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(Research Article)

Statistical analysis of the causes and effects of motorcycle accidents in the Gomoa East district in the Central Region of Ghana

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Abstract

Road traffic accidents involving motorcycle riders continue to pose a significant public health challenge, with a substantial portion of the health-related consequences occurring in developing nations, including Ghana. This research developed an appropriate model for assessing the causes and effects of a motorcycle accident in the Gomoa East District. Employing a cross-sectional research design, a random sample comprising 115 motorcycle riders was selected using the snowball sampling method. Structured questionnaires were employed to gather data from this selected sample. Statistical analysis included the utilization of the Chi-squared test of association and a binary logistic regression model. The findings indicated that most motorcycle accident victims were males (84.3%). Among the respondents, the majority (57.4%) were in the age categories of 26-35 years. Moreover, the study uncovered that age, frequency of maintenance, weight, adherence to speed limits, riding experience, and riding under the influence of alcohol all had a significant impact on motorcycle accidents in the Gomoa East district ($p<0.05$). The likelihood of motorcycle accidents occurring in the Gomoa East district was considerably high, primarily due to a prevalent issue of drunk riding among motorcycle riders. There was high prevalence of motorcycle accidents among males than females. It is imperative that policies and regulations designed to enhance road safety for both motorcycle riders and other road users be rigorously implemented in the Gomoa East district.

Keywords: Motorcycle Accidents; Logistic Regression; Injuries; Gomoa East District; Ghana

1. Introduction

In Ghana, road transport is the predominant mode of travel, with over 80% of passenger traffic and more than 70% of freight transportation relying on roads [1]. The surge in economic activities and investments in road infrastructure has led to an increased use of motorcycles, particularly in urban areas for commercial purposes, despite the fact that these operations are often unauthorized [2]. In Ghana and several other developing countries, motorcycles have become the preferred and most accessible mode of transportation for many people, even though it comes with considerable risks [3]. Shockingly, an average of 3,242 individuals succumb to road traffic injuries every day, amounting to 1.35 million lives lost annually due to road accidents, along with as many as 50 million people sustaining injuries [1]. Motorcycle-related injuries present a notable but often overlooked public health issue in developing nations, ranking among the leading causes of injuries and fatalities resulting from accidents [2].

In sub-Saharan Africa, the utilization of commercial motorcycles for transportation, especially by young people, has become widespread and accepted, driven by rising unemployment. Several factors contribute to this surge in commercial motorcycle use, including inadequate mass transportation systems, poor road conditions, and traffic congestion, among other factors prevalent in developing countries [4].

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According to Haworth and Rowden[5], the growing popularity of motorcycles as a mode of transportation has led to a rise in motorcycle accidents and associated fatal injuries in countries where they are widely used. Despite being a substantial public health issue, there is a notable lack of research in this field, especially in the Gomoa East district, where the problem is particularly acute. Injuries resulting from motorcycle accidents constitute a significant yet frequently overlooked emerging public health issue in developing nations, making a substantial contribution to the overall tally of road traffic injuries [6, 8].

According to an exclusive report obtained by the Ghana report, motorcycles were responsible for approximately 45% of the total 1,454 fatalities documented in the first half of 2021. During this period, motorcycle-related deaths exceeded the 518 fatalities involving commercial vehicles and were 308 more than the fatalities linked to private vehicles [9]. According to the World Health Organization (WHO), even in developed countries with low morbidity and mortality rates from motorcycle accidents, the risk of fatality in a motorcycle crash is twenty times higher than in a motor vehicle collision [10].

Thus, this research aims to establish the causes and effect of motorcycle accidents in the Gomoa East Constituency where motorcycle accidents is on the rise. This will go a long way in providing information that could influence policy makers and road users to help curb motorcycle accidents and the formulation and proper implementation of plausible solutions like sanctioning for reckless driving, adequate traffic control and road safety policy enhancement.

