



Direct Costs for the Management of Road Traffic Accident Casualties in Six Hospitals. Case of Mbandaka City in the Democratic Republic of Congo

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How to cite this paper: Kandolo, S.I., Mfumu, B.K., Kabamba, J.N., Much'Apa, B.M., Kabeya, B., Kashala, J.N., Kalala, J.T., A-Nkoy, A.T.M., Numbi, C.K. and Bitambile, B.N.F. (2025) Direct Costs for the Management of Road Traffic Accident Casualties in Six Hospitals. Case of Mbandaka City in the Democratic Republic of Congo. *Open Access Library Journal*, 12: e13832.

<https://doi.org/10.4236/oalib.1113832>

Received: June 24, 2025

Accepted: July 26, 2025

Published: July 29, 2025

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Abstract

Introduction: Road traffic accidents are a real public health issue worldwide. Every second, a case is reported. The cost incurred by this phenomenon is just the tip of the iceberg. Many victims are unable to cope with the direct costs due to a lack of social protection systems, especially in low- and middle-income countries. The objective of our study is to evaluate the direct costs of care for victims of road accidents in Mbandaka. **Methods:** We conducted a cross-sectional study on road traffic accident victims in Mbandaka from 01/01/2023 to 30/06/2024. Our sample consists of 302 victims. A form and an unstructured interview served as our data collection tools, and the data was collected on Excel and then analyzed using SPSS 23. **Results:** The prevalence of road traffic accidents is 0.71% with a lethality of 12.3%. The average age was 29.2 years (± 16.9). The male sex was predominantly represented. In 95.4% of cases, patients were not referred, and only 1% of patients used a medical transport to reach the hospital. Fractures (75.5%) were the most common injuries with a high proportion, and the lower limbs were more affected (76.3%). In 91.4%, patients resorted to direct payment, and the length of stay would be ≥ 12 days

in 96.4% of cases, and this duration is influenced by the type of facility (private facility) as well as the payment method for care ($p < 0.05$). **Conclusion:** The financial barrier is a major obstacle to accessing healthcare; it is important to establish universal health coverage to ensure not only the continuity of care but also access that will protect users from catastrophic health expenses.

Subject Areas

Public Health

Keywords

Road Traffic Accidents, Urban Environment, Hospital, Direct Costs, Injuries, Hospitals, Mbandaka, DRC

1. Introduction

Trauma is a major issue, both in developing and developed countries. Globally, road traffic accidents account for 25% of all trauma-related deaths [1]. They are responsible for 12% of the global burden of disease and are the third leading cause of death in the world. Road Traffic Accidents are one of the top neglected issues in public health despite their high contribution to mortality and morbidity globally. Road traffic accidents are considered the 8th cause of mortality worldwide [2] leading to deaths in children and adults ranking above tuberculosis and malaria in 2016 [2]. About 50 million road traffic injuries (RTIs) are reported yearly with over 1.3 million mortalities associated with these RTIs yearly [1] [3]. While Road Traffic Accidents occur globally, developing countries, notably in Southeast Asia and Africa, consistently report high numbers of Road Traffic Accidents. Road traffic injuries -associated mortality in Africa is estimated as 26.6 per 100,000 population and considered the highest globally and is three times that of Europe [2].

In Ghana, road accidents significantly contribute to mortality and morbidity, particularly affecting individuals aged 5 to 29. Road accidents represent a considerable physical and economic burden for individuals, households, and governments, especially in African countries [3].

They contribute significantly to the burden of morbidity as well as mortality in the Democratic Republic of Congo.

2. Methodology

This study was carried out in the city of Mbandaka the Democratic Republic of Congo, using hospital data on motor vehicle crashes registered in six hospitals (public and private) of the provincial health division of Mbandaka. It covers a year and a half period, from January 1, 2023, to June 30, 2024. The study was in form of an analytical cross-sectional study focusing on the Hospital register. Six hospitals were involved in our study, namely: The General Reference Hospital of Wangata, the General Reference Hospital of Mbandaka, Bolenge Hospital, the Military

Hospital, the Jourdain Medical Center, and the TABE Medical Center.

The sampling was comprehensive, including all reported road crash cases. Data were collected using a pro-forma data sheet. Data analysis was performed with SPSS version 23 software (SPSS, Armonk, NY). The P-value was determined as the statistical assessment.

3. Results

Table 1. Distribution of victims by age.

