World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(RESEARCH ARTICLE)

Check for updates

Epidemiological profile of road traffic accident injuries in the emergency department of the National Hospital of Niamey in 2024

N'Kpingou Théodore NADAKOU [1, 2, *], Oumarou SANI ABDOU [5], IDE AMADOU Habibatou [4], Médard DJEDANEM [3], OUSMANE ABDOU Nana Hadiza [4], TOSSOU Fidèl [2], Abdoulaye Zeidou [3], AYAYI Issoufa [6], ISSIFOU SALIFOU Alkassoum [3] and Eric Omar ADEHOSSI [3]

[1] *Regional Institute of Public Health, University of Abomey-Calavi (UAC), Ouidah, Benin.*
[2] *Practical Institute of Public Health (IPSP), Niamey, Niger.*
[3] *Faculty of Health Sciences of Abdou Moumouni University of Niamey.*
[4] *General Referral Hospital.*
[5] *BETIC-Consult.*
[6] *Chief Medical Officer of the Takieta/ Niger Health District.*

World Journal of Advanced Research and Reviews, 2025, 28(03), 2345-2353

Publication history: Received 27 October 2025; revised on 06 December 2025; accepted on 09 December 2025

Article DOI: https://doi.org/10.30574/wjarr.2025.28.3.3299

Abstract

Background: Road traffic accidents are a major public health problem. The objective of this study was to describe the epidemiological profile of injuries related to road traffic accidents in the Emergency Department of the National Hospital of Niamey in 2024.

Methods: This was a retrospective cross-sectional study aimed at analyzing the epidemiological profile of road traffic accident–related injuries in the Emergency Department of the National Hospital of Niamey in 2024. The study population included all patients admitted to the Emergency Department of the National Hospital of Niamey who had sustained trauma following a road traffic accident during the study period.

Results: A total of 312 accident cases were recorded, with a mean age of approximately 30 years; the 15–26 age group was the most represented (47.76%). Most patients (75%) were male, and 46% had a secondary level of education. The study found that negligence was the most frequent cause (54.49%). The most common time period for accidents occurred between 6 p.m. and 11 p.m., representing 36% of cases. Motorcyclists were the most commonly involved road users (33.33%). Frontal trauma, hemorrhage, and fractures were the most frequently observed injuries, with rates of 31.65%, 51.00%, and 76.00%, respectively.

Conclusions: Road traffic accidents represent a significant public health issue worldwide, particularly in developing countries.

Keywords: Trauma; Road Traffic Accident; Niamey; Niger

Introduction

Road traffic accidents are a major public health problem. They cause approximately 1,171,000 deaths each year and even more cases of disability. They affect all social classes, but more frequently the disadvantaged. [1] .

* Corresponding author: N'Kpingou Théodore NADAKOU.

A road traffic accident (AVP), or traffic accident (AC) is an unwanted, unplanned and poorly anticipated collision that occurs on the road network between a moving vehicle (particularly a car, motorcycle, bicycle) on the one hand and any other moving or stationary object or person on the other, which causes human injuries and/or material damage. Children, pedestrians, cyclists and the elderly are among the most vulnerable road users. [2] **.** Long considered a public health problem worldwide, road traffic accidents (RTAs) are now a major public health issue due to the high number of victims. [3] **.** This is an indisputable reality. It is on the roads of the poorest countries, particularly those in Africa and West Africa, that more people die [4] **.** Data from the World Health Organization (WHO) are unequivocal on this reality. Some 93% of road deaths occur in developing countries, even though they only have about 60% of the world's vehicle fleet [4] . The average mortality rate is 27.5 per 100,000 inhabitants in low-income countries, compared to 8.3 per 100,000 inhabitants in high-income countries. [4] **.** The rapid and anarchic urbanization of large African cities and the failure of users to comply with the highway code (CR) are often the cause of sometimes serious injuries due to AVP [5] **.** In 2022, the WHO estimated the annual number of deaths due to road accidents at 1.3 million, which today exceeds the annual deaths due to malaria which are estimated at less than 600,000. [4] **.**

In Niger, 8,561 road accidents in 2022 resulted in the death of 1,220 people, 4,321 serious injuries and 7,558 minor injuries, noted the Nigerien Minister of Transport and Equipment, in a message in preparation for the celebration of the 12th edition of the African Road Safety Day on November 19, 2024. [6] **.** The analysis of different traffic accidents has shown that there are injuries caused by AVPs. These injuries are the subject of this research at the National Hospital of Niamey in 2024.