2. Methods

2.1. Study Area and Population

The Gomoa East district is positioned in the southeastern portion of the Central Region, lying between latitudes 5014' North and 5035' North, as well as longitudes 0022 West and 0054' West. This district holds a distinctive geographical position, bordered to the northeast by the Agona East district, to the southwest by Gomoa West, to the east by the Awutu-Senya District, and to the south by the Efutu Municipality. The southernmost part of the district meets the Atlantic Ocean. It covers an approximate area of 260.69 square kilometers [11]. According to the 2021 population and housing census, the district's population stands at 308,697, comprising 152,238 males and 156,459 females [12]. The study population comprised of individuals who operate motorcycles within the Gomoa East district.

2.2. Study Design

This was a quantitative cross-sectional study conducted at the Gomoa East district in the Central Region of Ghana.

2.3. Sampling Techniques

In this research, a snowball sampling approach was employed. Using this method, the researcher initially reached out to a participant from the target population who met specific criteria. This initial participant then assisted in identifying and recruiting other motorcycle riders who shared similar characteristics for the study.

2.4. Sample Size Determination

The sample size was calculated using Yamane's formula as shown below at a 95% Confidence Interval and a 5% margin of error [13]. A total of 161 motorcyclists were identified in the Gomoa East district. The formula is given as follows:

$$n = \frac{N}{1 + N(e)^2}$$

where;

n = Sample size, N = Total number of motorcyclists in the district (161), and e = Margin of error set at 5% (0.05).

$$n = \frac{161}{1 + 161(0.05)^2} = 114.795 = 115$$

The sample size was rounded up to 115 to increase the precision of the values.

2.5. Source of Data

This research utilized primary data as its main source of information. Data collection was carried out through a structured questionnaire distributed to respondents in the Gomoa East district during fieldwork. Additionally, supplementary information was obtained from diverse sources, including textbooks, journals, articles, previous research studies, media reports, and online platforms, contributing to the literature review.

2.6. Data Collection Procedure

Data collection occurred between April and July 2024. Prior to data collection, two research assistants were recruited and trained in the fundamental ethical principles of data collection and in using the study instrument. The research assistants were stationed at locations where commercial motorcycle riders typically gather to pick up passengers and recruit respondents. On average, it took approximately 5 minutes to complete each questionnaire. The data collection instrument was an interviewer-administered questionnaire consisting of 31 questions divided into six sections. Section A of the questionnaire focused on capturing demographic information about the respondents, including their gender, age, educational level, marital status, employment status, and weight. Section B contained general questions about motorcycle usage. Section C aimed to determine whether speeding contributed to motorcycle accidents. Section D aimed to investigate if alcohol consumption played a role in motorcycle accidents. Finally, Section E examined the economic and social consequences of motorcycle accidents on the victims [14].

2.7. Pretesting of Questionnaire

The research instruments were pretested in the Cape Coast Municipality, after which essential adjustments were made to the questionnaire prior to the main study. These modifications addressed ambiguities, ensuring clarity in the questions. Furthermore, the pretesting process helped identify the most suitable timing for conducting the study.

2.8. Ethical Consideration

The study participants received a detailed explanation of the study's purpose and procedures, and their verbal consent was secured before participation. Moreover, strict protocols were implemented to maintain the confidentiality of the collected data.

2.9. Data Analysis

After gathering questionnaires from the study's participants, the data was processed using IBM SPSS Inc. version 16 (Chicago, Illinois, USA). Descriptive statistical tables were utilized to construct a demographic profile for the respondents, and the results of other variables were conveyed through frequencies, percentages, and graphical representations. To investigate the relationship between motorcycle accidents and the demographic attributes of the respondents, Pearson's chi-square test was employed. Finally, logistic regression analysis was employed to establish a suitable model for evaluating the factors contributing to motorcycle accidents in the Gomoa East district.

