

# Clinical and sociodemographic profiles of persons with spinal cord injury

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## ABSTRACT

**Aim:** To collect and correlate the sociodemographic and clinical details of persons with spinal cord injury who were admitted to the Department of Neurological Rehabilitation. **Objectives:** To assess the sociodemographic characteristics and collect the clinical profiles of persons with spinal cord injury and to correlate their sociodemographic and clinical details. **Materials and Methods:** A retrospective file review was done over a period of 2 years from January 2017 to December 2018 to study patients with spinal cord injury who were admitted to the Neurological Rehabilitation ward of NIMHANS, Bengaluru, Karnataka, India. **Results:** A total of 60 patients were admitted with spinal cord injury. The mean age was 32.39 years and majority of the patients were young married males. Most of them belong to the low socioeconomic status and are housewives and daily wage laborers. Falls and road traffic accidents are the causes for the injury. Anxiety and depression are high among traumatic spinal cord injury patients. **Conclusion:** This information may contribute to prevent SCI and to improve the quality of life of patients with SCI. It has implications for the primary care physicians who are at first contact to identify and refer them for specialized super speciality district hospitals for further treatment as they pose a great threat to public health and their proportions are increasing. It is imperative that trauma care is included in graduate medical training as well to facilitate early intervention after initial screening.

**Keywords:** Clinical profile, sociodemographic profile, spinal cord

## Introduction

Spinal cord injury (SCI) is a life-changing event and has profound effects on various domains like physical, emotional, and social life. It can be either traumatic or nontraumatic and complete or incomplete. The mortality risk increases with injury level and severity and is strongly influenced by the availability of timely and quality medical care and medical professionals. SCI alters the previous lifestyle of the person, causing a high biosocial and

economic impact both in the short- and long-term of the young persons during their productive age.<sup>[1]</sup>

Insights about the data of the spinal cord injury are important to provide the clinical and community services and will help us in categorizing the resources, allocating to the needy, and to regulate the interventions for better outcomes. The studies on spinal cord injury from the developing countries are limited but it is important to understand the risk factors in order to reduce the incidence rate. Investments in manpower, equipment, infrastructure, and supplies are phenomenal and occupy 70–80% of the total cost of the care. However, the allocated budget for trauma care is insufficient.<sup>[2]</sup>

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Due to lack of research, no comprehensive data are available from India on the prevalence of injuries. The absence of emergency and trauma care and inadequate care provided by local practitioners combined with various dangerous home remedies aggravate injuries and complications, especially in rural areas and districts.<sup>[2]</sup>

## Methods and Materials

### Data collection

Data were collected from all the patients admitted to the DNR from January 2017 to December 2018. Only those patients with complete information were included in this study. Data that were recorded consisted of the sociodemographic profiles and clinical profiles of the patients. The sociodemographic profile includes the variables like gender, age, education, occupation, marital status, religion, SES, community, and domicile. The clinical profile includes the variables like diagnosis, type of injury, DOI, DOS, comorbidity, HADS, and cause of injury.

### Setting and participants

NIMHANS is recognized as a tertiary super speciality hospital and it receives all types of spinal injury patients either directly or through reference from different hospitals and from all over India for rehabilitation.

## Results

Table 1 displays the information related to the sociodemographic background variables such as gender, education, occupation, marital status, religion, socioeconomic status, community, and domicile of the respondents.

Of the total 60 patients, 36 (60%) were male; 23 (38.3%), 19 (31.7%), and 7 (11.7%) patients have completed secondary, primary, and graduate level education, respectively, and 6 (10.0%) patients were illiterates. 17 (28.3%), 16 (26.7%), and 13 (21.7%) patients were students, daily wage laborers, and housewives, respectively. 35 patients (58.3%) were married. 27 (45.0%) were from low-income families and 32 (53.3%) were from middle-income families. Most of them are from rural community (37; 61.7%) and hail from Karnataka (29; 48.3%) followed by West Bengal (13; 21.7%) and Andhra Pradesh (10; 16.7%).

