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ORIGINAL ARTICLE

KNOWLEDGE, ATTITUDE AND PRACTICES OF COMMERCIAL MOTORCYCLISTS TOWARDS HELMET USAGE IN OSOGBO METROPOLIS OF NIGERIA

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ABSTRACT

Introduction: Helmets are known to mitigate the risk of traumatic brain injury and fatality among motorcyclists involved in road traffic crashes. Despite their proven effectiveness, the adoption of helmets remains low among commercial motorcyclists in many parts of Nigeria. This study aimed to assess the knowledge, attitude, and practices (KAP) towards helmet usage among commercial motorcyclists in Osogbo metropolis, Osun State, Nigeria.

Methods: A descriptive cross-sectional study involving 217 commercial motorcyclists was conducted using a multi-stage sampling technique. A pre-tested interviewer-administered semi-structured questionnaire was used to collect data on knowledge, attitude and practices regarding helmet usage. Data was analyzed using IBM SPSS version 25.0. Univariate analysis was done using a frequency table for socio-demographics. Chi-square test was used for bivariate analysis of association between categorical variables. Level of significance was set at $p<0.05$

Results: The results indicated that while most respondents demonstrated good knowledge regarding helmet usage (86.2%), their attitudes and practices towards helmet usage were generally poor (57.1% and 86.2%, respectively). Age, ethnicity, educational level, motorcycle ownership and engagement in other vocational activities had statistically significant association with good knowledge regarding helmets (p-values <0.05). Ethnicity, income and motorcycle ownership were significantly associated with good attitude towards helmet usage (p-values <0.05) whereas only educational level and motorcycle ownership had significant association with good practices.

Conclusion: The findings underscore the need for targeted interventions to promote positive attitudes and practices towards helmet usage among commercial motorcyclists in Osogbo metropolis.

Keywords: Knowledge; Practice; Helmet usage; Commercial Motorcyclist

INTRODUCTION

In Nigeria, motorcycles have become a popular mode of transportation for both commercial and private purposes, particularly in areas with limited access to conventional motor vehicles and also because of increasing unemployment and economic downturn.[1] However, the proliferation of commercial motorcycle transportation, commonly known as 'Okada,' has also led to an increase in road traffic crashes and associated injuries, including traumatic brain injuries.[1,2]

In response to this public health concern, the Nigerian government implemented a law mandating the use of crash helmets for

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motorcycle riders in 2009.[3,4] Despite this legislation, helmet usage among commercial motorcyclists remains low, with various cultural, economic, and behavioral factors influencing compliance with the law including the use of unwholesome materials such as pots, rubber tires and plastic buckets as helmets by motorcycle occupants.[3,5]

In Nigeria, as in other developing countries, head injuries are a leading cause of morbidity and mortality among motorcycle occupants.[2,5,6] Since its introduction, crash helmets have proven to be the most successful approach to preventing injury among motorcycle users.[2,5,6] Majority (about 88%) of deaths among motorcyclists in low- and middle-income countries have been attributed to head injury from road traffic crashes.[7] Motorcycle accident-related injuries may also result in economic losses for individuals, families, and communities in addition to death and disabilities.[8] A previous local study has shown that head injuries and fatalities resulting from motorcycle crashes are mostly due to non-use of helmet.[9]

The risk of serious injuries and mortality in motorcycle crashes are greater compared to other forms of transportation because of the open nature of the vehicle as well as lack of protective equipment such as seat belts and airbags found in other vehicles.[8] In addition to their effectiveness in reducing death, crash helmets have been shown to protect the face from injury, increase visibility on the road, help protect eyes from the effects of direct sun rays or rain and block cool breeze from entering ears.[8]

Aside the body structure of motorcycles, the sometimes negative attitudes of motorcycle users towards the use of crash helmet contribute to increased injuries when crashes occur. While governments in many countries have promulgated laws on the compulsory use of helmets by motorcyclists and their passengers, the compliance with such laws have been largely low in developing countries such as Nigeria. Many Okada riders consider the use of helmets as inconvenience and unnecessary expenses in the face of dwindling incomes.[10] For many passengers, the use of helmet is considered dangerous especially the ones provided by the Okada riders as many have associated helmets with transmission of skin infections and also consider it as being used for ritual purposes.[11]

Studies have shown that helmet use prevent an estimated 37% and 41% fatalities among motorcycle operators and passengers respectively.[12] Globally, motorcycles account for 23% of RTA-related deaths and motorcycle crashes are among the leading causes of traffic-related injuries and deaths in all age groups.[8] This burden is mostly borne by low- and middle-income countries (LMICs) where motorcycles are the most popular private transportation vehicles and its riders are among the most vulnerable road users.[8] Thus, there is a need to strengthen legal frameworks regarding helmet use by motorcycle occupants and improve access to quality and affordable helmets by motorcyclists.[13] There is also a need for regular public enlightenments to foster positive attitude towards its use. Towards this, further explorative studies on the quality of helmet and the factors associated with its use and non-use have been recommended.[13]

Helmet wearing and positive attitude towards its usage have been found to be associated with level of education.[13] Furthermore, there is a high disparity on the observed helmet wearing between riders and passenger as very few passengers were found to be wearing helmet.[13] Generally, the barriers and factors associated with helmet usage among motorcyclists have been categorized into five viz: 'legislations/enforcement strategies, helmet disadvantages (discomfort, visual/auditory blockage, and thermal dysregulation), risky behaviors (riding while drunk or high on drugs), sex and/or age factors, and the location and time of the injury event (rural vs. urban locations, day vs. night riding)'.[14] To overcome these perceived barriers, initiatives to use helmets need to be promoted and cyclists' perceptions regarding the risk of injury and death need further exploration.[15]

While previous studies have explored the effectiveness of helmets in preventing injuries

among motorcycle users, there is a dearth of research on the knowledge, attitudes, and practices regarding helmet usage specifically among commercial motorcyclists in Osogbo metropolis, Osun State. This study seeks to address this gap by assessing the knowledge, attitude and practices towards helmet usage among commercial motorcyclists in this region.