3. Results

3.1. Preliminary Analysis

In the preliminary analysis, descriptive statistics were used to provide an overview of the demographic characteristics of the participants. Following this, the Pearson Chi-Square test was conducted to evaluate the relationship between each contributing factor and motorcycle accidents. The study gathered responses from 115 participants who fully completed the structured questionnaire, achieving a 100% response rate due to the accessibility of the entire target population.

Table 1 Demographic Characteristics of Respondents

Variables	Frequency (n)	Percentage (%)
Gender		
Male	97	84.3
Female	18	15.7
Age		
15 – 25	13	11.3

26 – 35	66	57.4
36 – 45	23	20
46 – 55	9	7.8
55 and above	4	3.5
Level of Education		
Basic	28	24.3
Secondary	64	55.7
Tertiary	19	16.5
None	4	3.5
Marital Status		
Married	39	33.9
Divorced	6	5.2
Single	68	59.1
Separated	2	1.7
Employment Status		
Government employee	26	22.6
Self-employed	70	60.9
Unemployed	10	8.7
Student	9	7.8
Weight		
40 - 60kg	28	24.3
61 - 80kg	54	47
81 - 100kg	32	27.8
Above 100kg	1	0.9

Source: Field survey (2024)

Table 1 shows the demographic characteristics of the participants in this study. The findings indicate that the majority (84.3%) of respondents were male, while females constituted 15.7%. In terms of age distribution, 57.4% of participants were aged between 26 and 35 years, with only 3.5% being over 40 years old. Regarding education, 55.7% had completed secondary education, 16.5% had attained tertiary education, and 3.5% had no formal education. Marital status revealed that 59.1% of respondents were single, while 1.7% were separated. For employment status, 60.9% were self-employed, and 7.8% were students. Concerning weight, the majority (47%) fell within the 61–80 kg range, while only 0.9% weighed over 100 kg.

Table 2 Respondent Knowledge about Motorcycle Usage

Variables	**Frequency (n)**	**Percentage (%)**
Riding experience		
Less than six months	12	10.4
1 - 5 years	41	35.7
6 - 10 years	45	39.1
More than 10 years	17	14.8

License to ride		
Yes	68	59.1
No	47	40.9
Helmet usage		
Never	16	13.9
Sometimes	41	35.9
Always	58	50.4
Motorcycle insurance		
Yes	76	66.1
No	39	33.9
Maintenance frequency		
Never	1	0.9
Monthly	58	50.4
Every three months	36	31.3
Every six months	20	17.4
Adherence to speed limit		
Yes	88	76.5
No	27	23.5

Source: Field survey (2024)

The results shown in Table 2 reveal that most respondents (39.1%) had 6–10 years of riding experience, while 10.4% had less than six months of experience. Approximately 68% of participants possessed a valid motorcycle license, whereas 47% did not have one. The study also found that 50.4% of respondents regularly wore helmets while riding, while a smaller group (16%) reported never using a helmet. Regarding motorcycle insurance, 66.1% had insured their motorcycles, while 39% had not secured insurance coverage. About 50.4% of participants stated that they serviced their motorcycles monthly, with only 0.9% indicating they never did so. Additionally, the majority (88%) reported adhering to speed limits, while 27% admitted to not following speed regulations while riding.

