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Prevalence of Protective Measures and Incident Among Motorcycle Riders with Road Safety Compliance in a Nigerian Semi-Urban Community

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Abstract

Introduction: The operation of commercial motorcycles has eased transport difficulties, but an increased rate of road traffic collisions, injuries, and deaths deserve attention. This study aimed to evaluate compliance with road safety preventive measures and incident prevalence among motorcycle riders in Ado-Odo Ota, Ogun State, Nigeria.

Methods: This study was a descriptive cross-sectional survey that employed a structured questionnaire for collecting information related to compliance to protective measures and incident prevalence. A stratified random sampling technique was used to identify respondents from 20 motorcycle parks. Also, a multistage probability sampling method was used to select 374 respondents from all motorcycle parks listed. Data analysis was done using IBM-SPSS version 25.0

Results: Of the 374 respondents, 69.0% owned motorcycles and 31.0% hired/rented theirs. Less than half (45.7%) of all riders were aware of the implications (health, financial, and psychological) of a motorcycle incident. Only 39.5% of owners and 59.5% rented/hire knew the implications ($p<0.001$). Helmet use was significantly higher among owners (76.4%) than hired/rented (55.2%), $p<0.001$. More owners (70.9%) had protective jackets than rented/hired (57.8%) ($p<0.05$). Availability of bright/reflective clothing was poor (45.7%) though significantly higher among owners (50.0%) than rented/hired (36.2%) ($p<0.05$). Overall incident prevalence was 45.2%, significantly higher among rented/hired riders (56.0%) than owners (40.3%) ($p<0.005$). Respondents aged 18-24 years were more involved in MCA (52.9%) than the other age groups ($p<0.05$). Respondents with no formal education had more incidents (73.1%) than the educated ($p<0.001$).

Conclusion: The knowledge of the consequences of motorcycle incidents was limited among motorcycle riders in Ado-Odo, and the prevalence of incidents was significantly higher among riders who rented/hired motorcycles than owners. Therefore, there is a need for incident documentation and cost implication of motorcycle incidents in the local government areas; this will help policymakers design intervention programs. Also, there is a need for regular training of the riders on road safety measures and the associated benefits.

Key words: Compliance, Incident implication, Motorcycle, Prevalence, Safety measures

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Introduction

The operation of commercial motorcycles (known as Okada in Nigeria) has eased the transport difficulties encountered by the people. Thus, we can say that the Okada business has filled a significant gap in the public transport system in Nigeria. With the

operation of commercial motorcycles, people can now go to areas previously impregnable by conventional means of transportation. For example, there were some rural suburbs that conventional commercial buses and taxis could not reach. The Okada has now provided a means of transportation for commuters in these areas. In Ado Odo-Ota local government area (LGA) in Ogun State, the interior Sango, Ilogbo, Ojuore, Atan, and many more have been opened up by Okada.

However, the motorcyclist spends more than 10 hours on the road and is directly exposed to numerous environmental hazards, including road traffic incidents and related crash incidents of varying severity levels.[1] There was also an increase in the rate of road traffic collisions associated with commercial motorcycling, increasing the number of hospital injuries.[2,3]In addition, the incidents are correlated with tremendous socio-economic effects for the victims, their families, and society.[4,5]

Many explanations for the unacceptably high rate of road traffic incidents involving commercial motorcycle riders have been proposed. The causes vary from human factors and conditions for vehicles to roads in Nigeria.[1,6] The risk of death among motorcycle riders is twenty times higher than among car occupants.[7] About two-thirds of all road traffic incidents in Nigeria involve commercial motorcycle riders.[1] A large proportion of the deaths in Ogun state are also due to commercial motorcycle crashes.[1]A significant risk factor for incidents among commercial motorcycle riders is excessive speed resulting from impatience to make higher returns.[8,9] For other road users, other causes include poorly maintained motorcycles, poor roads, and lack of knowledge of basic traffic regulations and the consequences of road traffic incidents.[9] Significant risk factors for incidents among commercial motorcyclists have also been unhealthy social activities indulged in by motorcyclists. The use of alcohol, cigarette smoking, and the misuse of psychoactive drugs affect drivers' judgment and ability to perceive incidents correctly.[10–12] However, the use of protective measures has been shown to substantially reduce the severity of injuries that can result from road traffic incidents.[10,13] Studies have shown a high prevalence of risk actions among commercial motorcyclists involved in road traffic incidents and severe crash injuries due to a lack of safety knowledge, compliance with these measures, and non-enforcement of laws banning high-risk behaviors.[1]