METHODS

Study Area

This study was conducted between April and August 2023 among commercial motorcyclists in Osogbo, Osun State, located in South Western Nigeria. Osogbo serves as the capital city of Osun State and encompasses both the Osogbo Local Government Area (headquartered at Oke Baale) and the Olorunda Local Government Area (headquartered at Igbonna). The city shares borders with Ikirun, Ilesa, Ede, Egbedore, Ogbomosho, and Iragbiji, and its central location allows easy accessibility from all parts of the state. Osogbo has a diverse population of approximately 178,047 individuals and spans an area of approximately 2,875 square kilometers. Yoruba and English are the official languages.[16]

Study Population

The target population comprised all commercial motorcyclists in Osogbo, while the study population included consented commercial motorcyclists selected from specific areas within Osogbo.

Study Design

This study employed a descriptive cross-sectional design. Inclusion criteria included being a commercial motorcyclist of all ages within the study area, while uncooperative respondents and those unable to complete the questionnaire due to work demands were excluded.

Sample Size

The sample size of 217 participants (including a 10% attrition rate) was determined using Leslie Fisher's formula for population less than 10,000 as empirically, the commercial motorcyclist in Osogbo LGA are not up to 10,000. The prevalence of helmet usage (84.8%) was obtained from a previous study (Okpoko, 2014).[1]

Sampling Method

A multistage sampling method was utilized:

- **Stage 1:** One out of the two Local Government Areas (LGAs) in Osogbo was randomly selected using a simple balloting method.
- **Stage 2:** Five parks within the selected LGA were chosen using simple random sampling via a ballot method.
- **Stage 3:** Commercial motorcyclists were selected from each bus-stop using convenience sampling.

Study Instrument

An interviewer-administered questionnaire was developed through a review of previous studies and consultation with field experts.[9,10,12] The questionnaire comprised five sections:

- **Section A:** Socio-demographic characteristics.
- **Section B:** Knowledge of helmets among commercial motorcyclists and proportion of helmet usage.
- **Section C:** Attitude towards helmet usage.
- **Section D:** Practices of helmet usage.
- **Section E:** Factors influencing helmet usage.

Psychometric Properties

Face and content validity of the questionnaire were established through comparison with similar studies and expert examination.[9,10,12] Pre-testing of the questionnaire was conducted in Ede Local Government Area of Osun State.

Ethical Considerations

Ethical clearance was obtained from the Health Research and Ethics Committee of Osun State University, Osogbo, Nigeria (UNIOSUNHREC2023/PBH/156). Verbal

informed consent was obtained from all participants after explaining the study's purpose and ensuring confidentiality and security of personal data.

Data Management

Data were analyzed using IBM SPSS version 25.0. Univariate analysis was conducted using frequency tables for socio-demographic data, bivariate analysis utilized the chi-square test to examine associations, and multivariate analysis employed binary logistic regression to identify predictors of knowledge, attitude, and practices towards helmet usage. Statistical significance was set at $p < 0.05$ with a 95% confidence level.

Outcome Variables

The following outcome variables were assessed:

1. Knowledge of helmet usage among commercial motorcyclists.
2. Attitudes towards helmet usage.
3. Practices of helmet usage.

RESULTS

Demographics

The socio-demographic characteristics of the respondents are summarized in Table 1. Majority of the respondents fell within the age bracket of 30-39 years, representing 48.8% of the total sample. All respondents were male, with 73.3% being married. Christians constituted 41% of the respondents, while Muslims made up 59%.

Table 1: Socio-Demographic Characteristics of the Respondents (n= 217)

Variable	Sub variable	Frequency	Percentage
Age (Yrs)	21-29	49	22.6
	30-39	106	48.8
	40-61	62	28.6
Marital status	Single	58	26.7
	Married	159	73.3
Gender	Male	217	100.0
Religion	Christianity	89	41.0
	Islam	128	59.0
Ethnicity	Yoruba	163	75.1
	Igbo	23	10.6
	Hausa	31	14.3
Level of education	No formal education	20	9.2
	Primary	20	9.2
	Secondary	82	37.8
	Tertiary	95	43.8
Monthly Income	10,001 – 20,000	8	3.7
	20,001 – 30,000	78	35.9
	30,001 – 40,000	74	34.1
	Above 40,000	57	26.3
Number of years in Business	Less down 2 years	27	12.4
	2-4 years	78	35.9
	5-6 years	60	27.6
	7-8 years	47	21.7
	Above 8 years	5	2.3
Motorcycle ownership	Owned by rider	155	71.4
	Not owned by rider	62	28.6
Other Vocational Activities	Yes	151	69.6
	No	66	30.4

Knowledge of helmet usage

Table 2 presents insights into the knowledge and usage of helmets among commercial motorcyclists, highlighting their awareness, understanding, and practices regarding helmet usage. The key findings are summarized as follows:

1. **Awareness of Helmets:** An overwhelming majority of respondents (99.5%) acknowledged having heard of helmets, indicating widespread awareness within the community. Only a negligible percentage (0.5%) stated they had not heard of helmets.

2. **Understanding of Helmet Function:** When asked if they understood that a motorcycle helmet is protective headgear for riders, the majority

(92.6%) responded affirmatively, demonstrating a high level of understanding. Only a few (2.3%) denied having such knowledge, while a small percentage (5.1%) were uncertain about this aspect.

