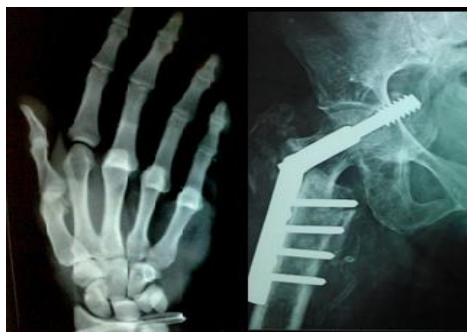




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Epidemiological, clinical, and therapeutic aspects of limb trauma related to road traffic accidents at Bonassama district hospital

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Abstract

Introduction: Road traffic accidents pose a significant public health issue, resulting in 1.2 million deaths annually and ranking as the 8th leading cause of mortality worldwide. Limb trauma is a common traumatic emergency, often occurring as a result of road traffic accidents. This study aims to describe the epidemiological, clinical, and therapeutic aspects of limb trauma related to road traffic accidents at Bonassama District Hospital.

Methods: This was a descriptive cross-sectional study that included all patients admitted and managed for limb trauma at Bonassama District Hospital between February and June 2023 (five months). Sociodemographic, clinical, and therapeutic parameters were described and compared with existing literature.

Results: Overall, the frequency of limb trauma due to road traffic accidents was 94.9%. A total of 241 patients were included in the study. The mean age was 32.5 ± 6 years, ranging from 5 to 70 years. Males accounted for 58% of the population, with a sex ratio of 1.39. Motorcycle taxi riders were the most affected victims (28.22%), and motorcycle-to-motorcycle collision was the most common injury mechanism (48.54%). Lower limbs were the most affected (62.66%). Pain was a functional sign present in all patients, and fractures were the most frequently encountered injuries (63.9% of cases). Traumatic brain injury was the most commonly associated injury (86.67%). Transverse fractures were the most frequent type (45.45%), with the tibia being the most commonly fractured bone (34%). Sixty-five point fifty-six percent (65.56%) of patients were admitted within the first 6 hours after the accident, and 39.83% received treatment 12 hours after admission. All patients received medical treatment, with osteosynthesis being the most commonly associated surgical treatment (72.58%), while circular plaster cast was the most frequent orthopedic treatment (65.67%). Sixty-two percent (62%) of admitted patients had a hospital stay exceeding 24 hours.

Conclusion: Road traffic accidents remain a major issue in our country. Raising awareness and protecting vulnerable road users such as pedestrians and motorcyclists are urgent priorities.

Keywords: Road Traffic Accidents, trauma, accident, limb, treatment, urgent priorities

Introduction

Road Traffic Accidents (RTAs) are events that result in at least one victim, occurring on a road open to public traffic and involving at least one vehicle ^[1]. A recent report by the World Health Organization (WHO) describes road traffic injuries as a serious epidemic, as they account for 1.2 million deaths worldwide each year. They are the 8th leading cause of death globally and the leading cause of death among young people aged 15 to 29 ^[2]. Traumatic limb injuries are common traumatic emergencies that often occur as a result of road traffic accidents ^[1]. When not fatal, these accidents can sometimes result in severe disabilities that often pose challenges for the patients' socio-professional reintegration ^[3]. In Mali, during the year 2012, 578 cases of RTAs were recorded in October, and up to 251 cases were limb injuries ^[5], with limb injuries accounting for 21.1% of deaths in 2016 ^[6]. In Madagascar, in 2016, the prevalence of limb injuries due to road accidents was 16.84%.

Materials and Methods

This was a descriptive cross-sectional study conducted in the surgical emergency department of Bonassama District Hospital (HDB) during the period from February to June 2023 (five months). All patients admitted for limb trauma following a road traffic accident and managed within the aforementioned department were included. Any patient who signed a discharge form or died before receiving any treatment was excluded. Sociodemographic, clinical, and therapeutic data were collected using an investigation form, extracted, and analyzed using Microsoft Word and Excel 2013 and SPSS version 21.0 software. A 5% error rate was chosen for correspondence with the significance threshold defined as $p < 0.05$.

