

Original Research Article

Motorcycle Accidents: Epidemiological and Clinical Aspects in the Orthopaedics and Traumatology Department of Ignace Deen Teaching Hospital, Conakry University Hospital

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Abstract: **Objective:** To analyse the epidemiological, clinical, and injury patterns associated with motorcycle-related trauma. **Patients and Methods:** This was a retrospective descriptive study conducted over a two-year period, from May 2023 to May 2025. **Results:** During the study period, 2,818 motorcycle accident cases were recorded out of 3,723 road traffic accidents, representing a frequency of 76%. The victims were predominantly male (76%), with a mean age of 29 ± 17 years. Drivers were the most affected occupational group (34%), and motorcycle-car collisions were the leading mechanism of injury (47%). Limb injuries were the most frequent lesions (45%), followed by traumatic brain injuries (24%), predominantly mild forms (63%). Facial bone fractures, thoracic contusions, and open fractures of the lower limb were the most common injuries within their respective categories. The outcome was favourable in 94% of cases, while the mortality rate was 6%. **Conclusion:** Motorcycle accidents represent a major public health problem, particularly affecting young people. Strengthening prevention strategies and improving trauma management are essential to reduce morbidity and mortality.

Keywords: Motorcycle Accidents, Trauma, Epidemiology.

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INTRODUCTION

A motorcycle accident is defined as a collision occurring on the road network between a moving vehicle (motorcycle or tricycle) and a person or an object, resulting in death, personal injury, or property damage (Panda, 2003). Motorcycle accidents are responsible for numerous deaths and disabling sequelae worldwide, with motorcyclists being among the most affected road users (Phillipo *et al.*, 2010).

Motorcycle accidents are increasing and represent an underestimated public health problem in developing countries. They account for a substantial proportion of road traffic accidents in both developed and developing countries (Pang *et al.*, 2000). Most fatalities occur in developing countries and mainly involve the most vulnerable road users, particularly motorcyclists (Madougou *et al.*, 2016).

Motorcycle accidents have become a major global public health concern because of the high number of victims. According to the World Health Organization

(2015), more than half of all road traffic deaths involved vulnerable road users, including motorcyclists (23%), pedestrians (22%), and cyclists (4%). The African Region recorded the highest mortality rate among these road users. Each year, approximately 1.2 million people die on the roads, more than 3,000 every day, while an additional 140,000 people are injured, of whom about 15,000 are left permanently disabled (Dedewanou *et al.*, 2019).

This burden falls disproportionately on low-and middle-income countries, which account for nearly 90% of road traffic-related deaths and disabilities, a proportion that could reach 95% (World Health Organization, 2023).

In France, the 2011 Road Safety Report recorded 772 motorcycles among 981 road traffic accidents. In Côte d'Ivoire, Konan *et al.*, (2006) reported a high burden of motorcycle-related road traffic injuries. In Niger, Phillipo *et al.*, (2010) observed that 41.8% of the 1,325 trauma patients sustained injuries related to motorized vehicle crashes. In Mali, Sangaré *et al.*, (2020)

highlighted the increasing burden of road traffic accidents, whereas Almeimoune *et al.*, (2019) reported that motorcycle crashes accounted for a large proportion of road traffic injuries in Bamako. In Guinea, Bah *et al.*, (2017) recorded 164 motorcycle accidents among 250 road traffic accidents, representing 64%.

The study of motorcycle accidents is essential for improving trauma management and gaining a better understanding of their health and socioeconomic consequences. The objective of this study was to analyse the epidemiological, clinical, and injury characteristics of motorcycle-related trauma.

METHODS

This retrospective descriptive study was conducted over a two-year period, from May 2023 to May 2025. The study included all patients who met the predefined eligibility criteria. The inclusion criteria comprised all patients admitted to the emergency department following a motorcycle accident and subsequently hospitalized in the Orthopaedics and Traumatology Department during the study period. Patients presenting with injuries unrelated to road traffic accidents and those who did not provide consent were excluded from the study.

Several categories of variables were analyzed. Epidemiological variables were used to describe the demographic and social characteristics of the patients, including age, sex, place of residence, occupation, and marital status. Clinical variables included the patients' presenting symptoms and the assessment of trauma severity, including the reason for admission, physical examination findings (Glasgow Coma Scale score, respiratory status, and hemodynamic status), as well as the anatomical location and type of injuries.