3.2. Respondent Involvement in Motorcycle Accident

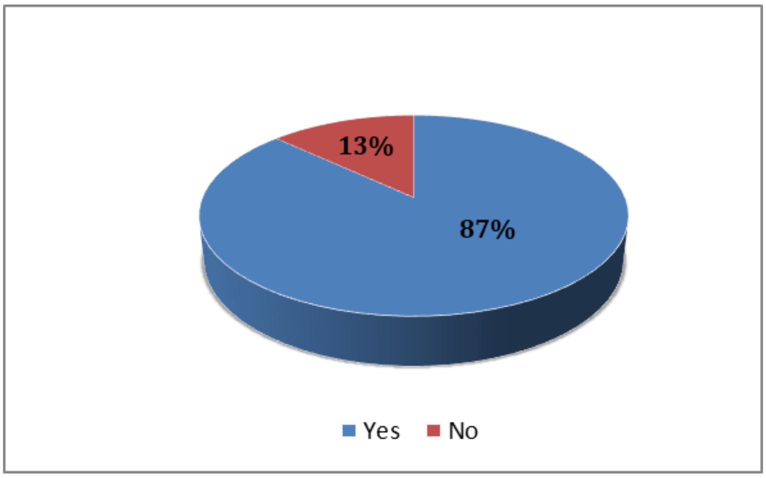

Figure 1 Respondent Involvement in Motorcycle Accident

Figure 1 depicts the respondents' experiences with motorcycle accidents. The findings reveal that approximately 87% reported having been involved in a motorcycle accident, while the remaining 13% indicated they had never experienced one.

Table 3 Nature of Motorcycle Accident

Variables	Frequency (n)	Percentage (%)
Collision with another motorcycle/car	19	16.5
Loss of control	42	36.5
Knocked down a pedestrian	44	38.3
Mechanical fault	10	8.7
Total	115	100.0

Source: Field survey (2024)

Table 3 highlights the common types of motorcycle accidents observed in this study. About 16.5% of accidents in the Gomoa East district were due to collisions with other motorcycles or cars, while 36.5% were caused by a loss of control. Additionally, 38.3% of the incidents involved motorcycle riders hitting pedestrians, and 8.7% were attributed to mechanical failures. Notably, the majority of motorcycle accidents in the district were linked to riders colliding with pedestrians.

Table 4 Economic and Social Effect of Motorcycle Accident

Variables	Frequency (n)	Percentage (%)
Have you lost any property		
Yes	55	47.8
No	60	52.2
Cost of treatment after accident		
Less than 250 cedis	41	35.7
250 - 450 cedis	52	45.2
451 - 650 cedis	14	12.2
Above 650 cedis	8	7
Unemployed as a result of accident		
Yes	10	8.7
No	105	91.3
Are able to carry out your economic activities after the accident		
Yes	109	94.8
No	2	1.7
Some of them	4	3.5
Did the insurance covered the cost of treatment		
Yes	109	94.8
No	2	1.7
Some of them	4	3.5

Source: Field survey (2024)

Table 4 outlines the economic and social impacts of motorcycle accidents on the respondents. Around 52.2% reported no property loss because of motorcycle accidents, while 47.8% acknowledged experiencing property damage. Approximately 45.2% of those involved in accidents incurred expenses ranging from 250 to 450 Ghana cedis, with 7.0% spending over 650 Ghana cedis. In terms of employment, 91.3% of respondents who had been in accidents remained employed, while 8.7% lost their jobs due to the incident. Additionally, 94.8% were able to resume their economic activities after the accident, whereas 1.7% could not. Furthermore, the majority (94.8%) indicated that their medical expenses were covered by insurance, while 1.7% had no insurance coverage for medical treatment, as their motorcycles were uninsured.

Table 5 Association between Demographic Characteristics and Motorcycle Accident

Variables	**Motorcycle Accident**		**χ^2**	**p - value**
	Yes	No		
Gender				
Male	84(86.6)	13(13.4)	0.07	0.87
Female	16(88.9)	2(11.1)		
Age				
15 – 25	12(92.3)	1(7.7)		
26 – 35	57(86.9)	9(13.6)		
36 – 45	19(82.6)	4(17.4)	1.362	<0.002*
46 – 55	8(88.9)	1(11.1)		
55 and above	3(90.0)	1(10.0)		
Level of Education				
Basic	27(96.4)	1(3.6)		
Secondary	53(82.8)	11(17.2)	3.91	0.205
Tertiary	16(84.2)	3(15.8)		
None	3(90.0)	1(10.0)		
Marital Status				
Married	36(92.3)	3(7.7)		
Divorced	5(90.0)	1(10.0)	3.455	<0.037*
Single	56(82.4)	12(17.6)		
Separated	1(50.0)	1(50.0)		
Employment Status				
Government employee	23(88.5)	3(11.5)		
Self-employed	59(84.3)	11(15.7)	1.924	<0.03*
Unemployed	9(90.0)	1(10.0)		
Student	6(70.0)	2(30.0)		
Weight				
40 - 60kg	26(92.9)	2(7.1)		
61 – 80kg	46(85.2)	8(14.8)	1.347	<0.005*
81 - 100kg	27(87.1)	4(12.9)		
Above 100kg	1(50.0)	1(50.0)		