Results

During the period from February 1st to June 1st, 2023, out of 275 patients with limb trauma, 261 patients were victims of road traffic accidents, resulting in a frequency of 94.9%. A total of 241 patients were included in the study. The mean age was 32 ± 6 years, ranging from 5 to 70 years. The most affected age group was ^[26-35] years, with 65 cases. In our study series, there was a male predominance with 140 cases and a sex ratio of 1.39. Motorbike taxi riders were the most affected, accounting for 28.22% or 68 cases. According to Table 2, motorbike-to-motorbike collision was the injury mechanism described in 117 patients (48.54%). According to Table 3, the lower limb was the most affected limb, with 151 cases (62.66%). Figure 1 reveals that 34% of patients had a tibia fracture, 22% had a femur fracture, and 20% had a radius fracture. Table 4 reveals that 60 patients had associated injuries with limb trauma, accounting for 24.9% of the study population, among which 88.67% had a traumatic brain injury. According to Table 5, 20.74% of patients had a fracture. Among these patients, 45.45% of fractures were transverse fractures, and 24.68% were oblique fractures (Table 6). According to Tables 7, all patients received medical treatment, 124 patients received surgical treatment (51.45%), and 65 patients received orthopedic treatment (29.97%). Tables 8 and 9 reveal that osteosynthesis was the major surgical treatment performed in 90 cases (72.58%). External fixation was applied in 43.34% of cases. Circular plaster cast was the major orthopedic treatment at 65.67%. According to Figure 2, 150 patients had a hospital stay exceeding 24 hours, accounting for 62% of the study population.

Table 1: Distribution of patients by profession

Profession	N	%
Motorbiker	68	28.22
Administrative Employee	45	18.68
Driver	30	12.44
Merchant	26	10.78
Student	25	10.38
Unemployed	20	8.3
Retired	15	6.22
Housewife	12	4.98
Total	241	100

Table 2: Distribution of patients by mechanism of injury

Mechanism of injury	N	%
Motorbike-Motorbike	117	48.54
Motorbike-Pedestrian	81	33.62
Motorbike-Truck	20	8.3
Motorbike-car	19	7.88
Pedestrian car	4	1.66
Total	241	100

Table 3: Distribution of patients by site of trauma

Site of trauma	N	%
UPPER LIMB	64	26.55
Forearm	40	16.6
Arm	12	4.98
Hand	7	2.91
Shoulder	5	2.07
LOWER LIMB	151	62.66
Leg	59	24.48
Thigh	55	22.82
Knee	12	4.98
Genou + Jambe	12	4.98
Jambe + Cuisse	9	3.73
Pied	4	1.67
Intersection (2 Members)	26	10.78
Forearm+Thigh	9	3.73
Arm+Leg	7	2.9
Shouder+Knee	5	2.07
Hand+Leg	5	2.07
Total	241	100

Table 4: Distribution of participants by associated injuries

Associated injuries	N	%
Head Trauma	52	86.67
Non-penetrating wound on the abdomen	3	5
Maxillary Sinus fracture	3	5
Rib fracture	2	3.33
Total	60	100

Table 5: Distribution of participants by type of injury.

Type of injury	n	%
Wounds	24	9.96
Plaies + Erosions	24	9.96
Erosions	26	10.78
Fractures	50	20.74
Fractures + Erosions	47	19.52
Fractures + Wounds	45	18.67
Fractures + Erosions + Wounds	12	4.98
Erosions + Contusion	5	2.07
Contusion	5	2.07
Dislocation	3	1.24
Total	241	100

Table 6: Distribution of fractures by type of line.

Type of injury	N	%
Transverse	70	45.45
Oblique	38	24.68
Complex	26	16.88
Comminuted fracture	20	12.99
Total	154	100

Table 7: Distribution of participants by type of treatment received.

Type of treatment	N	%
Traitement médical	241	100
Traitement chirurgical	124	51.45
Traitement orthopédique	65	29.97
Total	241	100

Table 8: Distribution of patients according to the type of surgical treatment received.

