The prevalence and determinants of helmet use amongst commercial motorcyclists in Ido-Osi local government area

Kayode Rasaq Adewoye, Shuaib Kayode Aremu, Charles Oluwatemitope Olomofe, Adebayo Makinde Adeniyi, Richard Dele Agbana, Opeyemi Oladipupo Abioye & Yusuf Funsho Issa

Published online: 10 Oct 2019.

Submit your article to this journal ⬚

View related articles ⬚

View Crossmark data ⬚

Taylor & Francis
Taylor & Francis Group

Check for updates

The prevalence and determinants of helmet use amongst commercial motorcyclists in Ido-Osi local government area

Kayode Rasaq Adewoye[a], Shuaib Kayode Aremu[b], Charles Oluwatemitope Olomofe[c], Adebayo Makinde Adeniyi[c], Richard Dele Agbana[d], Opeyemi Oladipupo Abioye[c], and Yusuf Funsho Issa[e]

[a]Department of Community Medicine Federal Teaching Hospital, Ido Ekiti/Afe Babalola University, Ado-Ekiti, Nigeria; [b]ENT Department, Federal Teaching Hospital Ido-Ekiti/Afe Babalola University, Ado-Ekiti, Nigeria; [c]Department of Community Medicine, Federal Teaching Hospital, Ido Ekiti, Nigeria; [d]Department of Community Medicine, College of Medicine and Health Science, Afe Babalola University, Ado-Ekiti, Nigeria; [e]Department of Community Health, Kwara State University, Malete, Nigeria

ABSTRACT

Commercial motorcycle (CM) accidents constitute a major public concern in Nigeria. There is 8:10 chance that injuries resulting from these accidents are severe and debilitating including head and spinal injuries. This study is aimed at producing useful data on the prevalence, frequency, and determinants of helmet use among commercial motorcyclist in Ido-Osi Local Government Area, Ekiti State, Nigeria. The study was a descriptive/cross-sectional study. A total of 360 respondents were selected by multi-stage sampling technique and interviewed using assisted self-administered, semi-structured questionnaire. Data were analyzed using SPSS version 21. Determinants of helmet use examined included age, educational level, marital status and religion. There was a 100% response rate. More than half of the respondents were within the age range of 20–29 years 164(53.6%) with the mean age of the study participants 29.9. The prevalence of helmet usage among commercial motorcyclist was 23.5%. The commonest reason for not using a crash helmet in this study was non-availability. The commonest reason for the non-availability of the welding helmet was the cost of the helmet. Less than half of the respondents were able to show or present helmet although some of the helmet presented were sub-standard (39.7%). The study also revealed irregular use of helmets among the respondents that used a helmet while riding a motorcycle as only 2.7% of them used it for all the five riding sessions assessed in this study. There was a statistically significant relationship between age, educational level, marital status and the use of helmets among respondents with p values of 0.005, 0.027, and 0.009, respectively. The prevalence of the use of helmets among the motorcyclist in this study is low despite the high level of awareness of legislation among the respondents on the use of helmets during riding. There is a need for the government to make provision for a safety helmet for this group of people at a subsidized rate if it cannot be given free of charge because of the economic situation of the country. There is a need to carry out behavioral change communication for this group of people.

Introduction

Road transport remains the major means of moving persons, goods, and services across Nigerian. Apart from creating employment for unengaged youths, road transport also accounts for more than 90% of the subsector's contribution to the Gross Domestic Product.[1] Commercial motorcyclists (CM) are a subset of road transport workers,[2] and they constitute a significant percentage of the subsector's workers in low and middle-income countries including Nigeria.[3]

There have been rising motorcyclist population and a significant increase in the number of motorist and commuters in Nigeria, as such, we may expect more road accidents, with the accompanying casualties and fatalities.[3] Commercial motorcycles (CMs), are relatively cheaper to purchase, inexpensive to commuters, offers effective means of transportation as passengers are usually taken to their doorsteps, highly maneuverable during traffic,[4] and easy source of income and employment for teeming unengaged youths.[5] Despite

these advantages, CM accidents constitute a major public concern in Nigeria.[6]

