Trucks	14	21.54
Van	10	15.38
Bicycle	5	7.69
Motorcycle	7	10.77
Jeep or taxi	4	6.16
Predominant accident types		
Hit pedestrian	14	21.54
Rear end collisions	17	36.15
Head on collision	27	41.54
Fall into a ditch	7	10.77

It can be seen from the data in table 5 that, majority 80(74.07%) of the motor vehicle users were involved in drunk driving, only 28(25.93%) were not. It is apparent in the table that, most 59(73.75%) of drunk drivers have been involved in a road traffic accident in the last 12 months. As shown in the table, out of the 28 respondents who do not practice drunk driving, only 6(21.43%) were involved in road traffic accident as compared to drunk drivers (73.75%). From the above table, the study concluded that majority (49.23%) of motor users who were in accidents were the age range of 36 - 45. Only (13.85%) were within the age range of 46 - 55. The average age of drivers who were involved in road traffic accident was 38. It can also be identified from the table under discussion that, the most vehicular involvement in the road traffic accident is bus/minibus. Head on collision (41.54%) is the most predominant accident type. The study found that most of the accidents happened on Saturdays. It was observed that most of the social activities like funerals, naming ceremonies, birthday parties, weddings etc.; are done on Saturdays' and most of these occasions are celebrated with alcoholic beverages where people drink and drive.

Table 6. Drug driving and road traffic accident

Parameter	n = Total Population	Percentage (%)
Illegal or prescription drugs impaired driving (n=108)		
Yes	87	80.56
Don't know	21	19.44
Drugs that impaired driving (n=87)		
Cocaine	15	17.24
Marijuana	52	59.77
Tramadol	20	22.99
Drugs mostly taken by motor vehicle users (n=108)		
Cocaine	12	11.11
Marijuana	37	34.26
Tramadol	59	54.63
Reducing drug driving		
Education on drug driving	45	41.67
Enforcing drug driving laws	63	58.33

It is shown in table 6 that, 19.44% of the respondents did not know that illegal or prescription drugs could impair driving. It can be seen from table 6 above that, marijuana is the most impaired driving drug. However, drug mostly taken by drivers is Tramadol. Majority of the respondents (58%) indicated that, drug driving could be prevented through the enforcement of drug driving laws. The study failed to establish the link between drug driving and RTA. Even though related work has proved the link between drug driving and road crashes. The study participants failed to provide answer to their involvement in drug driving even though they indicated that other drivers were involved in drug driving. Also, there was no secondary data on drug driving and road traffic accident through drug test.

Table 7. Fatigue driving and road traffic accident

Parameter	n = Total Population	Percentage (%)
Does fatigue impaired driving? (n = 108)		
Yes	90	83.33
No	18	16.67
Symptoms of fatigue (n = 90)		
Drowsiness	8	8.89
Dizziness	12	13.33
Loss of concentration	19	21.11
Sleepiness	51	56.67
Driving hours		
Continuously drive > 8 hours a day	60	55.56
Continuously drive < 8 hours a day	48	44.44
Drive > 8 hours a day and RTA (n = 60)		
Accident	37	61.67
No accident	23	38.33
Drive < 8 hours a day and RTA (n = 48)		
Accident	6	12.50
No accident	42	87.50

It can be observed in the above table 7 that, 90% of the study participants were aware that fatigue driving impairs driving and majority (56.67%) of the respondents said that fatigue leads to sleepiness. The study found that 55.56% of the motor vehicle users continuously drive 8 hours or more in a day. Study participants who were exposed to driving 8 hours continuously in a day, 61% had ever involved in road traffic accident as compared to 12.50% of drivers who were not exposed to such situation

Table 8. Impaired by emotions and road traffic accident

Parameter	n = Total Population	Percentage (%)
Causes of impaired driving (n = 108)		
Emotions	39	36.11
Others	69	63.89
Causes of road traffic accident		
Emotions	5	4.63
Others	103	95.37
Effect of emotion driving		
Loss of concentration	51	47.22
Aggressive driving	57	52.78
Ever been impaired by emotion		
Yes	108	100
Emotion driving and road traffic accident		
Have an accident	4	3.70
No accident	104	96.30

The table 8 above indicates that, 36.11% of impaired driving is caused by emotions driving. However, its contribution to road traffic accident is not significant. All the study participants have ever been driven impaired but a few (3.70) have involved in road crashes. The null hypothesis establishes that, there is no association between emotions and RTA. The study found that there is an association but the relationship is not statistically significant.