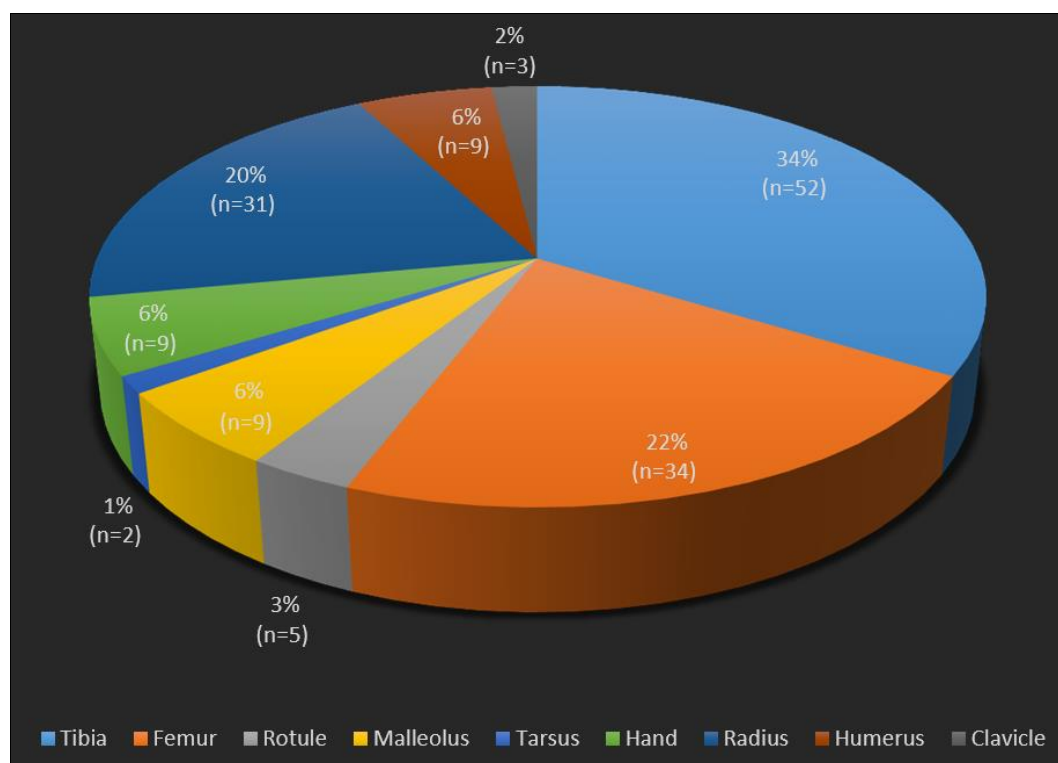
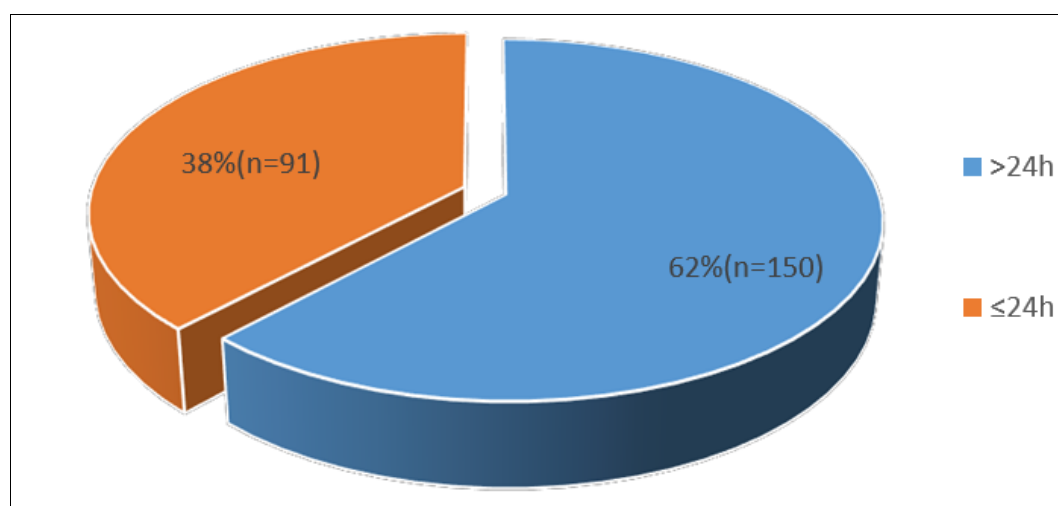
Type of surgical treatment	N	%
Osteosynthesis	90	72.58
Suture	26	20.96
Dressing	8	6.46
Total	124	100

Table 9: Distribution of fractures according to the type of osteosynthesis.

Type of osteosynthesis	N	%
External fixator	39	43.34
Screwed plate	27	30
Centromedullary nail	13	14.44
Pins	11	12.22
Total	90	100

Table 10: Distribution of fractures by type of orthopaedic treatment

Type of orthopaedic treatment	N	%
Circular plaster	44	65.67
Plaster splint	12	17.91
Cast Boot	9	13.43
Scarlet immobilization	2	2.98
Total	67	100

**Fig 1:** Distribution of fractures by location**Fig 2:** Distribution of patients according to their length of hospital stay

Discussion

Our study was conducted in the Surgical Emergency Department of the Bonassama District Hospital with the aim of determining the frequency of limb injuries related to road traffic accidents and identifying the sociodemographic, clinical, and therapeutic characteristics of the patients included in this study. The frequency of limb injuries due to road traffic accidents was 94.9%. In Mali, Doumbia^[19] found a consultation rate for road traffic accidents in the orthopedic and traumatology department of CHU-GT of 12.01% in 2005.

