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Incidence of road traffic accidents and pattern of injury among commercial motorcyclists in a rural community in south western Nigeria

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Abstract

Background and Objective: Motorcyclists are at high risk of road traffic accidents and the attendant injuries, but few community-based studies have investigated the problem in Nigeria. Therefore, this study was conducted to determine the incidence of accidents and patterns of non-fatal injury among commercial motorcyclists in a rural community in Oyo State, Nigeria.

Methodology: A total sample of all the commercial motorcyclists registered in the motor parks of Igbo-Ora, Oyo State was surveyed. An interviewer administered questionnaire was used to collect information on the respondents' socio-demographic characteristics, occurrence of accidents in the year preceding the study, type of injury sustained, motorcycle riding experience, substance use and other characteristics.

Results: Two hundred and ninety nine motorcyclists were interviewed, 136(45.3%) had been involved in a road traffic accident; of these 85 (62.5%) were involved in a single accident, while 51(37.5%) were involved in 2 or more accidents. Motorcycle accident risk factors included age of the motorcyclist, between 20-29 and 30-39 years, OR 10.1 and OR 9.6 respectively, alcohol use, OR 1.18, and visual impairment, OR 1.62. The collisions occurred mainly with cars (28.7%) and other motorcyclists (27.9%). The commonest types of injuries sustained were abrasions and cuts (67.6%) and fractures of the upper and lower limbs (16.2%).

Conclusion: Road traffic accidents occur frequently among commercial motorcyclists in this community. Introduction of road safety education targeted at discouraging alcohol use among these motorcyclists while riding and ensuring periodic visual acuity assessment is recommended.

Introduction

Globally, deaths and injuries resulting from road crashes are a major and growing public health problem. More than 20 million people are severely injured or killed on the world's roads each year and the burden falls most heavily on low-income countries (LICs) in Africa, Latin America and Asia¹⁻³. In most high-income countries, cars make up the largest proportion of the road traffic, while in low-income and middle-income countries pedestrians and riders of bicycles, motorcycles and mopeds are more common. These differences in road users have an important impact on the occurrence of injuries among the different types of road users. Generally, pedestrians and riders of bicycles, motorcycles and mopeds are less protected from accidents per kilometres traveled and they are at far greater risk than the drivers and passengers of cars and motor vehicles⁴. In the Taiwan Province of China, an increase in the use of motorcycles was reportedly associated with increasing deaths and injuries⁵. Similarly, Barros et al in Brazil reported that motorcyclists had an

eight-fold risk of dying, a four fold risk of injury and a two-fold risk of running over pedestrians as compared to automobile drivers⁶. By and large, motorcyclists and their passengers are vulnerable to speed, poor visibility and those without safety helmets are particularly at risk⁴.

The declining Nigerian economy has led to an increase in the use of motorcycles for private and commercial transportation. Despite the clear evidence of higher incidence of road traffic accidents and injuries among motorcyclists from other countries, there is little information in this regard in Nigeria. The few studies conducted among motorcyclists have been located in the urban areas and are hospital-based^{7,8}. There is paucity of literature from rural communities. Thus, this study was carried out to determine the incidence of road traffic accidents and patterns of injury among commercial motorcyclists in a rural community.

Methodology

Study area

The study was conducted in Igbo-Ora, the headquarters of Ibarapa Central Local Government Area of Oyo State. It is located about 70 kilometres from Ibadan and has a population of about 60,000 people. Most people are small scale farmers, traders and artisans. The major types of commercial transport in the town are minibuses and motorcycles. scale farmers, traders and artisans. The major types of commercial transport in the town are minibuses and motorcycles.

Methods

Using a cross-sectional survey design, the study was conducted in February 2004. All the commercial motor parks in Igbo-Ora were visited and all the commercial motorcyclists who consented to participate in the study were interviewed. Using an interviewer-administered questionnaire, information was collected on the respondents' socio-demographic characteristics, alcohol consumption, motorcycle-riding experience, occurrence of road traffic accidents in the year preceding the study, and injuries sustained. The questionnaire was designed in English and translated into Yoruba (the local language) and back translated into English to ensure that original meanings were retained. Consent was obtained from the leaders of motorcyclists' association to conduct the study and informed consent from the individual motorcyclists before the administration of the questionnaires.

Data was entered using SPSS version 10, frequencies were generated and the Chi square was used to test associations between categorical variables. Logistic regression analysis was also carried out; the level of significance was set at $p < 0.05$.

