

EPIDEMIOLOGICAL PROFILE OF PATIENTS WITH VERTEBRAL TRAUMA AT A REFERENCE CENTER IN THE AMAZON

PERFIL EPIDEMIOLÓGICO DE PACIENTES COM TRAUMA VERTEBRAL EM UM CENTRO DE REFERÊNCIA DA AMAZÔNIA

PERFIL EPIDEMIOLÓGICO DE PACIENTES CON TRAUMA VERTEBRAL EN UN CENTRO DE REFERENCIA EN LA AMAZONIA

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ABSTRACT

Objective: To analyze the epidemiological profile of patients with vertebral trauma treated at a medical reference center at the state of Pará, Northern Brazil. **Methods:** A quantitative and retrospective study conducted at Hospital Metropolitano de Urgência e Emergência (HMUE) in Ananindeua, Northern Brazil, from January 2020 to March 2020, using medical records of patients admitted to the hospital from January 2018 to December 2019. **Results:** Data from 270 medical records from the orthopedic and trauma sector of the hospital were analyzed. **Conclusion:** The predominant profile was male patients, aged between 20 and 29 years, with low social conditions, presenting compressive lesions of lumbar vertebrae, submitted to conservative intervention, with hospital stays of 8 to 30 days, and evolving to complete recovery without sequelae. **Level of evidence II; Retrospective Study.**

Keywords: Health Profile; Spine; Wounds and Injuries.

RESUMO

Objetivo: Analisar o perfil epidemiológico de pacientes com trauma vertebral atendidos em centro médico de referência no estado do Pará, norte do Brasil. **Métodos:** Estudo quantitativo e retrospectivo realizado no Hospital Metropolitano de Urgência e Emergência (HMUE), em Ananindeua, norte do Brasil, entre janeiro de 2020 e março de 2020, usando prontuários de pacientes internados entre janeiro de 2018 e dezembro de 2019. **Resultados:** Foram analisados dados de 270 prontuários do setor de ortopedia e trauma do hospital. **Conclusão:** O perfil predominante foi de pacientes do sexo masculino, com idade entre 20 e 29 anos, de baixa condição econômica, que apresentaram lesões compressivas em vértebras lombares, submetidos a intervenção conservadora, internação hospitalar de 8 a 30 dias, que evoluíram para recuperação completa, sem sequelas. **Nível de evidência II; Estudo Retrospectivo.**

Descritores: Perfil Epidemiológico; Coluna Vertebral; Ferimentos e Lesões.

RESUMEN

Objetivo: Analizar el perfil epidemiológico de pacientes con trauma vertebral atendidos en un centro médico de referencia en el estado de Pará, norte de Brasil. **Métodos:** Estudio cuantitativo y retrospectivo realizado en el Hospital Metropolitano de Urgência e Emergência, en Ananindeua, norte de Brasil, entre enero de 2020 y marzo de 2020, que utilizando historias clínicas de pacientes ingresados en el hospital de enero de 2018 a diciembre de 2019. **Resultados:** Se analizaron los datos de 270 historias clínicas del sector de ortopedia y traumatología del hospital. **Conclusión:** El perfil predominante fue de pacientes del sexo masculino entre 20 y 29 años, de bajas condiciones económicas, que presentaban lesiones compresivas en las vértebras lumbares, sometidos a intervención conservadora, con estancias hospitalarias de 8 a 30 días que evolucionaron hacia recuperación completa sin secuelas. **Nivel de evidencia II; Estudio Retrospectivo.**

Descriptores: Perfil Epidemiológico; Columna Vertebral; Heridas y Traumatismos.

INTRODUCTION

Vertebral trauma causes great impact on affected individuals' quality of life, as well as increasing public and private expenses on treating the injuries and their sequelae. The prevalence of paraplegia among those affected is 46%.^{1,2} Nationally, the rate of injuries affecting the spinal cord has increased considerably, and is higher in large urban centers due to traffic accidents. In some Brazilian states, these represent over a half of all vertebral traumas.^{3,4}

The problem is more serious in states with lower human development, such as Pará, where referral hospitals receive patients from different parts of the north and northeast regions. One such hospital is Hospital Metropolitano de Urgência e Emergência (HMUE), which plays a fundamental role in serving these patients.⁵ This support extends to the treatment of complications and the management of comorbidities, such as reparative plastic surgery.⁶

