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Research Article

Epidemiological and Clinical Aspects of Road Accidents

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Abstract

Introduction: Road accidents (RTA) are a major public health problem because they happen so often, cause serious injuries, and have social and economic consequences. Low- and middle-income countries bear a disproportionate share of this burden, in a context of rapid urbanization, increasing motorcycle use, inadequate infrastructure, and limited access to emergency care. **Objective:** Describe the epidemiological and clinical aspects of road traffic accidents handled at Idrissa Pouye General Hospital (HOGIP) in Dakar during the last quarter of 2024, in order to identify directions for prevention and improving care. **Patients et methods:** A retrospective, descriptive, and analytical study was conducted at the Emergency Reception Service of HOGIP from October to December 2024. It involved patients admitted for trauma related to a road traffic accident who had usable clinical data. The variables collected included sociodemographic characteristics, medical history, lifestyle habits, circumstances of the accident, injury characteristics, severity, prognosis, and treatments received. The data were entered and analyzed using office and statistical tools. Proportions, means, and standard deviations were calculated; comparisons were based on the chi-square test and Student's t-test, with a 5% error risk. **Results:** Out of 5,761 patients who came to the emergency room during the study period, 1,166 had consulted for a road traffic accident, which is 20.24% of admissions. The available descriptive tables covered 250 complete cases. The average age was 32.8 ± 11.6 years, and the most represented age group was 26 to 35 years (95 cases; 38.4%). Men accounted for 79.6% of the victims, with a male-to-female ratio of 3.9. The most common level of education was secondary (37.6%), and single people made up 52.9% of the patients. The majority had no significant medical history (88.9%) or reported risky lifestyle habits (84.2%). Accidents mainly occurred between 6 a.m. and 6 p.m. (62%) and in November (45.6%). Vehicle-to-vehicle collisions represented 46% of the incidents, followed by vehicle-to-pedestrian collisions (29.2%). Motorcycles were involved in 72.8% of the accidents. Riders made up 51.6% of the victims; helmets were the most commonly reported protective gear (52.9%). The lower limbs were the most common injury site (64%), and fractures were the main type of injury (44%). Medical treatment accounted for 60% of the reported interventions, orthopedic treatment 34.2%, and surgical treatment 5.8%. The vital prognosis was favorable in 94.4% of cases. **Conclusion:** Road traffic accidents made up a significant part of emergency activity at HOGIP and mainly involved young men, often in motorcycle-related accidents. Vehicle collisions, lower limb injuries, and fractures were the most common clinical issues. Prevention should combine controlling risky behaviors, improving infrastructure, securing motorcycles, strengthening road checks, and enhancing prehospital and trauma care.

Keywords: road accidents; trauma; motorcycle; emergency; epidemiology; HOGIP; Senegal.

1. Introduction:

Road accidents are a major cause of death, disability, and emergency room visits worldwide. They happen in all sorts of settings, but the impact is especially severe in low- and middle-income countries, where exposure to road risks often goes hand in hand with poor infrastructure, unevenly enforced laws, and limited trauma care capacity **[1, 2].**

Road accidents cause around 1.3 million deaths every year and tens of millions of non-fatal injuries, disproportionately affecting vulnerable road users and working-age adults **[1, 3].**

In sub-Saharan Africa, road accidents happen in a context of rapid urbanization, more vehicles on the road, and the growth of both public and private transport. The mix of busy roads, poorly developed streets, motorcycle traffic, and incomplete safety measures makes collisions more likely and often more serious **[4, 5].**

The difficulties in accessing emergency care, the distance from specialized facilities, and delays in evacuation can then worsen the victims' prognosis.

In Senegal, road accidents particularly affect urban, suburban areas and major traffic routes. Young men, two-wheeler riders, pedestrians, and public transport users are among the groups most often exposed. The consequences go beyond just medical issues: loss of income, temporary or permanent disability, healthcare costs, family disruption, and reduced productivity are all impacts documented in literature on the Senegalese context **[6-9].**

The factors linked to road accidents are usually grouped into three interconnected sets. Human factors include things like speeding, driving under the influence, fatigue, distraction, and not following traffic rules. Environmental factors involve road conditions, signage, lighting, intersection design, and insufficient separation between road users. Vehicle-related factors include mechanical failures, the condition of tires and brakes, overloading, and not meeting safety standards **[10, 11].**

Preventing road accidents therefore relies on an integrated approach combining road planning, effective enforcement of regulations, road safety education, vehicle safety, and the organization of prehospital and hospital response. Having reliable local data is essential to identify victim profiles, accident mechanisms, and the injuries that should be prioritized for prevention **[12].**

The Idrissa Pouye General Hospital is a reference center for trauma care in Dakar. This study aimed to describe the epidemiological and clinical aspects of road traffic accidents treated at this hospital from October to December 2024, in order to help develop recommendations suited to the Senegalese context.

