



## Knowing to care: characterization of individuals with spinal cord injury treated at a rehabilitation center

*Conhecer para cuidar: caracterização de pessoas com lesão medular atendidas em um centro de reabilitação*

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### Abstract

**Introduction:** Spinal cord injury (SCI) results in motor, sensory and autonomic dysfunction. The symptoms observed in patients with spinal cord injury will depend on the area affected by the injury. Nursing care is essential for better patient outcomes. Objective: The aim of this study was to characterize patients with spinal cord injury treated at a state referral rehabilitation center for SCI. **Methods:** We performed a quantitative cross-sectional descriptive study of 109 patients between the years 2000 and 2009. **Results:** We found a predominance of spinal cord injury in men aged up to 30 years (48.5%). The main causes of spinal cord injuries were traffic accidents. The thoracic region was the most frequently affected site (39.7%), followed by the cervical region (25.6%). Most of the study subjects had been rated as ASIA A, according to the American Spinal Cord Injury Association scale. **Discussion:** These findings corroborate previous studies observing that traffic accidents are the leading causes of spinal cord injury and that

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people affected by it usually do not seek proper care. Receiving early intervention services and counseling is essential for a better outcome and for achieving an improvement in the quality of life of these patients. **Conclusion:** Despite the increasing incidence of spinal cord injuries nowadays, there is still a lack of data on the subject. The greatest limitation of this study is the incompleteness of medical records, which hindered the access to information.

**Keywords:** Spinal cord injury. Rehabilitation. Health Care. Nursing. Physical Therapy.

## Resumo

**Introdução:** O trauma raquimedular consiste numa agressão à medula espinhal que gera sequelas motoras, sensitivas e autônomas. Os sintomas observados nos pacientes com lesão medular dependem da área lesionada. O cuidado em saúde de enfermagem é essencial para a reabilitação dessas pessoas. **Objetivo:** Caracterizar as pessoas com lesão medular atendidas em um centro de reabilitação de referência estadual. **Metodologia:** Estudo descritivo, quantitativo e transversal de 109 prontuários atendidos entre os anos de 2000 a 2009. **Resultados:** Observou-se a predominância de lesão medular em homens com até 30 anos (48,7%), sendo que os acidentes automobilísticos foram as causas mais frequentes. A região mais acometida é a torácica (39,7%), seguida pela cervical (25,6%). A maioria dos indivíduos do estudo apresentava classificação A, de acordo com a escala da American Spinal Cord Injury Association. **Discussão:** A literatura confirma o achado da pesquisa, mostrando que os acidentes de moto e carro são as causas mais frequentes de traumas na coluna e que muitas pessoas, após sofrerem lesão medular, não procuram acompanhamento adequado. As orientações e as intervenções precoces são imprescindíveis para a melhora da qualidade de vida desses pacientes. **Conclusão:** Apesar do aumento da ocorrência de lesão medular na atualidade, observa-se uma escassez de dados sobre o assunto. A maior limitação do estudo são as avaliações incompletas nos prontuários, dificultando o acesso às informações.

**Palavras-chave:** Lesão medular. Reabilitação. Assistência à saúde. Enfermagem. Fisioterapia.

## Introduction

Spinal cord injury (SCI) is defined as an aggression to the spinal cord that can lead to neurological damage, such as impaired motor, sensory and autonomic function. It predominantly occurs in men aged between 18 and 35 years. Since the spinal cord is responsible for controlling many bodily functions, injury to it may cause serious neurological damage (1, 2, 3).

Symptoms vary according to the level of the lesion, its extension, the time of impairment and the type of spinal trauma. People with spinal cord injury may have intestinal and urinary disorders, musculoskeletal atrophy, reduced respiratory capacity and decreased blood circulation, among others (4). Spinal cord injuries occur more frequently in the cervical and thoracic regions. In these cases, they cause severe respiratory and cardiovascular effects (5, 6, 7). Patients with cervical injury experience greater

functional impairment than patients with low thoracic and lumbar injuries (8).

Due to the increase in urban violence, spinal cord injuries have become more and more frequent. They are mainly caused by traffic accidents, firearm aggression and falls. These accidents are a serious public health problem, increasing morbidity and mortality, as well as health care costs. Moreover, they result in major changes in a person's lifestyle. Although there are few epidemiological data available on the exact number of people with spinal cord injury in Brazil, it is estimated that there are around 130,000 individuals with spinal cord injury in this country (1, 5, 6).