However, public expenditure on the treatment of these patients is

Study conducted at the Hospital Metropolitano de Urgência e Emergência (HMUE), Rod Br-316, Ananindeua, Guanabara, (CEP: 67010-000) Pará, Brazil.
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<https://dx.doi.org/10.1590/S1808-185120212003238514>



very high, and epidemiological studies are very important to combat this problem, promoting awareness among individuals and public institutions, in order to improve our knowledge of the sociodemographic profile of patients and the interventions used by medical centers.⁷ This study aims to analyze the epidemiological profile of patients with vertebral trauma treated at a referral center in the Amazon region of Brazil.

METHODS

Ethical aspects

All the research subjects were included in this research in accordance with the precepts of the Declaration of Helsinki and the Nuremberg Code, respecting National Research Norms Involving Humans (Res. CNS 466/12) of the National Health Council. Furthermore, this study was approved by the Ethics Committee on Human Research of the Universidade do Estado do Pará (UEPA) (protocol number 3.772.949), after authorization from the HMUE, and its signing of the Data Usage Agreement, which guarantees the confidentiality of collected data.

Study design

This was a quantitative, observational, descriptive, transversal and retrospective study conducted in the municipality of Ananindeua (PA), at HMUE from January 2020 to March 2020. Data from the medical records of the orthopedic and traumatology department of the hospital were used for the epidemiological analysis of patients with vertebral trauma. The gathering and analysis of medical records did not require the use of Prior Informed Consent.

Inclusion criteria

All vertebral trauma patients received in the orthopedic and trauma department of HMUE were included.

Research protocol

Data regarding the patients' age, sex, monthly income,

education, origin, alcohol and drug consumption was collected. Aspects related to trauma were also assessed, such as the cause of the vertebral injury, number of patients received per quarter of the year, patient's clinical condition before medical intervention, type of injury, length of time between the trauma and intervention of the surgical team, type of surgical technique used, and patient's recovery.⁷

Injuries were divided into levels of severity, according to the AOSpine classification for vertebral disorders, which divides injuries into three groups, represented by the letters A, B and C. Group A consists of compressive injuries; B is for distracting injuries; and C is for rotational injuries.⁸

In the analysis of the patients' origin, the geographic division of the State of Pará was used according to integration zones. Twelve main regions were separated, as well as patients from other Brazilian states (Figure 1).⁹