2.Patients et methods

Type, location and period of study: It was a retrospective, descriptive, and analytical study carried out at the Emergency Department of Idrissa Pouye General Hospital in Senegal. The study period ran from October to December 2024.

HOGIP is a public health facility located in the town of Grand-Yoff, in Dakar. It evolved from the Traumatology and Orthopedics Center created in 1989, which later became the Grand-Yoff General Hospital, and then the Idrissa Pouye General Hospital. The facility has a theoretical capacity of 300 beds and receives patients from the Dakar region, its suburbs, other regions of Senegal, and the West African sub-region.

The Emergency Reception Service receives an average of 60 to 70 patients per day outside of peak times. It includes a consultation and observation area as well as a short-stay hospitalization sector. The latter notably has a shock room for life-threatening emergencies, a stabilization room, and a short-stay hospitalization unit. The care of road accident victims involves emergency doctors, paramedical teams, and several medical-surgical specialties, including orthopedic-traumatology, neurosurgery, maxillofacial surgery, oto-rhino-laryngology (ENT), visceral surgery, and urology.

Population and selection criteria: The source population was made up of all patients admitted to the emergency room for a traffic accident-related injury during the study period. Patients who had been in a traffic accident were included, regardless of the severity of the injury, as long as the necessary clinical data were available. Incomplete medical records were not included.

The study reports 1,166 patients who were victims of road traffic accidents (RTAs) out of 5,761 patients admitted to the emergency room, which is 20.24% of admissions. However, the detailed tables in the study cover only 250 complete files. In this article, the 1,166 cases are used to estimate the proportion of RTAs among admissions, while the epidemiological, circumstantial, and clinical characteristics are presented based on the 250 files analyzed in the available tables.

Collected data: The information was collected using a medical records data sheet. It covered sociodemographic details like age, gender, education level, marital status, and occupation when available. Personal history and lifestyle habits, including alcohol or tobacco use, were also looked into.

The circumstances of the accident included the date and time it happened, the time of day, the location of the accident, the type of collision, the type of vehicle involved, the victim's role, whether protective gear was worn, and any reported speeding. The clinical data covered the location and nature of the injuries, their severity, whether there was a risk to life or function, the treatment received, and the immediate outcome.

Operational definitions: Road accidents were defined as traumatic events that occurred in the context of road traffic and involved at least one moving vehicle. The types were grouped into running off the road, motorcycle skidding, collision with a fixed object, vehicle-pedestrian collision, rollover, and vehicle-vehicle collision.

The vehicles involved were listed as motorcycles, light vehicles, buses, trucks, bicycles, and carts. The victim's role could be driver, passenger, pedestrian, or cyclist. Injuries were described according to their anatomical location and type. Severity was classified as minor, moderate, or serious, according to the thesis collection form; the reference for the classification wasn't specified in the source document. The prognosis was categorized as favorable, guarded, or critical.

Statistical analysis and ethical considerations: The data were entered into a computer and then analyzed using office and statistical tools, notably Epi Info and Excel. Qualitative variables were described by their counts and proportions. Quantitative variables were summarized by their mean and standard deviation. Comparisons of proportions and means were based, depending on the situation, on the chi-square test and Student's t-test. The significance level was set at 5%.

Information confidentiality was respected during the collection, analysis, and presentation of the results. The data was used for

scientific purposes and presented in a way that does not allow patients to be identified.

Results

Frequency of AVPs and general characteristics

From October to December 2024, 5,761 patients were seen at the HOGIP Emergency Reception Service. Among them, 1,166 had visited due to a road traffic accident, making up 20.24% of admissions. The available results tables included 250 complete records of road accident victims.

