

# Socio-Demographic Profile of Patients Victims of Subaxial Cervical Spine Trauma at the University Hospital of Brazzaville (Congo)

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**How to cite this paper:** Briex, E.M.H., Florice, L.R.A., Arnaud, T.K.C., Eryx, M.E.D., Gerald, B.K.R. and Léon, B. (2023) Socio-Demographic Profile of Patients Victims of Subaxial Cervical Spine Trauma at the University Hospital of Brazzaville (Congo). *Open Journal of Modern Neurosurgery*, 13, 137-144.

<https://doi.org/10.4236/ojmn.2023.133016>

**Received:** May 3, 2023

**Accepted:** July 17, 2023

**Published:** July 20, 2023

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## Abstract

**Introduction:** Traumatic spinal cord injuries (TSCI) are a public health problem. Subaxial cervical spine trauma (SCST) is the most common. They are a source of neurological consequences that can affect the functional prognosis, but above all vital. The objective of this study was to describe the profile of patients with lower cervical spine trauma. **Method:** We carried out a cross-sectional and retrospective study over seven years, from January 1, 2015, to December 31, 2021, in the multipurpose surgery department of the University Hospital Center of Brazzaville. We included all patients hospitalized for SCST, having performed at least one radiological examination. We excluded all patients whose records were incomplete. **Results:** We recorded 90 cases of SCST, and 60 cases met our selection criteria. The median age was 37 years, with the extremes of 6 and 83, the sex ratio of 3.6. The level of education was secondary in 45 cases (75%), and university in 13 cases (21.7%). Road traffic accidents accounted for 68.3% of cases, followed by falls in 16.7%. Motorcyclists were the most frequent victims (46.3%). Among the 60 patients in the series, three (5%) had health insurance. **Conclusion:** The SCST concerns subjects in their thirties, of the male sex. Road traffic accidents are the first cause, and mainly concern motorcyclists.

## Keywords

Subaxial Cervical Spine Trauma, Road Traffic Accidents, Prevention

## 1. Introduction

Traumatic spinal cord injuries (TSCI) constitute a public health problem, insofar

as these injuries can be prevented and their management is complex with a high overall cost. The annual worldwide incidence of TSCI varies from 11 to 16 cases per 100,000 inhabitants and this incidence has not changed significantly since 1990 [1]. TSCI due to trauma can affect motor, sensory, and autonomic functions. In case of serious and permanent incapacity, these patients need permanent and complete medical assistance. This situation implies a high cost of expenses related to the care of these patients, especially since they are often young subjects, with a considerable life expectancy [2].

Subaxial cervical spine trauma (SCST) is linked to an increase in the frequency of road traffic accidents (RTA). The predominance of cervical lesions over thoracolumbar is confirmed in the literature and explained by the fact that it is the most mobile spinal segment, and therefore exposed to trauma. They are a source of neurological sequelae that can affect the functional prognosis, but above all vital [3]. Their prognosis depends on the initial spinal cord injury and the speed of treatment [4]. They affect the workforce in developing countries. In the Republic of Congo, they represent 64.28% of spinal cord injuries, of which 46.34% of the surrounding cases are operated on, for an overall mortality of nearly 22% [5].

The aim of this study was to describe the profile of patients with SCST, in order to help strengthen preventive measures and assess the socio-economic impact of this condition.

## 2. Methods

We conducted a descriptive, cross-sectional observational study. Data collection was retrospective. The study was conducted over seven years, from January 1<sup>st</sup>, 2015 to December 31<sup>st</sup>, 2021, within the multipurpose surgery department of the University Hospital Center of Brazzaville (UHCB) which is a tertiary level hospital center, comprising by elsewhere, an emergency-department, multipurpose resuscitation, pediatric surgery, orthopaedics-traumatology, medical imaging, and functional rehabilitation.

Cervical spine trauma patients are usually admitted to surgical emergencies. After an initial assessment, the on-call neurosurgeon is asked for a specialist opinion. When the diagnosis of SCST is made, the patient is transferred to the Polyvalent Surgery department. If surgery is indicated, an operative prescription is given to the family. It includes a prescription for introns for the surgery, anesthetic drugs, and payment for the operation at the hospital cash register. The cost of these sections is estimated at 1024.41 US dollars, the operation being invoiced by the hospital at 109.18 US dollars. All these costs were the responsibility of the patient, his entourage, or even the insurance if it existed.