CM are six times more likely to die from road crashes than people in other encased vehicles.[7] Eight out of 10 injuries resulting from these accidents are severe and debilitating including head and spinal injuries.[4] Similarly, World Health Organization affirmed that CM accidents constitute a high proportion of road traffic injuries and death, particularly in low and middle-income countries such as Nigeria and Malaysia with 88% of fatalities from these accidents result in head injury.[8] Because of this, the World Health Organization identified helmet as a protective measure against head injury amongst CM.[9]

Despite the obvious benefits of the helmet in reducing mortality from head injuries,[10] non-usage of the protective device is still widespread and this is responsible for head injuries and fatalities amongst CM.[11] Several factors have been implicated in the use and nonuse of helmet amongst this group of road transport workers; long-distance traveling, the anticipation of meeting police officers, highways driving have been selectively associated with helmet use amongst CM.[4,12] However, this is not in tandem with the prescribed standards which entails a consistent and proper wearing of helmet.[9] Non-usage factors identified in India include; discomfort due to heat, obstruction lateral vision, and impairment of hearing.[7] In other climes, cost, availability of the device, knowledge of its use, age, and level of education the riders[13] have also been linked with use and nonuse of helmet amongst CM. Data on motorcycle accidents especially in hinterlands in Nigeria are not very accurate. The absence of reliable statistics on helmet usage and CM crashes has hindered further deliberate public policy to mitigate the menace in the country. This research has never been done in Ekiti State, and this study is aimed at producing useful data on the prevalence, frequency, and determinants of helmet use in Ido-Osi Local Government Area, Ekiti State, Nigeria. The emerging data will be critical for policy formulation and provide evidence for community mobilization necessary to change their behavior.

Methodology

Study area

The study was carried out in Ido-Osi Local Government Area of Ekiti State in Nigeria. It is located in the South-western part of the country. The State has 16 Local Government Areas (LGAs) and three senatorial districts: Ekiti Central, Ekiti South,

and Ekiti North senatorial districts. Ido-Osi is one of the LGA in Ekiti North senatorial district of the state and has its headquarters in Ido town. There are eleven other communities in Ido-Osi LGA in addition to Ido town which serves as the headquarter of the LGA. With a total land area of more than $340\,km^2$, the landmass enjoys the friendly warm climate and fertile vegetation suitable for agricultural activities. Ido-Ekiti LGA is bounded to the North by OtunEkiti in Moba LGA; in the South and East by AwoEkiti and IworokoEkiti in Irepodun/Ifelodun LGA; and lastly to the West by Ijero-Ekiti in Ijero LGA. As of 2006, Ido-Osi LGA had a total population of 159,114 with vastly educated people. With an annual growth rate of 3.2%, the 6 years projected population will be 192,215.[6,14] The people of Ido-Osi LGA speak the Ekiti dialect of the Yoruba language. They are predominantly farmers growing both cash and food crops. These include Cocoa, Coffee, Kolanut, Yam, Maize and Okro among others. However, few of the people engage in vocational services. The people practice Christianity and Islam while some are traditional worshipers.

Road transport is the major means of moving persons, goods and services within the state[15] and commercial motorcyclist constitute the majority of the road transport workers in the LGA. Apart from creating employment for unengaged youths, CM ease transportation within the LGA as there are difficult terrains which other means of transportation may not be able to access.

Study design

The study was a descriptive/cross-sectional study to determine the prevalence, frequency and identify the determinants of helmet use amongst commercial motorcyclist in Ido-Osi LGA in Ekiti State.

Sample size determination

Using Fischer's formula,[10]

$$n = \frac{Z^2 \times P\,(1-P)}{E^2}$$

Where Z standard normal deviate at 95% = 1.96

P proportion of helmet use in previous study= 23.8[16]

E Level of error = 5%

$$n = \frac{(1.96)^2 \times 23.8\,(100-23.8)}{5^2}$$
$$= 3.842 \times 23.8\,(76.2)/25$$
$$= 279$$

For non-response rate compensation

$$
\begin{aligned}
ns &= n/0.9 \\
&= 279/0.9 \\
&= 306
\end{aligned}
$$

Therefore, 306 CM participated in the study.

