

## ORIGINAL ARTICLE

# Factors affecting the utilization of safety devices by commercial motorcyclists in South- East Nigeria

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## ABSTRACT

**Background:** Motorcycle crashes are common causes of morbidity and mortality for both riders and passengers. To prevent and reduce the severity of injuries sustained through road traffic accidents (RTA) many countries enforce the use of safety devices while riding. Certain factors including non-enforcement of the existing road safety laws have been implicated as causing the poor utilization of safety devices by motorcycle riders in the developing countries. This study seeks to determine the prevalence of use of safety devices, and the reasons for non-utilization of these devices among the commercial motorcyclists in south eastern Nigeria.

**Methodology:** This was a cross sectional survey conducted among commercial motorcycle riders in the three local government areas in Enugu metropolis, the capital of Enugu State.

**Results:** The prevalence of safety device use (goggles/helmets) in this study was 82.1% (505 motorcyclists). Four hundred and fifty three (73.7%) use goggles while 131 motorcyclists (21.3%) use helmets alone. The major determinants of non-utilization of helmets noted were cost among 52.1% of the riders and discomfort as 25.7% found the use of helmets uncomfortable. Age (>40 years) and marital status were significantly associated with use of safety devices while formal school education did not positively influence their use.

**Conclusion:** The prevalence for use of safety helmets is low and the reasons for the poor utilization of this safety device are trivial when compared with the overall safety of the motorcyclists.

**Keywords:** Determinants, prevalence, protective wears, riders

## INTRODUCTION

Injuries to the head, following motorcycle crashes, are a common cause of severe morbidity and mortality.<sup>1</sup> Many victims of RTA spend weeks in hospital after severe crashes and may end up handicapped for life.<sup>2</sup> To minimize the effects of road hazards, the developed countries, such as the New Zealand in 1956, Luxemburg in 1959, France in 1961, Ireland, and the U.K. enforced the use

of protective gear.<sup>3,4</sup> In the United States of America (USA), only 34-54% of riders wear helmets in the states without helmet laws.<sup>5</sup> In Nigeria, the crash helmet edict came into effect 1<sup>st</sup> June 1976 and was re-enforced 1<sup>st</sup> January 2006. Yet, many motorcyclists still go about without safety helmets and devices.

These safety devices which include helmets, wind shields, goggles, protective and

reflective clothing should provide comfort, increase visibility, and prevent or reduce injuries in the event of a crash.<sup>3,6</sup> There have been arguments that motorcycle helmet use, decreases rider vision, increases neck injuries and impair hearing.<sup>1,6</sup> However, scientific evidence points to the contrary as Hurt, *et al*, reported no attenuation of critical traffic sounds, limitation of pre-crash visual field nor accident causation with use of helmets.<sup>7</sup> Impairment of vision with subsequent crash can occur if the motorcyclist is hit by a stone, bitten by an insect or has a gust of wind blown into unprotected eyes causing irritation and inflammation of the eyes with watering. Consequently, in some states in the U.S.A, windscreens and eyeglasses are considered legal protection.

Windscreens, though, may not provide adequate face and eye protection as wind, insects, dusts and pebbles can be blown behind them.<sup>3</sup> Eyeglasses on the other hand are shatter proof but may not seal out wind and dust which may cause watering of the eyes. Helmets, therefore, that provide full-face protection are considered the best protection.<sup>3</sup> Helmets can also be used with face shield or a pair of goggles. The latter should be impact resistant and free of scratches that can refract light and blur vision. While tinted shield can be used during the day, clear ones should be used for night riding or in conditions of poor illumination such as poorly lit roads that may increase the effect of night myopia especially in younger eyes.<sup>8</sup> In Nigeria, in spite of the law, use of helmets and other protective gears are yet to be enforced. The rider and passenger are therefore constantly exposed to potential eye hazards and the possibility of a crash with its attendant complications.

Commercial motorcycle riding was a thriving business in South-East Nigeria as at the time of this study. This study was, therefore, aimed at exploring the prevalence of safety device use, and the determinants of non-use of these devices with a view to making recommendations for safety measures on our roads to the relevant authorities.

## METHODOLOGY

This was a cross sectional survey conducted among commercial motorcycle riders in Enugu, capital of Enugu State. Enugu metropolis consists of 3 local government areas: Enugu South, Enugu East and Enugu West.

