

Motorcycle-related injuries at a university teaching hospital in north central Nigeria

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ABSTRACT

Background: Motorcycle-related injuries lead to considerable morbidity and mortality. The aim of this study is to determine the pattern and outcome of motorcycle-related injuries at Benue State University Teaching Hospital, Makurdi, Nigeria. **Patients and Methods:** Case records of all patients who presented to the accident and emergency department with motorcycle-related injuries between July 2012 and June 2013 were analysed for age, gender, injury host status (i.e. rider, pillion or pedestrian), nature of collision (motorcycle *versus* other vehicles, motorcycle *versus* motorcycle, motorcycle *versus* pedestrian or lone riders), body region injured, injury severity score (ISS) at arrival, length of hospital stay (LOS) and mortality. **Results:** Seventy-nine patients with motorcycle-related injuries were included in the study. They consisted of 63 males (61.8%) and 16 females (15.7%). The age range was 5-65 years with a mean of 32.4 ± 14.0. Motorcycle *versus* vehicle collisions were the most common mechanism of injury ($n = 46$, 58.2%). Musculoskeletal injuries constituted the most common injuries sustained ($n = 50$, 47.6%) and the tibia was the most frequently fractured bone ($n = 14$, 35.9%). The majority of patients (57.0%) sustained mild/moderate injuries (ISS ≤ 15). There was no statistically significant difference between the sexes for sustaining mild/moderate injuries or severe/profound injuries ($P > 0.05$). Mortality rate was 6.3% with head injuries being involved in all cases. **Conclusion:** Young males were mostly injured in motorcycle-related trauma. Musculoskeletal injuries were the most common injuries sustained and head injuries were involved in all the deaths. Enforcement of motorcycle crash bars and helmet usage is recommended.

Key words: Motorcycle injury, nigeria, north central, pattern

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INTRODUCTION

There has been an increase in the use of motorcycles in Nigeria largely on account of their rising popularity as a form of commercial transport.¹ This growing popularity is attributed to relative ease of maintenance, flexibility in traffic, offering convenient door-to-door services and rapid rate of urbanisation in the face of inadequate means of transportation.² Poor licensing and disregard of road traffic regulations by riders have brought about a significant increase in motorcycle injuries.³

Motorcycle-related injuries are associated with considerable morbidity and mortality.⁴ The inherent nature of motorcycles offers riders and passengers no protection like cars making them potentially dangerous.⁴ Riders often absorb all kinetic and compressive energy resulting from a motorcycle crash contrary to a car crash.⁵ Motorcyclists are about three times more likely than car occupants to be injured in a crash, and 16 times more likely to die.⁶

A number of hospital-based studies have demonstrated a considerable contribution by motorcycle-related injuries to the overall incidence of road traffic injuries in developing countries.^{7,8,9} Elucidating factors involved in motorcycle injuries will help in formulating measures to reduce the global road traffic injury epidemic.

The objective of this study was to determine the injury patterns and outcome of patients with motorcycle-related injuries who were attended to at the Accident and Emergency Department of Benue State University Teaching Hospital, Makurdi.

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PATIENTS AND METHODS

The clinical records of all patients with road traffic injuries who presented to the Accident and Emergency Department between July 2012 and June 2013 were retrieved from the medical records department. Those with motorcycle-related injuries were examined for age, gender, occupation, injury host status (i.e. rider, pillion, or pedestrian), nature of collision (motorcycle *versus* other vehicles, motorcycle *versus* motorcycle, motorcycle *versus* pedestrian, or lone riders), body region injured, injury severity score (ISS), length of hospital stay (LOS) and mortality. Patients with incomplete records were excluded from the study.

Data collected were analysed using the Statistical Package for Social Sciences for Windows version 15.0 (SPSS, Inc., Chicago, Illinois). Descriptive statistics were applied to determine means, frequencies and ranges. A confidence interval of 95% was assumed, and the difference was considered significant at $P \leq 0.05$. Results are presented using tables and graphs.

RESULTS

One hundred and eighty-nine patients presented with road traffic injuries within the study period. Seventy-nine (41.8%) were victims with motorcycle-related injury consisting of 63 males (61.8%) and 16 females (15.7%) with a male-female ratio of 3.9:1. Their ages ranged from 5 years to 65 years with a mean of 32.4 ± 14.0 and a peak age incidence of 20-29 years. About 70% of victims were less than 40 years of age. Figure 1 shows the age distribution of patients.

Riders constituted majority of the injured ($n = 44, 55.7\%$), followed by pillions (passengers) ($n = 24, 30.4\%$) and pedestrians ($n = 11, 13.9\%$).