Table 2 displays information related to the type of injury, etiology of nontraumatic SCI, cause for the illness, duration of illness, duration of stay, co-morbidity, and HADS of the respondents.

Among all the patients, 41 (68.3%) were diagnosed with nontraumatic SCI; of the 41 nontraumatic SCI patients, 27 (45.0%) developed the illness due to the inflammation of the spinal cord whereas 7 (11.7%) patients developed it both due to infection and tumor of the spinal cord. The cause for the illness was due to falling in 11 patients (18.3%), followed by RTA in

**Table 1: Sociodemographic profiles of persons with SCI**

	Frequency (n=60)	Percent (%)
Gender		
Male	36	60.0
Female	24	40.0
Education		
Illiterate	6	10.0
Primary	19	31.7
Secondary	23	38.3
PUC	4	6.7
Degree	7	11.7
Post graduate	1	1.7
Occupation		
Student	17	28.3
Private employee	9	15.0
Daily wage laborers	16	26.7
House wife	13	21.7
Farmer	5	8.3
Marital status		
Single	25	41.7
Married	35	58.3
Religion		
Muslim	8	13.3
Hindu	52	86.7
SES		
Low	27	45.0
Middle	32	53.3
High	1	1.7
Community		
Rural	37	61.7
Urban	23	38.3
Domicile		
Karnataka	29	48.3
Andhra Pradesh	10	16.7
West Bengal	13	21.7
Other	8	13.3

6 (10.0%) and assault in 2 (3.3%). Most of the patients (18; 30.0%) have had illness for 2–4 weeks, 16 (26.7%) patients for less than a week, 12 (20.0%) patients for 1–3 months, and 6 (10.0%) patients for 3–6 months and more than a year. Most of the patients (24; 40.0%) have stayed in the hospital for 2–3 weeks, 18 (30.0%) for 1–2 weeks, and 4 (6.7%) for more than a month. 16 (26.7%) patients have reported the co-morbidity. Most of the patients (24; 40.0%) have had the borderline range of anxiety and depression and 20 (33.3%) have reported abnormal scores.

Table 3 displays the information about the cross tabulation of different variables like HADS and gender, marital status, SES, and type of injury to understand the nature of the relationship between each other.

Compared to women, men have reported high score in HADS; among all the patients, 24 patients (15 male and 9 female) have reported borderline HADS, 20 (13 male and 7 female) patients were under the abnormal category, and 16 ( 8 male and 8 female) were in the mild category. Among all, married

**Table 2: Illness profiles of persons with SCI**

	Frequency	Percent (%)
Type of injury		
Traumatic	19	31.7
Non traumatic	41	68.3
Etiology of Non-T SCI		
Tumor	7	11.7
Infection	7	11.7
Inflammation	27	45.0
Cause		
Assault	2	3.3
RTA	6	10.0
Fall	11	18.3
Duration of illness		
Less than a week	16	26.7
2-4 weeks	18	30.0
1-3 months	12	20.0
3-6 months	6	10.0
6-12 months	2	3.3
More than a year	6	10.0
Duration of stay		
Less than a week	8	13.3
1-2 weeks	18	30.0
2-3 weeks	24	40.0
3-4 weeks	6	10.0
More than a month	4	6.7
Comorbidity		
No	44	73.3
Yes	16	26.7
HADS		
Mild	16	26.7
Borderline	24	40.0
Abnormal	20	33.3

**Table 3: Cross tabulation of the variables**

	HADS (Frequency)		
	Mild	Borderline	Abnormal
Gender			
Male	8	15	13
Female	8	9	7
Marital status			
Single	7	9	9
Married	9	15	11
SES			
Low	7	11	9
Middle	9	13	10
High	0	0	1
Type			
Traumatic	5	10	4
Nontraumatic	11	14	16

patients have reported high scores in HADS when compared with the unmarried patients. Most of the married patients fall under the category of borderline (15 married and 9 unmarried) and abnormal (11 married and 9 unmarried). Both the low and middle socioeconomic status of the patients have reported high scores in HADS. Compared with the low-income status,

middle-income patients have high scores in HADS. Nontraumatic SCI patients have reported a high score in HADS when compared with traumatic SCI patients. 16 nontraumatic SCI patients have reported abnormal range of HADS whereas only four traumatic SCI patients have reported the same. 11 nontraumatic SCI patients have reported mild HADS while only five traumatic SCI patients have reported the same.