Data collection

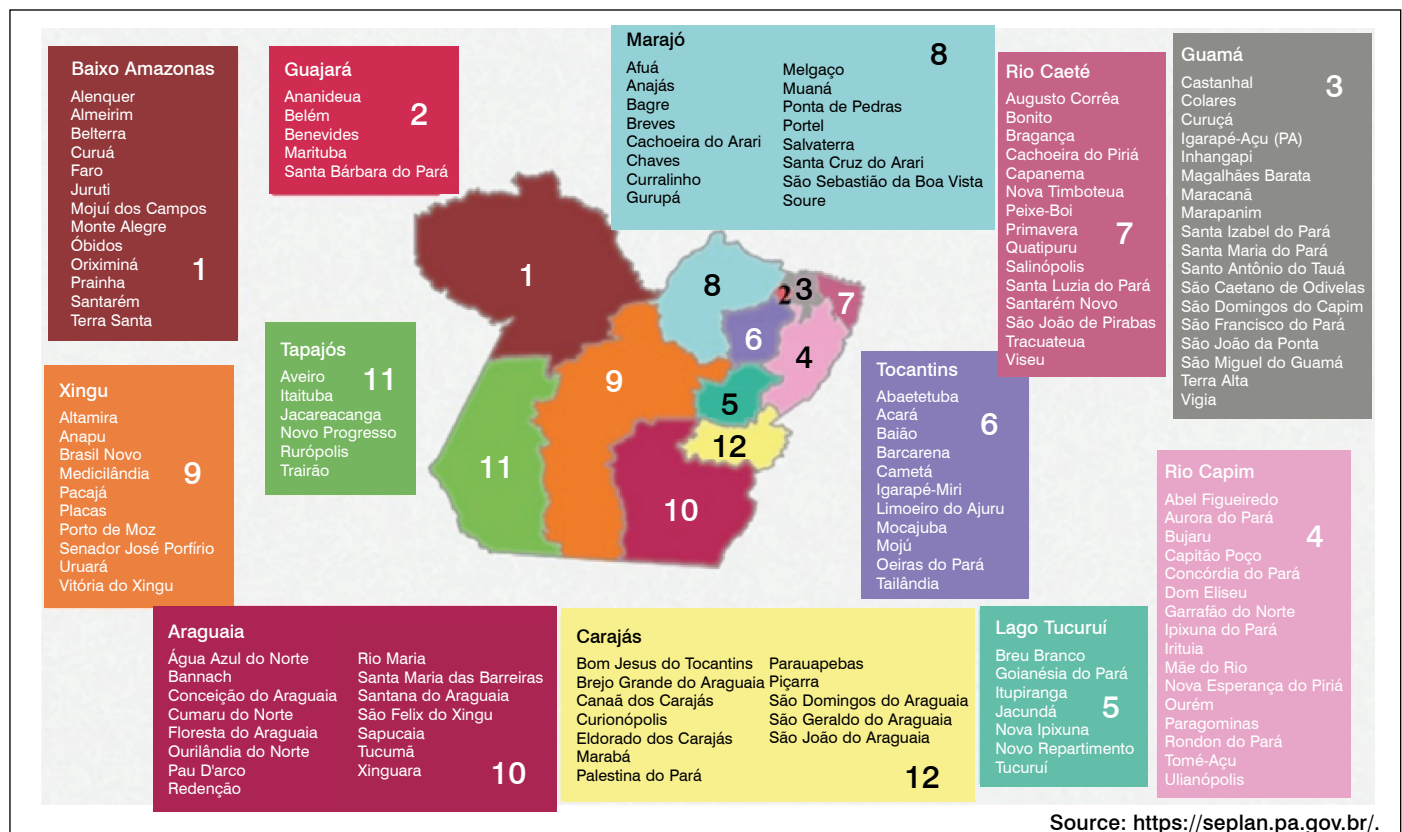
Data was gathered from January 2020 to March 2020, through access to medical records of the HMUE orthopedic and traumatology department for patients seen from January 2018 to December 2019. The study was conducted at HMUE in Ananindeua, in the state of Pará.

Statistical analysis

The information was stored in the software programs Microsoft Office Excel 2016 and Microsoft Office Word 2016. The data were organized in the form of graphs and tables (for the researchers' use only) and then analyzed using descriptive statistics, relating the data from 2018 to 2019 with data from the current literature, in order to compare epidemiological patterns among the study subjects.

RESULTS

A total of 270 medical records were collected at HMUE, all of which met the inclusion criteria. Regarding the patients' level of



Source: <https://seplan.pa.gov.br/>.

Figure 1. Geographic regions of Pará.

education, the highest prevalence was of patients with incomplete primary education (50.74%), and the lowest was those with incomplete graduation (1.11%). In relation to age, most of the patients were aged between 20 and 29 years (26.29%), and the average age was 38 years (Table 1).

Classifying the study population by sex, it was found that 206 (76.29%) were men. In relation to monthly income, most of the patients (72.22%) earned up to 2 minimum wages per month. Regarding alcoholism, 72.6% were not alcohol-dependent. In regard to the use of illicit drugs, 97% were non-users (Table 2).

The analysis showed that the majority of patients came from the Metropolitan zone (48.1%) and the Tocantins region (17.4%). The highest numbers of patients were registered in the 3rd quarter of 2019 (17.9%) and the 3rd quarter of 2018 (16.3%) (Table 3).

Among the main causes of vertebral trauma, there were 100 traffic accidents (37.03%), 55 construction site accidents (20.37%), 42 falls from trees (15.55%), 38 cases of violence (14.07%) and 35 falls at home (12.96%) (Figure 2).

Within the types of spine injury, 103 (38.14%) occurred in the lumbar region, 74 (27.40%) in the cervical region, 49 (18.14%) in the thoracic region, 23 (8.51%) in the thoracolumbar region, and 21 (7.77%) in the lumbosacral region. In the AOSpine classification, 161 (59.62%) had type A pattern, 38 (14.07%) type B and 71 (26.29%) type C (Figure 3).

