

Childhood motorcycle-related injuries in a Nigerian city - prevalence, spectrum and strategies for control

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The use of motorcycles is becoming increasingly popular in Nigeria because of poor public and private transportation systems. Motorcycle crashes account for a disproportionate share of the deaths and disabilities that result from road traffic accidents.

We undertook a prospective descriptive study of all children aged 15 years or under with motorcycle-related injuries (MCRIs) who presented at the emergency room of the University of Ilorin Teaching Hospital over a period of 3 years. Children with ophthalmic injuries and those who died before reaching the hospital were excluded. Over the study period, 40 of a total of 440 patients admitted with MCRIs were children (9.0%). Twenty-seven children (67.5%) were injured as pedestrians, 11 (27.5%) as passengers and 2 (5%, young adolescents) as riders. One 3-year-old child was admitted to the intensive care unit with severe head injury and died.

Prevention of MCRIs in children should be a priority in our setting. Public campaigns should clearly highlight the risk of injury to this age group, and poor safety practices with regard to children should be specifically targeted. With the motorcycle gaining popularity as a mode of transportation in our cities and communities, the importance of teaching our youth about correct safety behaviour such as helmet use, and parents on the danger of letting their children cross roads alone, cannot be over-emphasised.

Paediatric health care in developing countries is mainly focused on the prevention and control of communicable diseases and malnutrition, with little attention given to trauma in children.¹ However, injuries claim more children's lives than birth defects, cancer and infectious diseases combined and have evolved into the number one cause of death and disability among children aged 1 - 14 years.² In developing countries motorcycle accidents account for a disproportionate share of the deaths and disabilities that result from road traffic crashes.³⁻⁶ The absence of pedestrian walkways increases the vulnerability of child pedestrians to motorised vehicles.⁵ The use of motorcycles is becoming increasingly popular in Nigeria because of poor public and private transportation systems. Additionally, the motorcycle is relatively cheap, and enables its rider to navigate narrow streets or roads unsuitable for cars and to thread through traffic snarls in urban areas.⁷ Motorcyclists are often untrained and unlicensed, and may have little or no regard for traffic rules or safety. They commonly drive too fast, and overload their motorcycles with passengers or goods (Fig. 1) in an opportunistic commercial transport system.



Fig. 1. Motorcycle overloaded with passengers.

Aims and methods

In order to determine the spectrum of childhood motorcycle-related injuries (MCRIs) in a Nigerian city and to suggest strategies for their control, we undertook a prospective descriptive study of all children with MCRIs aged 15 years or under who presented at the emergency room of the University of Ilorin Teaching Hospital over a period of 3 years. The hospital is a tertiary referral centre that receives patients from Kwara state and four neighbouring states.

The data obtained included patient demographics, use of a protective device (helmet), mechanism of injury, parts of the body injured, type of injury, injury-to-arrival time (hours), paediatric trauma score, hospital length of stay (days), and outcome. Children with ophthalmic injuries and those who died before reaching the hospital were excluded. SPSS® was used to perform statistical analysis. The chi-square test and Fisher's exact test were used to compare categorical values as appropriate, and Student's *t*-test was used to

compare numerical variables with $p < 0.05$ established as statistically significant.

Results

A total of 440 patients were admitted with MCRI, of whom 40 were children (9.0%). There were 23 boys and 17 girls (male/female ratio 1.4:1). Three children were aged 1 - 4 years, 20 (50%) were aged 5 - 9 years (primary school age), and 17 (42.5%) were young adolescents. Ten children were injured in the first, 11 in the second and 19 in the third years of the study. Twenty-seven children (67.5%) were injured as pedestrians, 11 (27.5%) as passengers and 2 (5%, young adolescents) as riders (Table I). None of the passengers or riders wore helmets. The mechanism of injury was motorcycle-pedestrian collision in 28 cases (70%), other vehicle-motorcycle collision in 7 (17.5%), motorcycle-motorcycle collision in 3 (7.5%), and crash of a single motorcycle from loss of control or collision with a stationary object in 2 (5%).

