

## Demographic pattern, clinical profile and outcome of traumatic spinal cord injuries at a tertiary care hospital

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**Abstract:** *Background:* Traumatic spinal cord injury (SCI) is recognized as a serious public health problem resulting in significant morbidity, mortality and permanent disability. The present study is aimed to describe the epidemiological characteristics and outcome of patients with traumatic spinal cord injury in rural tertiary referral care center form South India. *Material and methods:* The present study was conducted at Narayana Medical College and Hospital, Nellore. All patients admitted and managed for traumatic spinal cord injury were retrieved and data collected in a pre-designed proforma. Patient characteristics, details of etiology, mechanism of injury, level of injury, extent of neurological deficits, details of investigations, details of management and immediate outcome were recorded. *Results:* A total 152 patients were included in the present study. The mean age was 38.45 years and majority the patients were young adult males. The mean hospital stay was 19.12 days. 71.7% percent patients were non-agriculture workers (mainly involved in construction work) and 28.3% patients were farmers. 61.2% of the patients sustained injuries due to fall from height and 34.2% patients sustained injuries due road traffic accidents. Cervical spine injuries were most common (44.1%), followed by thoraco-lumbar region (36.8%) and dorsal spinal region (19.1%). 9 patients expired in post-injury during hospital stay and all of them had complete cervical spinal cord injury. All patients received aggressive rehabilitation care. *Conclusion:* In accordance with the literature our results reflect that traumatic spinal cord injuries affect young population and can leave these persons with significant functional and physical morbidity. The major limitation of the study is that it is a single institution based and may not reflect the true spectrum of traumatic spinal cord injuries in the population.

**Key words:** Spinal cord injury, spinal injuries, spinal trauma

## Introduction

Traumatic spinal cord injury (SCI) is recognized as a serious public health problem that can result in significant morbidity, mortality and permanent disability (leading to emotional and financial hardships). (1-3) Only few studies report the epidemiological characteristics of traumatic SCI in developing countries and describe their etiology, demographic and clinical characteristics and management options. (4, 5) The present study is aimed to describe the epidemiological characteristics and outcome of patients with traumatic spinal cord injury in rural tertiary referral care center from South India.

## Material and methods

The present study was conducted at Narayana Medical College and Hospital, Nellore. After approval from the Institutional Ethical Committee, the medical records of all patients admitted and managed for traumatic spinal cord injury were retrieved and data collected in a pre-designed proforma. Patient characteristics including age, gender, occupation were noted. Details of etiology, mechanism of injury, level of injury, extent of neurological deficits, details of investigations, details of management and immediate outcome were recorded. The details of motor and sensory functions were recorded by using the American Spinal Injury Association (ASIA) scale and the severity was classified as complete or incomplete injury. (6) The data were analyzed on Epiinfo<sup>®</sup> version 7. The descriptive statistics were used to calculate mean and frequencies of data.

## Results

A total of 152 patients were included in the present study. The mean age was 38.45 years (range 6-72 years SD±14.566 years). In present study majority of the patients were young adult males (Figure 1). The mean hospital stay was 19.12 days (range 4-59 days SD±10.699 days). 71.7% percent patients were non-agriculture workers (mainly involved in construction work) and 28.3% patients were farmers. 61.2% of the patients sustained injuries due to fall from height and 34.2% patients sustained injuries due road traffic accidents. Cervical spine injuries were most common (44.1%), followed by thoraco-lumbar region (36.8%) and dorsal spinal region (19.1%). In our series majority of the patients had incomplete spinal cord injury. 18 patients had associated traumatic brain injury and had low Glasgow Coma Score at the time of presentation. CT scan was performed for all these patients and two patients had lesions (one patient extradural hematoma and one patient acute subdural hematoma) those required neurosurgical intervention. Twenty two patients were managed conservatively and 130 patients underwent spinal fusion and fixation. Elective mechanical ventilation was required in 19 cases (all cases were of cervical spine injuries). 9 patients expired post-injury during hospital stay and all of them had complete cervical spinal cord injury. All patients received aggressive rehabilitation care (chest physiotherapy, bowel, bladder and back care).

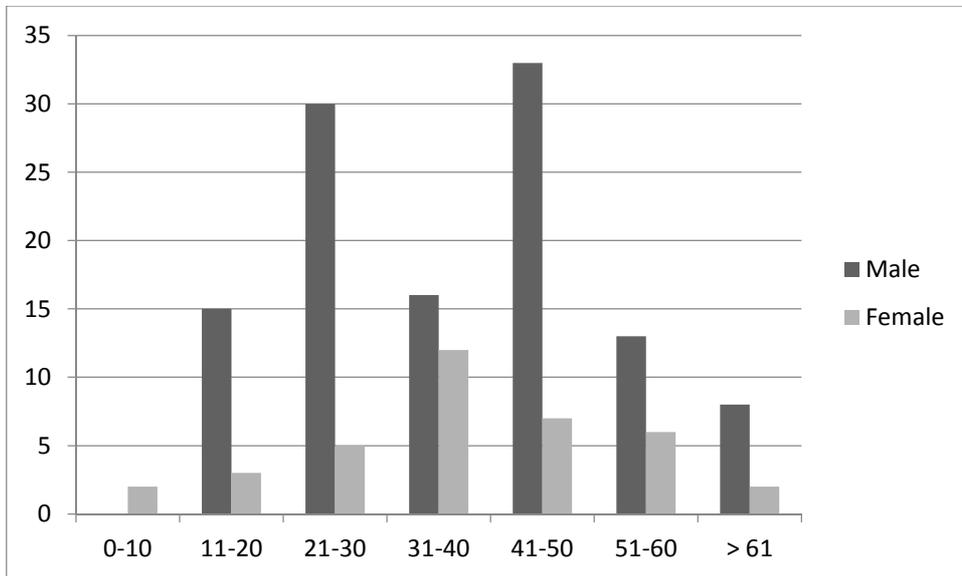


Figure 1 - Age and gender distribution (n=152)