The target population corresponded to all patients with SCST. The source population corresponded to all cases hospitalized in the multipurpose surgery department. We included all patients hospitalized for SCST, having performed at least one radiological examination. We excluded all patients for whom the file

was incomplete (insufficient data to verify our research hypotheses).

Recruitment was exhaustive. Data were collected from admission registers and medical records. A survey sheet was drawn up for data collection. The patient registers made it possible to identify the medical files to be used. A cross-check was performed by reviewing the contents of each medical file in the storage areas. The files were then classified for use. The exploitation was carried out from a survey sheet.

Data were recorded and processed using Epi Info software (version 7.2.5.0). The Excel version 2016 software was used for the creation of the graphs. The qualitative variables were expressed in number and proportion. Quantitative variables were reported as the mean (or median) along with the standard deviation (or quartiles).

The socio-demographic variables studied were age, sex, occupation, level of education, marital status, the existence of health insurance, and the circumstances of the occurrence of the trauma.

The necessary authorizations have been obtained from the Faculty of Health Sciences of Marien Ngouabi University and the University Hospital Center of Brazzaville. The research protocol has been submitted to the Health Science Research Ethics Committee.

### 3. Results

During the period of study, we recorded 2800 hospitalized patients, among whom we identified 90 cases of SCST, *i.e.* a hospital frequency of 3.2%. We included 60 cases. The median age in the population studied was 37 years, with quartiles of Q1 = 28 years and Q3 = 45.5 years, and extremes of 6 and 83 years. **Table 1** represents the distribution of patients according to age. Among the 60 cases, 47 (78.3%) patients were male and 13 (21.6%) were female, a sex ratio of 3.6.

The level of education was primary in two cases (3.3%), secondary in 45 cases (75%), and university in 13 cases (21.7%). The patients had informal professional activity in 28 cases (46.7%), in a private company in 12 cases (20%), in the public service in nine cases (15%). They were students in seven cases (11.7%), and unemployed in four cases (6.6%). They were single in 28 cases (46.7%), in a couple in 22 cases (36.7%), married in seven cases (11.7%) and widowed in three cases (5%).

The trauma was due to an RTA in 41 patients (68.3%), a fall in 10 cases (16.7%), a playful and/or diving accident in five cases (8.3%), three assaults, and one wall collapse (6.7%).

All ATR patients (41 cases) were either in a car or on a motorcycle. **Table 2** represents the study population according to the circumstances of the injury, specifying the type of vehicle and the possible collision with another type of vehicle. Among patients' victims of RTA, motorcyclists were concerned in 19 cases (46.3%), car drivers in 17 cases (41.5%), and passenger in a car in five cases (12.2%). Of the 22 cases that were in a car, 19 reported not having worn a seat belt.

**Table 1.** Distribution of patients in the series according to age in years.

	<b>n</b>	<b>%</b>
<b>0 - 18</b>	6	10
<b>19 - 60</b>	49	81.7
<b>&gt;60</b>	5	8.3
<b>Total</b>	60	100

**Table 2.** Distribution of patients by traumatic circumstances among victims of accident traffic road.

	<b>n</b>	<b>%</b>
<b>Motorcycle-car</b>	8	19.5
<b>Car-car</b>	5	12.2
<b>Car alone</b>	13	31.7
<b>Motorbike alone</b>	15	36.6
<b>Total</b>	41	100

Among the 60 patients in the series, three (5%) had health insurance.

#### 4. Discussion

This study deals with a phenomenon very little described in the Republic of Congo. The phenomenon of spinal trauma is not yet a priority in national health policy. However, our study being only descriptive, it did not make it possible to appreciate the impact of the socio-demographic aspects related to this pathology, at the economic and social levels, as well as their influence on the future of the patients.

The median age of the population studied was 37 years, with the extremes of 6 and 83. Our result is close to that of Kpelao *et al.* [5] in Dakar, Senegal, who found an age of 36.1 years, and that of Bello *et al.* [6] in Yaoundé in Cameroon who found an age of 39.7 years. Young adults were the most frequently affected, and this trend is consistently reported, making cervical spine injuries a public health problem, affecting the working-class of the population in developing countries [7]. Also, with an annual incidence of 12.1 to 57.8 cases per million, spinal cord injuries (SCIs) are a major drain on the resources of the state and society [8].

The male predominance in our series (sex ratio of 3.6) is also found in Kpelao *et al.* [4] but with a higher proportion of 9/1. Loembe *et al.* [9] in Gabon found a male predominance of 84% on the data of a study conducted over the period from 1981 to 1994. This could be explained by the fact that in general, men are more exposed to trauma [10].