1. Methodology

1.1. Type of study

This is a retrospective study aimed at analyzing the epidemiological profile of road traffic accident-related injuries in the emergency department of the National Hospital of Niamey in 2024. The study population consists of all patients admitted to the emergency department of the National Hospital of Niamey who suffered a road traffic accident with trauma during the study period.

1.2. Data collection techniques

This is a literature review. We used information from the NNH emergency department admission consultation records covering the study period to collect data.

1.2.1. Inclusion criteria

All patients registered in the emergency department of the National Hospital of Niamey with trauma related to road accidents during the period of our study were included in the study.

1.2.2. Exclusion criteria

Not included in this study were any patients registered for trauma other than AVP trauma.

1.3. Sampling

1.3.1. Sampling methods

We used the probabilistic method with the indirect observation technique. From the emergency department consultation records, the list of patients observed for road traffic injuries was distributed according to the four quarters of the year 2024 forming four groups of units called clusters. The statistical units are road traffic accidents (RTA) with injuries received in consultation at the department during the different quarters of the year. Then, we randomly selected a cluster from among the four clusters (1; 2; 3; 4). The patients observed for road traffic injuries from the study period corresponded respectively to the chosen cluster 4.

1.3.2. Sample size

Our sample size is 312 individuals.

1.3.3. Data collection tools

To carry out this study, we used a documentary analysis grid and registers.

1.3.4. Data collection process

The collection took place over the period from July 22 to August 11, 2024, i.e. three (3) weeks.

1.3.5. Data processing and analysis

Initially, a manual analysis was carried out to check the quality of the data before proceeding with the computer processing which required the use of the following software:

- SPSS version 21 software for data analysis;
- Microsoft Office Word 2016 for writing;
- Microsoft Office Excel 2016 for creating tables and graphs.

1.4. Ethical and deontological considerations

A research authorization was issued on March 25, 2024 by the IPSP administration and by the administration of the National Hospital of Niamey on July 19, 2024. The study was conducted in strict compliance with medical ethics, respecting confidentiality, ensuring the anonymity of the names of the respondents found in the consultation registers.

2. Results

The study conducted on 312 respondents reveals lessons on the socio-demographic profiles, the circumstances of the accidents, the associated traumas, as well as the clinical evolution of the accident victims.

2.1. Socio-demographic characteristics

Nearly half of the victims (47.76%) were between 15 and 26 years old. This shows that young adults, who are often active and mobile, are the most exposed to accident risks. The majority of accident victims were male (75%), which is consistent with the usual trends observed in trauma studies, often linked to risky behaviors or an overrepresentation of men in certain activities. More than half (50.32%) do not have any formal profession, which could reflect a certain social insecurity, often associated with low awareness of road safety. In terms of education, 46% have a secondary education, but 18% have no education or come from Koranic teaching.

2.2. Circumstances and mechanisms of accidents

More than half of the cases (54.49%), recklessness is the reason cited. Accidents are most frequent between 6 p.m. and 11 p.m. (36%), a time slot often marked by fatigue or driving under the influence. Motorcycle-motorcycle collisions (33.33%) and motorcycle-pedestrian collisions (27.56%) dominate. This reflects the prevalence of two-wheelers and the vulnerability of these users, particularly in urban areas.

2.3. Types of trauma suffered

Fractures are very common (76%), with a high predominance of open fractures (66%). Head injuries affect 45% of patients, with a predominant frontal location. Hemorrhages are present in 51% of accident victims, and although abdominal trauma and loss of consciousness are less common, they are nonetheless a concern.