As regards the time between injury and hospitalization, 115 patients (42.59%) had at least 1 day, 47 (17.40%) 5 to 11 hours

Table 1. Data on age and education of the patients.

Sociodemographic data	Frequency	
	N	%
Education		
Illiterate	7	2.5%
Incomplete elementary school	137	50.7%
Complete elementary school	38	14.0%
Incomplete high school	32	11.8%
Complete high school	48	17.7%
Incomplete graduation	3	1.1%
Graduate	5	1.8%
Age		
Under 20 years	30	11.1%
20 to 29 years	71	26.2%
30 to 39 years	52	19.2%
40 to 49 years	39	14.4%
50 to 59 years	40	14.8%
60 years or over	35	12.9%
Average age	38 years	

Table 2. Data on sex, monthly income, use of illicit drugs and alcoholism.

Sociodemographic data	Frequency	
	N	%
Sex		
Male	206	76.2%
Female	64	23.8%
Monthly income		
Up to 2 minimum wages	195	72.2%
3 to 5 wages	66	24.5%
6 to 9 wages	9	3.3%
Illicit drugs		
Non-user	262	97.0%
User	8	3.0%
Alcoholism		
Alcoholic	196	72.6%
Non-alcoholic	74	27.4%

Table 3. Data on patients' origin and the number of people received per quarter.

Sociodemographic data	Frequency	
	N	%
Origin (Integration zones)		
Metropolitan zone	130	48.1%
Region of Tocantins	47	17.4%
Rio Caeté	33	12.2%
Rio Capim	21	7.8%
Region of Guamá	15	5.5%
Marajó	9	3.3%
Other state	5	1.9%
Xingu	3	1.1%
Araguaia	3	1.1%
Carajás	2	0.8%
Tapajós	1	0.4%
Lago Tucuruí	1	0.4%
Baixo Amazonas	0	0.0%
Patients received		
1 st quarter 2018	26	9.6%
2 nd quarter 2018	42	15.5%
3 rd quarter 2018	44	16.3%
4 th quarter 2018	39	14.4%
1 st quarter 2019	30	11.1%
2 nd quarter 2019	20	7.4%
3 rd quarter 2019	48	17.9%
4 th quarter 2019	21	7.8%

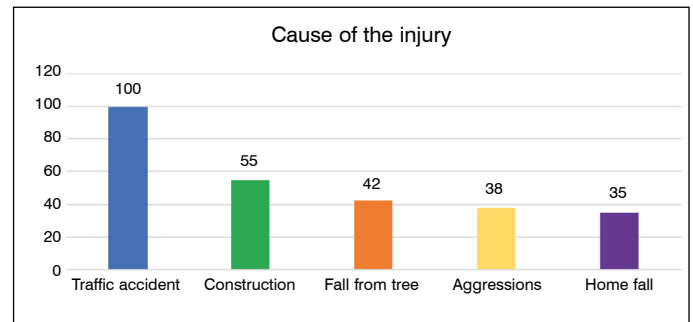


Figure 2. Main causes of spinal cord injury among patients.

and 59 minutes, 46 (17.03%) from 2 to 4 hours and 59 minutes, 38 (14.07%) less than 2 hours and 24 (8.88%) 12 to 23 hours and 59 minutes (Figure 4).

Of the main interventions conducted, 165 (61.11%) were conservative, 71 (26.29%) involved arthrodesis, 14 (5.18%) were laminectomies; there were 9 (3.33%) projectile removals, 5 (1.85%) fixations and 6 (2.22%) cases without intervention due to abandonment of treatment (4 cases) and premature death (2 cases) (Figure 5).

Regarding the patients' main clinical situation, 171 (63.33%) had localized pain, 61 (22.59%) had plegia, 32 (11.85%) had paresis, 4 (1.48%) were unconscious and 2 (0.74%) were asymptomatic (Figure 6).

In relation to the length of time spent in hospital, 119 (44.07%) spent from 8 to 30 days, 107 (39.62%) up to 1 week, 38 (14.07%) from 31 to 90 days and 6 (2.22%) stayed in hospital for more than 90 days (Figure 7).

Regarding the evolution of patients, 182 (67.40%) had complete recovery, 72 (26.67%) were affected with one or more sequelae, 12 (4.44%) died and 4 (1.48%) abandoned treatment (Figure 8).