Table 9. Distracted driving and road traffic accident

Parameter	n = Total Population	Percentage (%)
Causes of distracted driving (n = 108)		
Changing radio set	12	11.11
Passengers	8	7.41
Using cell phone	88	81.48
Effect of distracted driving		
Causing driving to be impaired	104	96.30
Don't know	4	3.70
Have ever been distracted		
Yes	87	80.56
No	21	19.44
Distracted and involved in road crashes (n = 87)		
Yes	32	36.78
No	55	63.22
Not distracted but involved in road crashes 21		
Yes	3	14.29
No	18	85.29

It can be observed from table 9 that, operating a motor vehicle while using a cell phone is the major cause of distracted driving. Most of the respondents (96.30%) were aware of the effect of distracted driving. The table 9 above further indicates that, of the 87 motor vehicle users who have ever been distracted, 36.78% were involved in motor traffic crashes as a result of distracted driving. Motor vehicle users who were not exposed to distracted driving, 14.29% were involved in road traffic accident.

Magnitude of road traffic accident

The study found that, road traffic accidents in Ghana have killed 46,284 people between 1991 and 2018. (Motor Traffic and Transport Department accident report,2018). According to the data, the number of commuters killed rose from 1,212 in the first half of 2018 to 1,252 during the first six months of 2019. (Secondary data from fieldwork)

Measures that have been put in place to address road traffic accident

During the focus group discussions organised for 108 participants, the study found that; Road transportation in Ghana is saddled with many safety challenges making roads unsafe. Due to the above, Ghana has road traffic laws and regulations established to define the scope of behaviour towards each other as road users. It was observed during the focus group discussions that, the key agencies available to ensure road safety are National Road Safety Commission, Driver Vehicle and Licensing Authority, Motor Traffic and Transport Department, Ministry of Road and Highway. The key logical books used for enforcement are Road Traffic Act - 2004 (Act 683) amended in 2008, the 2012 LI 2180, Ghana Highway code 1974, and DVLA regulatory Act. The study found that such important and necessary road traffic laws, regulations and policies are not enforced or given the needed attention.

Consequence of road traffic accident on individuals, family and the country

During focus group discussions, participants indicated that road traffic accidents have large functional, psychological and socio-economic consequences. It was found that many families are driven into poverty by the cost of prolonged medical care, the loss of the family bread winner It also put burden on the country's GDP.

Discussions

Table 10. The relationship between drunk driving and road traffic accident

Statistical method	Critical value for alpha	P-value/Relative risk
Pearson's Chi-Square	05(z for 95% CI = 1.96	0.0
T – test	95% CI = 2.017	0.025
Kappa agreement measure	95% CI = 2.266 < 0.446 > 0.625	0.446
Relative risk	95% CI = 1.673 > 3.442 > 7.079	3.44

It can be observed in table 10 that, P-value (0.00) is less than the significance level (0.05), that is to say $p < 0.05$. There is sufficient evidence to reject the Null Hypothesis which says there is no association between drunk driving and road traffic accident and accept Alternative Hypothesis which says, drunk driving and road traffic accidents are not independent. Hence the current study concludes that, there is a statistically significant relationship between drunk driving and road traffic accident. The results of the inferential statistics in table 10 confer the study findings. The finding observed in the study mirror those of the previous studies that have examined the effect of drunk driving on road traffic accidents. The finding is in line with a case control study conducted by Woratanarat (2009) in Thailand. The study found that, alcohol impaired drivers were 24 times more likely to be involved in an injury related crash.