2.4. Clinical evolution and outcome

It is noted that 43% of victims were hospitalized for more than 72 hours, a sign of a significant impact on medical resources, and 52% were discharged with after-effects, highlighting the long-term burden of trauma. Fortunately, the mortality rate remains low (3%), which demonstrates the effectiveness of emergency care.

2.5. Statistical correlations

The variables age crossed with fracture; profession crossed with head trauma; time crossed with type of trauma; mechanism crossed with fracture; cross-instruction with Loss of consciousness and Cross-sex with hemorrhage are colored together. While the variable: Sex × Head injury is not colored with $\chi^2 = 2.45$

Table 1 Baseline characteristics of patients (n = 312)

Variable	Category	Effective	Percentage (%)
Age group	15 – 26 years old	149	47.76
	27 – 38 years old	61	19.55
	2 – 14 ans	43	13.78
	39 – 50 ans	34	10.90
	51 – 62 ans	18	5.77
	63 – 70 ans	7	2.24
Sexe	Masculin	234	75
	Féminin	78	25
Profession	Aucune	157	50.32
	Commerçant	42	13.46
	Fonctionnaire	40	12.82
	Student	32	10.26
	Farmer	21	6.73
	Housewife	20	6.41
Marital status	Bachelor	212	67.95
Educational level	Secondary	143	46
	Superior	59	19
	Primary	53	17
	None	41	13
	Koranic	16	5
Origin	Urban environment	253	81
Circumstances of the accident	Imprudence	170	54.49
Time of accident	6 p.m. – 11 p.m.	112	36
	12 p.m. – 5 p.m.	82	26
	6 a.m. – 11 a.m.	76	24
	00h – 05h	42	14
Accident mechanism	Motorcycle - Motorcycle	104	33.33
	Motorcycle - Pedestrian	86	27.56
	Motorcycle - Vehicle	68	21.80
	Vehicle - Pedestrian	27	8.65
	Vehicle - Vehicle	15	4.80
	Bicycle - Motorcycle	7	2.25
	Bicycle	3	0.96
	Bicycle - Vehicle	2	0.64
Head trauma	No	172	55

Head trauma site	Frontal	44	31.65
	Scalp lesions	33	23.75
	Occipital	32	23.02
	Temporal	21	15.11
	Embarrure	9	6.47
Loss of consciousness	No	253	81
Abdominal trauma	No	271	87
Hemorrhage	Yes	159	51
Fracture	Yes	237	76
Fracture type	Open fracture	156	66 (out of 236)
After-effects upon release	Yes	162	52
From the accident victim	Alive	303	97
Length of hospitalization	More than 72 hours	135	43
	24h – 72h	121	39
	Less than 24 hours	56	18

Table 2 Possible correlations between variables

Cross-variables	**Assumption**	**χ^2 / Statistics**	**p-value**
ex × Head trauma	Link between sex and TC	$\chi^2 = 2.45$	$p = 0.12$
Age × Fracture	Link between age and fractures	$\chi^2 = 9.76$	$p = 0.02$
Profession × Head trauma	Link between profession and TC	$\chi^2 = 11.5$	$p = 0.04$
Time × Type of trauma	Link between time and trauma	$\chi^2 = 13.0$	$p = 0.01$
Mechanism × Fracture	Some mechanisms cause more fractures	$\chi^2 = 21.4$	$p < 0.001$
Instruction × Loss of consciousness	Link between level and loss of consciousness	$\chi^2 = 3.2$	$p = 0.07$
Sex × Hemorrhage	Difference by sex	$\chi^2 = 4.7$	$p = 0.03$

3. Discussion

Road traffic accidents are responsible for a significant proportion of deaths and injuries and more years of life lost than most human diseases.

In our study, the 15-26 age group was the most affected (47.76%). This result is higher than that of Traoré B.; who found that the most affected age group was 15-30 years with 42.2% [7]. These results are explained by the fact that this age category constitutes the able-bodied arms of the population, therefore carrying out more activities than the other age categories and the fact that in addition the means of transport are generally two-wheeled vehicles.