Paraclinical variables comprised the complementary investigations performed to confirm the diagnosis and assess the patients' clinical condition. These included imaging examinations (plain radiography, ultrasonography, and computed tomography) and laboratory investigations, including complete blood count, coagulation profile, serum electrolytes, renal function tests, and blood glucose measurement.

Data were extracted from the patients' medical records archived in the department. Following data collection, the information was entered and organized using Microsoft Word and Microsoft Excel. Statistical analysis was performed using Epi Info version 7.2.6.0. Qualitative variables were expressed as frequencies and

percentages, whereas quantitative variables were presented as means $\pm$ standard deviations.

RESULTS

During the study period, a total of 3,723 road traffic accidents were recorded, of which 2,818 were motorcycle accidents, representing a frequency of 76%.

Males predominated, accounting for 2,150 patients (76%), compared with 668 females (24%), giving a male-to-female ratio of 3.2. The mean age of the patients was 29 ± 17 years.

Regarding occupation, drivers were the most represented group with 967 cases (34%), followed by pupils/students with 368 cases (13%) and traders with 277 cases (10%).

According to the mechanism of injury, motorcycle-car collisions were the most frequent, accounting for 1,325 cases (47%), followed by single-motorcycle crashes with 597 cases (21%).

Limb injuries were the most common lesions, occurring in 1,284 cases (45%), followed by head injuries in 672 cases (24%). Abdominal injuries accounted for 245 cases (9%), maxillofacial injuries for 158 cases (6%), and multiple trauma for 132 cases (5%).

Mild traumatic brain injury was the most common type, with 426 cases (63%). Moderate traumatic brain injury was observed in 228 patients (34%), whereas severe traumatic brain injury occurred in 18 patients (3%).

Facial bone fractures were the most frequent maxillofacial injuries, accounting for 92 cases (58%). Wounds and abrasions were reported in 41 cases (26%), followed by hematomas in 17 cases (10%).

Thoracic contusion was the most common chest injury, occurring in 61 cases (53%). Rib fractures accounted for 36 cases (28%), followed by wounds and abrasions in 14 cases (8%).

Open fractures of the lower limb were the most frequent limb injuries, accounting for 519 cases (40%). They were followed by closed fractures of the lower limb, with 388 cases (30%).

The outcome was favourable in 2,647 patients (94%). An unfavourable outcome was observed in 171 patients, corresponding to an overall mortality rate of 6%.

Table 1: Distribution of patients according to sociodemographic characteristics

Characteristic	Number (n)	Percentage (%)
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Sex		
Masculine	2150	76

Féminine	668	24
Mean age (years)	29 ans ± 17	
Occupation		
Pupil/Student	368	13
Driver	967	34
Trader	277	10
Other	1206	43
Mechanism of injury		
Motocycle only	597	21
Motocycle-car	1325	47
Motocycle-motocycle	388	14
Moto-pedestrian	505	18
Moto-bicycle	3	0,13

Table 2: Distribution of patients according to the type of injuries

Injury type	Number (n)	Percentage (%)
Traumatic brain Injury	672	24
Maxillofacial Injury	158	6
Spinal injury	61	2
Chest injury	127	4
Abdominal injury	245	9
Pelvic injury	117	4
Limb injury	1284	45
Multiple trauma	132	5
Wounds and abrasions	22	1
Total	2818	100

Table 3: Distribution of patients according to outcome

Outcome	Number (n)	Percentage (%)
Favorable	2647	94
Death	171	6
Total	2818	100



Figure 1: Traumatic amputation of amputation both upper limbs at the proximal third



Figure 2: Complex fracture of both bones of the lower leg



Figure 3: Partial foot

DISCUSSION

Over a two-year period, we conducted a retrospective cross-sectional study on motorcycle accidents in the Department of Orthopaedics and Traumatology of Ignace Deen National Hospital.

The retrospective design of this study exposed us to several limitations, including poor preservation of medical records, the absence of documentation for certain variables, and incomplete information regarding the victims. These shortcomings considerably reduced our sample size. Despite these limitations, our findings provide a valuable overview of the current situation of motorcycle accidents in our setting.