### Study Design

The study using a multi-stage random sampling design, selected 615 commercial motorcyclists who fulfilled the criteria for inclusion during the eight weeks survey between January and February 2006.

The minimum sample size representative of the study population was determined using the formula for a study population <10,000 people.<sup>13</sup> The formula is:

$$nf = \frac{n}{1 + \frac{n}{N}}$$

Where *nf* = minimum sample size

*N* = study population

*n* = sample size of population <10,000 which is given by the formula:

$$n = \frac{pqz^2}{d^2}$$

*P* = assumed prevalence taken from a previous study.<sup>14</sup>

*d* = Precision level acceptable (maximum random sampling error)

*q* = 1-*P*

*Z* = A constant for 95% probability of not exceeding the maximum random sampling error

### Estimates

*N* = 3,000

*P* = 1.63% (0.0163)

*q* = 1- 0.0163

*Z* = 1.96

*d* = 0.02

The calculated minimum sample size was 146. An additional 10% allowance for possible attrition was made giving a minimum sample size of 161. However, a total of 615 motorcyclists were enrolled from the 14 units which were selected by simple random sampling from the 60 motorcycle assembly

units in the three local government areas. All the motorcyclists present at the time of the study in each of these units were enrolled and ticked off with their register. No second visit was made to any unit.

**Data Collection**

Relevant data were obtained using a structured questionnaire adopted and modified for this study.<sup>14</sup> The questionnaire was administered by the researcher and three trained assistants (resident doctors). It elicited information on socio-demographic characteristics such as age, education, marital status, and details of use of safety devices while riding. The interview was conducted in English or the native vernacular (Igbo) when necessary. A pilot investigation was undertaken in a motorcycle unit of 21 riders outside the study area to pre-test and fine-tune the questionnaire and also to familiarize the team members with procedures.

**Data Analysis**

The data collected were analyzed using the statistical package for social sciences (SPSS) version 11.5. Data are presented as tables, charts, and in prose. The chi-square was used to cross tabulate the various variables for meaningful interpretations and a P- value of less than 0.05 was considered significant.

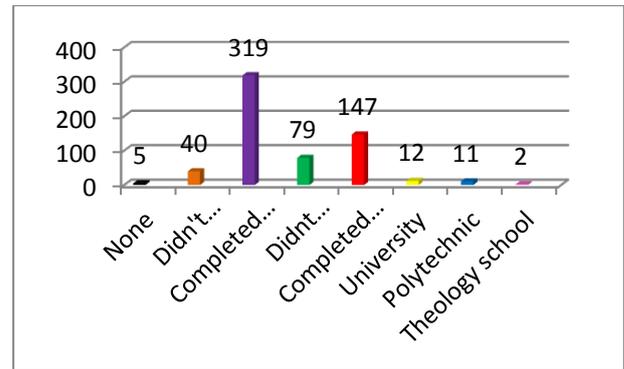
**Ethical Considerations**

Institutional consent was obtained in writing from the university of Nigeria Teaching Hospital Enugu ethics committee, while informed verbal consent was obtained from each subject who participated in the study after detailed explanation.

**RESULTS**

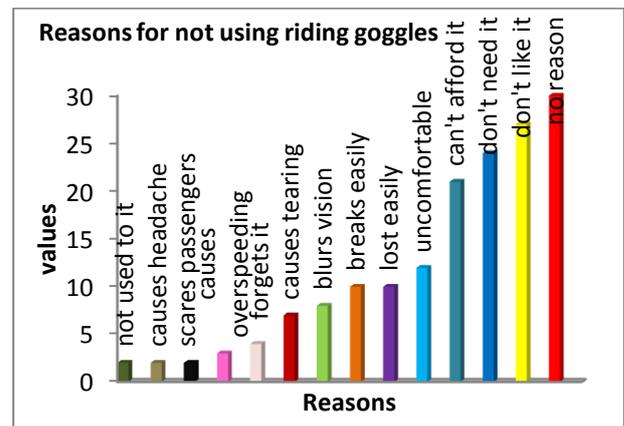
A total of 615 commercial motorcycle riders were examined from 14 motorcycle assembly units in Enugu Metropolis. The mean age was 38.1 years ± 10.27 with a range of 18 - 70 years. Four hundred and eighty-one (78.2%) were married, 130 (21.1%) were single, while 4 (0.7%) were widowers. They were all males.