One big way to minimize motorcycle morbidity and mortality is by using safety devices and observing precautionary safety measures.[14] According to the WHO (2020), correct helmet use can reduce the risk of fatal injuries to 42% and head injuries to 69%.[4] It can also reduce the duration of stay in the hospital and medical bills for injured riders [4]. A motorcyclist without a helmet has a 40% greater chance of fatal head injury and a 15% more chance of non-fatal injury than a rider with a helmet when they have a crash.[15]Besides, the rates and patterns of use under national regulation can differ significantly depending on education, penalty charging, and compliance.[16] The rules for using motorcycles for passenger transport in Nigeria are laid down in the 2004 National Road Traffic Regulations (Federal Republic of Nigeria), which require, among other items, the use of helmets for riders and pillion.[17] Despite these rules and responsibilities, motorcycle riders' usage of protective devices in Nigeria remained poor. In an investigation into the know-how, behavior, and practice of business motorcyclists in Ile Ife, South West of Nigeria, 20% of motorists suggested using a crash cask as one safety device, and 23,8% suggested wearing a helmet at the time of the report.[18]

Some personal protection aids readily available to commercial motorcyclists are helmets, goggles, and gloves, yet only a few commercial motorcycle riders use these devices. It should be remembered that deaths and injuries from road traffic can be prevented. However, the only secret to effective prevention lies in determining all relevant stakeholders representing different sectors: public and private health, transport, education, finance, police, politicians, suppliers, foundations, and the media. This study evaluates the riders' knowledge of the implications of road traffic incidents and compliance with road safety and preventive measures in Ado-Odo Ota LGA of Ogun State, South-West, Nigeria. Due to inadequate local data, motorcycle incidents have not received the attention they deserve in this state, and public policy solutions to this crisis have been ignored. So, it is necessary to determine the riders' knowledge and compliance with road safety and preventive measures and their association with incident prevalence.

Methods

A descriptive cross-sectional survey conducted in Ogun State, Nigeria, in Ado Odo Ota local government area. The sample population was based on the number

of registered motorcycles (620)in the LGA indicate in "digest of motor vehicle statistics," 2017 edition.[19] This number was used because there is no recent data on the number of registered motorcycles in the LGA, meaning that there may be more riders in the LGA than 620.

The sample size was estimated using the formula

$$n = \frac{Z^2\ p\ q}{d^2}$$

Where: n is the sample size, Z= 1.96 for 95% Confidence level. P is the prevalence of road safety and preventive measures among Nigerian motorcycle riders (67% = 0.67)[20], and q = 1-p (1-0.67 = 0.33), d is marginal error = 0.05.

The estimated sample was 340 and 374 with 10% allowable attrition.

A multistage probability sampling method was used to select 374 respondents from all motorcycle parks listed. There were 20 motorcycle parks identified through stratified random sampling from five major divisions. A simple random sample selection was used to select 19 participants from fifteen bigger parks and 18 participants from the remaining five smaller parks. Data collection was done from January 25 to February 30, 2021. The information obtained from the respondents includes the sociodemographic data, knowledge of the implications of motorcycle incidents, availability, and compliance with safety measures, as well as incident prevalence.

Data analysis was done using IBM-Statistical Package for Social Sciences (IBM-SPSS) version 25.0 for Windows *IBM* Corp., Armonk, NY, USA. Association between dependent variables (knowledge of implications of MCA, compliance with safety measures, and motorcycle incidents) and independent variables (ownership, age category, marital status, education, and year of experience) was determined using Chi-square statistics and p-value <0.05 was considered significant.

Motorcycle riders included in this study must be 18 years old and above, below 60 years, riding a motorcycle in the LGA for at least one year, and must be full-time riders. At the same time, those that did not satisfy inclusion criteria were excluded.