Significance level at ($p<0.05$)

Table 5 shows the relationship between motorcycle accidents and the demographic characteristics of the respondents. The analysis revealed significant associations between motorcycle accidents and factors such as age, marital status, employment status, and weight (p<0.05). However, gender and educational level did not show a significant association with motorcycle accidents (p>0.05).

Table 6 Association between Motorcycle Usage and Motorcycle Accident

Variables	Motorcycle Accident		χ^2	p - value
	Yes	**No**		
Riding experience				
Less than six months	11(91.7)	1(8.3)		
1 - 5 years	37(90.2)	4(9.8)	1.539	<0.034*
6 - 10 years	37(82.2)	8(17.8)		
More than 10 years	15(88.2)	2(11.8)		
License to ride				
Yes	61(89.7)	7(10.3)	1.109	0.219
No	39(83)	8(17.0)		
Helmet usage				
Never	11(68.8)	5(31.3)		
Sometimes	37(90.2)	4(9.8)	5.439	<0.02*
Always	52(89.7)	6(10.3)		
Motorcycle insurance				
Yes	68(89.5)	8(10.5)	1.252	<0.025*
No	32(82.1)	7(17.9)		
Maintenance frequency				
Never	1(50.0)	1(50.0)		
Monthly	51(89.5)	6(10.5)	1.17	<0.005*
Every three months	32(88.9)	4(11.1)		
Every six months	16(80.0)	4(20.0)		
Adherence to speed limit				
Yes	78(88.6)	10(11.4)	0.933	<0.02*
No	22(81.5)	5(18.5)		
Speeding				
Yes	84(86.6)	13(13.4)	0.07	0.281
No	16(88.9)	2(11.1)		
Riding under the influence of alcohol				
Yes	46(90.2)	5(9.8)	0.848	<0.001*
No	54(84.4)	10(15.6)		

Significance level at (p<0.05)

Table 6 examines the relationship between motorcycle accidents and motorcycle usage. The findings indicate significant associations between motorcycle accidents and factors such as riding experience, helmet usage, motorcycle insurance, maintenance frequency, adherence to speed limits, and riding under the influence of alcohol ($p<0.05$). However, possessing a riding license and speeding were not significantly associated with motorcycle accidents ($p>0.05$). Consequently, non-significant factors were excluded, and the analysis proceeded with the remaining variables

3.3. Further Analysis

Due to the dichotomous nature of the dependent variable, binary logistic regression analysis was carried out as an advanced analysis to investigate the effect of the predictor variables on the dependent variable.

3.4. Detecting Multicollinearity between explanatory variables

One of the assumptions in logistic regression is that explanatory variables should not be highly correlated with each other. Therefore, before applying logistic regression, multicollinearity was checked among explanatory variables. Tolerance and VIF values were used to confirm multicollinearity, and the results were indicated in Table 7 below.