Ages (in years)	Percentage	Percentage
1 to 17	81	26.8
18 to 23	46	15.2
Greater than 23	175	57.9
Minimum	1	1
Maximum		78
Means		29.2
Standard déviation		16.9
Total	302	100

Table 1 indicates that those aged over 23 had more victims of road traffic accidents (175 cases or 57.9%) compared to those aged between 18 and 23 years (15.2%), while victims aged between 1 and 17 years represent a proportion of 15.2%.

Table 2. Distribution of victims by gender.

Sex	Frequency	Percentage
Female	140	46.4
Male	162	53.6
Total	302	100

Male victims are predominantly represented (53.6%) compared to female victims (46.4%). (See **Table 2**)

Table 3. Distribution of accident victims according to the means used to reach the hospital.

Means used to get to the hospital	Frequency	Percentage
Medicalized	3	1.0
Non-medicalized	299	99.0
Total	302	100.0

Table 3 shows us that most victims arrived at the hospital using non-medicalized means (99%) compared to those who used medicalized transport (1%).

Table 4. Distribution of accident victims according to the mode of admission to the hospital.

Admission mode	Frequency	Percentage
Unreferred patient	288	95.4
Referred patient	14	4.6
Total	302	100.0

Non-reference was the most observed mode of admission compared to reference, with 95.4% and 4.6% respectively. (See **Table 4**)

According to **Table 5**, we observe that the Wangata general reference hospital (HGR) received a large proportion of the victims (33.8%), followed respectively by the Jourdain medical center (27.2%), TABE medical center (12.3%), Bolenge general reference hospital (9.9%), Mbandaka general reference hospital (8.9%), and the Military hospital (7.9%). The proportion of road traffic accidents in the six health facilities is 0.71% while the fatality rate is 12.3%.

Table 5. Distribution of accident victims according to frequency and lethality.

Name of the medical facility	Number of hospitalized patients	Victims of road traffic accidents	Deaths related to road traffic accidents	Lethality related to road accidents	Proportion of the injured
JourdainMedical Center	1227	82	1		
Centre Médicale TABE	499	37	20		
HGR Bolenge	4251	30	3		
HGR Mbandaka	6490	27	3		
HGR Wangata	7575	102	7		
Military Hospital	22753	24	3		
Total	42795	302	37	12.3	0.71

Table 6. Distribution of accident victims according to emergency arrival.

Emergency	Frequency	Percentage
No	27	8.9
Yes	275	91.1
Total	302	100.0

Table 7. Distribution of accident victims by types of injuries.

Lesions types	Frequency	Percentage
Pain in the right leg	1	0.3
Skinning	19	6.3
Fractures	228	75.5
Left shoulder Dislocation	1	0.3
Wound	44	14.6
TBI	9	3.0
Total	302	100.0

In most cases, the patients arrived in an emergency (91.1%). (See **Table 6**)
Fractures were more commonly observed than other injuries (75.5%). (See **Table 7**)

Table 8. Distribution of accident victims according to the location of the fracture.

Fractures localization	Frequency	Percentage
Lower Limb	174	76.3
Upper limb	54	23.7
Total	228	100.0

The lower limbs were the most affected by fractures (76.3%) compared to the upper limbs (23.7%). (See **Table 8**)

Table 9. Distribution of victims according to the payment method for medical care.

Payment method	Frequency	Percentage
Direct payment	276	91.4
Indirect payment (mutual insurance)	26	8.6
Total	302	100.0

Most victims opted for direct payment (91.4%) compared to 8.6% for indirect payment. (See **Table 9**)

Table 10. Distribution of accident victims according to the cost of care.

Total cost of care	Frequency	Percentage
≥50	196	64.9
<50	106	35.1
Total	302	100.0

Patients who spent less than 50 US dollars were predominantly represented (64.9%). (See **Table 10**)

Table 11. Estimated distribution of direct costs.

Costs	Total costs (\$)	Means(\$)	Standard deviation (\$)	Min(\$)	Max(\$)
Imaging	2084	6.9	15.8	0	85.7
Medications	5785	19.2	21.6	0	267.9
Procedures	4761	15.8	1.6	0	137.1
Hospitalization	4139	13.7	63.7	0	10.71
Cost total	16769	55.5			

\$ = US dollars, Standard deviation of the average, Min = minimum cost, Max = maximum cost. The table above indicates that the cost of medications was high, fol-

lowed by the cost of procedures, the cost of hospitalization, and the cost of imaging with respective amounts of \$5785, \$4761, \$4139, and \$2084. (See **Table 11**)

Table 12. Distribution of accident victims according to the duration of hospital stay.