There are a few limitations of this study which should be borne in mind; the major one being that injuries would only have been reported among survivors and those who were not severely disabled by a road traffic accident. Therefore information was not obtained on fatal and severe injuries. Secondly the survey relied on the reports of the respondents which could not be independently validated. There could be tendency to underreport injury due to poor recall, thus the incidence of accidents is likely to be underestimated by this study. The survey requested for self reported behaviours, it is expected that motorcyclists would over report safer behaviours and under report unsafe behaviours such as alcohol consumption. Despite these limitations, the data from this study provides important information about road traffic accidents among motorcyclists, which can be used to develop road safety strategies.

Results

Two hundred and ninety nine male commercial motorcyclists were interviewed; all the motorcyclists who were approached consented and participated in the survey. The mean age of the respondents was 27.5 ± 7.4 years and 254 (85.0%) were aged 20 - 39 years (Table 1).

One hundred and sixty eight (56.2%) had been working as commercial motorcyclists for less than six years, 183(61.2%) reported that they were licensed, but only 72(24.1%) could produce their licenses. None of them reportedly wore safety helmets.

Incidence of road traffic accidents

One hundred and thirty six (45.3%) respondents had been involved in a road traffic accident in the year preceding the study; of these, 85(62.5%) were involved in a single accident while 51(37.5%) were involved in 2 or more accidents. The major factors considered to be responsible for the accidents were faults on the part of the other road users 75 (55.1%), bad roads 40 (29.4%), and poor vision 11 (8.1%).

Table 1: Characteristics of motorcyclists

| Characteristics | n | % |
|---------------------------|-----|------|
| <20 | 24 | 8.0 |
| 20-29 | 177 | 59.2 |
| 30-39 | 77 | 25.8 |
| 40 | 21 | 7.0 |
| Religion | | |
| Islam | 181 | 60.5 |
| Christian | 113 | 37.3 |
| Traditional | 5 | 1.7 |
| Level of education | | |
| None | 18 | 6.0 |
| Primary | 160 | 56.3 |
| Secondary | 110 | 36.8 |
| Tertiary | 11 | 3.7 |
| Marital status | | |
| Single | 105 | 35.1 |
| Married | 188 | 62.9 |
| Separated | 6 | 1.0 |
| Licensed | | |
| Yes /license seen | 72 | 24.1 |
| Yes/ license not seen | 111 | 37.1 |
| No | 116 | 38.8 |
| Years of riding | | |
| 0-5 | 168 | 56.2 |
| 6-11 | 104 | 34.8 |
| ≥12 | 27 | 9.0 |
| * N=299 | | |

Risk factors in traffic accidents

Table 2 shows the association between certain characteristics of the motorcyclists and the occurrence of accidents. The proportion of motorcyclists who had accidents increased from 8.3 to 50.6% among those aged below 20 and 30-39 years respectively, and it was

Table 2: Characteristics of respondents and incidence of accidents

| Characteristic | Yes n (%) | Accident No n (%) | Total | χ^2 | P-value |
|--------------------------|--------------|-------------------------|-------|----------|---------|
| Age | | | | | |
| <20 | 2 (8.3) | 22 (91.3) | 24 | 16.03 | 0.001* |
| 20-29 | 87 (49.2) | 90 (50.8) | 177 | | |
| 30-39 | 39 (50.6) | 38 (49.8) | 77 | | |
| ≥40 | 8 (38.1) | 13 (61.9) | 21 | | |
| Years of riding | | | | | |
| 0-5 | 71 (42.3) | 97 (57.7) | 168 | 2.88 | 0.237 |
| 6-11 | 49 (47.1) | 55 (52.9) | 104 | | |
| ≥12 | 16 (59.3) | 11 (40.7) | 27 | | |
| Licensed | | | | | |
| Yes | 80 (43.7) | 103 (56.3) | 183 | 0.595 | 0.257 |
| No | 56 (48.3) | 60 (51.7) | 116 | | |
| Average speed | | | | | |
| 20-40 | 35 (45.5) | 42 (54.5) | 77 | 2.28 | 0.32 |
| >40-60 | 66 (49.6) | 67 (50.4) | 133 | | |
| >60 | 35 (39.3) | 54 (60.7) | 89 | | |
| Alcohol use | | | | | |
| Yes | 62 (55.9) | 49 (44.1) | 111 | 7.60 | 0.06 |
| No | 74 (39.4) | 114 (60.6) | 188 | | |
| Visual Impairment | | | | | |
| None | 100 (43.7) | 129 (56.3) | 229 | 3.48 | 0.17 |
| Longsighted | 19 (61.3) | 12 (38.7) | 31 | | |
| Shortsighted | 7 (43.9) | 22 (56.4) | 39 | | |