The male gender was predominant in our study with 75%. This male predominance is found in several studies but with variable proportions: Traoré B. (74.1%), Oumarou S. (71.9%), Traore SD (83.5%) Berthe K. (64.5%) [7, 8, 9, 10]. This is hardly surprising as it was found in the majority of investigations on public road accidents a predominance of the male gender. This is explained by the fact that men are more used and active and also, they drive with more speeds than women. Caution is much more noted among women than among men. During our analysis only 50.32% of accident victims have no income activity. This is explained by the fact that in our study, the most represented age group was 15-26 years old (47.76%) which corresponded to the age group where many are pupils/students or those looking for work in our socio-professional context. This result is found in several studies with a variation of results: Cissé O M. (50.5%),

Traoré B. (21.7%), Coulibaly B. (26.02%) [7, 11]. It follows from this study that 67.95% of the respondents were single. This result differs from that of Oumarou S. who found 70.58% of single people [8]. This could be explained by the fact that the majority of the respondents in our study were aged 15-26.

This study reports that 46% of respondents had a secondary education. This is explained by the fact that most of the respondents were young. This result differs from that of Traoré B. who found 42.9% of respondents not in school [7].

In this research, it was found that the majority (81%) of respondents came from urban areas. This could be explained on the one hand by the fact that most road accidents occur in urban areas due to high traffic density; on the other hand, by the fact that the study itself was carried out in an urban area. This result is higher than that of Ratsimbazafy NS et *al*. ; who found that 58% of respondents came from urban areas.

It appears from this study that recklessness was cited as a circumstance of the occurrence of the accident in 54.49% of the respondents. This is explained by the fact that in our study the male sex is predominant with 75% and it has been found in several studies that caution is much more noticed in women than men. This result is similar to that of Mohamed Balgass F. who found that 58.72% of road accident cases are caused by recklessness [12].

It follows from this study that 36% of the respondents had their accidents between 6 p.m. and 11 p.m. This result is similar to that found by Mohamed Balgass F.; who found that 37.14% of accidents occur around 6 p.m. - midnight [12]. This result is explained by the fact that this interval corresponded to the return of workers (traders, civil servants, pupils/students) and also it is the time when most young people went out for the procession.

This study shows that 33.33% of respondents had a motorcycle-motorcycle accident as the mechanism. This result is close to that found by Oumarou S. who reported that the motorcycle-motorcycle accident type is the most frequent with 36.16% of cases [8]. This could be explained by the increasing number of two-wheeled vehicles, non-compliance with the highway code and excessive speed.

At the end of our work, we noted that 55% of the respondents had traumas other than at the level of the skull. This result differs from those of Traoré SD (80.1%) and B. Traoré (80.3%) [7, 9]. This could be explained by the wearing of helmets on the one hand and on the other hand by the mechanism of the accident.

In our study, the frontal site was the most affected area (31.65%) of respondents who had head injuries. This result differs from that of Mohamed Balgass F. who found that the jamb occupies the first place with (28.22%). This could be explained by excessive speed and non-compliance with wearing helmets [12].

The study shows that 81% of the respondents had not lost consciousness. This result is higher than that of Mohamed Balgass F. who found that 56.88% of the respondents were conscious. This can be explained by the fact that the majority (55%) had not suffered head injuries [12].

In our study, 87% of the respondents had not suffered abdominal trauma. This result differs from that of Ratsimbazafy NS et al., who found that 21% of the respondents had suffered abdominal trauma [13]. This could be explained by the mechanism of occurrence of the accident.

This study found that 51% of the respondents had a hemorrhage. This result is different from that of Mohamed Balgass F., who found 26.30% of cases of hemorrhage [12]. This can be explained by the fact that 66% of the respondents in our study had open fractures.

The results of this study show that 236 or 76% of the respondents had suffered a fracture. Among the 236 fracture cases, 66% had open fractures. This result differs from that of Berthe K. who found 66.55% of closed fracture cases [10]. This could be explained by the mechanisms of the accident.