Motorcycle *versus* vehicle collisions were the most common mechanism of injury ($n = 46, 58.2\%$). This was by

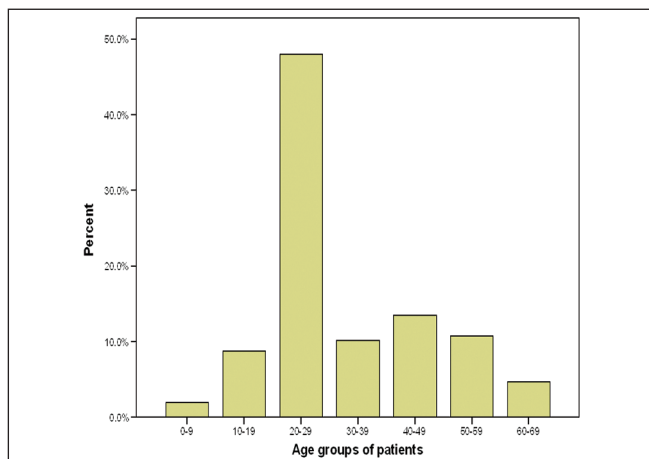


Figure 1: Distribution of motorcycle related injury patients by age groups

followed by motorcycle *versus* pedestrian ($n = 21, 26.6\%$), motorcycle *versus* motorcycle ($n = 10, 12.7\%$) and lone motorcyclists ($n = 2, 2.5\%$).

Musculoskeletal injuries constituted the most common injuries sustained ($n = 50, 47.6\%$). This was followed by head injuries ($n = 46, 43.8\%$) and chest injuries ($n = 9, 8.6\%$). The lower limbs were the most injured with the tibia being the most commonly fractured bone ($n = 14, 35.9\%$). Fourteen patients (17.7%) were multiply-injured. Table 1 shows the distribution of fractures sustained by patients.

The overall LOS ranged from few hours to 147 days (mean 8.01 days). Twenty five per cent of patients were admitted for not more than an overnight stay.

The overall ISS ranged from 1-75 (mean 14.0). The majority of patients (57.0%) sustained mild or moderate injuries (ISS ≤ 15). There was no statistically significant difference between the sexes for sustaining mild/moderate injuries or severe/profound injuries ($P > 0.05$).

Five patients died giving a mortality rate of 6.3%. All deaths involved head injuries.

DISCUSSION

This study showed a significant young male preponderance to motorcycle-related injuries, a finding that aligns with prior studies.^{4,10,11} Risk-taking behaviours of young riders contributing to crashes include speeding, disobedience of traffic regulations, drugs and alcohol intoxication, and neglecting safety measures.¹² Almost all commercial motorcycle riders are males and constitute a major risk group. Males are more often exposed to traffic, travel longer distances to work and are more often involved in use of automobile for leisure activities.¹³ Involvement of the productive age group of the society places an adverse effect on the economy.

Musculoskeletal injuries were the most common motorcycle-related injuries from this study and this corresponds with findings from other series.^{10,12} These

Table 1: Distribution of fractures sustained by the patients

Bone	Close	Open	Total	%
Tibia	6	8	14	35.9
Fibula	3	8	11	28.2
Radius	4	0	4	10.3
Femur	3	0	3	7.7
Humerus	2	0	2	5.1
Ulna	2	0	2	5.1
Metatarsal/Tarsal	1	1	2	5.1
Ankle	1	0	1	2.6
Total	22	17	39	100.0

injuries occur when exposed limbs become trapped between the motorcycle and the ground or impacting vehicle. Use of motorcycle crash bars and protective clothing is known to reduce the rate of occurrence of these injuries. The protective clothing is made of leather and is designed to offer near frictionless impact between the body and ground. They are, however, uncomfortable in hot climates making them a poor compliance in tropical countries.¹¹ Enforcing use of motorcycle crash bars and designing protective clothing for use in hot and humid conditions may go a long way in reducing the number and severity of lower limb injuries.

Head injuries formed a significant proportion of overall injuries sustained in this study. The use of approved safety helmets at the time of injury is said to significantly reduce the morbidity and mortality from head and neck injuries from motorcycle accidents.^{14,15} In fact, severe head injury is generally a reflection of low usage of helmets by motorcyclists.¹ Dismal results of compliance with helmet usage have been reported in developing countries.^{1,16} Lack of traffic law enforcement, unawareness of value of helmet use, hot tropical weather and prohibitive costs are some of the reasons put forward for poor compliance with helmet usage in Nigeria.¹¹ Educational campaigns should be launched targeting all motorcycle riders. Stricter enforcement of traffic rules and development of tropical-friendly safety helmets may help improve compliance.

Collisions between motorcycles and motor vehicles were the most common mechanism of injury in this study followed by motorcycle *versus* pedestrian collisions. This finding is similar to those of earlier studies.^{10,11} Disregard of road safety measures by riders,¹ namely riding under the influence of alcohol and drugs, low motorcycle conspicuity, or the inability of the motorcyclist to be seen by other road users,^{16,17} is thought to be an important factor associated with risk of motorcycle accidents. Using fluorescent or reflective clothing, wearing white or light-coloured helmets, and voluntary daytime use of headlight were associated with reduced risks of motorcycle crashes in a study.¹⁸ Unavailability of pedestrian walkways on most roads has been cited as a reason for significant involvement of pedestrians in motorcycle-related accidents in a number of developing countries.^{10,11}

The LOS has been reported to be an important measure of morbidity among trauma patients.¹⁰ Long hospital stay results in a lot of constraints on both human and material resources of the healthcare delivery system and reduction in productivity from lost man-hours. The average LOS obtained in this study was shorter than the findings in a similar study.¹⁰ This may not be unconnected to the fact that the majority of patients had mild and moderately severe injuries with about a quarter of all the patients not requiring more than an overnight stay in the hospital.