3. **Actual Usage:** A considerable proportion (89.4%) of respondents reported having used a helmet before, indicating a substantial level of actual usage within the population. However, 10.6% admitted never having used one, suggesting a minority who have yet to adopt helmet usage. Some respondents (13.4%) were uncertain about their usage history, indicating potential gaps in self-reporting.
4. **Awareness of Injury Risk:** The majority of respondents (85.3%) were aware that most motorcyclists involved in road traffic accidents die due to head injuries resulting from a lack of helmets, indicating a strong understanding of the risks associated with non-usage. However, a small minority (1.4%) disagreed with this statement, while 13.4% were unsure about this fact, suggesting some uncertainty within the population.

Table 2: knowledge of the respondents' regarding usage of helmets and proportion of commercial motorcyclists who use a helmet

Variable	Sub variable	Frequency	Percentage
Have you heard of Helmet	Yes	216	99.5
	No	1	0.5
A motorcycle helmet is a protective headgear for motorcycle riders.	Yes	201	92.6
	No	5	2.3
	I don't know	11	5.1
Have you ever used a Helmet before	Yes	194	89.4
	No	23	10.6
Most Motorcyclist on road traffic accident die of head injury due to lack of helmets	Yes	185	85.3
	No	3	1.4
	I don't know	29	13.4
Do you have a Helmet	Yes	161	74.2
	No	56	25.8
	I don't know		
Do you think Helmet usage is safe	Yes	197	90.8
	No	2	0.9
	I don't know	18	8.3
Do you think Helmet usage has more positive effects than negative ones	Yes	178	82.0
	No	8	3.7
	I don't know	31	14.3
Are you aware of the dangers of not using helmet	Yes	189	87.1
	No	10	4.6
	I don't know	18	8.3
Do you think not using helmet can increase the risk of head injury during road accident	Yes	169	77.9
	No	2	0.9
	Maybe	46	21.2
Do you use helmets mostly only when it is enforced	Yes	90	41.5
	No	127	58.5
Is helmet an extra load on you when riding a motorcycle	Yes	140	64.5
	No	77	35.5
When last did you use a helmet	1 week	81	37.3
	2 weeks ago	16	7.4
	3 weeks ago	21	9.7
	4weeks and more	56	25.8
	None	43	19.8

5. **Enforcement Influence:** Interestingly, when asked if they used helmets primarily when enforcement was in effect, 41.5% of respondents admitted to doing so, while a larger majority (58.5%) denied using helmets only under enforcement. This suggests that while some respondents may be influenced by enforcement measures, a significant portion use helmets regardless of enforcement.
6. **Perception of Helmets:** Addressing the perception of helmets as an extra load while riding a motorcycle, 64.5% of respondents agreed with this notion, while 35.5% disagreed. This indicates a mixed perception of helmets among respondents, with some viewing them as burdensome.
7. **Recent Helmet Usage:** Regarding recent helmet usage, 37.3% of respondents had used a helmet in the last week, indicating relatively frequent usage among a portion of the population. However, a notable portion (19.8%) reported not using a helmet recently, suggesting potential gaps in consistent helmet usage behavior.

Categorized knowledge about helmet

Figure 1 illustrates the categorized knowledge of respondents regarding helmet usage, with 86.2% demonstrating good knowledge.

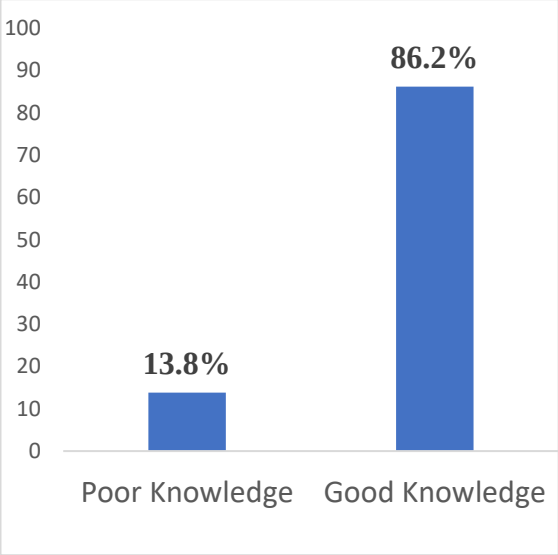

Figure 1: Categorized Knowledge of Motorcyclists Regarding Helmet Usage

Attitude regarding usage of helmets

Table 3 provides insights into the attitudes of motorcyclists regarding helmet usage, highlighting their perceptions and beliefs. The key findings are summarized as follows:

1. **Recognition of Safety Practice:** A majority of respondents expressed positive attitudes towards helmet usage as a safety practice. Nearly half (49.8%) strongly agreed that using a helmet is a good safety practice, while 45.6% simply agreed. A small proportion (4.1%) neither agreed nor disagreed, and only 0.5% disagreed with the idea of helmet usage as a safety practice.
2. **Responsibility While Under the Influence:** The majority of respondents exhibited a responsible attitude towards helmet usage while riding under the influence of alcohol or drugs. A substantial number (55.3%) disagreed with the notion that riding under the influence, with or without a helmet, is good. Additionally, 28.1% strongly disagreed with this idea.
3. **Safety Concerns While Receiving Calls:** A significant proportion of respondents prioritized safety when it comes to receiving calls while riding. The majority (64.1%) disagreed with the belief that it is safe to receive calls while riding, and 14.7% strongly disagreed with this notion.
4. **Importance Regardless of Distance Traveled:** The majority of respondents displayed responsible attitudes regarding the importance of helmet usage irrespective of the distance traveled. A substantial proportion (56.2%) agreed that using a helmet regardless of the distance is essential, and 15.2% strongly agreed. Only a small proportion (15.7%) disagreed with this viewpoint.
5. **Recognition of Importance Regardless of Speed:** Similarly, the majority of respondents recognized the significance of wearing a helmet regardless of the speed of travel. A