Approval for the study was taken from the National Health Research Ethics Committee of Nigeria (NHREC) with approval number HREC/01/01/2007-20/01/2021. Data collected from respondents were treated confidentially, and no traceable information to any of them was collected. All respondents were informed of the study protocol, and both verbal and written consent was obtained before questionnaires were administered to them.

The knowledge of the implications of motorcycle incidents was assessed with eight questions, including "reduction of working capacity," "physical disabilities," "burden of the cost of medication," "loss of livelihood," "loss of parents and family loved ones," "intangible costs (i.e., pain, grief, and suffering)," "medical costs, funeral costs, and property damage," "psychological distress, i.e., posttraumatic stress disorder and major depressive disorder." An overall score of at least 70% was considered high knowledge, while scores lower than 70% were termed insufficient knowledge[21].

Results

As shown in Table 1, most motorcycle riders (69.0%) own the motorcycles, while 31.0% either hired it in instalments or rented for daily delivery of specific amounts. The highest proportion of these riders was between 25 – 44 years, with the peak age of 35 – 44 (38.0%), and the majority were married (86.9%). More than half (53.7%) had secondary education, had children (90.6%), and have been doing commercial riding work for seven or more years (49.7%).

The respondents were classified into two groups; group one is those that hired/rented motorcycles for business, and group two are the riders that own the motorcycles. Of the 374 respondents, 69.0% owned motorcycles and 31.0% hired/rented theirs. Most of them were married (86.9%) and (38.0%) were within 35 – 44 years, had secondary education (53.7%), had children (90.6%), and have been doing riding business for more than six years (49.7%) (Table 1).

Respondents' mean scores out of five from eight questions used to evaluate their knowledge about the implications of MCA are shown in Table 2. Both groups were similarly aware that MCA might lead to the reduced working capacity of its victims (owned-3.25, rented/hired-3.48) (p>0.05). Those that rented/hired motorcycles were significantly more aware that MCA could result in a burden of the costs of medication (3.61), cause pain, grief, and suffering (3.65), cause medical costs, funeral costs, and property damage (3.66), and could cause psychological distress

(posttraumatic stress disorder and major depressive disorder) (3.28) than motorcycle owners (p<0.05).

Table 3 displays the knowledge of motorcycle riders about the implications of motorcycle incidents. From the eight questions on the impacts of MCA, less than half (45.7%) of all riders displayed good knowledge, and 54.3% had insufficient knowledge. Thus, only 39.5% of motorcycle owners knew the implications of MCA incidents whereas, about three-fifths (59.5%) of rented/hired ones had good knowledge (p<0.001). On the other hand, more than half of riders aged 18 -24 (52.9%) and 45 – 54 (62.4%) displayed adequate knowledge than others (p<005). Similarly, riders with secondary education (53.7%) and those that have been riding for more than six years (59.7%) showed better knowledge of the implications of MCA than the rest (p<0.001).

The proportion of riders wearing helmets at the time of the interview was (69.8%) but higher (76.4%) among motorcycles owners than hired/rented (55.2%), p<0.001. The majority (90.1%) had a functional headlamp though no significant difference was between owners (88.8%) and hired/rented (93.1%) (p>0.05). More owners (70.9%) had protective jackets than rented/hired (57.8%) (p<0.05). Availability of functional speedometer was not significantly different between owners (76.4%) and hired/rented (83.6%) (p>0.05). There was an overall poor availability of bright/ reflective clothing (45.7%) though significantly higher among owners (50.0%) than rented/hired (36.2%) (p<0.05). Availability of connecting gloves (41.2%) and a pair of the boot (38.8%) were generally poor and not significantly different between both groups (p>0.05).

The majority of the riders had two functioning indicators (79.9%) but significantly higher (85.3%) among hired/ rented bikes than owners (77.5%) (p<0.001). On the other hand, the overall availability of wing mirrors was (57.8%) with 56.9% among rented/hired motorcycles and 58.1% among owners (p>0.05), as shown in Table 4.