In our series, RTA were the most frequent circumstance of occurrence, they represented 68.3% of cases, followed by falls which represented 16.7% of cases. Our results are similar to those of Kpelao *et al.* [4] who found a frequency of

73.7% of RTA followed by occupational accidents in 13.1% of cases. Ekouele Mbaki *et al.* [5] found a frequency of 78% for RTA. Loembe *et al.* [9] found a frequency of 67.5% of cases for RTA followed by 18.1% of cases of falls. The majority of the Western literature and publications from developed nations have revealed motor vehicle accidents to be the most frequent cause of injury [11]. These results show the interest in a reinforcement of the regulation of RTA, to reduce the frequency of traumatism of the cervical spine. Specifically, it is important to insist on the wearing of helmets for motorcyclists, and the wearing of seat belts for car drivers and passengers. We must also insist on speed limits and drink-driving, even if our study did not make it possible to assess the impact of these two factors in the occurrence of road traffic accidents.

Motorcyclists were the most frequent victims of RTA (46.3%). In Central Africa, “rapid” urbanization and the increase in the car fleet as well as the growing demand for urban transport have given rise to a new, insufficiently regulated mode of transport, that of “motorcycle taxis” [12] [13]. The increase in motorcycle transport has led to an increase in the number of road accidents. In Kenya, these accidents doubled between 2004 and 2009 with an annual increase of 29% [5]. In our context, despite a high level of knowledge and an attitude favorable to the use of safety helmets, the promotion of the wearing of safety helmets should take into account the emergence of this type of transport, with awareness-raising measures and coercion [12] [13].

The management of spinal trauma with neurological deficits includes surgical care requiring implants which have a high cost. Moreover, about the age of the patients, their life expectancy, and the low socio-economic level, the difficulties of care are increased, because functional rehabilitation and nursing care require a level of expertise that is not always available in our context [14]. Indeed, in addition to the absence of health insurance, there are no centers specializing in the management of long-term disabilities in our context.

The global incidence of spinal cord injuries is steadily increasing in low- and middle-income countries. The most frequent causes are road accidents followed by falls. The incidence of home accidents with falls among the elderly is increasing in high-income countries due to the aging of the population. Prevention in the context of African countries requires legislative, technical, educational, and social efforts that require joint efforts of the whole society. It is essential to strengthen health insurance measures [15].

## 5. Conclusion

SCST is common. This frequency will probably increase in proportion to urbanization, with the development of the road network in developing countries, and the increase in the number of vehicles, in particular two-wheelers. The needs are related to the development of these countries, particularly in the construction of infrastructures and the increase in the standard of living of the populations, contrast with weak regulation of road traffic and the level of health insurance.

Young people are more exposed to cervical spine trauma related to RTA. They are mostly motorcyclists. The prevention of these traumatisms requires a reinforcement of the regulation of road traffic and the implementation of a system of health insurance allowing the assumption of responsibility in the acute phase and the assumption of responsibility for the durable handicap.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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## Annex

### SURVEY SHEET

Sheet No.: /...../.

Date: /...../...../202...../

Q1: Age in years: /\_/\_/

Q2: Sex: /\_/

Q3: Profession: /\_/ 1 (Civil servant) 2 (Private sector employee) 3 (Informal sector agent) 4 (Pupil/Student) 5 (Unemployed).

Q4: Level of education: /\_/ 1 (Primary) 2 (Secondary) 3 (University) 4 (No schooling)

Q5: Marital status: /\_/ 1 (Married) 2 (couple) 3 (single) 4 (widowed)

Q6: Origin: /\_/ 1 (Place of accident) 2 (Health facility) 3 (Home)

Q7: Health Insurance: /\_/ 1 (Yes) 2 (No)

Q8: Nature of the accident: /\_/ 1 (Accident on public roads) 2 (Fall) 3 (Playful and diving accidents) 4 (Aggression) 5 (Other)

a) If an accident on the public highway:

Q9: Type of conflict: /\_/ 1 (Car-Pedestrian) 2 (Motorcycle-Pedestrian) 3 (Motorcycle-Car) 4 (Car-Car) 5 (Motorcycle-Motorcycle) 6 (Car only) 7 (Motorcycle only)

Q10: Position of the injured: /\_/ 1 (Car driver) 2 (Car passenger) 3 (Pedestrian) 4 (Motorcyclist)

Q11: Seat belt: /\_/ 1 (Yes) 2 (No)

Q12: Insured vehicle: /\_/ 1 (Yes) 2 (No)