Table 7 Collinearity Statistics

	Collinearity Statistics	
Model	Tolerance	(VIF)
Gender	0.099	10.112
Age	0.821	1.217
Level of education	0.059	11.125
Marital status	0.06	10.105
Employment status	0.047	12.167
Weight	0.905	1.105
Riding license	0.046	15.766
Helmet usage	0.044	12.366
Maintenance frequency	0.817	1.299
Motorcycle insurance	0.043	16.299
Adherence to speed limit	0.921	1.218
Alcohol consumption	0.056	13.483
Riding under the influence of alcohol	0.869	1.495
Riding experience	0.948	1.336

Table 7 revealed that age, weight, maintenance frequency, adherence to speed limit, riding under the influence of alcohol and riding experience exhibit low variance inflation factors (VIFs) with their tolerance level closer to 1. This indicates that multicollinearity does not exist between these variables and other predictor variables. Hence, these variables can be included in the model. However, gender, level of education, marital status, employment status, possession of a riding license, helmet usage, motorcycle insurance, and alcohol consumption have high variance inflation factors (VIFs) with their tolerance level not closer to 1. This indicates the presence of severe multicollinearity between these variables and other predictor variables. Hence, these variables cannot be included in the final model due to the potential for unstable coefficient estimates and unreliable results.

3.5. Binary logistic regression analysis

Given that the response variable is dichotomous, binary logistic regression model was utilized for the analysis. The parameters of the model were estimated using the maximum likelihood method. A forward stepwise selection approach was employed in the logistic regression analysis, with variables included based on the significance of the score statistic, set at $p<0.05$.

Table 8 Results of Baseline Model

Baseline Model	B	S.E.	Wald	df	Sig.	Exp(B)
Constant	1.897	0.277	46.944	1	0.000	1.215

Significance level at ($p<0.05$)

Table 8 shows the results of the baseline model, which includes only the constant before any explanatory variables were added. The findings indicate that the constant is statistically significant ($p<0.05$). The initial log-likelihood value for this baseline model is 89.518, serving as a reference point for selecting the optimal model. Additionally, the baseline model demonstrates a predictive accuracy of 87%, representing the percentage of correctly classified cases in the absence of explanatory variables.

3.6. Measures of Goodness of Fit

Table 9 Omnibus Test of Model Coefficients

	Chi-square	**Df**	**Sig.**
Step 1	13.270	1	0.00
Block	38.872	14	0.00
Model	38.872	14	0.00

Significance level at ($p<0.05$)

The results in Table 9 show that the chi-square value for the model is highly significant (χ^2 (14) = 38.872, $p<0.05$). This indicates that the developed model performs significantly better than the baseline model. In other words, the inclusion of explanatory variables improved the model's accuracy, demonstrating a good fit.

Table 10 Hosmer and Lemeshow Test

Step	**Chi-square**	**df**	**Sig.**
1	8.383	8	0.397

Significance level at ($p<0.05$)

The Hosmer-Lemeshow statistic suggest a poor fit when the significance value is less than 0.05. However, as shown in Table 10, the model demonstrates a good fit to the data with a p-value of 0.354 (>0.05). This indicates no significant difference between the observed and predicted outcomes, confirming the model's adequacy.

Table 11 Model Summary Table

Step	**-2 Log likelihood**	**Cox & Snell R^2**	**Nagelkerke R^2**
1	84.518	0.683	0.758

The results in Table 11 show that the developed model has a lower log-likelihood value (84.518) compared to the baseline model, indicating improved performance. This suggests that the developed model accounts for more variance in the outcome and represents a significant improvement over the baseline model, which lacked predictor variables. Additionally, the Cox and Snell R^2 and Nagelkerke R^2 values reveal that approximately 68.3% and 75.8% of the variation in motorcycle accident outcomes are explained by the predictor variables, reflecting a satisfactory level of explanatory power.

3.7. Predictive Accuracy of Developed Model

Table 12 Classification Table

Observed		Predicted		
		Motorcycle accidents		Percentage Correct
		Yes	No	
1 Motorcycle accident	Yes	97	3	97
	No	8	7	46.7
Overall Percentage				90.4

Table 12 above shows the classification table, which compares the actual and predicted groups to assess how many would be correctly classified. The results indicate that 97% of cases involving motorcycle accidents were correctly classified, while 46.7% of cases not involving motorcycle accidents were correctly identified. Overall, the model achieved an accuracy rate of 90.4%. This demonstrates that the developed model correctly classifies 90.4% of cases, an improvement over the 87% accuracy of the baseline model.