* Statistically significant

Table 3: Results of multivariate logistic regression model for incidence of accidents among motorcyclists

| Characteristics | Number of Respondents | Had accidents % | Adjusted Odds ratio | p-value |
|------------------------|-----------------------|-----------------|---------------------|---------|
| Age | | | | |
| <20 | 24 | 8.3 | 1 | 0.002* |
| 20-29 | 177 | 49.2 | 10.1 (2.27 45.12) | |
| 30-39 | 77 | 50.6 | 9.6 (2.03 45.9) | |
| >40 | 24 | 38.1 | 3.9 (0.68 23.2) | |
| Years of riding | | | | |
| 0-5 | 168 | 42.3 | 1 | 0.990 |
| 6-11 | 104 | 47.1 | 1.00 (0.59 1.70) | |
| ≥12 | 27 | 59.3 | 2.41 (0.926.27) | |
| Alcohol use | | | | |
| No | 188 | 39.4 | 1 | 0.017* |
| Yes | 111 | 55.9 | 1.18 (1.12 3.11) | |
| Longsighted | | | | |
| No | 268 | 43.8 | 1 | 0.254 |
| Yes | 31 | 61.3 | 1.62 (0.74 3.6) | |

* Statistically significant

significantly higher in the 20-29 and 30-39 age groups ($p=0.001$). With regards to years of riding experience, the occurrence of accidents was highest among those who had been riding for 12 years and above, but the difference was not statistically significant. Commercial motorcyclists who were unlicensed had a slightly higher incidence of accidents (48.7%) compared to those who were licensed (43.7%), this difference was not statistically significant ($p=0.25$). The occurrence of accidents was higher among those who consumed alcohol compared with those who did not take alcohol (57.6% versus 37.6%, $p = 0.001$). Also, the occurrence of accidents was higher among those who had an estimated average riding speed of 41-60km/hr, 63(49.6%). Motorcyclists who had visual impairment (difficulty in seeing distant) also had higher risk of accidents compared to those who had no visual impairment 36(61.3%) and 98(43.4%), but the difference was not statistically significant ($p= 0.17$).

Following multivariate logistic regression analysis , motorcyclists aged 20-29 and 30-39 years had a significantly higher risk of road traffic accidents, OR 10.12 (95% CI, 2.27 45.12) and OR 9.67 (95% CI, 2.04 45.96) respectively, so also did alcohol users, OR 1.86 (95% CI, 1.12 3.11) (Table 3).

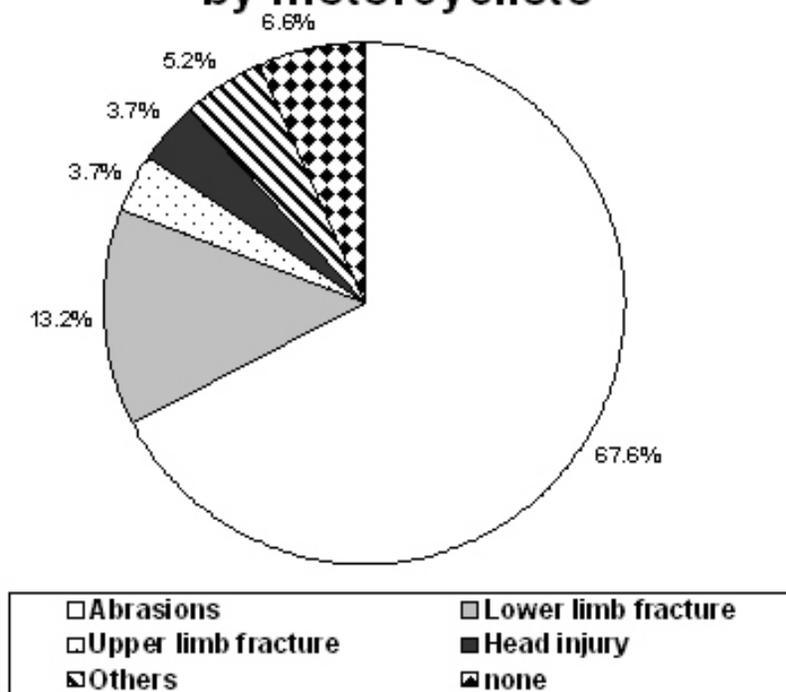
Nature of collisions and types of injuries sustained

The commonest types of accidents reported by the motorcyclists involved collision with a car, 40(28.7%), followed by accidents which involved collision with other motorcyclists 38(27.9%), and pedestrians 19 (13.2%). The types of injury sustained by the motorcyclists who had been involved in accidents are shown in Figure 1. Ninety-two (67.6%) had abrasions and cuts, while 17(12.5%) and 5(3.7%) sustained upper and lower limb fractures respectively. Only a few, 3.7%, sustained head injuries.