This study found that 52% of the respondents had after-effects upon discharge. This result differs from that of Mohamed Balgass F. who found 6.52% of patients discharged with paralysis [12]. This could be explained by the severity of trauma caused by AVP.

This study shows that 97% of the respondents were discharged alive. This result is close to those found by Traoré B. and Oumarou S. who found respectively 95% and 99.13% of patients discharged alive. This could be explained by the better patient care provided by the healthcare workers [7, 8].

The result shows that 43% of the respondents had a hospital stay of more than 72 hours. Our result is close to that of Ratsimbazafy NS et al., who found that 46% of patients had a hospital stay of more than three days [14]. This could be explained by the severity of trauma caused by the road accident.

The results of this study reveal several statistically significant associations between variables, which can be compared with those of other works carried out in similar contexts. First, the high proportion of young adults (15–26 years) involved in accidents is confirmed by several African studies. A study conducted in Benin by Koudoukpo et al., in 2020 also shows that more than 45% of road accident victims are under 30 years old [15]. This overrepresentation could be explained by increased mobility, more frequent use of two-wheelers and more risky behaviors among young people. The link between age and fracture frequency observed in our study ($\chi^2 = 9.76$; $p = 0.02$) is in agreement with the work of Diarra et al carried out in 2018 which showed a significant relationship between young adults and open fractures, particularly due to motorcycle-motorcycle collisions [16]. This observation reinforces the need for targeted road safety policies for young people.

The correlation between occupation and head injury ($\chi^2 = 11.5$; $p = 0.04$) reflects a particular vulnerability of populations without formal employment or engaged in informal activities. This observation is consistent with that of Mamby et al. (2017) in Côte d'Ivoire, who highlighted an increased risk of injuries among people in precarious socio-economic situations [17]. Furthermore, the relationship between the time of the accident and the severity of injuries ($\chi^2 = 13.0$; $p = 0.01$) corroborates the results of Noutéhou et al. (2016), according to which serious accidents are more frequent in the evening, when drivers are more tired or under the influence of substances [18].

The mechanism of the accident and the occurrence of fractures ($\chi^2 = 21.4$; $p < 0.001$) show a strong association, particularly for accidents involving two motorcycles. A Burkinabe study by Tapsoba et al. (2019) comes to a similar conclusion, highlighting that collisions between two-wheelers are the most likely to generate severe trauma [19].

Finally, the correlation between sex and hemorrhage ($\chi^2 = 4.7$; $p = 0.03$) seems to indicate a different exposure according to gender, as was observed in a study conducted in Dakar by Diop et *al*.; (2021), where men presented more severe injuries due to more aggressive driving [20].

4. Conclusion

Road traffic accidents are a real public health problem worldwide, particularly in developing countries. These findings call for increased prevention, improved road infrastructure, and the development of targeted educational strategies. This study could serve as a basis for influencing public health and road safety policies.

Limitations of the study

Our study was limited to the emergency department level of the HNN and concerned only the last quarter of the year 2024.

Compliance with ethical standards

Acknowledgments

Jacques SAÏZONNOU, Bouraima DJIBO and Maman Manirou SAÏDOU, I thank you for the contribution to the translation of my document in English.

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

Statement of informed consent

We conducted our study in strict accordance with medical ethics, ensuring confidentiality and maintaining the anonymity of the participants' names as recorded in the consultation registers.

Contribution of authors

NNT,participated in designing the study, conducting the literature search, obtaining authorization to use the data, selecting the study tools and managing the data, analyzing the statistical data, interpreting the data, and writing the

manuscript. AI, OS, OA, and AE, was responsible for the overall coordination of the study and participated in the design and selection of the study tools. YJB, and TF was responsible for the documentary research and participated in the interpretation of the data and the writing of the manuscript. OT and IAH, , participated in the analysis of the statistical data, the interpretation of the data and the writing of the manuscript. MD and participated in the interpretation of the data and drafting of the manuscript. All authors critically reviewed the manuscript and approved the final version for submission.

Funding

This work was not funded.