Table 3: Attitude of the respondents' regarding usage of helmets

Variable	Sub variable	Frequency	Percentage
The usage of helmet is a good safety practice	Strongly agree	108	49.8
	Agree	99	45.6
	Neither	9	4.1
	Disagree	1	0.5
Riding under the influence of alcohol/drugs with/without a helmet is good	Strongly agree	1	0.5
	Agree	18	8.3
	Neither	17	7.8
	Disagree	120	55.3
	Strongly disagree	61	28.1
Receiving calls while driving with or without helmet is safe	Strongly agree	1	0.5
	Agree	27	12.4
	Neither	18	8.3
	Disagree	139	64.1
	Strongly disagree	32	14.7
Using helmet irrespective of the distance traveled in a trip is important	Strongly agree	33	15.2
	Agree	122	56.2
	Neither	28	12.9
	Disagree	34	15.7
Helmet should be used irrespective of the speed at which you travel	Strongly agree	30	13.8
	Agree	114	52.5
	Neither	30	13.8
	Disagree	42	19.4
	Strongly disagree	1	0.5
Helmet is a burden while wearing it irrespective of the distance traveled in a trip	Strongly agree	5	2.3
	Agree	99	45.6
	Neither	35	16.1
	Disagree	68	31.3
	Strongly disagree	10	4.6
Helmet should be worn always irrespective of the distance traveled in a trip	Strongly agree	38	17.5
	Agree	101	46.5
	Neither	34	15.7
	Disagree	44	20.3
Putting on helmet all the time is difficult	Strongly agree	18	8.3
	Agree	87	40.1
	Neither	16	7.4
	Disagree	62	28.6
	Strongly disagree	34	15.7

considerable number (52.5%) agreed that a helmet should be used irrespective of speed, and 13.8% strongly agreed. Only a small proportion (19.4%) disagreed with this safety practice.

6. **Perception of Helmets as a Burden:** Interestingly, a majority of respondents did not view helmets as burdensome. Only a small number (2.3%) strongly agreed that helmets are burdensome, while 4.6% strongly disagreed. The majority (45.6%) agreed that helmets are not a burden when worn irrespective of the distance traveled, while 16.1% were neutral on this aspect.
7. **Perceived Difficulty of Helmet Usage:** When asked about the difficulty of putting on helmets all the time, responses varied. A considerable proportion (40.1%) disagreed with the notion that it is difficult to put on helmets all the time, while 15.7% strongly disagreed. However, a significant number of respondents (8.3%) strongly agreed that putting on helmets all the time is challenging.

Categorized attitude of commercial motorcyclists towards helmet usage

'Strongly Agree' and 'Agree' in positive terms indicate good attitude while same responses in negative terms indicate poor attitude. Figure 2 displays the categorized attitudes toward helmet usage, with 42.9% having a good attitude and 57.1% having a poor attitude.

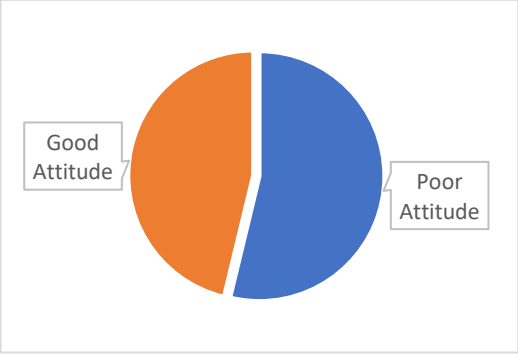

Figure 2: Categorized attitude of commercial motorcyclists towards helmet usage

Practice of helmet usage

Table 4 presents the practice of helmet usage among commercial motorcyclists. The key findings are summarized as follows:

1. **Ownership vs. Usage:** More than half of the respondents reported owning helmets, indicating a considerable awareness of the importance of having a helmet. However, only 65.9% of respondents reported actually wearing helmets.
2. **Helmet-Wearing Habits:** Almost half (48.4%) of respondents rarely use helmets, while 18% adhere to helmet use consistently. Safety implications were cited as the main reason for helmet usage (48.8%), followed by obeying the law (33.2%) and avoiding fines or punishment (16.6%). Only a small percentage of respondents reported wearing helmets rarely (11.5%), sometimes (0.9%), or most of the time (0.5%). An insignificant portion (1.4%) claimed to always wear helmets. Interestingly, a substantial portion of respondents (32.3%) marked "Not Applicable," possibly indicating that they do not wear helmets at all.
3. **Frequency of Usage:** Among those who wear helmets, nearly half (49.3%) do so consistently, either every day or on every trip. Additionally, 30.9% wear helmets daily but not for every trip, while 19.8% diligently wear helmets every day on all their trips.
4. **Reasons for Non-Usage:** A significant percentage (34.1%) of respondents admitted to not wearing helmets at all. Various reasons were cited for this choice, including financial constraints (15.2%), discomfort (21.2%), not anticipating encounters with law enforcement (10.1%), riding short distances (15.2%), and discomfort during hot weather (10.6%).
5. **Helmet Education:** The majority of respondents (62.7%) reported having received education on helmet usage,

