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Original Article

Road Safety Regulations: How Compliant are Commercial Motorcyclists in Semi-Urban Towns in Western Nigeria?

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Compliance, Road Safety, Regulations, Commercial Motorcyclist.

ABSTRACT

The aim of the study was to determine compliance with road safety laws and factors that influence it among commercial motorcyclists in semi-urban towns in Western Nigeria. A descriptive cross-sectional study was done using a multi-stage sampling technique of 502 commercial motorcyclists. Data was collected using a pretested semi-structured questionnaire. Analysis was done using descriptive and inferential statistics with statistical significance determined at a 95% confidence interval and p-value of 0.05. The median age of respondents was 30 years; most were in the second and third phases of life. Compliance with road safety regulations was good in only 26% of respondents; mobile phone usage and alcohol drink riding was found in 31.9% and 28.1%, respectively. Approximately 96.4% indulged in carrying more than one pillion rider, 48% admitted to riding against traffic, and 83.3% wore reflective jackets at night. Use of stimulants was reported among 39.4% of respondents, while only 13.7% smoke cigarettes. The reported crash was found in 56.8% of respondents. Those with previous traffic violations and those that admitted fault for the crash were 2.75 times and 2.51 times more likely to comply with road safety regulations [AOR:2.748, 95%CI: 1.784- 4.332 and AOR: 2.512, 95% CI: 1.195-5-5.278] respectively. Compliance with road safety regulations was poor among commercial motorcyclists in the study population. Measures gingered towards increasing observance of road safety regulations such as increased safety education, effective policing to enforce compliance and punishment of erring riders, should be instituted. This will eventually translate to increased awareness and enhance road safety

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INTRODUCTION

As is the case in most developing countries, commercial motorcycle riding in Nigeria has grown in popularity as a mode of transport in both urban and rural populations. The prevailing economic situation coupled with the high unemployment rate in most developing countries has made commercial motorcycle riding a readily available means of commuting and is fast becoming a source of income for most lower- and middle-income families (Oluwadiya, 2009). Additionally, commercial motorcyclists easily navigate the frequently chaotic traffic conditions found in developing country cities, and they can access areas that automobiles and tricycles cannot. While this may be time-saving measures, with it comes to the risk of an accident when meandering the course of traffic. Sometimes, they are preferred by commuters to taxis because they can get them to their doorsteps.

Additionally, the gap created by insufficient and even non-existent public transportation has necessitated commuters' reliance on motorcycles. However, their ubiquity comes at a cost. Apart from their inherent fragility, commercial motorcyclists are notorious for flouting road safety standards and exhibiting risky road behaviours (Owoaje et al., 2005). Thus, exacerbating an already dire situation. While Africa is the least motorised continent in the world, accounting for only 2% of global vehicle fleets, it has the highest road mortality rate of 24.1 fatalities per 100,000 inhabitants, with vulnerable road users bearing the brunt (WHO, 2013). Commercial motorcycles are a significant contributor to these fatalities.

Human factors are responsible for between 80 and 90% of all road-related incidents, with poor compliance with safety-related traffic regulations being one of the most often reported causes (Adeloye et al., 2016). Road safety compliance rates in Africa are lower than in other parts of the world, according to studies (Arosanyin et al., 2012; Ogunkeyede & Osungbade, 2019; Awosusi et al., 2021). Understanding how road users adhere to safety standards will aid policymakers in developing countermeasures aimed at reducing road crashes.

In the drive toward a reduction in road-related crashes and injuries, the World Health Organization recommended the establishment and enforcement of speed limits, the use of safety helmets and seat belts, design and construction of elements of road infrastructure to reflect its function (WHO, 2015). Some of the measures that have proven to reduce crashes among motorcyclists include: avoiding drunk riding, wearing reflective vests for increased visibility on the road, carrying only one pillion rider, adequate training before starting to ride and strict observance of speed limits, while helmet use and

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it's enforcement reduce the fatality that can arise in the event of a crash (Ndagire et al., 2019). A report from Ghana found compliance rates with safety regulations to be 59.2% which was quite high. The study further opined that this might be connected to the affirmative response to the majority of the factors used in computing compliance (Hagan et al., 2021). In Nigeria, a study in Ibadan, one of Africa's largest major cities, reported that 50.6% of respondents complied with road safety regulations while only 25.6% had a good attitude to road safety measures; however, the prevalence rate of reported crashes was high both lifetime and in the last six months recall (Ogunkeyede and Osungbade, 2019).