DISCUSSION

Analyzing the sociodemographic data of individuals treated at HMUE due to vertebral trauma, we found a significant prevalence of men, a group that trends to adopt risky behaviors such as flouting

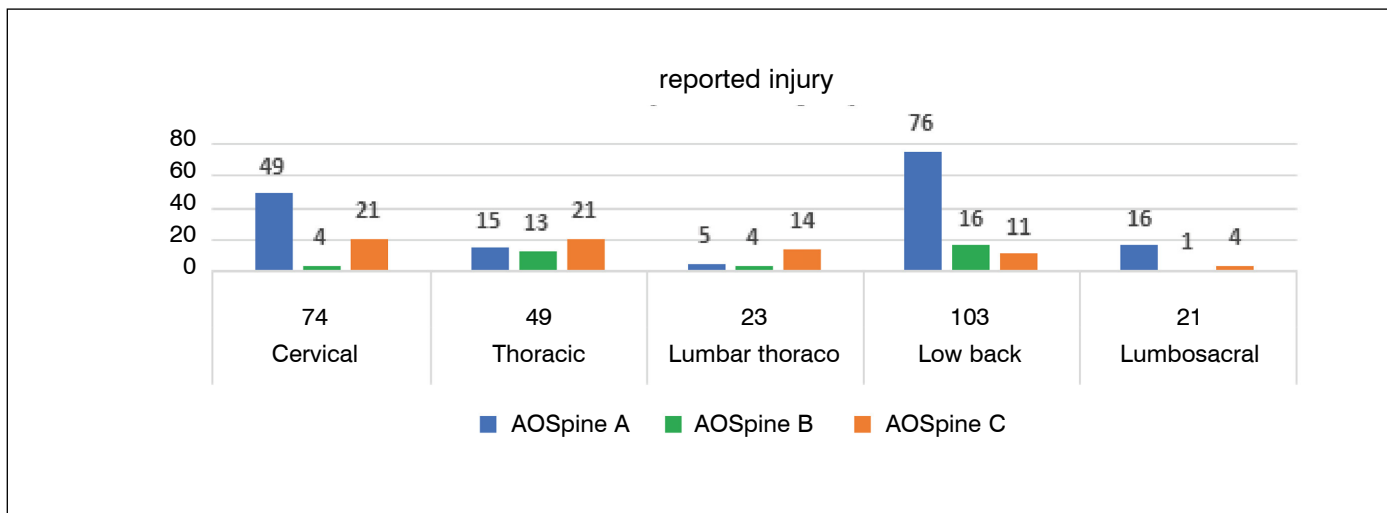


Figure 3. Topography of injuries and AOSpine classification of vertebral fractures.

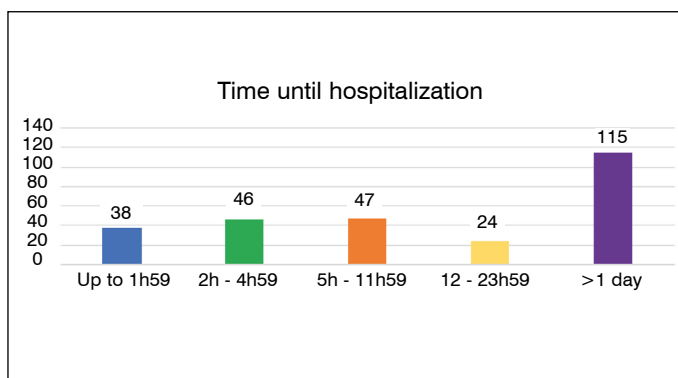


Figure 4. Time between injury and hospitalization of patients at HMUE.

traffic laws, not wearing seat belts, alcoholism, and violent behavior. Furthermore, most of those patients had not completed elementary school and earn up to 2 minimum wages per month. These data demonstrate that low income and educational level are major health determinants, due to higher social vulnerability.^{1,10}

There was a higher prevalence of young adults, as this group is more likely to be involved in motorcycle accidents caused by risky attitudes, such as driving while drinking alcohol, as well as involvement in physical aggressions.¹⁰ Moreover, when compared to a study by Souza Junior et al. (2003), this study showed an increased prevalence of patients aged over 60 years who had suffered vertebral trauma.¹¹ In 2003, 3.6% of patients seen at the same reference center for trauma were elderly, as opposed to 12.9% in the present study. The epidemiologic transition verified in Brazil might explain the changes in that data.¹¹