Drug driving and road traffic accident

Even though related work within this field indicated that, there is evidence of strong association between drug driving and road traffic accident. Legrand et al, (2012), conducted a hospital-based comparative study in Belgium and Netherlands and revealed that 53% and 34% of injured drivers tested positive for both alcohol and drugs. This study has been unable to determine such correlation between the two. Because drug use is a confidential issue and the study participants failed to acknowledge the fact that they are involved in drug driving. There was no drug test among the study participants during the study. Also, no secondary data on drug test among road users who have involved in road crashes before.

Table 11. The relationship between fatigue driving and road traffic accident

Statistical method	Critical value for alpha	P-value/Relative risk
Pearson's Chi-Square	05(z for 95% CI = 1.96	0.00
T – test	95% CI = 1.9858	0.025
Kappa agreement measure	95% CI = 0.394 < 0.578 > 0.763	0.578
Relative risk	95% CI = 2.667 > 5.733 > 7.079	12.323

Looking at the statistical inferences that have been established in table 11 above, there is a sufficient evidence to reject the **Null Hypothesis** which says there is no association between fatigue driving and road traffic accident and accept the **Alternative Hypothesis** which says, fatigue driving and road traffic accidents are not independent. Hence the current study concludes that, there is a statistically significant relationship between fatigue driving and road traffic accident. The results of the inferential statistics in table 11 confer the study findings. The finding observed in the study is a replica of previous studies that have examined the effect of fatigue driving on road traffic accidents. The finding is in agreement with a study done in Thailand (2012). The study indicated that, 20% of all traffic accidents and up to one-quarter of fatal accidents are due to drivers with diminished vigilance level.

Impaired by emotion and road traffic accident

The study does not entirely support the idea that driving by emotion is significantly associated with road traffic accidents. According to the United States National Highway Traffic Safety Administration report, 2009, one-third (1/3) of all motor vehicle crashes and about two-thirds of the 42,000 crashes fatalities that occur each year could be attributed to aggressive driving as a result of emotions. The findings of this study do not support the above findings. Even though all the study participants have one way or the other had ever been driven by emotions but only a few of them (5%) have ever involved in road crashes.

Table 12. The relationship between distracted driving and road traffic accident

Statistical method	Critical value for alpha	P-value/Relative risk
Pearson's Chi-Square	05(z for 95% CI = 1.96	0.00
T-test	95% CI = 1.9918	0.025
Kappa agreement measure	95% CI = 0.001 < 0.116 > 0.231	0.116
Relative risk	95% CI = 0.872 > 2.575 > 7.6.6	2.574

Previous studies have demonstrated the link between distracted driving and road traffic accidents. As elaborated in table 12 above, the outcome of the current study is in line with the previous related work. The outcome of this study supports WHO report (2017). The report reveals that, drivers using mobile phones while driving are approximately 4 times more likely to be involved in crashes than drivers not using mobile phones while operating motor vehicles.

Conclusion

The current study found that, drunk driving, drugs driving, fatigue driving, emotions and distracted driving are the major causes of impaired driving. 36.11% of impaired driving is caused by emotion but its contribution to road traffic accident is not significant. The study revealed that, almost 40% of road crashes is caused by drunk driving. The study indicated that, there is a relationship between fatigue driving and road traffic accidents. The study also concluded that, distracted driving and road traffic accident are not independent. The observed that, the incidents and prevalence rates of road traffic accidents in the region are very high

It is also indicated that there are measures that have been put in place to reduce road traffic accident. However, these measures are not effective the study observed that road crashes have psychological, social and financial burden on individuals, families and the nation. The magnitude of road traffic accidents in the region is very high at an alarming rate. Impaired driving was found to be the major cause of road crashes. Measures have been put in place to curb the situation. However, these measures have not been effective in reducing road crashes. Loss of lives and property damages are expected to continue if measures are not put in place to address impaired driving.