Table 4: Practice of helmet usage

Variable	Sub variable	Frequency	Percentage
Do you have helmet	Yes	154	71.0
	No	63	29.0
Do you wear helmet	Yes	143	65.9
	No	74	34.1
	Not applicable		
How often do you wear helmet	Neither every day nor at every trip	107	49.3
	Every day but not at every trip	67	30.9
	Every day at every trip	43	19.8
	Not applicable		
When do you not wear helmet (if you chose 'Neither every day nor at every trip' above)	When riding for a short trip	33	15.2
	When I don't anticipate meeting a policeman	22	10.1
	During the hot weather	23	10.6
	During the day	12	5.5
	During the night	8	3.7
	During weekdays	3	1.4
	During weekend	8	3.7
	Others	8	3.7
What are the reasons that make you not to wear helmet	It is expensive	33	15.2
	It is uncomfortable	46	21.2
	I don't like it	21	9.7
	Because of heat	16	7.4
	Not applicable	101	46.5
Frequency of helmet use	Rarely	105	48.4
	Sometimes	29	13.4
	Most of the times	38	17.5
	Always	39	18.0
	Not at all	6	2.8
Main reason for helmet usage	It is just a habit	3	1.4
	To obey the law	72	33.2
	To avoid being fined/punished	36	16.6
	Because of its safety implications	106	48.8
Does your passengers wear the helmets	Yes	4	1.8
	No	213	98.2
How frequent do they wear the helmet	Rarely	25	11.5
	Sometimes	2	0.9
	Most of the time	1	0.5
	Always	3	1.4
	Not Applicable	70	32.3
	Not at all	116	53.5
Did you receive education on helmet usage	Yes	136	62.7
	No	81	37.3

indicating efforts to increase awareness and promote safe riding practices among commercial motorcyclists.

Categorized practices of helmet usage

Figure 3 depicts the categorized practices of helmet usage, with 86.2% demonstrating poor practices.

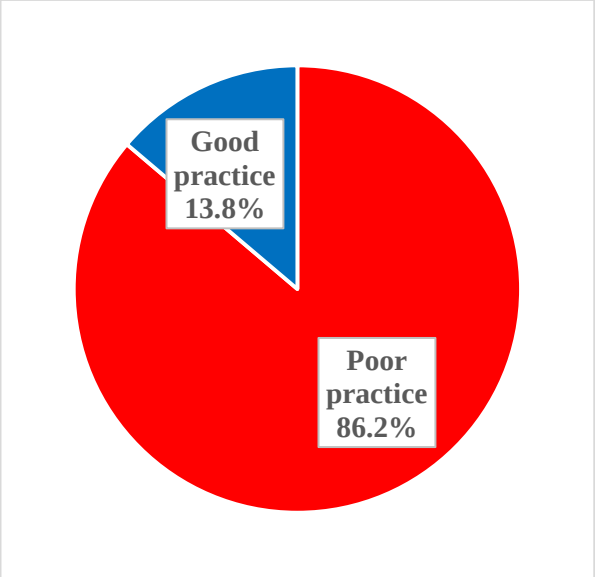

Figure 3: Categorized practices of helmet usage

Association between knowledge of helmet usage and socio-demographic characteristics

Table 5 presents the association between the knowledge of respondents regarding the usage of helmets and their socio-demographic characteristics. The key findings are summarized as follows:

1. **Age:** Respondents aged 30-39 exhibited the highest percentage of good knowledge (89.6%).
2. **Marital Status:** Married individuals showed a similar trend with a high percentage of good knowledge (89.9%).
3. **Ethnicity:** Yoruba ethnicity had the highest percentage of good knowledge (92.0%).
4. **Education Level:** Respondents with tertiary education demonstrated the most significant understanding, with a high percentage of good knowledge (97.9%).
5. **Monthly Income:** The income category above 40,000 naira displayed the highest percentage of good knowledge (98.2%).
6. **Motorcycle Ownership:** Motorcycle ownership by the rider positively influenced knowledge, with a high percentage of good knowledge (91.0%).
7. **Engagement in Other Vocational Activities:** Those involved in other vocational activities exhibited a high percentage of good knowledge (94.0%).

All these associations were statistically significant, with p-values less than 0.05.

Association between usage of helmets and socio-demographic characteristics

Table 6 presents the associations between helmet usage and key socio-demographic characteristics among commercial motorcyclists. The key findings are as follows:

1. **Ethnicity:** There is a statistically significant association ($p = 0.018$) between ethnicity and helmet usage. Yoruba individuals exhibited higher helmet usage (55.8%) compared to Igbo (43.5%) and Hausa (29.0%) individuals.
2. **Level of Education:** The level of education demonstrated a substantial association ($p < 0.001$) with helmet usage. Higher education levels corresponded to increased helmet usage among respondents.
3. **Monthly Income:** Monthly income displayed a significant association ($p = 0.001$) with helmet usage. Higher income levels were associated with a greater likelihood of helmet use among commercial motorcyclists.
4. **Engagement in Other Vocational Activities:** There was a significant association ($p = 0.040$) between engagement in other vocational

Table 5: Association between the knowledge of respondents regarding usage of helmets and their socio-demographic characteristics