The average age of the victims analyzed was 32.8 ± 11.6 years. The 26 to 35 age group was the most represented, with 95 patients, or 38.4% of the sample. The other age groups were represented by 19–25 years old (63 cases; 25.2%), 36–50 years old (56 cases; 22.0%), patients aged 51 or older (26 cases; 10.4%), and 0–18 years old (10 cases; 4.0%).

Table I: Distribution of age groups

Age group (years)	Frequency	Percentage (%)
[0–18]	10	4.0
[19–25]	63	25.2
[26–35]	95	38.4
[36–50]	56	22.0
[51 and over]	26	10.4
Total	**250**	**100.0**

Men accounted for 79.6% of the victims, with a male-to-female ratio of 3.9. The most frequently reported education level was secondary, with 37.6% of the patients. Singles made up 52.9% of the sample.

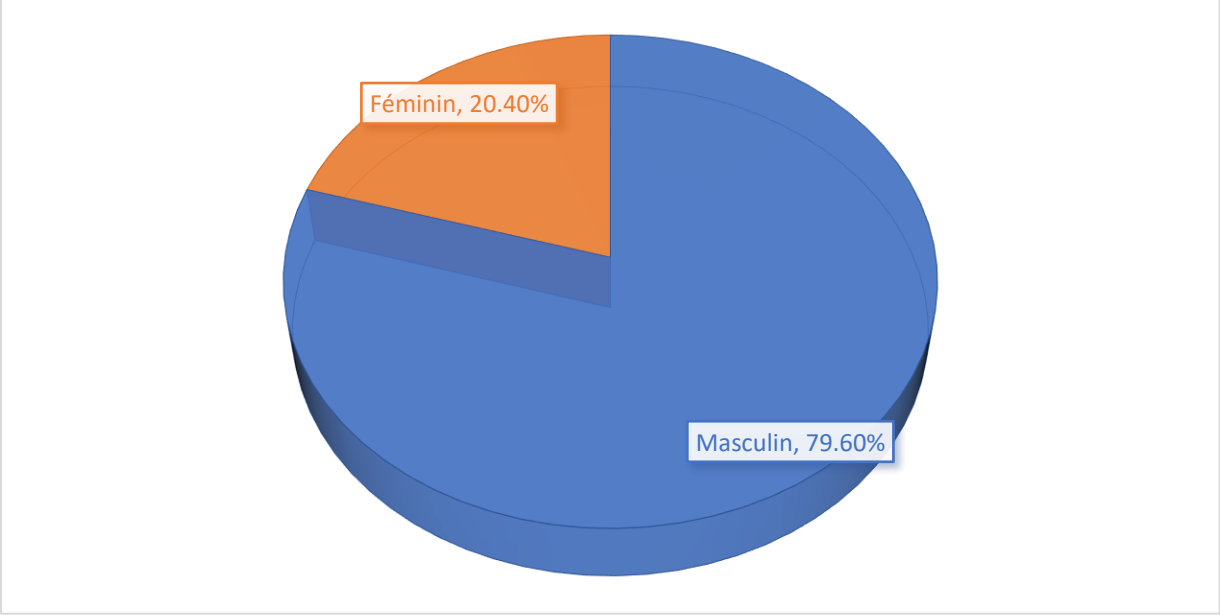

Figure 1 : Distribution of patients by gender

Level of Education

Secondary education level is the most common, with 37.6% of cases (**figure 2**).