The Pan American Health Organization estimates that 6% of all physical disabilities worldwide are caused by traffic accidents. The physical and disabling aspects of SCI cause serious financial, personal, professional and mobility losses, and result in high hospital and social security costs (9).

The provision of health care to people with spinal cord injury requires the knowledge and skill of a multidisciplinary team which addresses the patient's health care needs in a comprehensive and integrated manner, in order to assist patients in developing their potentials and limiting the disabling effects of the injury. Thus, early intervention is of high importance. Nevertheless, rehabilitation does not lead to cure for the majority of patients with SCI, but rather help them adapt to their new condition (1, 10, 11).

Since spinal cord injury causes several limitations, it puts the individual in a 'terminal condition'. The functional losses brought about by the injury are difficult to accept, both for the people who have suffered the injury and for their carers, family members and health professionals. Physical therapists accompany spinal cord injured patients from injury to rehabilitation and help them cope with their physical limitations and living situations. These patients are filled with concerns, fears and anxieties, and hope to find professionals who provide them with the necessary support. Therefore, the work of a multiprofessional team is of utmost importance (12).

Nursing plays an essential role in the care of people with spinal cord injury. The role of the nurse in the multiprofessional team is more specifically to provide direct care to patients in regard to vesicular-intestinal re-education, skin care, health education for self-care (to patients and their families), and participate in joint actions with other health care team members. The team's job is to minimize or mitigate the barriers imposed by the spinal cord injury, increase the possibilities for social inclusion, reduce physical dependence and strengthen preserved skills (3, 13).

The needs of people with disabilities vary greatly. It is therefore necessary to get to know each individual as well as possible, get to know his/her expectations, desires and limitations in order to provide him/her with efficient and appropriate care (14).

This study aimed to characterize individuals with spinal cord injury treated at a state referral rehabilitation center for SCI between the years 2000 and 2009. Patients were investigated with regard to age, sex, origin, underlying cause, date, level and classification of the lesion, and reason for seeking care the first time. We believe that the knowledge of who these people are qualifies health care, making it more directed at individual needs. Nursing is the science of caring and a nurse's duties will only be properly and fully performed when the nurse possess a deep

knowledge of the person being cared for (15). The characterization of these patients also contributes to the knowledge of the epidemiological profile of spinal cord injury in Brazil.

## Materials and methods

This is a descriptive, quantitative, cross-sectional study. The data were collected from the medical records of patients treated at the rehabilitation center of the State of Santa Catarina from 2000 to 2009, whose primary cause of admission to the center was spinal cord injury. Data collection was carried out from January through July 2011. All the collected data were available in the medical records. We used GraphPad Prism 5 software package (GraphPad Software Inc., San Diego, CA) to organize, tabulate and statistically analyze the results. The data were analyzed using univariate and bivariate descriptive statistics.

The study project was approved by the Research Ethics Committee of the UFSC, opinion number 1024, 07/10/10. This research was funded by the FAPESC – Foundation for Research Support of the State of Santa Catarina (contract number 24334/2010-5).

## Results

In this study, we analyzed 109 medical records of individuals with spinal cord injuries in order to identify the predominant sex and age groups, as well as the main causes of the spinal cord injuries, the interventions performed, and the amount of time this group of people remained without proper counseling and treatment. Of these 109 medical records, 31 were excluded from the study because they lacked important data for the conduction of the study.

We found that 82% of patients were male, while only 15% were female. Given that patients had been identified by their initials, the analysis of 3% of the records could not be performed because they lacked information on the patient's gender.

The patients' age ranged from 2 to 67 years, with a mean of 31.6 years. We found that people aged 10-32 years are at higher risk of suffering spinal cord injuries, since 48.7% of the cases studied belonged to this age group. People aged 33-54 years (39.8%) are at a slightly lower risk. Nevertheless, this is still

a high percentage. We found smaller percentages of spinal cord injuries in individuals aged 1-10 years (5.1%), 55-65 years (5.1%) and 66-76 years (1.3%).