Variable	Sub-variable	Knowledge of the respondent		Statistics
		Poor Knowledge	**Good Knowledge**	
Age	21-29	13(26.5)	36(73.5)	$x^2 = 8.592$ $p = \mathbf{0.014}$
	30-39	11(10.4)	95(89.6)	
	40-61	6(9.7)	56(90.3)	
Marital status	Single	14(24.1)	44(75.9)	$x^2 = 5.935$ $p = \mathbf{0.015}$
	Married	16(10.1)	143(89.9)	
Religion	Christianity	8(9.0)	81(91.00	$x^2 = 2.314$ $p = 0.128$
	Islam	22(17.2)	106(82.8)	
Ethnicity	Yoruba	13(8.0)	150(92.0)	$x^2 = 27.153$ $p =< \mathbf{0.001}$
	Igbo	2(8.7)	21(91.3)	
	Hausa	15(48.4)	16(51.6)	
Level of education	No formal	10(50.0)	10(50.0)	$x^2 = 42.972$ $p =< \mathbf{0.001}$
	Primary	9(45.0)	11(55.0)	
	Secondary	9(11.0)	73(89.0)	
	Tertiary	2(2.1)	93(97.9)	
Monthly Income	10,001 – 20,000	1(12.5)	7(87.5)	$x^2 = 14.269$ $p = \mathbf{0.003}$
	20,001 – 30,000	17(21.8)	61(78.2)	
	30,001 – 40,000	11(14.9)	63(85.1)	
	Above 40,000	1(1.8)	56(98.2)	
Number of years in Business	Less down 2 years	4(14.8)	23(85.2)	$x^2 = 2.444$ $p = 0.655$
	2-4 years	13(16.7)	65(83.3)	
	5-6 years	5(8.3)	55(91.7)	
	7-8 years	7(14.9)	40(85.1)	
	Above 8 years	1(20.0)	4(80.0)	
Motorcycle ownership	Owned by rider	14(9.0)	141(91.0)	$x^2 = 9.099$ $p = \mathbf{0.003}$
	Not owned by rider	16(25.8)	46(74.2)	
Other Vocational Activities	Yes	9(6.0)	142(94.0)	$x^2 = 23.651$ $p = < \mathbf{0.001}$
	No	21(31.8)	45(68.2)	

Table 6: Association between the usage of helmets and their socio-demographic characteristics

Variable	Sub-variable	Usage of Helmets		Statistics
		Yes	**No**	
Age	21-29	25(51.0)	24(49.0)	$x^2 = 4.151$ $p = 0.125$
	30-39	60(56.6)	46(43.3)	
	40-61	25(40.3)	37(59.7)	
Marital status	Single	30(51.7)	28(48.3)	$x^2 = 5.935$ p =0.976
	Married	80(50.3)	79(48.7)	
Religion	Christianity	44(49.4)	45(50.6)	$x^2 = 0.095$ $p =$ 0.865
	Islam	66(51.6)	62(48.4)	
Ethnicity	Yoruba	91(55.8)	72(44.2)	$x^2 = 8.018$ $p = \mathbf{0.018}$
	Igbo	10(43.5)	13(56.5)	
	Hausa	9(29.0)	22(71.0)	
Level of education	No formal	1(5.0)	1(95.0)	$x^2 = 34.556$ $p =< \mathbf{0.001}$
	Primary	6(30.0)	1(70.0)	
	Secondary	37(45.1)	45(54.9)	
	Tertiary	66(69.5)	29(30.5)	
Monthly Income	10,001 – 20,000	1(12.5)	7(87.5)	$x^2 = 16.577$ $p = \mathbf{0.001}$
	20,001 – 30,000	38(48.7)	40(51.3)	
	30,001 – 40,000	31(41.9)	43(58.1)	
	Above 40,000	40(70.2)	17(29.8)	
Number of years in Business	Less down 2 years	15(55.6)	12(44.4)	$x^2 = 8.191$ $p = 0.085$
	2-4 years	47(60.3)	31(39.7)	
	5-6 years	29(48.3)	31(51.7)	
	7-8 years	18(38.3)	29(61.7)	
	Above 8 years	1(20.0)	4(80.0)	
Motorcycle ownership	Owned by rider	84(54.2)	71(45.8)	$x^2 = 2.662$ $p =$ 0.103
	Not owned by rider	26(41.9)	36(58.1)	
Other Vocational Activities	Yes	84(55.6)	67(44.4)	$x^2 = 4.215$ $p =$ $\mathbf{0.040}$
	No	26(39.4)	40(60.6)	

activities and helmet usage. Respondents engaged in other vocational activities exhibited higher helmet usage (55.6%) compared to those not engaged in such activities (39.4%).

Association between attitude regarding usage of helmets and socio-demographic characteristics

Table 7 illustrates the association between the attitude of commercial motorcyclists regarding helmet usage and their socio-demographic characteristics. Key findings include:

1. **Ethnicity:** There is a highly significant association (p=< 0.001) between ethnicity and attitudes toward helmet usage. Respondents from the Hausa ethnic group showed a considerable disparity in attitudes, with a significant majority (93.5%) having a poor attitude, while only a small proportion (6.5%) exhibited a good attitude.
2. **Level of Education:** The level of education demonstrated a highly significant association (p = <0.001) with attitudes toward helmet usage. Notably, respondents with no formal education and primary education predominantly displayed poor attitudes, whereas those with secondary and tertiary education largely exhibited good attitudes.
3. **Monthly Income:** Monthly income also showed a significant association with attitudes toward helmet usage (p=0.001)
4. **Motorcycle Ownership:** There was an association between motorcycle ownership and attitudes toward helmet usage (p=0.035)

Association between practices regarding helmet usage and socio-demographic characteristics

The association between respondents' practices regarding helmet usage and their socio-demographic characteristics is presented in Table 8. Respondents with no formal education exhibited a 100% occurrence of "Poor Practices," while those with tertiary education showed a slightly better distribution of 82.1% "Poor Practices" and 17.9% "Good Practices" ($\chi 2$= 8.893, p = 0.031). Interestingly, respondents who owned their motorcycles displayed 81.9% "Poor Practices" and 18.1% "Good Practices," whereas those without motorcycle ownership exhibited a higher percentage of "Good Practices" (96.8%) and a lower percentage of "Poor Practices" (3.2%) ($\chi 2$= 6.987, p = 0.008). However, other socio-demographic characteristics such as age, marital status, religion, ethnicity, number of years in business, and engagement in other vocational activities did not demonstrate statistically significant associations with helmet usage practices (p > 0.05) (Table 8).