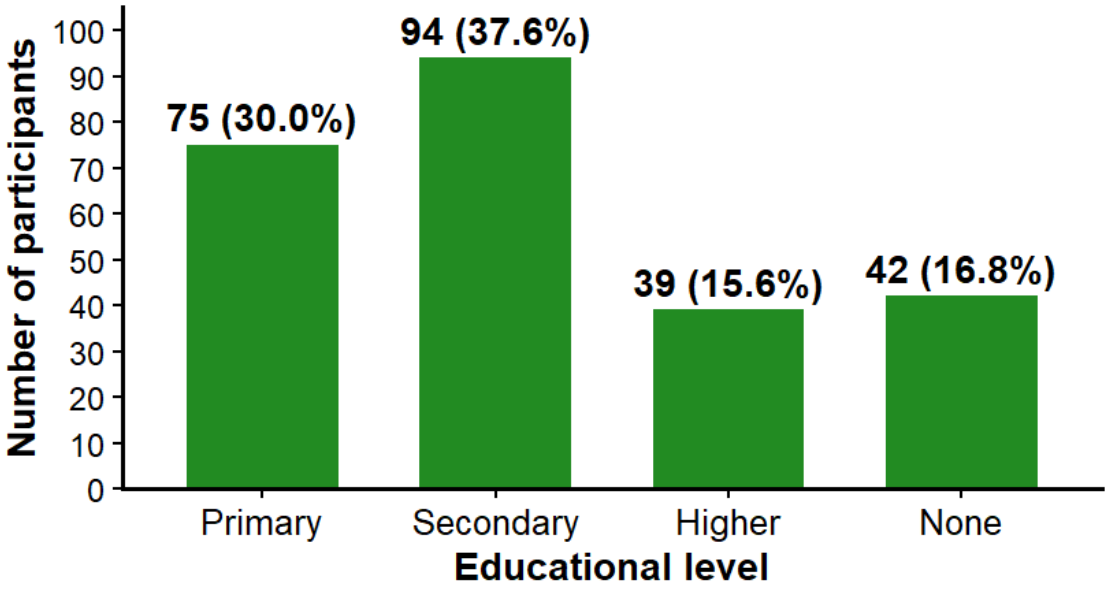

Figure 2 : Distribution of patients by education level

Statut marital

Single people are by far the majority, making up 52.9% of cases as shown (**figure 3**).

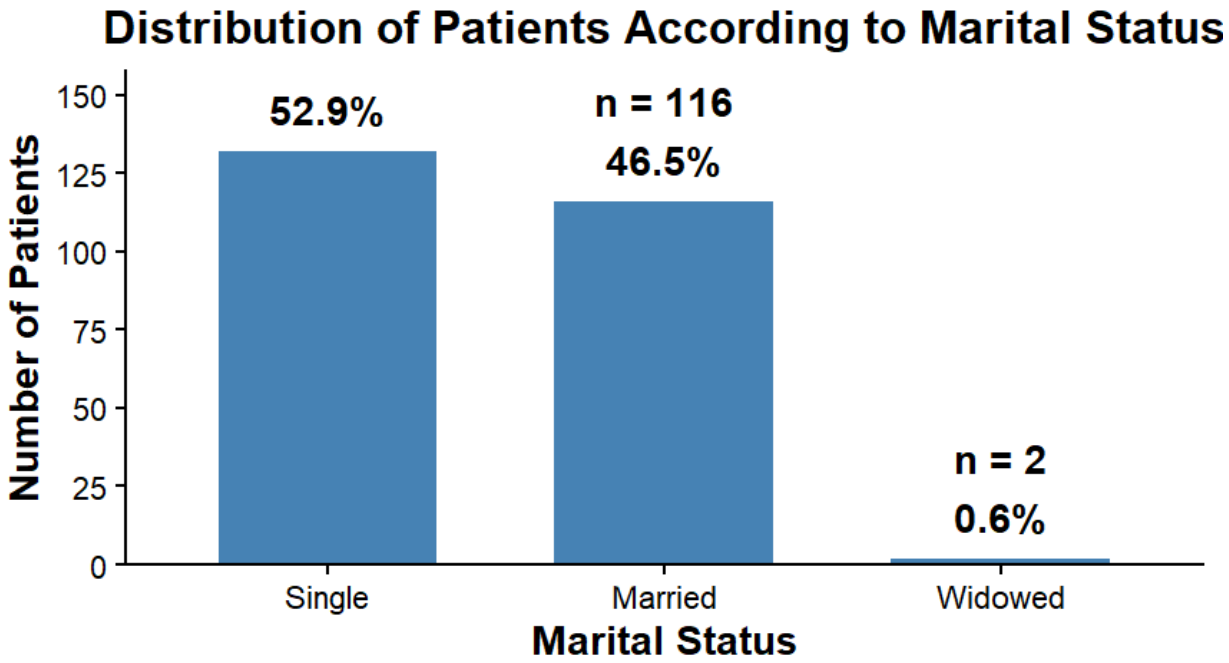

Figure 3 : Répartition des patients selon la situation matrimoniale

Medical history and lifestyle

The majority of patients, about 88.9%, had no particular medical history in the records analyzed. Risky lifestyle habits were absent in 84.2% of the victims. The report mainly refers to these habits in terms of alcohol or tobacco consumption.