Over 75% of the elderly patients reported episodes of fall as the main cause of injury, being more vulnerable due to comorbidities such as heart and osteoarticular diseases, reflecting national trends.^{12,13}

It was found that the minority of patients were alcoholics or used illicit drugs, and the injuries presented in this group were closely related to these addictions, such as traffic accidents and crimes.¹⁴ As for the frequency of injuries, a large portion of the injuries occurred during school vacations (June and July), when the volume of traffic increases significantly on the intermunicipal highways, often exacerbated by a lack of traffic signing, pavement markings, and police inspections.¹⁵

Although some regions, such as the *Baixo Amazonas* and *Carajás* zones, are served by hospitals like HMUE, there is still a large number of patients from other areas treated at HMUE, such as the *Rio Tocantins* region, reinforcing the fact that many parts of the State still do not have sufficient numbers of health professionals

and medical centers to serve the tertiary care needs of the local populations.^{16,17}

Falls from trees and construction site injuries also had considerable prevalence amongst patients, demonstrating that working conditions, especially among informal laborers, are still inadequate in most of these activities.¹⁸ One of the activities associated with injury is the manual extraction of açai (*Euterpe oleracea*) palm and berries in the Amazon estuary, which is the main source of income of many traditional communities, and is carried out without adequate safety.¹⁹

Over half of the individuals seen at HMUE complained only of localized pain, resulting in evolution free from sequelae, which was the case for the majority of patients, as also seen in several similar hospitals in Brazil. These aspects are closely related to hospitalization times at HMUE, with the majority of patients staying for less than one month.^{20,21}

A significant portion of patients took more than one day to receive medical care, impairing the efficiency of interventions that could reduce morbidity. Some hypotheses that might explain this delay are that individuals only seek medical care after developing more severe symptoms; some may have to travel long distances to reach the referral center, and the lack of road infrastructure, making journeys more delayed. This is a common problem among medical reference centers in the Amazon region.^{16,22}

The main type of vertebral injury was low-severity lumbar trauma, which was the most affected region in cases of car accidents and falls from low heights. In these injuries, there tends to be less impact force on spine due to the wearing of seat belts in cars, and weight-bearing on the arms when falling from low heights.^{18,23}

Conservative treatment was the most employed, reflecting the benign aspect of most of injuries, especially the lumbar ones, followed by arthrodesis, which was used more in injuries with signs of instability such as compression of vertebral canal, impacting over 50% of vertebral structure and vertebral translation.^{24,25}

Compared to previous decades, there were more positive outcomes, with a large increase in the number of people recovering without sequelae and a lower percentage of patients coming from rural areas of the state, indicating improvements in the efficiency of public health in Pará. However, the percentage of traffic accidents as the cause of vertebral trauma has increased, reinforcing the need for better awareness strategies and better infrastructure on the roads and highways.¹¹

CONCLUSION

From January 2018 to December 2019, the predominant profile of patients treated for vertebral trauma at the HMUE was men aged between 20 and 29 years, with incomplete primary education,