Associations between helmet usage patterns and educational level of respondents

Table 9 highlights associations between helmet usage patterns and educational levels, revealing differences in helmet usage frequency and reasons for non-usage based on educational attainment. Higher level of education is education up to tertiary level while those with no formal education or below tertiary level are considered as lower level of education.

Perceived factors influencing helmet usage among commercial motorcyclists

The perceived factors influencing helmet usage among commercial motorcyclists are outlined below:

1. **Education:** A large number of respondents (77.9%) believe that education plays a crucial role in promoting helmet usage. However, a small percentage (6.5%) disagrees, while 15.7% are unsure about the impact of education on helmet usage.
2. **Financial Status:** Nearly half of the respondents (47.9%) believe that financial status influences helmet usage. However, a notable proportion (33.6%) do not consider financial

status to have a significant impact, and 18.4% are uncertain about its influence.

3. **Road Safety (FRSC) Laws:** The majority of respondents (77.4%) perceive road safety laws, particularly those enforced by the Federal Road Safety Corps (FRSC), as a significant factor influencing helmet usage. This suggests that these laws play a crucial role in encouraging compliance with helmet usage. A small percentage (6.5%) disagrees with the influence of FRSC laws, while 16.1% are unsure about their impact on helmet usage.

Table 7: Association between the attitude of respondents regarding usage of helmets and their socio-demographic characteristics

Variable	Sub-variable	Attitude of the respondent		Statistics
		Poor Attitude	Good Attitude	
Age	21-29	31(63.3)	18(36.7)	$x^2 = 1.531$ $p = 0.465$
	30-39	61(57.5)	45(42.5)	
	40-61	32(51.6)	30(48.4)	
Marital status	Single	38(65.5)	20(34.5)	$x^2 = 1.824$ $p = 0.177$
	Married	86(54.1)	73(45.9)	
Religion	Christianity	44(49.4)	45(50.6)	$x^2 = 3.143$ $p = 0.076$
	Islam	80(62.5)	48(37.5)	
Ethnicity	Yoruba	82(50.3)	81(49.7)	$x^2 = 19.891$ $p =< \mathbf{0.001}$
	Igbo	13(56.5)	10(43.5)	
	Hausa	29(93.5)	2(6.5)	
Level of education	No formal	19(95.0)	1(5.0)	$x^2 = 33.856$ $p =< \mathbf{0.001}$
	Primary	18(90.0)	2(10.0)	
	Secondary	50(61.0)	32(39.0)	
	Tertiary	37(38.9)	58(61.1)	
Monthly Income	10,001 – 20,000	0(0.0)	8(100)	$x^2 = 15.759$ $p = \mathbf{0.001}$
	20,001 – 30,000	50(64.1)	28(35.9)	
	30,001 – 40,000	44(59.5)	30(40.5)	
	Above 40,000	30(52.6)	27(47.4)	
Number of years in Business	Less down 2 years	15(55.6)	12(44.4)	$x^2 = 1.626$ $p = 0.804$
	2-4 years	43(55.1)	35(44.9)	
	5-6 years	34(56.7)	26(43.3)	
	7-8 years	30(63.8)	17(36.2)	
	Above 8 years	2(40.0)	3(60.3)	
Motorcycle ownership	Owned by rider	81(52.3)	74(47.7)	$x^2 = 4.611$ $p = \mathbf{0.032}$
	Not owned by rider	43(69.4)	19(30.6)	
Other Vocational Activities	Yes	82(54.3)	69(45.7)	$x^2 = 1.274$ $p = 0.259$
	No	42(63.6)	24(36.40	

Table 8: Association between practices of respondents regarding helmet usage and socio-demographic characteristics

Variable	Sub-variable	Practices of the respondent		Statistics
		Poor Practices	Good Practices	
Age	21-29	36(79.6)	10(20.4)	$x^2 = 2.712$ $p = 0.258$
	30-39	92(86.8)	14(13.2)	
	40-61	56(90.3)	6(9.7)	
Marital status	Single	48(82.8)	10(17.2)	$x^2 = 0.776$ $p = 0.379$
	Married	139(87.4)	20(12.6)	
Religion	Christianity	78(87.6)	11(12.4)	$x^2 = 0.103$ $p = 0.748$
	Islam	109(85.2)	19(14.8)	
Ethnicity	Yoruba	136(83.4)	27(16.6)	$x^2 = 4.965$ $p = 0.084$
	Igbo	22(95.7)	1(4.3)	
	Hausa	29(93.5)	2(6.50	
Level of education	No formal	20(100.0)	0(0.0)	$x^2 = 8.893$ $p = \mathbf{0.031}$
	Primary	19(95.0)	1(5.0)	
	Secondary	70(85.4)	12(14.6)	
	Tertiary	78(82.1)	17(17.9)	
Monthly Income	10,001 – 20,000	8(100.00	0(0.0)	$x^2 = 5.275$ $p = 0.153$
	20,001 – 30,000	65(83.3)	13(16.7)	
	30,001 – 40,000	68(91.9)	6(8.1)	
	Above 40,000	46(80.7)	11(19.3)	
Number of years in Business	Less down 2 years	23(85.2)	4(14.8)	$x^2 = 8.170$ $p = 0.086$
	2-4 years	61(78.2)	17(21.8)	
	5-6 years	56(93.3)	4(6.7)	
	7-8 years	43(91.5)	4(8.5)	
	Above 8 years	4(80.0)	1(20.0)	
Motorcycle ownership	Owned by rider	127(81.9)	28(18.1)	$x^2 = 6.987$ $p = \mathbf{0.008}$
	Not owned by rider	2(3.2)	60(96.8)	
Other Vocational Activities	Yes	126(83.4)	25(16.6)	$x^2 = 2.401$ $p = 0.121$
	No	61(92.4)	5(7.6)	