Table 13 Results of Binary Logistic Model with Significant Variables

Variables	B	S. E	Wald	Df	Sig	Exp(B)	95% C.I for Exp(B)	
							Lower	Upper
Age	-0.356	0.391	0.83	1	0.002	1.7	0.325	1.707
Weight	-0.036	0.358	0.009	1	0.005	0.965	0.458	2.033
Maintenance Frequency	-0.354	0.397	0.796	1	0.001	1.425	0.654	3.104
Adherence to speed limit	0.933	0.699	1.779	1	0.044	0.541	0.446	10.004
Riding experience	-0.232	0.399	0.336	1	0.023	1.261	0.575	2.757
Riding under the influence of alcohol	0.063	0.661	0.009	1	0.001	1.939	0.257	3.433
Constant	1.752	3.527	0.247	1	0.000	0.173		

Significance level at ($p<0.05$)

The findings presented in Table 13 above indicate that age, maintenance frequency, weight, adherence to speed limits, riding experience, and riding under the influence of alcohol significantly influence the occurrence of motorcycle accidents in the district ($p<0.05$). On the other hand, variables such as gender, education level, marital status, helmet usage, employment status, license to ride, motorcycle insurance and alcohol consumption have no significant effect on motorcycle accident as evidenced by their p-values, which are greater than 0.05 (p=0.749, 0.683, 0.432, 0.378, 0.835, 0.905, and 0.452, respectively). Predictors with positive coefficients are indicative of an increased probability of motorcycle accidents, while those with negative coefficients are indicative of a reduced likelihood. More precisely, variables such as age, weight, maintenance frequency, and riding experience are correlated with a decreased probability of motorcycle accidents. Conversely, factors like adherence to speed limits and riding under the influence of alcohol are associated with an increased likelihood of motorcycle accidents.

The logit model containing the significant variables is presented as follows:

Logit (p) = 1.752 – 0.356Age – 0.036Weight – 0.354Maintenance frequency + 0.933Adherence to speed limit – 0.232Riding experience + 0.063Riding under the influence of alcohol

4. Discussion

The study aimed to examine the causes and impacts of motorcycle accidents in the Gomoa East district. specifically, a logistic regression model was used to identify the primary causes of motorcycle accidents and evaluate their effects on the victims. The findings revealed that the majority (84.3%) of the participants were male. These results align with previous study conducted by Olugbenga et al., (2012), which also observed a male predominance among motorcycle riders in Nigeria compared to their female counterparts. Among the participants, the majority (57.4%) fell within the age range of 26-35 years [15]. This finding is also consistent with a study conducted by Peden et al., (2004) in the USA, which reported that a significant portion of motorcycle riders belonged to the younger age group (14-25 years) [6]. This trend may be attributed to the youth's inclination toward adventure and a willingness to take more risks, such as engaging in hazardous driving practices, as noted by Steinberg [16]. Regarding marital status, a majority (59.1%) of the respondents were single, while 1.7% were separated. This corresponds to research conducted by Kudebong et al., (2011), which found a higher prevalence of accidents among young, unmarried individuals in the Bolgatanga municipality [17]. In terms of employment status, 60.9% of the participants were self-employed, with 7.8% being students. This observation aligns with the findings of Solagbenu et al., (2006) in Nigeria, which suggested that motorcycles were frequently utilized by workers and students seeking to navigate through traffic congestion and reach their destinations promptly [18]. The high prevalence of self-employment among the respondents can be attributed to the limited job opportunities available in the Gomoa East district, leading many young individuals to engage in the 'okada' business.