Incident prevalence within 12 months was 45.2%, significantly higher among rented/hired riders (56.0%) than owners (40.3%) (p<0.005). Most of the incidents occurred during the day (82.2%) and mainly on the highways (70.4%) (p>0.05). More than half (56.4%) were hit by another vehicle from behind. Also, 77.8% knew somebody who has been involved in a motorcycle incident in the previous 12 months, as shown in Table 4.

Table 5 shows the demographic distribution of respondents that have had an incident or more in the previous 12 months. Respondents aged 18-24 years were more involved in MCA (52.9%) than the other age groups (p<0.05). Divorced/widowed respondents had more incidents (47.6%) than married (45.5%) and singles (39.3%) (p>0.05). Respondents with no formal education had more incidents (73.1%), and respondents with tertiary education were the least (25.4%) (p<0.001). More than half of those that have been doing riding business for 4-6 years had had incidents (51.2%) than the rest (p<0.05).

Table 1: Sociodemographic characteristics of the respondents

Parameter	Response	Frequency (n=374)	Percentage
Ownership	Rented/Hired	116	31.0
	Owned	258	69.0
Age category (years)	18 – 24	17	4.5
	25 – 34	124	33.2
	35 – 44	142	38.0
	45 – 54	91	24.3
Marital status	Single	28	7.5
	Married	325	86.9
	Divorced/separated/widowed	21	5.6
Level of education	No formal education	26	7.0
	Primary	88	23.5
	Secondary	201	53.7
	Tertiary	59	15.8
Have children	Yes	339	90.6
	No	35	9.4
Years in the motorcycle riding	1 – 3 years	63	16.8
	4 – 6 years	125	33.4
	≥ 7years	186	49.8

Table 2: Means score of knowledge of the motorcycle riders about the implications of motorcycle incidents

Implication	Rented/Hired n(%)	Owned n(%)	Overall n(%)	P-value
Reduction of working capacity	3.25 (65.0)	3.48 (69.6)	3.41 (68.2)	0.206
Physical disabilities	3.17 (63.4)	2.85 (57)	2.95 (59)	0.082
Burden of cost of medication	3.61 (72.2)	3.18 (63.6)	3.32 (66.4)	0.016*
Loss of livelihood	2.81 (56.2)	2.76 (55.2)	2.77 (55.4)	0.760
Loss of parents and livelihood	2.79 (55.8)	2.62 (52.4)	2.68 (53.6)	0.306
Intangible costs (i.e., pain, grief and suffering)	3.65 (73)	3.11 (62.2)	3.28 (65.6)	0.001*
Medical costs, funeral costs, and property damage	3.66 (73.2)	3.2 (64)	3.34 (66.8)	0.008*
Psychological distress i.e., posttraumatic stress disorder and major depressive disorder	3.28 (65.6)	2.93 (58.6)	3.04 (60.8)	0.046*

*-significant at p<0.05 level; figures shown in bracket are in percentage

Table 3: Sociodemographic distribution of the knowledge of the implications of motorcycle incidents

Parameters	Response	Knowledge of implications of MCA			
		Poor n(%)	Good n(%)	Total n(%)	P-value
Ownership	Rented/Hired	47 (40.5)	69 (59.5)	116 (31.0)	<0.001*
	Owned	156 (60.5)	102 (39.5)	258 (69.0)	
Age category	18-24	8 (47.1)	9 (52.9)	17 (4.5)	0.028*
	25-34	79 (63.7)	45 (36.3)	124 (33.2)	
	35-44	82 (57.7)	60 (42.3)	142 (38.0)	
	45-54	34 (37.4)	57 (62.6)	91 (24.3)	
Marital status	Married	162 (49.8)	163 (50.2)	325 (86.9)	<0.001*
	Single	22 (78.6)	6 (21.4)	28 (7.5)	
	Divorced/separated/ widowed	19 (90.5)	2 (9.5)	21 (5.6)	
Education	No formal education	17 (65.4)	9 (34.6)	26 (7.0)	0.001*
	Primary	55 (62.5)	33 (37.5)	88 (23.5)	
	Secondary	90 (44.8)	111 (55.2)	201 (53.7)	
	Tertiary	41 (69.5)	18 (30.5)	59 (15.8)	
Have children	Yes	182 (53.7)	157 (46.3)	339 (90.6)	0.475
	No	21 (60.0)	14 (40.0)	35 (9.4)	
Year of experience	1 - 3 years	38 (60.3)	25 (39.7)	63 (16.8)	<0.001*
	4 - 6 years	90 (72.0)	35 (28.0)	125 (33.4)	
	Above 6 years	75 (40.3)	111 (59.7)	186 (49.7)	
	Total	**203 (54.3)**	**171 (45.7)**	**374 (100.0)**	