Table 9: Association between pattern of practices of helmet usage and educational level

Variable	Sub-variable	Education Level of the respondent		Statistics
		Lower Level	**Higher Level**	
Do you wear helmet	Yes	13(9.1)	130(90.9)	$x^2 = 22.554$
	No	27(36.5)	47(63.5)	$p = < \mathbf{0.001}$
How often do you wear helmet	Neither every day nor at every trip	36(33.6)	71(66.4)	$x^2 = 32.566$ $p = < \mathbf{0.001}$
	Every day but not at every trip	3(4.5)	64(95.5)	
	Every day at every trip	1(2.3)	42(97.7)	
What are the reasons that make you not to wear helmet	It is expensive	13(12.9)	88(87.1)	$x^2 = 11.988$ $p = \mathbf{0.017}$
	It is uncomfortable	10(21.7)	36(78.3)	
	I don't like it	1(4.8)	20(95.2)	
	Because of heat	6(37.5)	10(62.5)	
Frequency of helmet use	Rarely	31(29.5)	74(70.5)	$x^2 = 21.129$ $p = < \mathbf{0.001}$
	Sometimes	2(6.9)	27(93.1)	
	Most of the times	5(13.2)	33(86.8)	
	Always	1(2.6)	38(97.4)	
	Not at all	1(16.7)	5(83.3)	
Does your passengers wear the helmets	Yes	0(0.0)	4(100.0)	$x^2 = 0.921$
	No	40(18.8)	173(81.2)	$p = 0.337$
How frequent do your passengers wear the helmet	Rarely	4(16.0)	84(21.0)	$x^2 = 4.562$ $p = 0.472$
	Sometimes	0(0.0)	2(100.0)	
	Most of the time	0(0.0)	1(100.0)	
	Always	0(0.0)	3(100.0)	

DISCUSSION

This study assessed the knowledge, attitude, and practices (KAP) regarding helmet usage among commercial motorcyclists in Osogbo metropolis, Osun State, Nigeria. The findings revealed several important insights into the factors influencing helmet usage behavior among this population.

The demographic profile of the study participants, predominantly young adults between 30 and 39 years old and predominantly Yoruba ethnicity, reflects the study location and the socio-economic context of Nigeria where many young individuals turn to commercial motorcycle business as a source of livelihood.[17-19] These

demographic characteristics may have implications for understanding helmet usage patterns and attitudes within this population.

Notably, the study found a high level of knowledge regarding helmet usage among respondents, consistent with previous research in Nigeria.[20] Factors such as age, marital status, and motorcycle ownership were found to be associated with higher levels of knowledge about helmets, highlighting the importance of socio-demographic factors in shaping attitudes towards safety practices. In previous studies, helmet ownership has also been found to positively correlate with helmet usage.[21,22] In contrast, Haqverdi *et al* found out in a study in Iran that this was not necessarily so.[23]

Regarding the level of education, the majority of the respondents had completed tertiary education, representing 43.8% of the sample. This finding is probably a reflection of widespread unemployment rate among graduates of tertiary institutions in Nigeria.[24]

Contrary to previous findings, a relatively high proportion of respondents (65.1%) reported using helmets, suggesting a potential improvement in helmet usage rates compared to earlier studies.[25] However, the frequency of helmet use was inconsistent, with a significant proportion of respondents rarely using helmets or failing to adhere to consistent usage. This discrepancy between self-reported behavior and actual practices underscores the need for further investigation into the barriers to consistent helmet usage among commercial motorcyclists.

Concerns about comfort were cited as one of the reasons for non-compliance with helmet usage, echoing findings from previous studies.[9,13,26] Additionally, cultural misconceptions and beliefs, such as the notion that helmets could be used for casting spells or transmitting infections, may contribute to resistance towards helmet adoption among certain ethnic groups, particularly the Yoruba population.[24]

Despite widespread awareness of the legal requirement for helmet usage and perceived strict enforcement by law enforcement agents, observed practices during the study revealed a gap between knowledge and behavior. Many commercial motorcyclists only wore helmets in the presence of law enforcement, indicating a need for strategies beyond education and enforcement alone to promote consistent helmet usage. This is in line with earlier observations made by Olakulehin *et al*.[9]

The low rate of helmet usage among passengers highlights the importance of extending awareness and safety initiatives to all motorcycle occupants. Similar findings have been reported from India and Vietnam.[27,28] Efforts to promote helmet safety should not only target riders but also passengers to ensure comprehensive road safety measures.

The study findings underscore the complex interplay of socio-demographic, cultural, and behavioral factors influencing helmet usage behavior among commercial motorcyclists. Addressing these multifaceted barriers requires targeted educational campaigns, community engagement initiatives, and policy interventions aimed at promoting positive attitudes and practices towards helmet usage.[29-31]

However, it is important to acknowledge the limitations of this study, including the potential for response bias by the motorcyclists. Therefore, there is a need for further observational research to validate self-reported helmet usage behavior in this region.

CONCLUSION

The study revealed a high level of knowledge on crash helmets among commercial motorcyclists in Osogbo. However, their attitudes and practices towards helmet usage were generally poor. Socio-demographic characteristics such as ethnicity, education, income, and occupational engagement influenced helmet usage decisions. Continuous advocacy and stringent enforcement of road safety regulations,

including mandatory helmet use, are recommended to bridge the gap between knowledge and behavior among commercial motorcyclists.

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