Sampling technique

A multi-stage sampling technique was used. The stages were as follows:

STAGE 1: selection of communities

Three communities were selected out of the 12 communities that formed the LGA by simple random sampling using a table of random numbers. The communities selected were IdoEkiti, IfakiEkiti, and UsiEkiti.

STAGE 2: identification of CM parks and number of a registered commercial motorcyclist who owns and drive a personal motorcycle and does not share with another motorcyclist

IdoEkiti has 6 parks with a total number of CM =	362
IfakiEkiti has 4 parks with a total number of CM =	348
UsiEkiti has 1 park with a total number of CM =	90
Total	800

Using stratified random sampling by proportionate allocation the number of participants picked from each of the selected communities were calculated as follows from each community is calculated thus:

$$
\text{For Ido, } \frac{362}{800} \times 306 = 138 \text{ participants}
$$
$$
\text{For Ifaki, } \frac{348}{800} \times 306 = 133 \text{ participants}
$$
$$
\text{For Usi, } \frac{90}{800} \times 306 = 35 \text{ participants}
$$

Stage 3: selection of CMs

In this stage, the study participants from each of the three communities selected were picked by the systematic sampling technique with the list of registered Commercial motorcyclist in each of the communities serving as the sampling frame. Systematic sampling technique was done by dividing the total population of all the registered commercial motorcyclist in the three selected communities which were 800 in number by the calculated sample size which was 306 to arrive at sampling interval of 3. Simple random sampling by

balloting was then used to pick a number between 1 and 3 and sampling interval of 3 was added to the picked number to choose the participant in the study.

Study instrument

An assisted self-administered, semi-structured questionnaire was used to elicit the study subjects' socio-demographic characteristics, age, educational level, prevalence, and determinants of helmet use among the CM.

Data collection method

Four research assistants participated and assisted in the data collection on the field from September to December 2018. The data for the Ifaki, Usi and Ido motor parks were collected in September, October and November, respectively. Pretest of the questionnaire was done on 10% of CM at Aramoko Ekiti in Ekiti East LGA of the State, which were not included in the study. The questionnaire was translated into the Yoruba language for field use, and back-translated into the English language with the assistance of Yoruba Linguists from the Ekiti State University (EKSU), Ado Ekiti to ensure correctness and consistency of meaning.

Data management plan

a. **Dependent:** The outcome variable:
    1. Use of helmet.
b. **Independent:** The independent variables in the study would be:
    1. Demographic variable: age, gender, marital status, religion.
    2. Socio-economic variable: level of education of the respondents.

Statistical analysis

Data collation and editing was done manually to detect omission and ensure uniform coding. The data entry quality was then checked by running the frequencies of all variables to detect any double or omitted entries and corrections were done by reconciling the imputed data with the specific questions. Data were analyzed using IBM SPSS Statistics version 25.0; frequency tables and cross-tabulations were generated to show the distribution across the socio-demographic variables and the presence of determinants for helmet use. Bivariate analysis involving the use of Chi-square, odds ratio with 95% confidence intervals were employed to analyze the association among the

Table 1. Socio-demographic characteristics of respondent Okada riders.

Variable	Frequency (N = 306)	Percentage (%)
Age group (in years)		
20–29	164	53.6
30–39	101	33.0
40–49	41	13.4
Mean age ± SD	29.9 ± 7.6	
Range	20–49	
Sex		
Male	306	100.0
Highest educational level		
None	9	2.9
Primary	25	8.2
Secondary	201	65.7
Tertiary	71	23.2
Marital status		
Single	143	46.7
Married	163	53.3
Religion		
Christianity	262	85.6
Islam	30	9.8
Traditional	14	4.6
Tribe		
Yoruba	277	90.5
Hausa	9	2.9
Igbo	14	4.6
Others	6	2.0

Table 2. Availability of helmets.