The purpose of this study was to ascertain compliance with road safety regulations and the factors that influence it among commercial motorcycle riders in a semi-urban of Owo, headquarters of Owo local government area in southwestern Nigeria.

MATERIAL AND METHOD

Study design

The study employed a descriptive cross-sectional design.

Study Setting

The study was conducted among commercial motorcyclists in Owo, Ondo State – Nigeria. Owo, Ondo State is the headquarter of the Owo Local Government and is located 48 kilometres North of Akure, the capital of Ondo State – Nigeria. It has a population of 222,262 people (National Population Census, 2006) and is predominantly agrarian**.** It is home to two tertiary education institutions: Rufus Giwa Polytechnic and Achievers University as well as the Federal Medical Centre, a tertiary hospital. There is no public transportation system, the primary modes of transportation are taxi cabs and commercial motorcycles. During the day's rush hours, intra-city cabs cannot match the demand for commuting, making the commercial motorcyclist an easily accessible alternative.

Sample Size Determination

The compliance rate of 50.6% among commercial motorcyclists was used to calculate the sample size based on a study done in Ibadan, a major city in Nigeria using the Leslie formulae for a single proportion below:

$n= Z^2_{u/2}\ p(1-p)/\ d^2$

Where n= sample size required, $Z^2_{u/2}$= Z scores at 95% confidence level=1.96, p= proportion of the study population = 50.6%, d = margin of error with a margin of error of 5%. Therefore, the sample size (n) = $(1.96)^2 \times 0.506 \times (1-0.506)/\ 0.05^2$= 381.10. Addition of 10% non-response rate 10%×381.10 +381.10=419.21. This was approximated to 420.

Sample Population

This consisted of commercial motorcyclists operating in Owo Local Government Area (LGA) under the aegis of Amalgamated Commercial Motorcycle Owners and Riders' Association of Nigeria. There were six major branches in the LGA comprising 4-11 units. Each unit has a membership strength that ranges from 30 to 75 from the smallest to the largest. The branches were Oke-Ogun, Ijebu Owo, Owo central, Emure, Uso, and Ipele branches. The estimated total number of members was 1520.

Sampling Technique

A two-stage sampling technique was used for this study. In the first stage, three branches were selected from a box containing the names of all six branches written on six pieces of paper in an envelope using a simple random technique of balloting without replacement. Three branches selected were Oke-Ogun, Ijebu Owo and Owo Central with a total of 25 units. In the second stage, the sampling frame was determined by dividing the total number of members by the estimated sample size. Dividing 1520 by 420 gave a sample frame of 3.6, which approximated one out of every four members. This gave us a total of 380, which was less than the sample size. So, we used one in three sampling frames. Finally, the index respondent was defined as the first respondent to whom consent was used for consecutive sampling for each day. The data was collected every day during the month of June.

Data collection Tool and Procedure.

Ten trained research assistants were recruited for the data collection on the study using a semi-

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structured questionnaire. Prior to data collection, we ran a pilot test in which each trained assistant administered at least 5 questionnaires in different parks in Owo translating to a total of 50 administered questionnaires. This enabled the identification of any gaps in the questionnaire and the subsequent adjustment.

Data Analysis

The data was analysed using IBM SPSS version 22. Frequencies, mean and standard deviations of continuous variables were determined, and Chi-square was used to compare categorical variables. The level of significance was P<0.05. The primary unit of analysis, compliance with regulations, was made up of ten variables to give a minimum score of zero and a maximum of 10. A positive affirmation to each variable was scored as one; the total score was calculated. The primary unit was dichotomised as 1 for poor compliance if the score was less than or equal to 3 and 0 for good compliance if the scores were greater than 3. The variables used to define compliance with road safety regulations included traffic violations (those previously charged with traffic-related offences), alcohol-impaired riding, cigarette smoking, stimulant uses (chewing kolanut and bitter kola), riding against traffic, carrying more than one pillion rider, wearing a reflective jacket, functional speedometer, using a mobile device while riding, and crash helmet use. All of these variables were reverse coded, and those that were statistically significant at the binary logistic regression level at p<0.05 and confidence interval of 95% were subjected to multiple logistic regression using the backward elimination method at P<0.05 to determine the factors associated with compliance with road safety regulations.