TABLE I. STUDY POPULATION, AND PART PLAYED IN THE MOTORCYCLE ACCIDENT

| Age range | Part played in accident | | | Total |
|---------------|-------------------------|-----------|------------|-------|
| | Rider | Passenger | Pedestrian | |
| 1 - 4 years | 0 | 1 | 2 | 3 |
| 5 - 9 years | 0 | 3 | 17 | 20 |
| 10 - 15 years | 2 | 7 | 8 | 17 |
| Total | 2 | 11 | 27 | 40 |

Twenty-five per cent of patients sustained multiple injuries. The most commonly injured body parts were the extremities (67.5%), head (52.5%) and abdomen/pelvis (5%), and the most common injuries were abrasions/contusions (37.5%), lacerations (25%), fractures (20.8%) and solid abdominal organ injuries (2.5%). The median Paediatric Trauma Score (PTS) was 10 (range 6 - 11); 6 patients had a PTS of ≤ 8 , 27 patients had a score of 9 - 11, and in 7 there were no adequate records. Most of the patients arrived less than 1 hour after the accident (19, 47.5%) or between 1 and 6 hours (10, 25%). The median length of hospital stay was 1 day (range 1 - 39 days). There was a significant association between injury-to-arrival time and length of hospital stay ($p = 0.005$). The longest stay was that of a 6-year-old boy with head injury, who arrived 48 hours after the accident and was discharged after 39 days. The mean (standard deviation (SD)) length of hospital stay of patients with PTS ≤ 8 and PTS 9 - 11 was 11.3 (SD 14) and 1.6 (SD 1) days, respectively ($p = 0.002$). There was no significant difference between age, gender, part of the body injured and length of stay. A 3-year-old child with severe head injury was admitted to the intensive care unit with a Glasgow Coma Score of < 8 and died after 36 hours there.

Discussion

Even though this is a hospital-based study and therefore does not include information on children who died before reaching hospital, or on those with minor injuries who would have presented to a hospital of lower grade or not attended any health facility at all, it draws attention to childhood MCRI as an important problem in Nigeria. Children account for 9% of all hospitalisations for MCRI.

Pedestrian accidents have been noted to be the most common cause of both non-fatal and fatal traffic injuries in children.^{8,9} The 27 pedestrians (67.5%) who had been knocked down by motorcycles while crossing the road confirm that children younger than 5 or 6 years have limited perceptual and cognitive skills, and need to be supervised by an adult when they cross streets or roads.^{3,9}

MCRI continue to be a significant source of unintentional injuries in the paediatric population.^{3,5,6,10-12} The increasing annual trend in this study is similar to an Australian finding of a 2.5-fold increase over 2 years, with a quarter of the patients younger than 10 years.¹⁰

Two of our patients were under-aged children not licensed to ride a motorcycle. A child aged under 15 years will not have the developmental or cognitive ability to control and safely operate the power of a motorcycle; nor will he have the necessary capacity for hazard perception.^{11,13,14} Some reports analysing the causes of MCRI found that the accidents had been caused by young age and unsafe riding practices rather than another vehicle.^{11,15} Our local child riders represent a global phenomenon, but poor countries bear the brunt of the ensuing higher mortality from accidents.

Prevention of MCRI in children should be a priority in our setting. In Nigeria a mandatory helmet law was repealed in 1979 and recently re-enacted without enforcement in Ilorin in the last 2 years of this study, which explains why none of the patients in our study wore a crash helmet. This is consistent with low or infrequent use of helmets in other studies.^{6,11,16} Ankarath *et al.*'s suggested strategies to improve all-terrain vehicle safety⁵ are laudable and should be applied to MCRI in children. It was suggested that preventive efforts should clearly highlight paediatric injury risk and poor safety practice, and that public campaigns should be targeted to both the adult and paediatric groups, with differing emphasis.

Government and other relevant agencies should design community- and population-based prevention activities towards improving risk awareness. That 25% of our patients were passengers on motorcycles lends support to the banning by some governments of transportation of children (and pregnant women) on motorcycles.

One of the most common reasons for hospitalisation of children with MCRI in our study was traumatic head injury (52.2%). It is reasonable to presume that education efforts to promote helmet use will minimise the severity of these injuries. Some reports have consistently shown reduced mortality and severity of head injury with the use of crash helmets.^{12,17} With transportation by motorcycle gaining popularity in our cities and communities,^{3,18} the importance of teaching the youth about correct safety behaviour such as helmet use, and parents on the danger of letting their children cross roads alone, cannot be over-emphasised.

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