**Figure 1.** Levels of education of the commercial motorcyclists



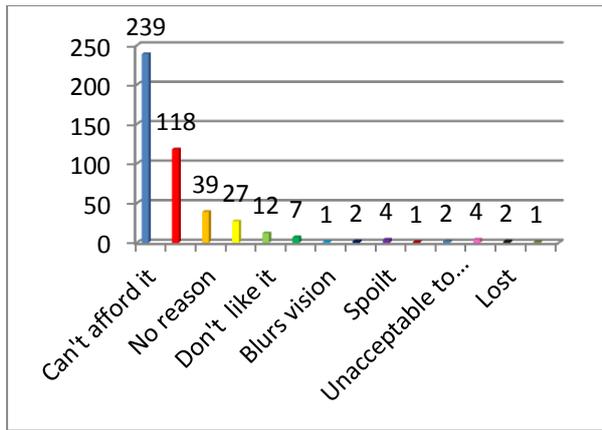
The prevalence of safety device use (goggles/helmets) in this study was 82.1% (505 motorcyclists). Four hundred and fifty-three subjects (73.7%) use goggles while riding and 162(26.3%) do not. Various reasons were proffered by the motorcyclists for using goggles including: dust particles (72.8%=353 motorcyclists), sun glare (11.9%=58 motorcyclists), wind (9.1%=44 motorcyclists), to prevent tearing (3.5%=17 motorcyclists) and to improve vision (2.7%=13 motorcyclists).

**Figure 2.** Reasons for not using riding goggles



The prevalence of use of helmets alone was 21.3% (131 motorcyclists). Sixty-one of these (46.6%) use helmets with face shields while 53.4% (70 motorcyclists) had helmets with no face shield. Twenty-five (4.1%) use helmets occasionally.

**Figure 3.** Reasons for not using safety helmets



**Table 1.** Relationship between use of safety devices and marital status among 615 motorcycle riders in Enugu metropolis

		Marital Status		Total
		Currently not Married	Currently Married	
Use of safety devices	No	98 (89.1%)	12 (10.9%)	110
	Yes	36 (7.1%)	469 (92.9%)	505
<b>Total</b>		<b>134 (21.8%)</b>	<b>481 (78.2%)</b>	<b>615 (100%)</b>
X <sup>2</sup> (CC) = 356.071		P = 0.000		

**Table 2.** Relationship between use of safety devices and age among 615 motorcycle riders in Enugu Metropolis

		Age		Total
		Less than/ = 40 years	Greater than 40 years	
Use of safety devices	No	81 (73.6%)	29 (26.4%)	110
	Yes	281 (55.6%)	224 (44.4%)	505
<b>Total</b>		<b>362 (58.9%)</b>	<b>253 (41.1%)</b>	<b>615 (100%)</b>
X <sup>2</sup> (CC) = 12.076		P = 0.001		

**Table 3.** Relationship between use of safety devices and formal education among 615 motorcycle riders in Enugu

		Education		
		No	Yes	Total
Use of safety devices (goggles and helmets)	No	1	109	110
	Yes	4	501	505
<b>Total</b>		<b>5</b>	<b>610</b>	<b>615</b>
X <sup>2</sup> (CC) = 0.015		P = 0.901		

The relationship between use of protective wear and formal education was not statistically significant.

**Table 4.** Association between education, marital status, age and use of safety devices

Variables	B	S.E	Wald.	df	Sig	95% confidence interval		
						Exp(B)	Upper	Lower
Education	0.827	1.429	0.335	1	0.563	2.286	37.592	0.139
Marital status	22.355	2,413.561	0.000	1	0.993	0.120	0.010	0.020
Age	18.601	2,413.561	0.000	1	0.994	0.190	0.010	0.040
Constant	2.927	0.296	97.563	1	0.000	18.667		

**DISCUSSION**

The prevalence of 21.3% noted for use of helmet in this study was similar to the findings in south western Nigeria where Oginni, *et al*, reported that only 23.8% had a helmet on at the time of their study.<sup>9</sup> Also in

agreement, were studies carried out in India (26.9%), Vietnam (23%), Chaozhou (34.6%), and Shantou (30.2%).<sup>9,11,12</sup> On the contrary, Amoran, *et al*, and Muazu in rural villages in south western and northern Nigeria respectively noted that none of the

motorcyclists use safety helmets in spite of their knowledge of the highway code while only 3.4% of motorcyclist use helmets in Kampala, Uganda, and 50% in USA.<sup>7,15-17</sup> This disparity in helmet use in the developing countries has been noted by World Health Organisation (WHO) in developing countries and has been attributed to issues of law enforcement.<sup>18</sup> The low prevalence of helmet use noted in our study and other studies suggests that there are factors which influence the use or non-use of helmets.