Figure 1 shows that the main causes of spinal cord injuries are motorcycle and car accidents, injuries by firearms and falls from a height. Other traumas to the spine are the result of pedestrian accidents, diving accidents and diseases such as: compressive disc disease, multiple myeloma, thoracic neuroblastoma, spinal cord ischemia, Hodgkin's lymphoma, and cervical canal stenosis. 7.6% of the records did not specify the cause of the injury.

The spinal cord injuries assessed occurred between 1985 and 2010. However, patients' first visits to the rehabilitation center took place from the year 2000 onwards. Some patients had no recent injury, i.e., they had suffered spinal cord injury more than 20 years before, but only recently had been receiving care or counseling. 43.5% of patients had undergone some treatment within one year since spinal cord injury. However, 19.2% first visited the center over one year after injury, 11.5% after two years, 16.7% after 3-15 years, and 7.7% after more than 15 years. This information was not provided in the remaining records.

The main reasons for seeking rehabilitation care were: to follow a rehabilitation program; the need for application of botulinum toxin; placement of lower limb orthoses; and other reasons, such as: placement of halo vest, use of wheelchairs and crutches, and treatment of pressure ulcers. 16.7% of the medical records analyzed did not contain this information (Figure 2).

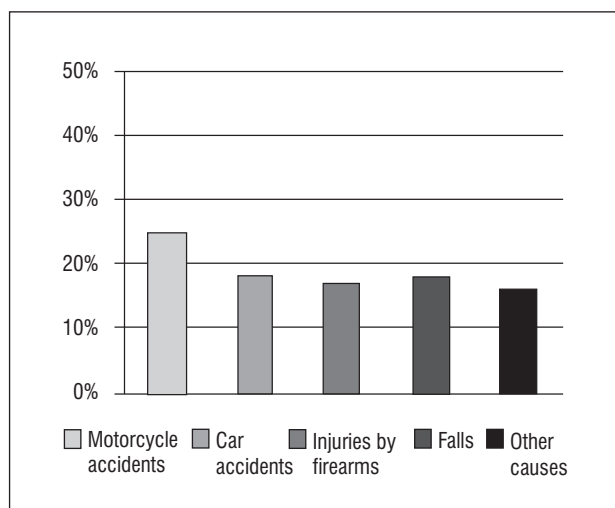


Figure 1 - Main causes of spinal cord injuries

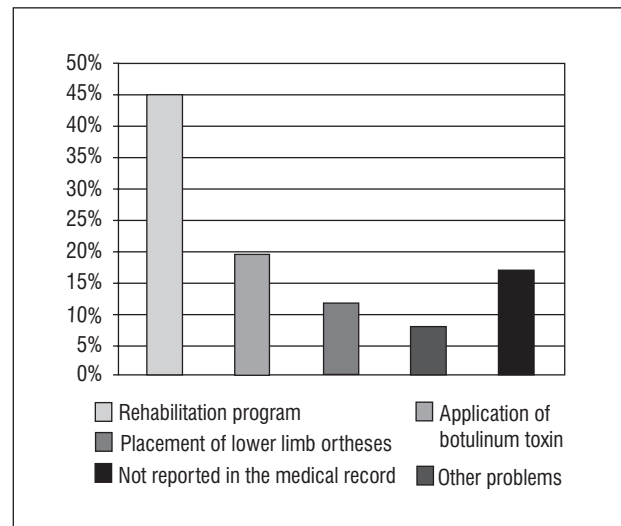


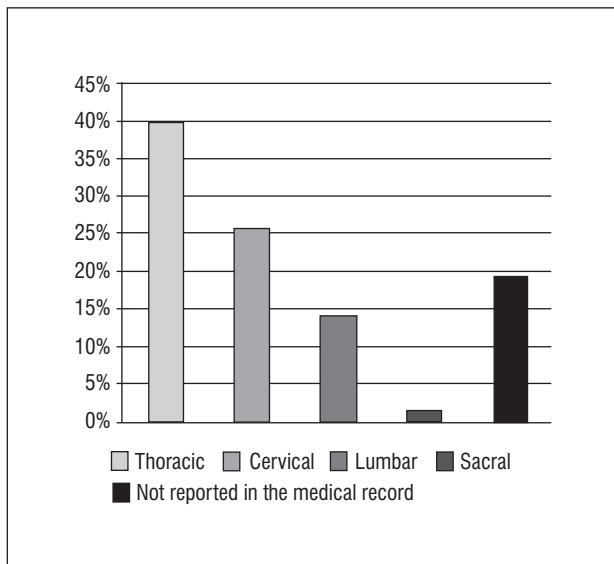
Figure 2 - Reasons for seeking care

57.2% of the participants of the rehabilitation program had joined the program soon after injury. The remaining 42.8% joined the program one, two, four or even twelve years after suffering spinal cord injury. Thus, there was a significantly high number of patients who did not receive adequate care in the early stages of the injury.