Date, time and place of the accident

Accidents were more often recorded in November, which accounted for 45.6% of cases. Most accidents happened between 6 a.m. and 6 p.m., with 155 out of 250 cases, or 62.0%. Accidents that happened between 7 p.m. and midnight made up 32.8%, while those recorded between 1 a.m. and 5 a.m. were 5.2% (**table II**).

Table II: Distribution by time of occurence

Time of occurrence	Number of cases	Perrcentage (%)
1 A.M – 5 A.M	13	5,2
6 A.M – 18 P.M	155	62,0
7 P.M – midnight	82	32,8
Total	**250**	**100,0**

Main roads were the most frequently reported accident sites, accounting for 35.3% of cases. This concentration matches the heavy traffic, the mix of users, and the speeds on main routes. However, it should be interpreted with caution since the other locations aren't fully broken down in the source table.

Accidental mechanisms and vehicles involved

Collisions between vehicles were the most common type, with 115 cases, or 46.0%. This was followed by vehicle-pedestrian collisions, with 73 cases (29.2%), motorcycle skids with 44 cases (17.6%), collisions with a fixed obstacle and rollovers, with 8 cases each (3.2%), and then road departures, with 2 cases (0.8%).

Table III: Distribution by mechanism of collision

Type of collision	Frequency	Percentage
Vehicle–vehicle	115	46.0
Vehicle–pedestrian	73	29.2
Motorcycle skid	44	17.6
Vehicle–fixed obstacle	8	3.2
Vehicle rollover	8	3.2
Off-road exit	2	0.8
Total	**250**	**100.0**

Motorcycles were involved in 182 accidents, making up 72.8% of the cases. Light vehicles accounted for 18.8%, buses 5.2%, bicycles 1.6%, trucks 1.2%, and carts 0.4% (**table IV**).

Table IV: Distribution by type of vehicle involved

Type of vehicule involved	Frequencies	Percentage
Motorcycle	182	72.8
Light vehicule	47	18.8

Type of vehicule involved	Frequencies	Percentage
Bus	13	5.2
Bicycle	4	1.6
Truck	3	1.2
Cart	1	0.4
Total	**250**	**100.0**

Drivers made up 51.6% of the victims. Helmets were the most commonly reported protective gear, worn in 52.9% of cases, ahead of no equipment at all (40.6%) and seat belt usage (6.5%). In 65.0% of situations, the accident was reported without speeding, compared to 35.0% where the speed limits were exceeded.

Location and type of lesions

Table V: Distribution by location of lesions

Location of lesion	Cases number	Percentage
Lower limbs	172	64,0
Upper limbs	86	32,0
Back	3	1,1
Chest	3	1,1
Abdomen	2	0,7
Head	2	0,7
Neck	1	0,4
Total reported locations	**269**	**100,0**

Injuries to the lower limbs were the most common, with 172 cases, making up 64.0% of the reported locations. The upper limbs accounted for 32.0%. Injuries to the back and chest each made up 1.1%, while the abdomen and head each represented 0.7%, and the neck 0.4% (**table V**).

The total of 269 locations is higher than the 250 patients analyzed. This difference suggests either the presence of multiple lesions in some patients or the use of a different denominator for this variable; the report doesn't allow us to decide between these two possibilities.

Fractures were the most common type of injury, with 112 cases, making up 44.0% of the reported injuries. They were followed by scratches, with 48 cases (18.8%), sprains, with 44 cases (17.3%), cuts, with 21 cases (8.2%), dislocations, with 10 cases (4.0%), and intact bones, with 8 cases (3.1%). All other injuries were each less than 1% (**Table VI)**.

Table VI: Distribution according the nature of lesion

Nature of lesion	Frequency	Percentage
Fracture	112	44,0
Scratch	48	18,8
Sprain	44	17,3
Laceration	21	8,2
Dislocation	10	4,0
Bone integrity	8	3,1
Damage	2	0,8
Acromioclavicular joint separation	2	0,8
Pubic symphysis separation	2	0,8
Open dislocation	2	0,8
Head trauma	2	0,8
Bruise	1	0,3
Lower back pain	1	0,3
Total reported injuries	**255**	**100,0**

The total of 255 lesions also exceeds the number of patients analyzed, which could reflect the coexistence of multiple lesions in some patients or a different denominator. This information needs to be clarified from the database before a final scientific submission.