Variable	Frequency (N = 306)	Percentage (%)
Have helmet (s)		
Yes	126	41.2
No	180	58.8
Reason(s), if No (n = 180)		
Cost of the helmet	92	51.1
The helmet is of no use	84	46.7
It is not available	9	5.0
Others	8	4.4
Standards of helmet, if Yes (n = 126)		
Standard	76	60.3
Sub-standard	50	39.7
Additional helmet for passengers (n = 126)		
Yes	31	24.6
No	95	75.4
Awareness of legislations on use of helmet		
Yes	262	85.6
No	44	14.4

variables. Chi-square test was used to determine the statistical significance of observed differences in the cross-tabulated variables. Odds ratio (OR) was calculated to determine the strength of association between the determinants and use of helmet by CM.

Ethical considerations

Ethical approval

Research approval was obtained from the Ethics and Research Review Committee of the Federal Teaching Hospital, Ido Ekiti. Also, Permission from the Local Government and the association of each commercial motorcyclist were sought before the study was carried out.

Informed consent

Written consent for interview was obtained from all respondents after giving them an explanation on the nature, purpose, and benefits of the study, as well as confidentiality issues.

Confidentiality

Moreover, the confidentiality of the information was assured by using anonymous but numbered questionnaires and by keeping the data in a secured place thereafter.

Results

All the 306 respondents consented and participated in the study (100% response rate). More than half of the respondents were within the age range of 20–29 years 164(53.6%) with the mean age of the study participants 29.9. All the 306 respondents interviewed were male. Close to two-third of the respondents had secondary education 201 (65.7%). Majority of the respondents were Christian 262 (85.6%) and are predominantly Yoruba by tribe (Table 1).

More than half of the respondents have no helmets 180 (58.8%). Ninety-two (51.1%) of the respondents with no helmets identified the cost of helmets as a reason for the non-availability of the helmets. Fifty (39.7%) of the respondents with helmets had sub-standard helmets (Federal Road Safety Commission of Nigeria recommended a standard helmet for motorcyclists) while 31(24.6%) of them had additional helmets for passengers. Two hundred and sixty-two (85.0%) of all the respondents were aware of the legislation on the use of helmets (Table 2). Less than one-quarter of the respondents 72 (23.5%) reported the use of helmets while riding their motorcycle (Figure 1). On the use of helmets on average of five sessions of motorcycle riding, only 7.2% of the respondents used helmets for all the sessions, while 76.5% did not use a helmet at all for all the sessions of riding. Major reason for not using helmets among the respondents is non-availability of helmets 180 (76.9%) (Table 3). Major reason for using helmets among the respondents that claimed the use of helmets during motorcycle riding is to protect their head against head injury 52 (72.2%) (Table 4). Almost all the respondents 304 (99.3%) reported nonuse of helmets by the passengers during riding (Table 5). There was a statistically significant relationship between age, educational level, marital status and the use of helmets among respondents with p values of 0.005, 0.027, 0.009 respectively. Increasing age, level of education and married respondents are positively associated with the use of the helmet (Table 6)

Frequency of helmet use in 5 sessions
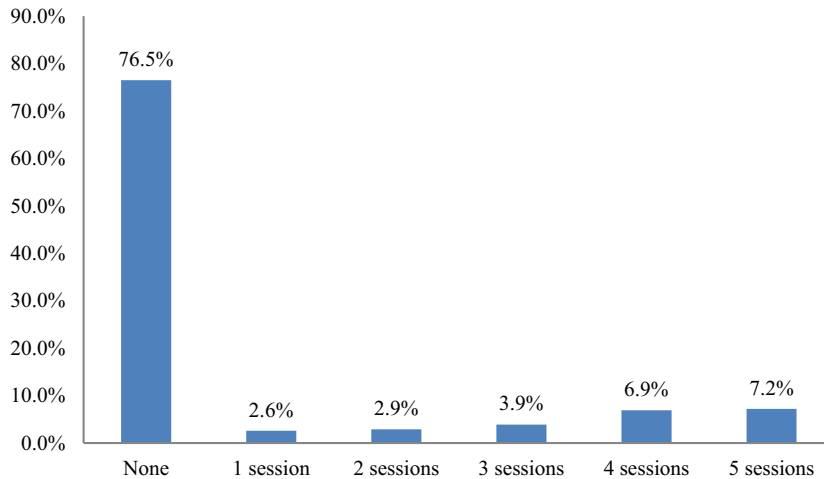
Figure 1. A bar chart showing frequency of helmet use among respondent riders.