This study has contributed to the field of road safety research by exploring the factors that contribute to impaired driving. It has added an in-depth knowledge and analysis of an important risk factors in the causal pathway of the causes of road traffic accidents of which impaired driving cannot be overlooked. This thesis has established the link between impaired driving and road traffic accidents as well as factors that contribute to impair driving. The current study has helped to identify the magnitude of road traffic accidents and casualties and has explored the impact of road traffic accidents on the individuals, families and the nation. The study has also made effective recommendations to improve road safety and reduction of road traffic accidents. To the best of the author's knowledge, this thesis is one of the first in Ghana that has treated impaired driving in a holistic manner.

Recommendations

Drunk driving

A driver with a blood alcohol level over the prescribed limit must be prosecuted. For this measure to be effective there should be many random breath testing activities on our roads whereby a large proportion of drivers are stopped at random and all are tested for alcohol impairment. Commitment to RBT is vital if we are to reduce the level of alcohol related accidents on our roads. In this case, the road traffic Act in the country should be applicable and enforced.

Drug and alcohol test program

Drug and alcohol program test should be part of the process of obtaining a driver's license in the country. The drug and alcohol program test should require the applicant seeking for a driver's license to pass the test (80%) before moving to the next stage of acquiring a driver's license in the country. The content of the alcohol and drug test program should teach and educate applicants seeking for driver's license on the effects of alcohol and drugs driving on road crashes.

Public education and information

Education is the backbone of a nation. Without education nation cannot be developed and aware about our surrounding environment. To minimize road traffic accidents, public must be educated and information about vehicular using, riding, crossing the road, walking on the street traffic rules and regulations.

All these must be incorporated in the basic school curriculum. Specifically, these can be added to social studies/social skills curriculum at the basic schools. The basic school level is preferred because the study found that more than 80% of the motor vehicle users had formal education up to basic level. Formal education sector can include the road safety issues in textbooks.

This will help them to acquaint themselves with some basic facts about road safety measures.

Distractive driving

There should be regular effective education program on distractive driving, especially the use of cell phones while operating a motor vehicle. Distractive driving laws under the Road Traffic Regulations, 2012 L.I. 2180 should be intensified and strictly enforced.

Fatigue driving

Motor vehicle users should be educated on the effect of fatigue driving. Motor vehicle users who drive long distance should have a second driver to assist them and there should be enough rest stops where drivers can relax and rest for some time before continuing their journey.

Intensified enforcement and safety education measures

It is necessary to intensify the enforcement and educational programs to abate the problems of road traffic accidents. The current level of traffic law enforcement, vehicular regulations and road user's education is exceedingly low in Ghana. Act 683 will be successful if it creates a meaningful deterrent threat to road users.

To be effective there must be a significant increase in the actual level of enforcement. Road safety education for road users is an effective tool for better road users' behaviour on the road. Public education through community leaders and local officials should be done repeatedly. Publicity and education are essential requirements to raise community awareness and improve the effectiveness of enforcement operations. Road safety must be made an integral component of driver's training. Public education plays a big part in educating the driver on safety and getting the driver to obey the traffic laws.

Police enforcement and sanctions

Traffic police have an important role to minimize accident. Sufficient traffic police should be posted on important points. They must ensure traffic rules to all citizens, passer-by, including drivers. Police should effectively ensure stationary and manual speed enforcement, automatic speed enforcement (speed camera), patrolling and red-light cameras, demerits' point system and license suspensions of vehicular driver. Fixed penalties and motor vehicle insurance, restrictions for convicted drivers and fine and imprisonment.

We should also establish accountability and responsibility of traffic police. Police and the courts must continue to enforce the laws on road traffic without fear or favour and this could be done if there is devoid of social and political influence. Police officers should be provided with adequate law enforcement equipment such as breathalyzer, towing and recovering trucks for broken down vehicles and establishment of effective collaborating Agencies.

Process of issuing driver's license

The process of issuing driver's license should be done without the influence of social and political influence. Illegal license and license to the unskilled drivers should not be encouraged. There is a need to establish accountability and responsibility of the officials involved in providing license and registration of vehicle.

Accident investigation

In order to improve strategies to reduce road accidents, there is a need to unveil all possible factors that contribute to road traffic accidents and this could be done through effective accident investigation. The use of tape measures and chalk at the accident scene should be replaced by better methods whereby accident locations on road networks are investigated.