The frequency of motorcycle accidents observed in our series is comparable to that reported in several African studies, where it ranges from 50% to 60% (Dedewanou *et al.*, 2019). This frequency remains particularly high in the African context (Dedewanou *et al.*, 2019; Kudebong *et al.*, 2011). The increasing number of Asian-manufactured motorcycles, the poor condition of road infrastructure, the young age of riders, alcohol and drug use, and the lack of specific legislation governing two-wheeled vehicles may explain the high frequency observed in our study.

African studies have consistently reported a relatively young mean age, generally ranging from 30 to 40 years (Almeimoun *et al.*, 2019; Allode *et al.*, 2008). The lower mean age observed in our series may be explained by the predominantly young population of Guinea, and Africa as a whole. The inexperience of

young riders, their tendency to engage in risky

behaviours, excessive speeding, and driving under the influence of alcohol or drugs may also have contributed to this finding.

Our study showed a marked male predominance, consistent with most reports in the literature. The widespread use of motorcycle taxis, which are predominantly operated by men, as a major means of transportation in our country, as in many developing countries, may explain this male predominance.

The victims were most frequently motorcycle taxi riders, as reported in several studies (Dedewanou *et al.*, 2019; Sangho *et al.*, 2021; Marie-Édith *et al.*, 2001). The predominance of this occupational group may be explained by the fact that motorcycle taxis have become one of the main means of transportation because of their accessibility and affordability.

In our study, motorcycle-car collisions were the most common mechanism of injury, followed by motorcycle falls. The lack of adequate road infrastructure, manoeuvres to avoid obstacles or other vehicles, driver illness, and rapid urban population growth may explain these accident mechanisms (Dedewanou *et al.*, 2019).

The main risk factor identified in our series was excessive speed, accounting for 41.5% of cases. This predominance may be explained by the combination of young rider age, inexperience, risk-taking behaviour, and driving under the influence of alcohol.

Limb injuries were the most frequently observed lesions, followed by traumatic brain injuries. Similar findings have been reported by several authors (Panda, 2003; Dedewanou *et al.*, 2019; Konan *et al.*, 2006). These injuries probably reflect poor compliance with helmet use and traffic regulations among motorcyclists, as well as the severity of the impacts sustained during crashes. The injury mechanisms of moped accidents described by Wade *et al.*, (2015) are comparable to those observed in our series.

Thoracic and abdominal injuries were the most severe lesions. In thoracic trauma, injuries mainly result from compression and are located at the point of impact and the underlying anatomical structures (Pons *et al.*, 2011). The kinetic energy generated at the time of injury is the main determinant of their severity. Abdominal injuries usually result from crushing or bursting mechanisms, leading primarily to solid organ rupture or hollow organ perforation. The severity of intra-abdominal injuries increases with the amount of energy transmitted during trauma (Ngaroua *et al.*, 2016). Projection of the victim onto the road surface may also result in traumatic brain injury, the severity of which depends on the speed of impact and helmet use. Brain injury may also result from sudden deceleration. These mechanisms have also been described in orthopaedic trauma textbooks (Bernard *et al.*, 2004).

Limb fractures predominated in our series (71.9%). This predominance may be explained by the fact that the lower limbs support the motorcyclist and are instinctively used to stabilize the motorcycle in situations of imbalance (Bernard *et al.*, 2004).

All patients in our series received both medical and surgical management within the department, as also reported in several African studies (Bousso *et al.*, 2011). Seventy-four patients were subsequently transferred to other departments for specialized management.

The outcome was favourable in 94% of the victims. However, 22 deaths were recorded, including seven that occurred before hospital admission. This high number of prehospital deaths highlights deficiencies in early trauma care, particularly the lack of emergency kits in receiving facilities and the limited organization of prehospital emergency services. The main predictors of poor outcome were a Glasgow Coma Scale score below 8 and the presence of multiple trauma.

CONCLUSION

Motorcycle accidents represent a major public health problem, primarily affecting young and economically active individuals. Limb injuries are the most common, whereas head, thoracic, and abdominal injuries are the most severe. Strengthening prevention strategies, enforcing road safety regulations, and improving the management of injured patients are

essential to reduce the morbidity and mortality associated with motorcycle accidents.

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