Table 3. Respondents' reasons for not using helmet.

Variable	Frequency (N = 234)	Percentage (%)
Reason(s) for not using helmet		
I don't have it	180	76.9
Discomfort due to heat	26	11.1
Obstruction of lateral vision	16	6.8
Impairment of hearing	20	8.5
Not affordable	12	5.1
It is of no use	20	8.5

Table 4. Respondents' reasons for using helmet.

Variable	Frequency (N = 72)	Percentage (%)
Reason(s) for using helmet		
Anticipation of meeting police/road safety officers	20	27.8
Long distance traveling	20	27.8
To protect against head injury	52	72.2

Table 5. Passengers' helmet use.

Variable	Frequency (N = 306)	Percentage (%)
Your passenger use helmet		
Yes	2	0.7
No	304	99.3

Discussion

World Health Organization[9] identified helmet as a protective measure against head injury amongst CM. Despite the obvious benefits of the helmet in reducing mortality from head injuries,[10] non-usage of the protective device is still widespread[11] and this is responsible for head injuries and fatalities amongst CM.

This study assessed the prevalence, frequency, and determinants of helmet use amongst Commercial Motorcyclist in Ido-Osi Local Government Area, Ekiti State, Nigeria. A total of 306 respondents were an interview and all of them were males. The male domination of this particular transport system is in tandem with other studies.[14–16] This may not be unconnected to the fact Commercial Motorcyclists are frequently exposed to risks which most females are not willing to take because of social and cultural reasons.

Riding CM without proper safety measure is a common culture among commercial motorcyclists in Ido-Osi local government area. The prevalence of helmet usage amongst Commercial Motorcyclist in this study was 23.5%. This finding is similar to another study done in Ile-Ife in Osun state Nigeria and Lagos state by Oginni et al where only 20% of the respondents supplied crash helmet as a known safety device and 23.8% had a helmet on at the time the study was conducted. Reasons adduced for the low prevalence in the study was lack of formal training of the respondents for the job.[17] The finding from the study also differs from a similar study done in Ado-Ekiti in Ekiti state where 60.4% of CM self-reported the use of helmet.[18] The major reason for this disparity was that the helmets must be visually seen in this study in addition to self-reporting. The commonest reason for not using a crash helmet in this study was no availability of helmet. The commonest reason for non-availability of welding helmets in this study was the cost of the helmets as more than half of the respondents (51.1%) attested to this view. This percentage was far higher than 13.6% of respondents who gave high cost as the main reason for non-usage of the helmet in a similar study in Oyo state.[3] This difference may be attributed to the fact the study was done amongst Commercial Motorcyclist living and working in urban areas where the poverty level is lesser compared to what obtains

Table 6. Socio-demographic factors associated with helmet usage.

Variable	Helmet usage				
	Yes n (%)	No n (%)	χ^2	p-value	OR (95% CI)
Age group (in years)					
20–29	27 (16.5)	137 (83.5)	10.57	0.005	1.00
30–39	30 (29.7)	71 (70.3)			2.14 (1.18–3.88)
40–49	15 (36.6)	26 (63.4)			2.93 (1.37–6.25)
All respondents	72 (23.5)	234 (76.5)	*	*	
Highest educational level					
None	1 (11.1)	8 (88.9)	9.177	0.027	1.00
Primary	5 (20.0)	20 (80.0)			2.00 (0.20–19.91)
Secondary	40 (19.9)	161 (80.1)			1.99 (0.24–16.35)
Tertiary	26 (36.6)	45 (63.4)			4.62 (0.55–39.06)
Marital status					
Single	24 (16.8)	119 (83.2)	6.790	0.009	1.00
Married	48 (29.4)	115 (70.6)			2.07 (1.19–3.60)
Religion					
Christianity	59 (22.5)	203 (77.5)	3.059	0.217	1.00
Islam	9 (30.0)	21 (70.0)			1.47 (0.64–3.39)
Traditional	4 (28.6)	10 (71.4)			1.38 (0.42–4.55)
Tribe					
Yoruba	64 (23.1)	213 (76.9)	0.834	0.834	1.00
Hausa	3 (33.3)	6 (66.7)			1.66 (0.40–6.84)
Igbo	3 (21.4)	11 (78.6)			0.91 (0.25–3.35)
Others	2 (33.3)	4 (66.7)			1.66 (0.30–9.30)