RESULTS

Socio-Demographic Characteristics of Respondents

The median age of the respondents was 30 years ranging from 15 to 67 years. The predominant age group was 20-29 years and 30-39 years, which accounted for 41.2 and 34.7% of the respondents, respectively. Out of the 502 respondents, 73.9% owned motorcycles, while only 40.4% had a valid current driver's license. 71.3%of the respondents were Christians and only 57% completed secondary education. The majority (63.9%) of respondents were married and they were predominantly male (98.6%). The daily income was less than #2300 Naira in 62.2% of respondents. 53.2% reported a history of the crash in the preceding year, while 13.7% admitted being at fault for the crash (*Table 1*).

Table 1: Socio-demographic characteristics of commercial motorcyclists in Owo (n=502)

Variables		Frequency	Percentages (%)
Age	<19	23	4.6
	20-29	207	41.2
	30-39	174	34.7
	40-49	75	14.9
	50-59	21	4.2
	50-69	2	0.4
Gender	Male	500	99.6
	Female	2	0.4
Marital status	Single	168	33.5
	Married	321	63.9
	Divorced	13	2.6
Educational levels	Primary school	96	19.1
	Secondary school	286	57.0
	Tertiary school	108	21.5
	None	12	2.4
Religion	Christianity	358	71.3
	Islam	131	26.1

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Variables		Frequency	Percentages (%)
	Traditional	12	2.4
	None	1	0.2
Daily income (NAIRA)	<2300	313	62.2
	>2300	189	37.6
Owner of the motorcycle	Yes	371	73.9
	No	131	26.1
Current license	Yes	203	40.4
	No	299	59.6
Previous crash	Yes	267	53.2
	No	235	46.8
At fault admittance	Yes	85	13.7
	No	417	86.3

Compliance with Safety Regulations

Among the respondents, 74.5% reported having a functional speedometer, while 49.7% reported wearing crash helmets. Alcohol-impaired riding and mobile phone use occurred in 28.1% and 31.9% of respondents, respectively, while approximately 83.3% wore reflective jackets at night for improved visibility. 57% of the respondents reported a crash within the previous year, while only 13. 7% indulged in cigarette smoking. Approximately 62% had never ridden against the traffic, while only 4.6% had never carried more than one pillion rider. 39.4% of respondents reported using stimulants (chewing kolanut and bitter kola). (*Table 2*)

Table 2: Compliance with safety regulations (n=502)

Variables		Frequency	Percentages
Functional speedometer	Yes	374	74.5
	No	128	25.5
Uses mobile while riding	Yes	160	31.9
	No	342	68.1
Alcohol Drinking riding	Yes	141	28.1
	No	361	71.9
Wear Crash helmets	Never	253	50.4
	Occasionally	176	35.1
	Frequently	58	11.6
	Nearly all the time	15	3.0
Wear reflective Jackets	Never	84	16.7
	Occasionally	165	32.9
	Frequently	191	38.0
	Nearly all the time	62	12.4
Previous traffic violations	Yes	285	56.8
	No	217	43.4
Cigarette Smoking	Yes	69	86.3
	No	433	13.7
Use of stimulants (Kolanut & bitter kola chewing	Yes	304	60.6
	No	198	39.4
Carrying more than one Pillion rider	Never	23	4.6
	Occasionally	232	46.2
	Frequently	157	31.3