Discussion

Commercial motorcycles (Okadas) have become a major form of public transportation in most parts of Nigeria over the past two decades. This mode of commercial transportation has introduced the attendant risk of road traffic accidents which is higher among this group of road users and their passengers. In this study, almost half of the motorcyclists had been involved in at least one accident. The incidence of accidents was highest amongst motorcyclists aged between 20 and 39 years. Findings from other studies conducted in Nigeria^{7, 8} indicate that this is the age group at greatest risk of being involved in road traffic accidents.

Figure 1: Type of injury sustained by motorcyclists



None of the motorcyclists in this study wore helmets; similarly Andrews *et al* in a study conducted in Kampala, Uganda reported helmet use among only 3.4% of motorcyclists⁹. The World Health Organization estimates that helmet use ranges from slightly over zero in developing countries to 100% in countries where laws on helmet are effectively enforced¹⁰. In countries where the use of helmets has been enforced, reduction in the occurrence of serious head injuries by 20 to 45% have been reported^{10, 11}. In view of the proven efficacy of helmets in the prevention of head injury and mortality, efforts should be intensified to enforce their use in this country. The seat belt initiative introduced by the Federal Road Safety Corps in the recent years in Nigeria has apparently increased awareness and use of seat belts among motorists. Similar efforts should be directed at promoting and enforcing the use of helmets among motorcycle users.

Alcohol use was found to be significantly associated with the occurrence of road traffic accidents among the motorcyclists. Impairment by alcohol has been identified as an important factor influencing both the risk of road traffic accidents and the severity of injuries by various researchers^{12, 13}. This finding and the reports of other studies provide a scientific justification for advocating for legislation against alcohol use among commercial motorcyclists during their working hours. Self reported visual impairment was also identified as a risk factor, similarly Mock *et al* in a study of Ghanaian commercial drivers identified poor vision as a risk factor for accidents¹⁴.

Regarding the type of collision, about one third of the motorcyclists who had accidents reportedly collided with motorcars. Similarly, Umbese and Okukpo in a study conducted among patients seen in the University of Benin Teaching Hospital reported that 36% of accidents were due to collisions with other motor vehicles⁷. However, it is lower than the 45% reported by Oluwadiya *et al* among patients who suffered motorcycle limb injuries in Ife⁸. Collisions with other motorcyclists were reported by 27.9%, this is a higher percentage than those reported by the University of Benin study⁹ and the Ife study⁷ in which only 7 and 8.7% of the accidents respectively involved other motorcyclists. This form of collision is probably common because this study was conducted in a rural area where there are fewer motor vehicles. In about one third of the accidents the motorcyclists did not collide with another vehicle; 24% were due to bad roads and 13% of the collisions involved pedestrians. Previous studies conducted among victims of motorcycle accidents reported 10 - 22% involvement of pedestrians^{7, 8}. In terms of the factor perceived to be responsible for the accidents, 88% of the motorcyclists who had been involved in accidents blamed the other road users. This is not an unexpected finding as there is always a tendency for human beings to blame others when adverse events occur. There are, however, no similar studies to compare these results with. Bad roads were the second most commonly mentioned factor responsible for the accidents; this finding is similar to the reports from other developing countries which have identified the bad condition of roads as a major contributory factor to the occurrence of accidents¹⁵.

Abrasions were the most common form of injuries reported

by two thirds of the motorcyclists following accidents. This is higher than observations reported from Nigerian hospital-based studies in which abrasions constituted 26 to 33% of the injuries^{7, 8}. Lower limb and upper limb fractures constituted only 13.2 and 3.7% of the injuries in this study, these proportions are lower than the reports from the hospital-based studies by Oluwadiya and Umbese in which the majority of the subjects had upper and lower limb fractures^{7, 8}. These differences are not surprising as it is expected that hospital subjects would have more serious injuries, whereas those who suffer mild abrasions would likely not to report to the hospitals. This may suggest that a community-based study is more likely to give a more complete picture of the pattern of injuries which occur among motorcyclists.

In conclusion, this study indicates that accidents occur frequently among commercial motorcyclists in this rural community and the main factors identified were alcohol use, visual impairment and age of the rider. The bad road surfaces were also identified as contributory factors. Introducing road safety education particularly targeted at discouraging alcohol use among motorcyclists while riding and routine visual assessments for the motorcyclists would go a long way in reducing the occurrence of motorcycle accidents. Promotion and enforcement of helmet use would also reduce the severity of injuries sustained in the event of an accident. The local government authorities should intensify their efforts to repair roads. Additional research is required in other parts of the country to identify location specific risk factors.

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