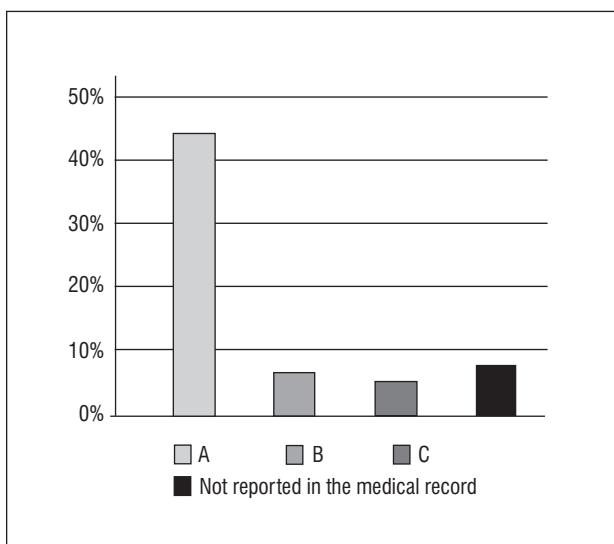
Figure 3 shows the regions most affected by spinal cord injury. The thoracic and cervical regions are the most frequently affected regions, followed by the lumbar region and, less often, the sacral region. 19.2% of the medical records did not contain information on the level of injury.

When comparing the most frequently affected areas of the spine to the cause of the lesion, we found that spinal cord injuries due to falls (50%), injuries by firearms (53.8%), motorcycle accidents (42.1%), and car accidents (42.9%) mainly affected the thoracic region. Spinal cord injuries from falls also resulted in damage to the lumbar region of the spine in 28.6% of cases, whereas the cervical spine was often injured in motorcycle (31.6%) and car (28.6%) accidents.

Some of the medical records analyzed (62.8%) contained information on the classification according to the American Spinal Injury Association (ASIA) scale, established by the American Association of Spinal Cord Injury. We observed that most of patients had been classified as ASIA A (complete spinal cord injury), i.e., as having no sensory and motor function below injury level. However, 37.2% of the medical records evaluated did not provide this information (Figure 4).



**Figure 3** - Regions of the spine most frequently affected by spinal cord trauma



**Figure 4** - Classification according to the ASIA scale

## Discussion

Spinal cord injuries are classified as: traumatic, caused by car accidents, falls, firearms, urban violence and sports; and non-traumatic, caused by vascular and degenerative disorders, spinal tumors, infections and inflammatory processes of the spine (16). The data found in the medical records are in line with the literature, since the analysis of the medical records of the rehabilitation center revealed that the main causes of spinal cord injuries are car and motorcycles accidents, followed by injuries by firearms and by falls.

The proportion of spinal injuries caused by motorcycle accidents is higher than the one cause by other types of accidents because the motorcycle driver/passenger receives the full impact of the collision. Consequently, victims have multiple trauma with more severe, localized lesions, especially in the head and extremities (17). This study corroborates the findings of the literature, inasmuch as most injuries affected the thoracic spine, especially those caused by falls, followed by those cause by firearms, motorcycle accidents and car accidents. The cervical spine was mostly injured in motorcycle and car accidents.

Traumas to the cervical and thoracic spines are more severe because they alter respiratory and cardiovascular functions, making these individuals more prone to systemic inflammation. Cervical spine lesions cause changes in the mechanical properties of the lung, surfactant changes and reduction in lung volume. In addition, they result in complete paralysis of inhaling and exhaling muscles, and respiratory muscle fatigue, which consequently leads to an inefficient ventilation and dependence on mechanical ventilation. Therefore, the higher the spinal cord injury, the greater the complications (5, 6, 7).