Length of Stay (in days)	Frequency	Percentage
<12	11	3.6
≥ 12	291	96.4
Total	302	100.0

The victims who stayed in the hospital for more than 12 days represent a large proportion (96.4%) compared to those who stayed for less than 12 days. (See **Table 12**)

Table 13. Associations between length of stay and other variables.

Variables	Length of hospital stay (in days)		OR	P-value
	>12	≤12		
belonging				
Public	10 (5.5%)	173 (94.5%)	6.8	0.036
Private	1 (0.8%)	118 (99.2%)		
Payment method				
Direct payment	8 (2.9%)	268 (97.1%)	0.22	0.024
Indirect payment (mutual)	3 (11.5%)	23 (88.5%)		
Brought in urgently				
No	2 (7.4%)	25 (92.6%)	2.4	0.274
Yes	9 (3.3%)	266 (96.7%)		
Type of lesion				
Fractures	9 (3.9%)	219 (96.1%)	1.5	0.2
2 (2.7%)	72 (97.3%)			

Table 13 indicates a significant association between the length of hospital stay and the type of hospital (private and public structures) and the mode of payment (direct and indirect).

4. Discussion

This study examined the crash data of a year and a half in the city of Mbandaka (DRC) using hospital crash data. This study examined hospital crash data from a year and a half in the city of Mbandaka (DRC) using hospital crash data. The lethality is 12.3% with an overall mortality of 0.71% (**Table 5**). This lethality is theoretically higher than that found by Kourouma. [4] in Guinea (1.2%). In Nepal, the prevalence of road traffic accidents was 9.58% [5]. The incidence rate of mortality for road traffic accident victims was 7.34 per 10,000 person-hours in Ethio-

pia [6].

We observed that out of 302 patients who were victims of traffic accidents, the majority, 175 patients (57.9%), were in the age group older than 23 years (29.2 ± 16.9 years) with extremes of 1 and 78 years (**Table 1**). In Brazzaville, the average age was 43.5 ± 2.7 years, and the most represented age group was 25 to 35 years (33.87%) [7]. In N'Djamena, the average age was 28.5 years with extremes of 16 and 75 years [8]. In Lebanon, the majority of RTIs (44.4%) were recorded among those aged between 15 and 29 years old [9].

Table 2 indicates that men represent a large proportion (53.6). Our results, although lower, are similar to those found in N'Djamena, where the male sex represented 77% and the sex ratio was 3.4 [8]. The predominance of the male sex was also found in Ethiopia and Nepal [5] [10].

Most victims of road traffic accidents were not referred (95.4%). The prevalence of road traffic accidents is 0.7%. This prevalence is different from that found in Nepal (9.58) [5].

In most cases, patients arrived in emergency (91.1%). Our observation, though higher, is consistent with that of the northeastern Democratic Republic of Congo in Butembo, where 80.4% of patients arrived at the emergency department [11].

The lesions mainly consisted of fractures, and fractures of the lower limbs were common (**Table 7** and **Table 8**). Our result is similar to that found by Boubacar [12]. Kalli Moussa's study revealed that the less severe injuries (scrapes, superficial wounds) were the most numerous [8]. In Cameroon, the trauma of limb without bone injury (15.9%) was the most commonly encountered [13]. In Nigeria, soft tissue injury only represented 71.9% [1].

Direct payment for care is the most observed method (91.4%) as indicated in **Table 9**. Some studies across Africa have found similar results to ours, such as in Morocco and Burkina Faso [14] [15].

In our study series, 96.4% had a length of stay ≥ 12 days (**Table 13**). There is a statistically significant association between the length of hospital stay and the type of facility as well as the method of payment ($p < 0.05$) whereas the fact of arriving at the hospital in emergency and the length of stay. Seydou Diandio Traoré observed in his study that most road traffic injury victims did not exceed 1 day [16]. Christian Térance found that the average length of hospitalization was 9.7 days [17].

Patients who spent less than 50 US dollars were predominantly represented (64.9%) (**Table 10**). The average care costs in different facilities are not statistically different ($F: 0.224, p = 0.95$). The total cost of care is \$16,769 with an average total cost of \$56 (**Table 11**). In Ghana, the total direct cost of road traffic accident care at St. Joseph Hospital was approximately \$164,483.44 US [3].

5. Conclusion

We conducted a cross-sectional study on the profiles of road accident victims. Appropriate preventive measures such as wearing helmets for motorcycles, wear-

ing seat belts, and complying with traffic laws should be promoted upstream to reduce the incidence related to this global scourge that plunges many families into despair.

Conflicts of Interest

The authors declare no conflicts of interest.

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