in communities in Ido-Osi L G A which are predominantly rural communities.

Three-quarter of the respondents (75.4%) were aware of legislation on the use of helmets by a commercial motorcyclist, less than half of the respondents were able to show or present helmets although some of the helmets presented were substandard (39.7%) and less than one-quarter of the respondents used helmets during riding. The interpretation of these findings is that not all the respondents that had helmets used it during riding and that many of the helmet used is substandard. Other factors responsible for the nonuse of helmets identified in this study apart from non- availability of helmets include discomfort due to heat, obstruction of lateral vision, impairment of hearing, perception by some that the use of helmets is not important and affordability. Other identified factors responsible for the nonuse of the helmet in another study done in Ado-Ekiti in Ekiti state include fear of contracting diseases, too heavy and the belief that the use of a helmet is not-protective.[18] This study further confirms the fact that the use of crash helmets is still very unpopular in Nigeria[19,20] despite the existing laws. In this study majority (85.6%) of the respondents had awareness on laws of Ekiti State against motorcycle riding without the use of crash helmet and the benefit of using it but only 23.5% of the respondents use it. A similar finding was seen by[11] in China where only 20% of CMs use helmet even though over 80% of them are aware of the need and benefit of using it. Therefore, there is a need for behavioral

change amongst this group of transport workers. This study also revealed irregular use of helmets among respondents as only 2.7% of respondents that used helmets used it for all the riding sessions. This finding is in contrast to another study where 33.3% of the respondents reported always use of helmet at every ridding session.[1,18,20,21] Reason for this disparity might be due to the urban and rural difference in the study area.

Several factors have been associated with the usage or nonuse of crash helmet amongst Commercial Motorcyclist. In this study, age, level of education, and marital status were found to be associated with the use or nonuse of the helmet. CMs within the age group 30–39 years tend to use crash helmet more and this was statistically significant with $p < 0.005$. Similarly, those with secondary and tertiary education tend to use helmet more than those CM with a lesser education and this association was statistically significant with $p < 0.027$. This finding was also in tandem with a submission on the relationship between age and level of education and usage of helmet amongst CMs.[1]

Limitations

1. The town is close to one another, there can be possible divulge of information from one respondent in one town which will create a bias in the responses given.
2. There could a problem of recall bias.

Conclusion

The prevalence of the use of helmets among the motorcyclist in this study is low despite the high level of awareness of legislation among the respondents on the use of helmets during riding. Not all the respondents that had helmets used it while riding their motorcycle. There was irregular use of helmets among its users. Age, educational status and marital status of the respondents influenced the use of helmets. There is a need for the government to make provision for a safety helmet for this group of people at the subsidized rate if it cannot be given free of charge because of the economic situation of the country. There is a need to educate this group of people on the importance of using helmet during cycling the need for the regular use of helmets should also be stressed during the behavioral change communication. There is a need for formal training for this category of workers.

References

1. Ackaah W, Afukaar F. Prevalence of helmet use among motorcycle users in tamale metropolis, Ghana: an observational study. *Traffic Injury Prev.* 2010;2(5):522–525. doi:10.1080/15389588.2010.489198.

2. Umar R. Helmet initiatives in Malaysia. In: Proceeding of the 2nd World Engineering Congress. Sarawak, Malaysia, Institution of Engineers, 2002:93–101.

3. Ogunmodede TA, Adio G, Ebijuwa AS, Oyetola SO, et al. Factors influencing high rate of commercial motorcycle accidents in Nigeria, Ame. *Int J Contemp Res.* 2012;2(11):130–140.