Some assessments, such as the ASIA scale, are used to evaluate the level of injury impairment. This scale is an important tool, which allows the classification of individuals with spinal cord injury into several categories, helping to determine the patient's current condition and his/her prognosis. It has two components: the sensory component and the motor component. Moreover, the scale allows to determine whether the spinal cord injury was complete or incomplete, by classifying spinal cord injuries into five categories: A – complete injury, no motor or sensory function below the level of injury; B – incomplete injury, sensory function is fully or partially preserved in sacral segments but there is no motor function below the level of injury; C – incomplete injury, motor function is preserved below the level of injury but the muscles below the level of injury present muscle strength lower than 3; D – incomplete injury, muscle strength below the level of injury equal to or higher than 3; and E – normal sensory and motor function (18). However, many medical records lacked information on the classification of patients according to the American Spinal Injury Association (ASIA) scale. This demonstrates and suggests flaws in the reporting system of patients admitted to the rehabilitation center. The scale is important in determining the prognosis

of spinal cord injuries. Nevertheless, in those records that contained this information, most patients had been rated as ASIA A.

In addition, we found that some of the patients treated at the rehabilitation center had suffered spinal cord injury more than 20 years before, but only recently had been receiving care or counseling about their health condition. We noticed that less than half of the patients had undergone some kind of treatment within one year since spinal cord injury. Although studies show that the survival rate of these individuals is high, it is necessary for this purpose to receive early intervention, starting on arrival at the hospital, the emergency department, the infirmary or the intensive care unit. The degree of functional recovery of a patient with SCI is related to the therapeutic approach received in the acute phase, the patient's age and the level of spinal cord injury. Because accidents are not predictable, when they happen, quick and objective measures need to be taken in order to minimize and stabilize the damage (3, 10, 11).

Rehabilitation programs for individuals with SCI are long and costly to implement. In addition, they do not lead to cure for the majority of patients with SCI, but rather help them adapt to their new condition. The rehabilitation process aims to improve the patient's self-esteem and quality of life through functional independence and social inclusion (1, 16). According to a 2011 study (15), the health professionals need a comprehensive view of the patient's condition. They need to get to know the patient and take his/her objectives into account, in order to provide him/her with greater autonomy.

Physical therapy prevents or mitigates the deleterious effects of immobility. Thus, therapeutic exercise and functional training are important for the recovery of the patient. The exercises performed in rehabilitation improve muscle strength, coordination and endurance, and decrease the incidence of urinary tract infections, bedsores and hospitalizations.

However, in order to provide care to these people, health professionals need to have a knowledge of this subject, especially of the clinical complications of SCI. Thus, the treatment of SCI patients requires a multidisciplinary team of health care providers that can assist patients in developing their potentials and limiting the disabling effects of the injury. The treatment of SCI patients consists of physical training, prevention of sequelae,

deformity correction and psychological care (9). Proper counseling of patients is also required, because this group of individuals suffer personal and psychosocial distress, as well as significant socioeconomic consequences (1, 10, 11).

Spinal cord injury is a major public health problem due to the complications experienced by SCI patients and their families, given that the reality of living with a family member who is physically dependent creates a sense of fragility. SCI patients suffer and at the same time refuse treatment and care. This causes great distress to their families, who worry and feel they have the duty to take care of their patients and help them follow the treatment plan. It is difficult for them to understand the self-destructive attitudes and behaviors of spinal cord injured individuals. Therefore, a good interaction between the health care team and the families of patients with spinal cord injury is important for the recovery of these individuals.

## Final considerations

This study was based on the analysis of medical records of patients treated at the rehabilitation center, as well as on a review of literature on spinal cord injury, including its main causes, consequences and mechanisms, and the importance of rehabilitation after the injury. We found that, due to the increase in urban violence, spinal cord injuries have become increasingly frequent. Thereby, the most frequent causes of SCI are traffic accidents and injuries by firearms. These findings were corroborated by the data obtained from the medical records analyzed.

A review of the literature confirms that spinal cord injury leads to many sequelae, functionally limiting the patient. Nevertheless, these patients have a significantly greater survival rate when they receive early specialized and multidisciplinary care.

As this study was based on data obtained from patient records and some of these records were incomplete, some items could not be identified.

## Financial support

This study had financial support from the Foundation for Research Support of the State of Santa Catarina (FAPESC).

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Received: 12/26/2013

Recebido: 26/12/2013

Approved: 07/14/2014

Aprovado: 14/07/2014