*-significant at p<0.05 level; figures shown in bracket are in percentage

Table 4: Level of Compliance with the use of safety devices/road safety and preventive measures

SN		Rented/Hired n(%) n=116	Owned n(%) n = 258	Total n(%) n =374	P-value
1	Have helmet	64 (55.2)	197 (76.4)	261 (69.8)	<0.001*
2	Have functional headlights present	108 (93.1)	229 (88.8)	337 (90.1)	0.193
3	Have protective jacket	67 (57.8)	183 (70.9)	250 (66.8)	0.012*
4	Functional speedometer present	97 (83.6)	197 (76.4)	294 (78.6)	0.113
5	Bright /reflective clothing available	42 (36.2)	129 (50.0)	171 (45.7)	0.013*
6	Connecting gloves present	45 (38.8)	109 (42.2)	154 (41.2)	0.530
7	A pair of boot present	46 (39.7)	99 (38.4)	145 (38.8)	0.814

8	**Number of direction indicators present**				
	Not available	17 (14.7)	23 (8.9)	40 (10.7)	
	One	0 (0.0)	35 (13.6)	35 (9.4)	<0.001*
	Two	99 (85.3)	200 (77.5)	299 (79.9)	
9	**Number of wing mirrors present**				
	Not available	40 (34.5)	79 (30.6)	119 (31.8)	
	One	10 (8.6)	29 (11.2)	39 (10.4)	0.630
	Two	66 (56.9)	150 (58.1)	216 (57.8)	

*-significant at p<0.05 level; figures shown in bracket are in percentage

Table 4: Prevalence of motorcycle road incidents among the respondents within the last 12 months

SN	Incidents	Rented/ Hired n=116	Owned n = 258	Total n =374	P-value
1	Had an incident that resulted in injury in the previous 12 months	65 (56.0)	104 (40.3)	169 (45.2)	0.005*
2	**Number of Incidents**				
	1 – 2 incidents	59 (90.8)	77 (74.0)	136 (80.5)	0.008*
	3 or more	6 (9.2)	27 (26.0)	33 (19.5)	
3	**Period of incident**				
	During the day	53 (81.5)	86 (82.7)	139 (82.2)	0.849
	In the night	12 (18.5)	18 (17.3)	30 (17.8)	
4	**Place of incident**				
	Highway	50 (76.9)	69 (66.3)	119 (70.4)	0.143
	Streets	15 (23.1)	35 (33.7)	50 (29.6)	
5	**Frequency of collision with other vehicles**				
	Collisions while overtaking other road users	36 (31.0)	100 (38.8)	136 (36.4)	0.151
	Being hit from behind by other road users (rear-end shunt)	60 (51.7)	151 (58.5)	211 (56.4)	0.220
	Collisions with right-turning vehicles	36 (31.0)	101 (39.1)	137 (36.6)	0.132
	Collisions with left-turning vehicles	41 (35.3)	77 (29.8)	118 (31.6)	0.290
	Poor riding technique leading to loss of control of the motorcycle	15 (12.9)	33 (12.8)	48 (12.8)	0.970
	Over-shooting bends in the road	12 (10.3)	36 (14.0)	48 (12.8)	0.334
6	Knows somebody who has been involved in an incident in the last 12 months	84 (72.4)	207 (80.2)	291 (77.8)	0.092