These reasons proffered by these motorcyclists for non-use of safety devices such as cost and lack of comfort are very important considering the fact that most of them are hire purchase riders who are striving to make enough money to pay off the cost of the motorcycles and also take care of their families at the same time. They, therefore, consider an investment of two thousand (2000) naira to purchase a safety helmet too high in spite of its attendant safety function.

The Nigeria weather is hot and humid such that the use of helmets can indeed be uncomfortable for anyone who has to ride in hot weather. Similarly, in the USA 26% of the motorcyclists, a figure comparable with our 25.7% did not use helmets because they found them uncomfortable as in other studies.<sup>7,11</sup> These problems can be dealt with if the government will subsidize the selling cost of these imported helmets or better still set up a factory in Nigeria where standard helmets are produced and through safety education encourage its use despite the attendant discomfort.

There is also the issue of blurring of vision with the use of helmets, a factor also noted in other studies but some studies have reported no limitation of pre-crash visual field or accident causation with use of helmets.<sup>3,7</sup> We believe that neither the helmets and face shields can blur the vision of the rider if he uses his rear view mirrors and freely moves his head as is the case with riders unless the shields are dusty (which may not be

uncommon on our roads) or old with scratch marks causing glare under intense sunlight.

At a prevalence of 0.000 and 0.001 respectively, marital status (currently married) and age (>40 years) were significantly associated with use of protective devices while formal education ( $P=0.901$ ), which was mostly primary school level education (limited at its best in terms of exposure to safety issues in Nigeria) in 52.0% did not positively influence the use of safety devices. Sreedharan, *et al*, in Kerala, India also found marital status to be significantly associated with use of safety devices.<sup>2</sup> This similarity may be attributed to the sense of responsibility that comes with marriage or having a family.

Dandona also in India, observed that lower education in addition to older age (>45 years) and riding a borrowed two-wheeler were significant predictors of helmet use.<sup>19</sup> While there is a similarity in the age group between our subjects and Dandona's subjects that use safety devices, a factor which may be attributed to maturity, the difference in education may be due to the fact that motorcycles in India are largely owned by families as their means of transportation so they may tend to be more careful in handling and using it, while in Nigeria they are mostly used for commercial purposes and our study focused on commercial motorcyclists. Moreover, financial considerations and issues of comfort/convenience may have outweighed the awareness of helmet safety values among the commercial motorcyclists in our study. Non-use of helmets was also noted among the young, untrained, and uneducated riders involved in RTA in the USA.<sup>7</sup>

When analysed together as shown in table 4, education, marital status and age all had no significant relationship with use of safety devices implying that none of them is a strong predictor of use of safety devices.

Some of the motorcyclists in our study noted that enforcement of helmet laws will positively influence the use of safety helmets.

Similarly, majority of the subjects 67.3% and 47% respectively in Oginni and Colorado studies favoured the enforcement of crash helmet laws.<sup>9,20</sup> The Federal government through the Federal Road Safety Commission (FRSC) has a role to play in enforcing the use of safety helmets as in other countries and more importantly educating the motorcyclists on road safety and the need to use safety devices regularly.<sup>9,12</sup> The importance of attitudinal changing education was emphasized in an interventional study carried out in Akwa Ibom State, Nigeria, where it was shown that the reason for lack of compliance to road signs at baseline in the control and test groups was largely due to lack of knowledge of the road signs but when safety education was given to the intervention group there was a marked difference in their compliance to road signs.<sup>21</sup>

Many more motorcyclists 453 (73.7%) used goggles than helmets (156=25.4%) in this study. This is probably because of the dusty environment as well as the inconvenience from wind while riding. Goggles are also cheaper and more readily available. Our findings on reasons for non-use of riding goggles could not be compared with other studies as no study was identified which considered the use of goggles as a safety device among motorcyclists.

## CONCLUSION

There is a low prevalence for use of safety helmets in this study, and trivial reasons proffered by the motorcycle riders for this when compared with their overall safety on the road. Attitudinal changing road safety training and enforcement of existing laws are recommended to change the ideologies, safety attitudes and practices of these motorcyclists.

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