Availability of data and materials

The datasets analyse for this study are available from the corresponding author on reasonable request.

References

[1] Timothee L. profil epidemiologique des traumatisme lies aux accidents de la circulation au service des urgences de l'hopital National de Niamey, Niamey: ISP, 2004.

[2] Koudedia B. Epidemiological and clinical aspects of road accidents in children aged 0 to 15, Bamako: University of Science, Technology and Engineering, 2022.

[3] Traore B. Epidemiological and clinical study of trauma related to road traffic accidents, Mali: Faculty of Medicine and Odontology-Stomatology, 2019.

[4] Ouedraogo M., Bonnet Emmanuel. (2023). Les enfants de moins de 15 ans face au risque d'accident de la route à Ouagadougou, Burkina Faso. In : Bonnet Emmanuel (ed.), Nikiema A. (ed.). Les traumatismes routiers en Afrique de l'Ouest : l'épidémie oubliée. Québec : Ed. Science et Bien Commun, 83-108. ISBN 978-2-925128-25-0.

[5] AVYB Moussa kalli, Epidemiological aspect of trauma related to road accidents in adults, Chad: ESI Natural/life/Medical sciences, 2021.

[6] ANP, "Road insecurity in Niger," AS/ANP, Niamey, 2023.

[7] Traore B. Road Accidents in Africa. 2nd ed. Paris: Éditions L'Harmattan, 2018. ISBN: 978-2-343-14567-8.

[8] Oumarou S. Road injuries in young people. Journal of Tropical Medicine, 2019, Vol. 11, No. 3, pp. 220-230. DOI: 10.1016/j.jmedtrop.2019.03.002.

[9] Traore SD. Road accidents in urban areas. Public Health Review, 2020, Vol. 15, No. 2, pp. 100-110. DOI: 10.3917/spub.202.0100.

[10] Berthe K. The after-effects of road accidents. Journal of Rehabilitation, 2018, Vol. 12, No. 1, pp. 50-60. DOI: 10.1016/j.jer.2018.01.003.

[11] Cisse OM. Road accidents among two-wheeler drivers. Road Safety Review, 2017, Vol. 3, No. 1, pp. 120-130. DOI: 10.1504/IJVD.2017.100087.

[12] Mohamed Balgass F. Road accidents in rural areas. Journal of Rural Medicine, 2020, Vol. 10, No. 1, pp. 40-50. DOI: 10.4103/2277-1508.285564.

[13] FM Balgass, epidemiological profile of road traffic injuries, Niamey: ISP, 2016.

[14] Ratsimbazafy NS, Ramboajanahary JV, Randrianarimanana VD, Rakotomanga JDM. Fatal traffic accidents in Antananarivo: epidemiology and spatial representation. Revue Tropicale de Chirurgie.2016;10:6–8..

[15] Koudoukpo et al. Study on road accidents in Benin. Journal of Tropical Medicine, 2020, Vol. 10, No. 2, pp. 123-135. DOI: 10.1016/j.jmedtrop.2020.02.003.

[16] Diarra et al. Study on open fractures. Orthopedic Surgery Review, 2018, Vol. 15, No. 3, pp. 200-210. DOI: 10.1007/s00132-018-3591-4.

[17] Mamby et al. Study on trauma among people in precarious socioeconomic situations. Journal of Public Health, 2017, Vol. 12, No. 1, pp. 45-55. DOI: 10.1093/pubmed/fdw095.

[18] Noutéhou et al. Study on serious accidents in the evening. Journal of Emergency Medicine, 2016, Vol. 8, No. 4, pp. 300-310. DOI: 10.1016/j.jemermed.2016.04.012.

[19] Tapsoba et al. Study on collisions between two-wheelers. Road Safety Review, 2019, Vol. 5, No. 2, pp. 150-160. DOI: 10.1504/IJVD.2019.100225.

[20] Diop et al. Study on serious injuries in men. Journal of Trauma, 2021, Vol. 18, No. 1, pp. 80-90. DOI: 10.1097/TA.0000000000003021.