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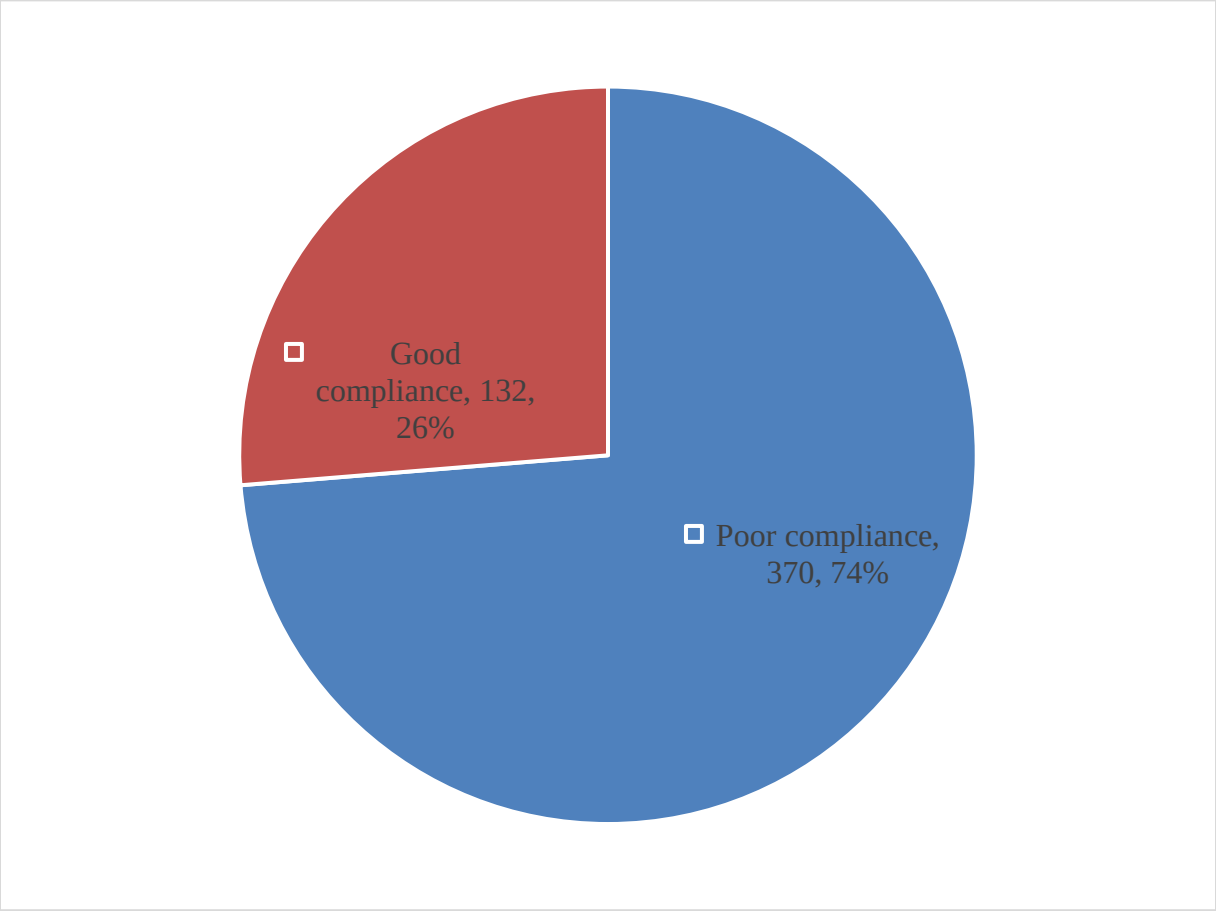
Variables		Frequency	Percentages
	Nearly always	90	17.9
Rides or attempts to ride against traffic	Never	311	62.0
	Occasionally	135	26.9
	Frequently	39	7.8
	Nearly all the time	17	3.4

Only 26% of respondents had good compliance with safety requirements, while 74% had poor compliance (*Figure 1*).

Figure 1: Compliance with safety regulations among commercial motorcyclists in Owo



Factors Associated with Compliance with Road Safety Regulations

Binary logistic regression analysis showed that previous traffic violations and admittance for the crash were associated with compliance with road safety regulations. In the multiple logistic regression, those who had previous traffic violations had 2.75 times odds of complying with traffic regulations than those with no previous violations [AOR:2.748, 95% CI: 1.784-4.332], while those who admitted fault for the crash had 2.51 odds of complying with road safety regulations than individuals who did not [AOR: 2.512, 95% CI:1.195-5-278] (*Table 3*).