Severity, prognosis and treatments

Moderate injuries were the most common, accounting for 55.2% of cases. The vital prognosis was favorable in 94.4% of situations, guarded in 5.2%, and critical in 0.4%. Medical treatment was the most frequently reported therapeutic approach, with 237 instances, or 60.0% of the treatments recorded. Orthopedic treatment accounted for 135 instances (34.2%) and surgical treatment for 23 instances (5.8%) (**Table VII**).

Table VII: Distribution by treatment received

Treatment received	Reported frequency	Percentage
Traitement médical	237	60.0
Traitement orthopédique	135	34.2
Traitement chirurgical	23	5.8
Total des modalités rapportées	**395**	**100.0**

The total of 395 therapeutic methods for 250 patients probably shows that several treatments could be assigned to the same patient

or that the denominator of this variable differed from that of the main sample. So the percentages are presented as proportions of reported methods rather than as an exclusive breakdown of patients.

Discussion

This study highlights the important role of road traffic accidents in the activity of the Emergency Department at HOGIP. Out of 5,761 patients received during the three-month study, 1,166 had come in because of a road traffic accident, which is 20.24% of admissions. The observed proportion is higher than the frequencies of 12.95% and 12.01% reported in the comparisons mentioned in the paper, respectively in studies conducted in Thiès and Mali **[13, 14].**

These differences could be related to the study period, the definition of cases, the recruitment profile of the establishments, traffic density, and the role of motorcycles in local travel.

The high proportion of road traffic accidents seen in this department can also be linked to HOGIP's role as a trauma reference center. The hospital receives victims from urban and suburban areas with heavy traffic, high daily mobility, and a mix of cars, public transport, motorcycles, pedestrians, and non-motorized vehicles. This mix of road users can increase the chances of conflicts on the roads, especially when the infrastructure doesn't adequately separate the flows.

Sociodemographic profile of the victims

The average age was 32.8 ± 11.6 years, with the 26 to 35 age group accounting for 38.4% of the victims. This predominance of young adults makes sense given their high mobility, presence in the workforce, and frequent use of personal transportation. Adults in this age range are often on the move for work, business, and social reasons, sometimes under time pressure and in heavy traffic.

The observed proportion is close to that reported in some comparative studies mentioned in the paper, notably a frequency of 37.8%, but it is still lower than the 47.1% reported in another series **[15-17].**

The differences between studies may be related to the age structure of the populations, the type of institution, the categories of users included, and the observation period.

The male predominance was clear, with men making up 79.6% of the victims, and a sex ratio of 3.9. This matches the results reported in several African contexts and in the comparative studies mentioned in the thesis: 77.3% men in a study by Diarra, 71.9% in Oumarou's series, 67.7% in a pediatric study conducted in Rabat, and 77% in a series carried out in N'Djamena **[13, 17-19].**

This overrepresentation of men can be explained by greater exposure to motorized travel, professional or personal driving, and certain risky behaviors. It may also reflect differences in mobility and the use of healthcare facilities. However, it should not be interpreted as proof of inherently more dangerous behavior in men. The study doesn't actually compare how much each gender is exposed to road traffic.

Most of the victims were single, and the most common level of education was secondary school. These data describe the social profile of the patients treated, but they don't allow us to establish a causal effect of marital status or education level on the occurrence of an accident. An analytical study would need to compare the victims to a similar, non-accident-exposed population and gather detailed information on profession, type of travel, and risk exposure.

Accident circumstances

Most accidents happened between 6 a.m. and 6 p.m., a period that accounted for 62% of cases. This daytime concentration could be linked to the high level of work, school, and shopping travel, as well as the increase in traffic density during rush hours. It's similar to the frequencies of 73% and 68.4% reported in comparative studies **[20, 21].**

The predominance of November, with 45.6% of accidents, should be interpreted with caution due to the short duration of the study and the lack of complete breakdown by month. It could be due to variations in exposure, traffic, weather conditions, or service operations, but no seasonal conclusions can be drawn based on just three months of observation.