The investigation should take the following issues into consideration; time of day, driver behaviour behind the wheel, including issues relating to driver fatigue, distractive driving, emotions of the driver, experience of the driver, road signs, location of the accident and how many accidents have occurred in that spot. The purpose of this exercise is to explore the causes of the accident and identify the risk factors.

Post accidents care

Everywhere in the country, there should be mandatory for post accidents care. It will save the victims life that injured in sudden vehicular accidents. In an emergency situation of road accidents, there should be an emergency medical service. Rescue helicopter is essential in order to save life. This will immediately transfer the injured person into hospital and also there is a need to ensure automatic crash notification.

Every health facility should have psychosocial unit to provide psychosocial services for accident victims.

Directions for future research

1. Road Factor (Narrow road and defect in roadway, Poor road surface, Poor maintenance of roads)
2. Vehicle Factor (Safety equipment (Airbags, ABS), Vehicle defects, Poorly maintained vehicles, Age of the vehicle)

References

- [1]. Albert Coleman (2014). Open Journal of Preventive Medicine Vol.04 No.11, Article ID:51371.
- [2]. Baker et al, (1992), and Voas et al, (1998). Use of alcohol has been associated with one third to one half of all fatal crashes in the USA.
- [3]. Carnegie Mellon, (June 2010) <http://www.distraction.gov/content/get-the-facts/facts-and-statistics.html>
- [4]. Ghana Statistical Service. (2010) Census.
- [5]. Gebru, M.K. (2017) "Road traffic accidents: Human security perspective". Mekelle University, Ethiopia. International Journal of Peace and Development Studies.
- [6]. Government of Tamil Nadu, (2012). Report of Transport Department for the State Road Safety Council.
- [7]. Hauer E. (1994). Can one estimate the value of life or is it better to be dead than stuck in traffic? Transportation Research Series A.
- [8]. Herbert Moskowitz et al, (2014), 3(2), pp. 135-141; Journal of Alcohol and Drug Research "Determinants of drink-driving and association between drink-driving and road traffic fatalities in Ghana.
- [9]. Kircher and Anderson (2012) Investigated Truck Drivers Opinion on Road Safety in Tanzania.
- [10]. Kopits E, Cropper M. (2003), fatalities and economic growth. Washington, DC, World Bank, (Policy Research Working Paper No. 3035).
- [11]. Stephen J. Laboratory study at National Institute on Drug Abuse (NIDA) Addiction Research Centre in Baltimore.
- [12]. Mathias, (1996). These effects of marijuana-induced impairment of automobile driving.
- [13]. Motor Traffic and Transport Department (2018), the Ghana Police Service report.
- [14]. Mohan D: (2002), safety and health in Indian cities. Journal of Transport and Infrastructure.
- [15]. NHTSA, (1996), Drowsy driving and automobile crashes.
- [16]. Open Journal of Preventive Medicine, (2014) Vol.04 No.11, Article ID: 51371,6 pages.
- [17]. Peden et al., (2001 and 2004), World Health Organization report on road traffic injury prevention. Geneva, World Health.
- [18]. Trinca G et al. (1988), Reducing traffic injury: the global challenge. Melbourne, Royal Australasian College of Surgeons.
- [19]. UN Economic Commission for Africa and the World Health Organization, (2007). African Road.

- [20]. United Nations Environment Program (2009). From Conflict to Peace building: the role of natural resources and the Environment.
- [21]. United States National Survey on Drug Use and Health (2006).
- [22]. World Health Organization, (2009, 2011).
- [23]. World Health Organization, (2010) Road traffic accident bulletin.
- [24]. The World Health Organization, (2010) Khart bulletin.
- [25]. World Health Organization (2009). Global Status report on Road safety Time for Action Switzerland.
- [26]. World Health Organization (2013). Pedestrian safety: A road safety manual for decision-makers and practitioners. WHO Press, World Health Organization.
- [27]. World Health Organization (2017) report.