The mortality rate of 6.3% obtained is comparable to the findings of other researchers.^{12,19} Head injuries are the leading cause of death in fatal crashes, contributing to about half of all the motorcycle-related deaths.¹² They accounted for all the deaths in this study. They are likely to stem from poor compliance with usage of helmets which is common in developing countries. Public education on the importance of the use of helmets by motorcyclists and stricter enforcement of crash helmet legislations may help reduce the mortality from motorcycle crashes.

CONCLUSION

Young males were mostly injured in motorcycle-related trauma. Collisions between motorcycles and other vehicles formed the most common mechanism of injury. Musculoskeletal injuries were the most common injuries sustained. Head injuries were involved in all the deaths. Enforcement of motorcycle crash bars and helmet usage is recommended.

REFERENCES

1. Oluwadiya KS, Oginni IM, Olasinde AA, Fadiora SO. Motorcycle limb injuries in a developing country. *West Afr J Med* 2004;23:42-7.
2. Aderamo AJ, Olatujoye S. Trends in motorcycle accidents in Lokoja, Nigeria. *Eur Int J Sci Technol* 2013;2:251-61.
3. Asogwa SE. Some characteristics of drivers involved in road traffic accidents in Nigeria. *East Afr Med J* 1980;57:399-404.
4. Ogunlusi JD, Nathaniel C. Motorcycle trauma in a St Lucian Hospital. *West Indian Med J* 2011;60:557-61.
5. Janmohammadi N, Pourhossein M, Hashemi SR. Pattern of motorcyclist's mortality in Mazandran Province, Northern Iran. *Int J Iran Red Crescent Med Soc* 2009;11:81-4.
6. Branas CC, Knudson MM. Helmet laws and motorcycle rider death rates. *Accid Anal Prev* 2001;33:641-8.
7. Madubueze CC, Chukwu CO, Omoke NI, Oyakhilome OP, Ozo C.. Road traffic injuries as seen in a Nigerian teaching hospital. *Int Orthop* 2011;35:743-6.
8. Agnihotri AK, Joshi HS. Pattern of road traffic injuries: One year hospital-based study in Western Nepal. *Int J Inj Contr Saf Promot* 2006;13:128-30.
9. Banthia P, Koirala B, Rauniyar A, Chaudhary D, Kharel T, Khadka SB. An epidemiological study of road traffic accident cases attending emergency department of teaching hospital. *JNMA J Nepal Med Assoc* 2006;45:238-43.
10. Chalya PL, Mabula JB, Ngayomela IH, Kanumba ES, Chandika AB, Giiti G, *et al.* Motorcycle injuries as an emerging public health problem in Mwanza city, North-Western Tanzania. *Tanzan J Health Res* 2010;12:214-21.
11. Solagberu BA, Ofoegbu CK, Nasir AA, Ogundipe OK, Adekanye AO, Abdur-Rahman LO. Motorcycle injuries in a developing country and the vulnerability of riders, passengers, and pedestrians. *Inj Prev* 2006;12:266-8.
12. Hefny AF, Barss P, Eid HO, Abu-Zidan FM. Motorcycle-related injuries in the United Arab Emirates. *Accid Anal Prev* 2012;49:245-8.
13. Akinpelu OV, Oladele AO, Amusa YB, Ogundipe OK, Adeolu AA, Komolafe EO. Review of road traffic accident admissions in a Nigerian Tertiary Hospital. *East Centr Afr J Surg* 2007;12:63-7.

14. Brandt MM, Ahrns KS, Corpron CA, Franklin GA, Wahl WL. Hospital cost is reduced by motorcycle helmet use. *J Trauma* 2002;53:469-71.
15. Zargar M, Khaji A, Karbakhsh M. Pattern of motorcycle-related injuries in Tehran, 1999 to 2000: A study in 6 hospitals. *East Mediterr Health J* 2006;12:81-7.
16. Nzegwu MA, Aligbe JU, Banjo AA, Akhiwui W, Nzegwu CO. Patterns of morbidity and mortality amongst motorcycle riders and their passengers in Benin-City Nigeria: One-year review. *Ann Afr Med* 2008;7:82-5.
17. Williams M. Motorcycle conspicuity and traffic accidents. *Accid Anal Prev* 1979;11:209-24.
18. Wells S, Mulin B, Norton R Langley J, Connor J, Lay-Yee R, *et al.* Motorcycle rider conspicuity and crash related injury: Case-control study. *BMJ* 2004;328:857.
19. Nwadiaro HC, Ekwe KK, Akpayak IC, Shitta H. Motorcycle injuries in North-Central Nigeria. *Niger J Clin Pract* 2011;14:186-9.

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