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Table 3: Factors associated with compliance with road safety regulations

Variables		Unadjusted			Adjusted		
		COR	95%CI	p-value	AOR	95%CI	p-value
Age		1.022	0.947-1.103	0.570			
Current License	No	ref					
	Yes	0.955	0.607-1.500	0.847			
Riding hours per day	≤10 hours	ref					
	>10 hours	0.784	0.497-1.238	0.297			
Previous crash	No	ref					
	Yes	0.285	0.184-0.443	0.000	2.748	1.195-5.278	0.000
At fault admittance	No	ref					
	Yes	0.474	0.194-0.884	0.023	2.512	1.195-5.278	0.015
Educational level	Primary	ref					
	Secondary	1.231	0.208-7.275	0.818			
	Postsecondary	.964	0.174-5.359	0.967			
	None	.946	0.162-5.523	0.951			
Daily income (Naira)	≤2300	ref					
	>2300	0.813	.516-1.276	0.365			
	Owner of Motorcycle						
	No	Ref					
	Yes	0.811	0.477-1.388	0.448			

DISCUSSION

The study found compliance with safety regulations among commercial motorcyclists in a semi-urban town in southwestern Nigeria to be good in only 26% of the respondents. At first glance, this appears to be significantly lower than compliance rates reported from comparable studies around the world. This finding is higher than what was found in Uganda by Ndagire in 2018 who found compliance of 24% among motorcyclists. A compliance rate of 59.2% and 50.6% were reported from studies done in a semi-urban town in Ghana (Hagan, 2021) and in Nigeria (Ogunkeyede and Osungbade, 2019), respectively. Similarly, another study on alcohol use and compliance with road safety rules found a maximum score of 77.3% and a minimum score of 31.6% compliance rates when each of the variables used to define compliance was scored individually (Awosusi et al., 2021). In addition to that, a study done in Tanzania found 39.7% of a good level of compliance among commercial motorcyclists (Nzuchi et al., 2022). A study of crash helmet usage in Ghana reported a compliance rate of 47% (Nimako et al., 2018). However, in all these studies, compliance was assessed separately for each variable. In practical terms, in order to avoid or minimise crashes, it is necessary to adhere to the majority of the variables that contribute to crashes. This is the strength of the current study, which defined good compliance as affirmative responses to at least seven of the ten variables used to define it

In this study, we found those with a history of previous traffic violations were 2.7 times more likely to comply with safety regulations. This conclusion is consistent with Davey and Freeman's classical deterrence theory, which states that "individuals will avoid offending behaviour(s) if they fear the perceived consequences of the act" (Sam, 2022). Deterrence can be classified into two broad categories: specific and general. Specific deterrence is the mechanism that explains our study's findings; it occurs when an individual commits an offence and is sanctioned and then refrains from further offending behaviours out of fear of further punishment/sanction. When aberrant behaviours are punished, and road safety laws and regulations are enforced, compliance is likely to

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increase. General deterrence, on the other hand, occurs when a would-be offender (e.g., a motorist) is deterred from committing a criminal behaviour (in this case, traffic offence) because another has been apprehended and punished for the same offending behaviour (Sam, 2022). On the contrary, different studies published in the African continent have reported that being young (below 25 years) was associated with a poor level of compliance among motorcyclists (Olumide and Owoaje, 2015).

Another study found that being married were associated with a good level of compliance among motorcyclist (Nzuchi et al., 2022). Arosanyin found in his study of safety issues among commercial motorcyclists in Nigeria that the odds of crash involvement decreased with highway code awareness, earnings, and mode of operation (Arosanyin et al., 2013). On the other hand, (Arosanyin, Olowosulu, & Oyeyemi, 2012) reported that inadequate road traffic education among road users contributes to poor traffic law compliance in Nigeria (Arosanyin, Olowosulu, & Oyeyemi, 2012). We also found that those who admitted fault for reported crashes in the previous year were 2.512 times more likely to comply with road safety regulations. This could be because previous painful events are unlikely to be repeated, especially if they were linked with injury or damage**.**

We concluded that compliance with road safety regulations was poor among commercial motorcyclists in Owo. Measures that have been shown to improve compliance, such as increased safety education, effective policing to enforce compliance and punishment of erring riders who remain deviant, should be implemented. This will help to improve road safety and mitigate crashes in our studied population.

Consent to Participate

Informed consent was obtained from all the participants in the current study. All methods were carried out in accordance with relevant guidelines and regulations.

Availability of Data and Materials

The datasets used and/or analysed during the current study are available from the corresponding author upon reasonable request.

Competing Interests

Authors declare no competing interest.

Authors' Contributions

Olasinde Anthony Ayotunde was the principal investigator, conceived, designed the survey and wrote the draft of the manuscript. Oluwadiya Kehinde partook in the conception, designed, data analysis and review of the manuscript, Sikakulya Franck critically reviewed the manuscript. Muhumza Joshua did the statistical analysis. All authors read and approved the final manuscript.

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