*-significant at p<0.05 level; figures shown in bracket are in percentage

Table 5: Demographic distribution of MCA among riders in the previous 12 months

Parameters	Response	Involved in an incident in the previous 12 months			
		Yes (n =169)	No (n=205)	X^2	P-value
Age category	18~24	9 (52.9)	8 (47.1)	8.288	0.040*
	25~34	56 (45.2)	68 (54.8)		
	35~44	53 (37.3)	89 (62.7)		
	45~54	51 (45.2)	40 (44.0)		
Marital status	Married	148 (45.5)	177 (54.5)	0.46	0.795
	Single	11 (39.3)	17 (60.7)		
	Divorced/separated/widowed	10 (47.6)	11 (52.4)		

Education	No formal education	19 (73.1)	7 (26.9)	18.034	<0.001*
	Primary	39 (44.3)	49 (55.7)		
	Secondary	96 (47.8)	105 (52.2)		
	Tertiary	15 (25.4)	44 (74.6)		
Have children	Yes	151 (44.5)	188 (55.5)	0.607	0.436
	No	18 (51.4)	17 (48.6)		
Year of experience	1 - 3 years	19 (30.2)	44 (69.8)	7.652	0.022*
	4 - 6 years	64 (51.2)	61 (48.8)		
	Above 6 years	86 (46.2)	100 (53.8)		
Knowledge of implication of incident	Poor	90 (44.3)	113 (55.7)	0.13	0.718
	Good	79 (46.2)	92 (53.8)		
	Total	**157 (42.0)**	**103 (27.5)**	**114 (30.5)**	

*-significant at p<0.05 level; figures shown in bracket are in percentage

Discussion

The respondents showed overall insufficient knowledge of the implications or consequences of motorcycle incidents. This inadequate knowledge might be responsible for high incident prevalence in the local government, emphasizing the need for regular awareness programs and training for all riders. However, older and married riders displayed better knowledge of the consequences of motorcycle incidents than younger ones, which might be due to the long-time experiences they had in the business. Studies have proposed that understanding the effects of MCI may significantly reduce incident rates and suggested regular training for road users.[22–25] However, this finding also underlines the need for accurate assessment of MCI's implication (both costs and non-cost) in this area to help design interventions towards reducing motorcycle incidents in the environment and the entire state.

There was a suboptimal level of helmet use among all respondents (69.8%) but slightly higher than half among riders who hired motorcycles (55.2%) as compared to over 70% of those who owned the motorcycles (p<0.001). This value is higher than an estimated helmet usage of 20% among motorcycle riders in Nigeria by the Federal Road Safety Corps.[9] Studies have shown that the use of helmets significantly reduces motorcycle fatality.[26] Similar to the findings of this study, a study conducted in Ilorin, Kwara State, Nigeria, found poor compliance with road safety and preventive measures and helmet usage.[27] Several other studies have reported low helmet usage among motorcycle riders in Nigeria, including 12.8% reported and 0.7% observed usage in Abuja,[28] 77% never used helmet before in Ibadan,[29] and 4.3% usage among riders in Oshogbo, Southwest Nigeria,[14] Although this study did not assess the reasons for the non-usage of the helmet, the reasons may not be different from other studies that reported non-availability, lack of enforcement, and discomfort as significant reasons for non-usage of helmet among motorcycle riders and pillion passengers.[28,29] Poor riders' helmet usage is not limited to Nigeria as lower usage than the finding of this study has been reported in other African countries. In Tanzania, the non-consistent use of helmets among motorcycle riders was reported as 67.6%,[30] while only 1.9 % wear crash helmets in a study conducted in Egypt,[5] only 4% wore a helmet in Kenya,[31] and 43.6% in Ghana.[10]

A very high proportion of both groups had functional headlamps, speedometers, and two functioning indicators, but a higher proportion of hired motorcycles had than the owned ones. This attitude may be because most hired motorcycles were new (mainly rented in installments), whereas owners ride old ones. On the other hand, there was a higher availability of protective jackets among motorcycle owners than the hired ones. However, there was low availability of bright/reflective clothing, connecting gloves, and wing mirrors in both groups of motorcycle riders. Although protective wear has been recommended and made mandatory for motorcycle riders in Nigeria,[9] studies have reported variations in the use of protective jackets and other clothing by riders; while some wear jackets, they may not wear protective trousers consistently.[32–34] For example, a study conducted in Makurdi, Benue State, Nigeria, reported low wing mirrors availability (2%) among motorcycle riders.[25]