Main roads accounted for 35.3% of reported accident sites. These routes carry a lot of traffic and connect different neighborhoods or cities. They can also involve high speeds, overtaking, irregular stops, pedestrian crossings, and local access points. National data mentioned in the report show that 45.8% of accidents happen on paved roads, while studies on road networks highlight how important road design, signage, and maintenance are for user safety **[22, 23, 24].**

Vehicle-to-vehicle collisions were the most common type, accounting for 46% of cases, followed by vehicle-to-pedestrian collisions at 29.2%. These types of accidents are encouraged by traffic density, lane changes, overtaking, ignoring right-of-way, speeding, and the mix of road users with different levels of vulnerability. Vehicle-to-pedestrian collisions remain particularly worrying because they can cause serious injuries to people without any mechanical protection **[25, 26].**

Motorcycles were the most involved vehicles, accounting for 72.8% of the cases. This result is an important signal for prevention in Senegal. Two-wheelers are accessible and convenient, but their riders are directly exposed to impact forces. The lack of protective bodywork, the risk of losing control, vulnerability in collisions with heavier vehicles, and irregular use of protective gear can increase the severity of injuries. The proportion of cases reported in this study justifies targeted actions on motorcyclist training, helmet checks, the technical condition of motorcycles, and the limitation of risky behaviors.

The helmet was the most commonly used protective gear, in 52.9% of cases, but 40.6% of victims weren't wearing any reported gear. This highlights the gap between a rule existing and it actually being followed. Prevention needs to include campaigns tailored to users, regular checks, and ensuring gear is financially and practically accessible. Wearing a helmet doesn't eliminate the risk of accidents, but it can reduce the likelihood and severity of certain head injuries when worn properly.

Speeding was reported in 35% of cases. This data should be seen as self-reported information collected in the records, not as an objective measure of speed. Still, it aligns with the known role of speed in how serious collisions are. Control devices, appropriate limits for the areas being crossed, and infrastructure designed to encourage controlled speed are all important measures **[27, 28].**

Clinical profile and management

The lower limbs were the most common site of injuries, followed by the upper limbs. This pattern can be explained by the direct exposure of the limbs during impacts, motorcycle falls, and collisions involving light vehicles. The predominance of fractures, which accounted for 44% of reported injuries, is

consistent with the mechanical impact of accidents and the frequency of limb trauma.

The results are similar to some series mentioned in the report, but differ from other studies that found a predominance of head injuries or wounds **[13, 20, 29, 30].**

These differences can be related to the types of users included, the role of motorcyclists, the accident mechanism, the time to reach the hospital, and the criteria for classifying injuries.

Moderate severity was the most common category, and the life prognosis was favorable in 94.4% of cases. These results may reflect the fact that the victims included were treated in an emergency department and had already undergone some clinical selection, but they should not be taken to mean there are no aftereffects. A favorable life prognosis can coexist with an unfavorable functional outcome, especially when there are fractures, nerve injuries, persistent pain, or joint limitations.

Medical treatment accounted for 60% of the reported modalities, followed by orthopedic treatment and surgical treatment. This distribution is consistent with the frequency of injuries requiring local care, immobilization, pain relief, antibiotic prophylaxis, or monitoring. Since the treatment data are higher than the number of patients, they should be interpreted as occurrences of treatment modalities rather than as an exclusive distribution. Comparison with other studies reported in the thesis shows a proportion of medical treatment higher than that observed by Doumbia (50.5%) but lower than that reported by *Traoré B.* (91.8 %) **[14, 30].**

Implications for prevention

The results support a primary prevention strategy focused on motorcyclist safety, speed control, wearing helmets properly, and reducing risky behaviors. Actions should target main roads and high-density areas, with visible signage, proper lighting, safe pedestrian crossings, and separation between motorized traffic and vulnerable users whenever possible **[23, 31, 32].**

Prevention should also include stronger vehicle and motorcycle inspections, tackling overloading, and consistent enforcement of penalties. Automated systems for speed control and rule enforcement can complement the presence of officers, as long as they're part of a transparent policy that's regularly evaluated **[12, 33-35].**

Secondary prevention involves the immediate response after an accident. Training first responders, coordinating between security forces, firefighters, and medical teams, having suitable ambulances available, and quickly directing people to trauma care facilities can reduce deaths and long-term damage. Developing prehospital emergency systems should take into account distances, road networks, and the geographic distribution of reference facilities **[36].**

Finally, tertiary prevention should include functional rehabilitation, pain management, psychological support, returning to school or work, and social assistance. The aftereffects of a road accident aren't limited to the hospital stay; they can long-term affect the victim's independence, income, and social involvement.