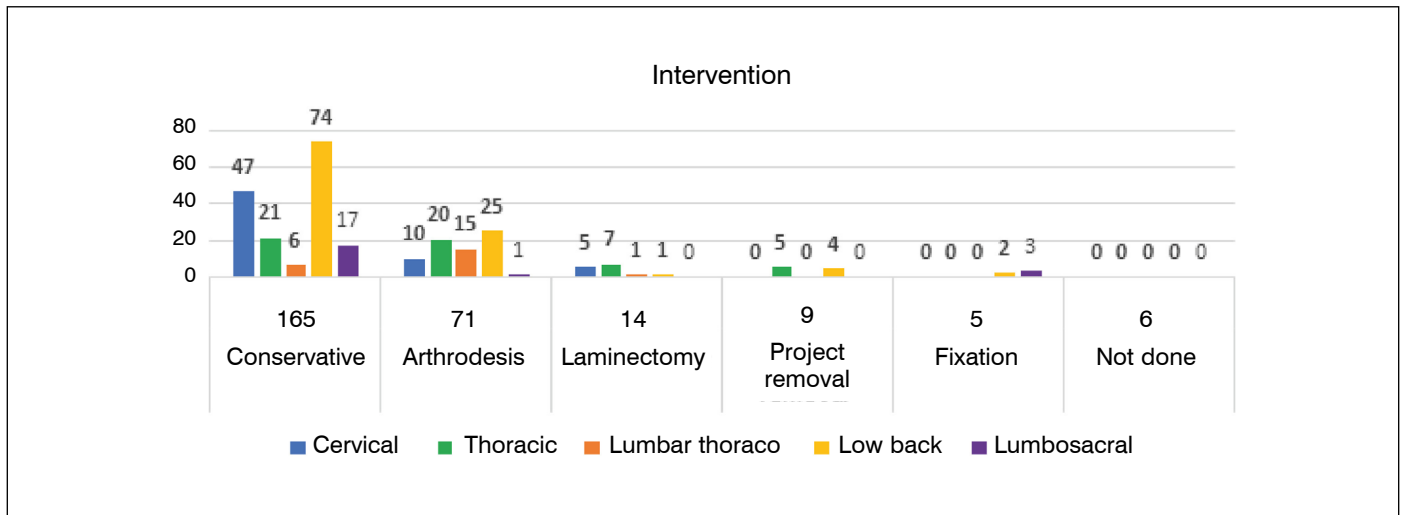


Figure 5. Interventions conducted and location.

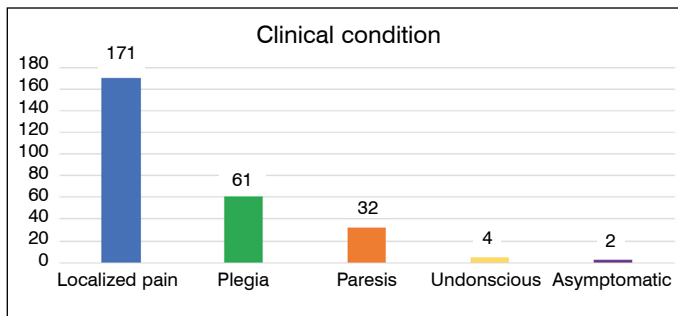


Figure 6. Predominant clinical situation among patients.

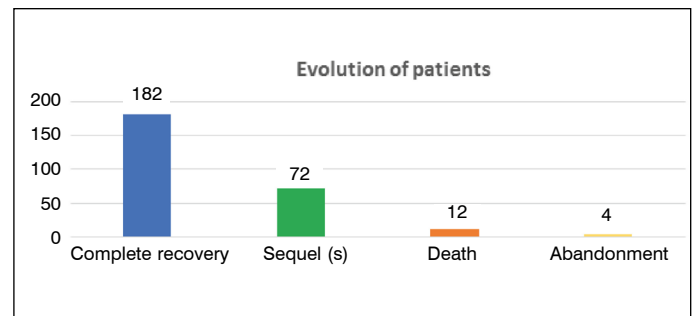


Figure 8. Patient evolution.

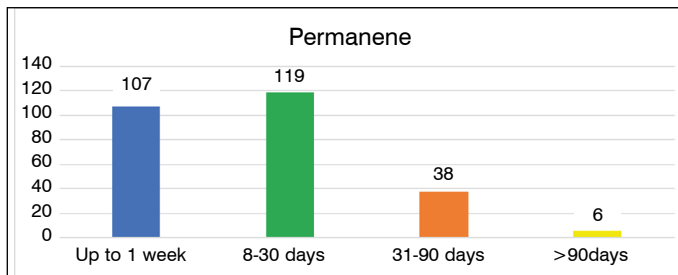


Figure 7. Hospitalization times.

monthly income up to 2 minimum wages, not addicted to alcohol and/or illicit drugs, and being attended in the 3rd quarter of those years. Most of the patients had suffered traffic accidents, and had spent more than one day until hospitalization; the predominant type of injury was compressive lumbar lesion, with localized pain, receiving conservative treatment, with hospital stays of 8 to 30 days, and progressing to full recovery without sequelae.

All authors declare no potential conflict of interest related to this article.

CONTRIBUTION OF THE AUTHORS: Each author made significant individual contributions to this manuscript. EJSS was the main author. MBSH, AMM, BSVI and LMC conducted the bibliographical research, contributed to the preparation of the article, and reviewed the manuscript.

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