Berthe *et al.*^[20] found a frequency of 14.52% in the orthopedic surgery and traumatology department of CHU-GT in 2007. Francine Loulougua^[21] found a frequency of 17.45% for road traffic accidents in the orthopedic surgery and traumatology department of CHU-GT and 13.69% in CHU de KATI in 2008. The frequency has been increasing over the years. These alarming rates can be explained by poor road conditions, the increasing number of two-wheeled vehicles, the lack of civility among road users, a significant number of vehicles, lack of knowledge and non-compliance with traffic

rules, and excessive and inappropriate speeding by drivers. In our study, the mean age of our patients was 32.5 ± 6.02 years, ranging from 5 to 70 years. This result is consistent with the findings of Razafimahatratra *et al.* [8] in 2017, who reported a mean age of 31.67 years. The modal age group in our population was [26-35] years with 65 cases, accounting for 26.97%. This frequency can be explained by the fact that this age group represents the most active segment of the population and generally has two-wheeled vehicles. Their audacity in driving their vehicles and their irresponsible behavior make them more prone to accidents. Our rate is lower than that observed by Sidibé [5] in Mali in 2012, who obtained a rate of 48.4% for the age group of 20 to 35 years. This difference in our figures can be explained by the size of their sample (578 patients) and the high population density in their region. Our study showed a clear male predominance, with 58% of the patients being male. This can be explained by the difference in the number of male and female drivers in our context. Our result is consistent with that of Razafimahatratra *et al.* [8], who found a male predominance of 68.12%. Pang *et al.* [22] and Batista d'Oliveira *et al.* [23] found male predominance rates of 90.3% and 86.57%, respectively. This difference can be explained by the duration of their study (12 and 10 months, respectively) and the size of their sample (800 and 615 patients, respectively), which are much larger than ours. All socioeconomic classes were more or less affected, but the highest prevalence was among motorcycle taxi drivers, accounting for 28.22%. This can be explained by the high presence of two-wheeled vehicles, especially motorcycles. Our result is lower than that of Moussa Kalli [4], who found that motorcyclists were the most affected victims at 76%. This could be due to the larger size of their sample (2771) compared to ours. 61% of the selected patients had a monthly income higher than the minimum wage (45000 FCFA), while 39% with an income below the minimum wage experienced delays in receiving medical care. In our study, 158 patients, accounting for 65.56%, were seen in consultation within the first six hours of their accident. This can be explained by the fact that most accidents occurred in the vicinity of our study area. 39.83% of the patients received medical care more than 12 hours after admission. This could be due to financial constraints, limited medical facilities, and the absence of an absolute indication for urgent care. In our study, "motorcycle-motorcycle" accidents were the most frequent type, accounting for 44.8%, followed by "motorcycle-pedestrian" accidents at 33.62%. This can be explained by the high presence of two-wheeled vehicles, especially motorcycles, excessive speeding, inadequate road infrastructure, and non-compliance with traffic rules. Our results are consistent with those found by Razafimahatratra *et al.* [8], who reported rates of 47.2% for "motorcycle-motorcycle" accidents and 30.76% for "motorcycle-pedestrian" accidents. Lower limb injuries were the most common in our series, accounting for 62.66%, followed by upper limb injuries at 37.34%. These regions are highly exposed in motorcyclists and passengers, and the lack of protective gear and safety measures contribute to the higher incidence of limb injuries. Our results are consistent with previous studies conducted by Razafimahatratra *et al.* [8] and Sidibé [5], who also found a higher frequency of lower limb injuries.

In terms of treatment, 80.67% of the patients underwent surgical intervention, while 19.33% were managed non-surgically. This indicates the severity and complexity of the injuries sustained in road traffic accidents. Surgical

interventions were mainly performed for fractures, dislocations, and soft tissue injuries requiring debridement and repair. Non-surgical management included conservative measures such as casting, splinting, and physiotherapy for less severe injuries.

Conclusion

The findings of our study highlight the significant burden of limb injuries related to road traffic accidents in our setting, with a frequency of 94.90%. The high frequency of these injuries, particularly among young males and motorcycle users, emphasizes the need for targeted interventions to improve road safety, increase awareness about traffic rules and regulations, and promote the use of protective gear, especially helmets. Additionally, enhancing access to timely and appropriate medical care, including surgical interventions, is crucial for optimizing patient outcomes and reducing long-term disability.

Conflict of Interest

No author has declared a conflict of interest

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