4. Manasseh J. Causes and consequences of commercial motorcycle accidents in makurdi metropolis. *Glob J Soc Sci.* 2013;12:11–18.

5. Solagberu B, Ofoegbu C, Nasir A, et al. Motorcycle injuries in developing country and the vulnerability of riders, passengers, and pedestrians. *Injury Prev.* 2006;12(4):266–268. doi:10.1136/ip.2005.011221.

6. Akinlade CO. Knowledge, attitudes, and practices of road safety and first aid among commercial motorcyclists in the Ibarapa District of Oyo State. An unpublished dissertation for the award of master of public Health/Health Education submitted to the sub-Department of Health Promotion and Education. Department of Preventive and Social Medicine, University of Ibadan; 2000.

7. Nigeria Highway Code. Federal road safety commission Abuja, Nigreria; 2008.

8. World Health Organisation. Helmets: A road safety manual for decision makers and practitioners. Geneva Switzerland: WHO; 2005. http://www.who.int/violence. Accessed September 12, 2018.

9. World Health Organization. Helmets: A road safety manual for decision-makers and practitioners. Geneva, Switzerland: WHO; 2006. http://www.who.int/violence. Accessed September 13, 2018.

10. Keng S. Helmet use and motorcycle fatalities in Taiwan. *Accid Anal Prev.* 2005;31:349–355. doi:10.1016/j.aap.2004.09.006.

11. Li L, Li G, Cai Q, et al. Improper motorcycle helmet use in provincial areas of a developing country. *Accid Anal Prev.* 2008;40(6):1937–1942. doi:10.1016/j.aap.2008.06.019.

12. Hung D, Stevenson M, Ivers R. Barriers to, and factors associated, with observed motorcycle helmet use in Vietnam. *Accid Anal Prev.* 2008;40(4):1627–1633. doi:10.1016/j.aap.2008.05.002.

13. Swaddiwudhipong W, Boonmak C, Nguntra P, et al. Effect of motorcycle rider education on changes in risk behaviours and motorcycle related in rural Thailand. *Trop Med Int Health.* 1998;3(10):767–770.

14. Amoran O, Eme O, Giwa O, et al. Road safety practices among commercial motorcyclists in a rural town in Nigeria: implications for health education. *Int Q Commun Health Educ.* 2004;24(1):55–64. doi:10.2190/8UCM-033U-2TBW-CLG9.

15. Alti-Muazu M, Aliyu A. Prevalence of psychoactive substance use among commercial motorcyclists and its health and social consequences in Zaria, Nigeria. *Ann Afr Med.* 2008;7(2):67–71. doi:10.4103/1596-3519.55678.

16. Iribhogbe P, Odai E. Driver-related risk factors in commercial motorcycle (okada) crashes in Benin City, Nigeria. *Prehosp Disaster Med.* 2009;24(4):356–359. doi:10.1017/S1049023X00007093.

17. Oginni F, Ugboko V, Adewole R. Knowledge, attitude and practice of Nigerian motorcyclists in the use of crash helmet and other safety measures. *Traffic Injury Prev.* 2007;8(2):137–141. doi:10.1080/15389580601058472.

18. Okpoko PI. Attitude and behaviour of users of motorcycle towards the use of crash Helmet in ado-ekiti, Nigeria. *South Am J Public Health.* 2014;2(3):344–358.

19. Dongo AE, Kasieme EB, Eighemherio A, et al. Motorcycle related Injuries among rural dwellers in Irrua, Nigeria: characteristics and correlates. *Emerg Med Int.* 2013;1:1–4. doi:10.1155/2013/569103.

20. Oluwadiya KS, Kolawole I, Adegbehingbe OO, et al. Motorcycle crash characteristics in Nigeria: implication for control. *Accid Anal Prev.* 2009;41(2):294–298. doi:10.1016/j.aap.2008.12.002.

21. National Bureau of Statistics. 2nd Quarter 2018 Road transport data: 2018. http://nigerianstat.gov.ng/. Accessed August 2019.