Similarly, a study conducted on 363 motorcycle incident patients (including riders, passengers, and pedestrians) found that none of them was wearing protective/reflective clothing at the time of the incidents.[35] The 66.8% availability of protective/reflective wear in this study can be attributed to improved awareness over the last decade. However, the finding of some studies outside Nigeria reported lower availability/usage of protective wears among riders. Studies from Nairobi and Kisumu, Kenya, found that 45.5%[4] and 45.9%[36] used protective/reflective wear. Whereas another study carried out in 11 cities in same Kenya, found 16% use. Also, a survey conducted among 424 respondents in the USA and Canada found that 39.8% of the respondents stated that they always use protective clothing and 20.6% almost always.[37] These findings underscore the need for consistent enforcement of the Nigerian highway code in Ota and Nigeria.

There was an unacceptably high rate of incidents (45.2%) among all the riders in ado-Odo Ota, in Ogun State, in the last 12 months. This prevalence is slightly lower than 54.8% previously reported in this LGA in 2017.[38] The difference may be because this study assessed 12 months of incident history, whereas Kolawole and Afolabi assessed incident history since the respondents started riding motorcycles. This study found that the prevalence of incident in the last 12 months was significantly higher ($p<0.05$) among the respondent who was driving hired/rented motorcycles (56.0%) than those who were using owned motorcycles (40.3%), indicating a difference of 15.7%. Besides, most incidents occurred during the day and on the highways among hired/rented motorcycles (80%). This finding justifies the ban placed on motorcycles on highways in some cities in Nigeria.[1,9,22,39–42] It is necessary to replicate such in Ado-Odo Ota LGA since it borders Lagos and is densely populated.

Like the high motorcycle incident prevalence of 45.2% found in this study, a study conducted in Ibadan, Oyo State, reported a 45.3% incident prevalence.[43] However, a higher prevalence (74.0%) in the last 12 months than 45.2% found in this study was reported among motorcycle riders in Ghana.[10] Still, slightly lower was found in some other regions, such as 37.8% in Mwea Town in Kenya,[44] 44.7% in Nairobi Kenya,[4] and 40.3% in Kisumu county, Kenya.[36]

The higher rate of incidents among rented motorcycle riders might be because they had to deliver a certain amount to the owner each day or pay monthly installments. Also, the anxiety to meet daily personal and family needs may cause them to avoid necessary safety rules and measures and often end up in road crashes, unlike riders who owned the motorcycles with less pressure. Previous studies have reported similar findings that high risk and incidents among motorcycle riders are due to the need to earn sufficient money to meet daily needs, pay rents, ticket fees, and installment payments to the motorcycle owner.[45,46]

Also, regular stoppage by law enforcement agents, who forcefully extort them, even without committing any road offense and high-ticket fee, might have contributed to the high rate of incidents in the LGA. Another factor is the poor road conditions and lack of parking space which may psychologically affect the riders and consequently result in incidents, particularly when riders have to remain in Sun or rain due to lack of proper parking space. Since these figures are self-reported, there is the possibility that they were underreported, especially those who ride rented motorcycles. Bad roads in Nigeria have been consistent over several decades and have been constantly reported as a challenge and a significant cause of road incidents in Nigeria.[35,38,47]

The major limitation of this study is that the prevalence of motorcycle incidents was estimated based on self-reported information, which may be generally reliable. However, the study's strength is that the findings represent motorcycle riders in Ado-Odo Ota LGA since the survey was conducted across the local government areas. Also, the study shows apparent differences between hired/rented riders and those who owned motorcycles.

Conclusion

The knowledge of the consequences of motorcycle incidents was limited among motorcycle riders in Ado-Odo Ota LGA, and the prevalence of incidents was significantly higher among riders who rented/hired motorcycles than owners. Therefore, there is a need for incident documentation and cost implication of motorcycle incidents in the LGA to help policymakers design intervention programs. Furthermore, since the study found a higher prevalence of incidents among riders who rented/hired motorcycles, it is recommended that the government subsidizes motorcycles and spreads the payment over a long period to reduce anxiety and reduce incident rates.

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