This study, among its objectives, sought to ascertain the impact of motorcycle accidents on the participants. The findings indicated that a majority (52.2%) of the respondents did not suffer property losses as a result of motorcycle accidents, while 47.8% acknowledged experiencing property damage in such incidents. About 45.2% reported they incurred expenses ranging from 250-450 Ghana cedis, with 7.0% spending over 650 Ghana cedis. In terms of economic recovery, about 94.8% of the participants were able to resume their economic activities after the accidents, whereas 1.7% were unable to do so. Regarding medical expenses, the majority (94.8%) of the participants reported that their insurance covered the costs of their medical treatment following the accidents, while 1.7% did not have insurance coverage for their medical expenses due to their motorcycles being uninsured.

This study revealed that 38.3% of the motorcycle accidents in the district were caused by collisions with pedestrians, while 36.5% were attributed to loss of control. This corresponds with a study conducted in Kenya, where motorcycle accidents were found to be caused by motorcyclists (both riders and passengers) and pedestrians [19]. However, Bachani et al., (2012) placed a higher proportion of the blame on motorcyclists for causing accidents [19]. Additionally, Odiwuor et al., (2015) reported that 60% of motorcyclists who had accidents collided with other motorcyclists [20].

The study sought to examine the association between motorcycle accidents and the demographic attributes of the participants. The results of the research showed that variables like age, marital status, employment status, and the weight of the participants had a statistically significant relationship with motorcycle accidents ($p<0.05$). The results is supported by research carried out by Luther (2019), who indicated that motorcycle accidents were significantly associated to factors such as age, income, family size, possession of a riding license, employment status, and educational background [21]. Another study conducted by Senaviratna and Cooray (2021) revealed that, location type, time, age of driver; accident cause and gender were statistically associated with severity of motorcycle accident [22].

Also, the study sought to explore the relationship between motorcycle usage and motorcycle accidents. The study's results indicated that variables like riding experience, helmet usage, motorcycle insurance, maintenance frequency, adherence to speed limits, and riding under the influence of alcohol were significantly associated with motorcycle accidents ($p<0.05$). According to Aworemi et al. (2019), more than 75% of traffic accidents in Nigeria were linked to a lack of experience among riders [23]. Pickrell and Starnes (2008) also noted that motorcyclists without helmet were 40% more likely to suffer a fatal head injury and 15% more likely to suffer a nonfatal injury than helmeted motorcyclists in the same crash. They estimated that helmets reduce the likelihood of a crash fatality by 37% [24].

In this study, it was identified that age, maintenance frequency, weight, adherence to speed limit, riding experience, and riding under the influence of alcohol were the leading causes of motorcycle accident in the Gomoa East district. These findings differ from a study conducted by Konlan et al., (2020), which identified over-speeding, reckless riding, non-observance of traffic laws, wrongful overtaking, and poor road conditions as the primary causes of motorcycle accidents [25].

5. Conclusion

The occurrence of motorcycle accidents and their impact on victims is a contemporary issue of global concern. The study identified significant factors contributing to motorcycle accidents in the district as age, maintenance frequency, weight, adherence to speed limits, riding experience, and riding under the influence of alcohol. To address this issue, awareness programs should be organized within the district to educate road users and motorcycle riders about essential factors such as speed limits, road signs, dangers of riding under the influence of alcohol, and the importance of regular maintenance, as these factors were identified as major contributors to road accidents in the Gomoa East district.

Compliance with ethical standards

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Disclosure of conflict of interest

All authors declare no conflict of interest.

Statement of informed consent

The study's participants were clearly informed about their option to willingly provide consent or choose not to participate, and they were assured that they could withdraw from the study at any point without facing any adverse consequences. After explaining the study's objectives and their respective roles, all respondents were treated impartially and fairly.

Authors' contributions

This work was carried out in collaboration with all authors. JAM: Contributed to the design of the study, data collection, data analysis and interpretation, literature search and manuscript write-up. MM: Contributed to the data collection processes, data analysis, data interpretation and contributed to the manuscript writing. The final manuscript was approved by all authors.

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