Study limits

This study has several limitations. First, its retrospective nature exposes it to information bias due to the variable quality of medical records. Some important variables, such as occupation, type of route, blood alcohol level, measured speed, proper helmet use, prehospital delay, and detailed circumstances of the accident, were not documented consistently.

Secondly, the observation period only covered three months, which limits the ability to study seasonal variations and to generalize the results to the whole year. In particular, the proportion of accidents observed in November cannot be considered an annual indicator.

Thirdly, the study reports 1,166 patients who were victims of road traffic accidents out of 5,761 admissions, while the descriptive tables are based on 250 complete files. The exact process between identifying the 1,166 cases and analyzing the 250 files isn't detailed. This discrepancy needs to be clarified from the original database before publication.

Fourth, the denominators aren't constant for certain variables: 269 lesion locations, 255 types of lesions, and 395 treatment methods are reported for 250 patients. These discrepancies might correspond to multiple responses, but this hypothesis isn't explicitly documented in the report. So, the results were presented as counts or reported occurrences, without converting them into individual risks.

Finally, the statistical tests are mentioned in the methodology, but the p-values, measures of association, and confidence intervals are not provided in the available results section. Therefore, the analysis should mainly be considered descriptive. A follow-up study should include an analytical model based on better-documented variables and a clearly defined sample.

Conclusion:

Accidents on public roads accounted for 20.24% of the admissions recorded at the HOGIP Emergency Reception Service between October and December 2024. The victims shown in the available tables were mainly young men, with the 26 to 35 age group being the most represented. Motorcycles were involved in nearly three-quarters of the accidents, vehicle collisions were the main cause, and injuries to the lower limbs, especially fractures, made up the main injury profile.

Treatment was most often medical or orthopedic, and the immediate survival outlook was generally good. However, these results shouldn't hide the risk of lasting functional and social issues, which is especially significant for a young and active population.

Reducing road accidents in Senegal requires coordinated action on human factors, vehicles, infrastructure, and emergency response organization. The priorities are improving motorcyclist safety, effectively enforcing helmet and seatbelt use, controlling speed, upgrading major roads, road safety education, availability of prehospital emergency services, and developing rehabilitation for victims. The quality of data also needs to be improved through standardizing records, harmonizing definitions, and setting up an integrated accident monitoring system.

Recommendations

Primary prevention:

It's recommended to improve the quality, lighting, and signage of roads, paying special attention to main roads, intersections, and areas with heavy pedestrian traffic. Separating traffic flows where possible, creating sidewalks and safe pedestrian crossings, as well as regular road maintenance should be strengthened.

Vehicle and motorcycle inspections should be made more systematic, while vehicles that are unfit for traffic should be taken out of passenger transport. Speed control, alcohol checks, overloading, and compliance with traffic rules should be strengthened using appropriate human and technological means.

Wearing helmets for motorcyclists and seat belts in vehicles should

be enforced through a combination of education, monitoring, and penalties. Road safety education should be promoted in schools, driving schools, workplaces, and communities, with messages tailored for young drivers and two-wheeler users.

Secondary prevention and management

It's important to strengthen prehospital emergency services, improve coordination between firefighters, defense and security forces, and healthcare facilities, and train first responders in basic rescue techniques and victim immobilization. The availability of ambulances and routing to trauma centers also needs to be improved on busy routes.

Healthcare facilities should step up staff training in trauma care, improve the technical equipment, and develop standardized protocols for fractures, head injuries, limb injuries, and life-threatening emergencies.

Tertiary prevention and research

Functional and psychological rehabilitation should be integrated early into the care process. Victims should receive support aimed at helping them regain independence, return to work or school, and reintegrate socially.

It is also recommended to set up a standardized system for monitoring traffic accidents, linking police, transport, rescue, and health services. Year-long prospective studies should specify the factors associated with severity, response times, functional aftereffects, and the socio-economic cost of accidents.

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