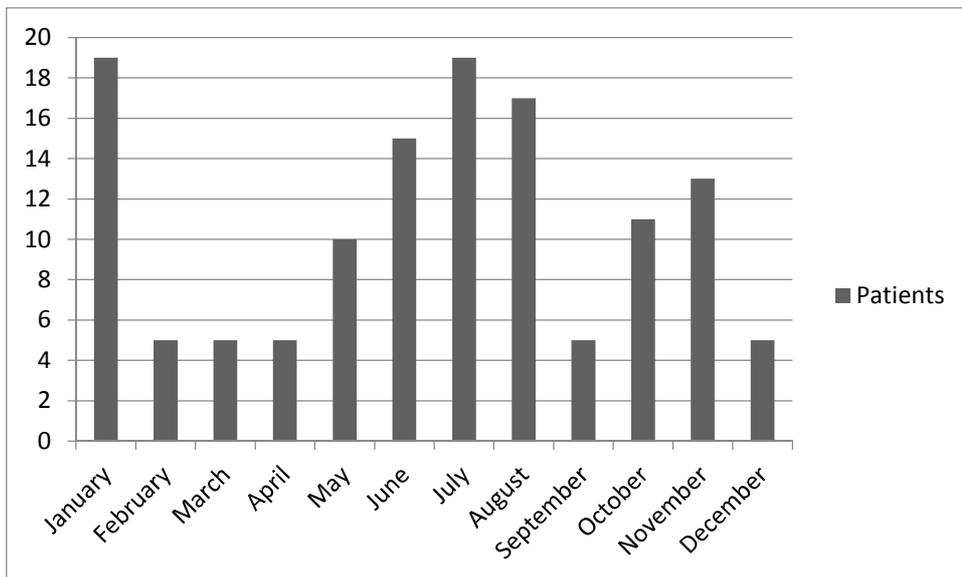


Figure 2 - Distribution of the patients according to the month of the year

## Discussion

As we observed and many studies have reported in the past, traumatic spinal cord injury young adult males in their productive years. (7-9) (1, 9-13) As reported in many, fall from height was the leading cause of spinal cord injuries in our series (mainly in non-agricultural workers followed by agricultural workers). (14-19) In contrary to this many other studies have reported where the authors found agricultural workers (9, 20) and road traffic injuries (21-23) as the commonest causes of traumatic spinal cord injuries respectively. We found incomplete injuries more than the complete injuries and cervical spine injuries were being the most common (44.1%), followed by thoraco-lumbar injuries (36.8%) and dorsal spinal injuries (19.1%). In literature the distribution of incomplete and complete injuries varies as per the anatomical involvement, location and mechanism of the injuries. (1, 9, 20, 24-26)

Most of the traumatic spinal injuries are managed by neurosurgeons, spinal surgeons and by orthopedic surgeons (followed by intensive rehabilitation) and the management of spinal cord injury patients is determined by their neurological status, instability of the spine and ability to tolerate neurosurgical intervention. (4, 27, 28) As described in the literature, in majority of our patients surgical interventions were performed for different indication to stabilize the spine and/or to decompress the spinal cord. (29-32) Depending on the severity of level of the spinal cord injury, the duration of the hospital stay varies. In present study we noted that tThe

mean hospital stay was 19.12 days (range 4-59 days  $SD \pm 10.699$  days). Lan et al reported that the average hospital stay for paraparetic was 62 days, for paraplegics 118 days, for tetraparetics 102 days and for tetraplegics 132 days. (24) In another study the authors reported that the mean hospital stay for paraparetic was 44 days, for paraplegics, for tetraparetics 90 days and for tetraplegics patients it was 100 days. (1) In present study we found the mortality rate of 5.9%. Chen et al (1) reported a mortality rate of 6.0% and Lan et al (24) reported a mortality rate of 10.1%. respiratory failure (particularly in tetraplegic) was the leading cause of mortality. (1, 24) Other causes those can influence the outcome include sepsis (from pressure ulcers), renal failure and other associated systemic injuries (abdominal/chest injuries, head injury). (1, 24)

In present study we did not collect data regarding financial implications of spinal cord injuries. However because of the difficult to cure and their potential to give rise to much human stress traumatic spinal cord injury can cause great loss not only to the individuals but also to the society. (33) The lifetime cost of the traumatic spinal cord injuries has been shown to be directly attributed to the age at the time of injury and the severity of injury. (30) It has been estimated that the lifetime costs for an incomplete motor lesion at age 50 years at any level range from \$300,000 to \$1.7 million for a person who sustain higher injuries (tetraplegia) at the age of 25 years. (34) Type of transportation depends on locations of treating facilities and availabilities of pre-hospital care. In major cities there is greater availability of ambulance networks equipped

with trained and semi-trained personnel's, in contrary to this in rural areas these patients are transferred by untrained personnel's with different means. (35, 36)

### Conclusion

In spite of much advancement for the management of spinal cord injury patients, there is no definitive treatment modality which can help to recover the neurological functions. Hence the preventive programs have been promoted to prevent spinal cord injuries. (17, 20) Preventive strategies and policies needs to be focused on subjects with high risk activities: sports activities (diving and motorcycles accidents) for young people; road traffic accidents for adults; injuries due to fall in elderly population. (37) The major limitation of the study is that it is a single institution based and may not reflect the true spectrum of traumatic spinal cord injuries in the population. However in accordance with the literature our results reflect that traumatic spinal cord injuries affect young population and can leave these persons with significant functional and physical morbidity.

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