Table 4 displays the information about the cross tabulation of different variables like the type of injury and gender, marital status, community, occupation, and duration of stay to understand the nature of the relationship between each other.

Compared to females (3), males (16) have reported the more number of traumatic SCI cases, whereas there is mostly an equal chance of having the nontraumatic SCI in both males (20) and females (21). Most of the nontraumatic SCI patients were married (25) and traumatic SCI has been reported in equal number by both single (9) and married (10) patients. Both traumatic (11) and nontraumatic (26) SCI have been reported mostly by the rural community when compared with the urban community. Eight daily wage laborers reported traumatic SCI when compared to patients with other occupations and one housewife reported low traumatic SCI. While 19 nontraumatic SCI patients have stayed for 2–3 weeks, 12 patients have stayed for 1–2 weeks in the hospital.

## Discussion

The present study explores the demographic characteristics, cause of injury, and clinical conditions of patients with SCI, who have availed the neurorehabilitation services. Patients were referred from neurology and neurosurgery units also. The mean age of patients in the present study was 32.39 years, which indicates that SCI affects their productivity and makes them dependent. In a systematic review by<sup>[3]</sup> Rahimi *et al.* (2009) that analyzed the epidemiological characteristics of patients with SCI in developed countries, it was found that the male gender predominated. The average age at presentation was 32.4 years.

The main cause of SCI was automobile accidents followed by falls. Complete injuries and paraplegia predominated. The male to female ratio is 3: 2 whereas in Turkey<sup>[4]</sup> it was 2.5:1 and<sup>[5]</sup> (5.8:1). In our study, the male (36) population is higher than the females (24) population which is similar to the studies from both Turkey and across the globe.<sup>[6-10]</sup> It is because the male population are engaged in various high-risk occupations compared to female.

Mathur and colleagues (2015) have also reported that the major cause for the spinal cord injury is occupational hazards like fall from heights (53%) and road traffic accidents (23%), carrying heavy object overhead (3.0%), and fall following electric shock (4.0%). The respondents of the study have reported similar reasons. Compared to singles, married people were at high risk for spinal cord injuries. The current study findings reveal that 58.3% were married which is similar to the studies from the Western countries (57.7%)<sup>[11]</sup>. A study from India has also reported that most of the patients were married people<sup>[12]</sup> (70%).

**Table 4: Cross tabulation of the variables**

	Type (Frequency)	
	Traumatic	Non-traumatic
Gender		
Male	16	20
Female	3	21
Marital status		
Single	9	16
Married	10	25
Community		
Rural	11	26
Urban	8	15
Occupation		
Student	4	13
Private employee	4	5
Daily wage laborers	8	8
House wife	1	12
Farmer	2	3
Duration of stay		
Less than a week	6	2
1-2 weeks	6	12
2-3 weeks	5	19
3-4 weeks	1	5
More than a month	1	3

This is because males were the breadwinners of the family and they receive immediate attention as family sustenance depends on them.

A significantly higher percentage of SCI, 58.3%, were married at the time of injury in our study. It would affect their sexual life and impact the marital quality and the burden of caring falls on the spouse. More family support from their families of orientation and extended relatives would strengthen the spouse to take the role of the caregiver and to deal with the various psychosocial issues. The present study reveals that 26.3% of the patients were daily wage laborers; a study from India has reported that 46.7% patients were labourers<sup>[13]</sup> and another study from India<sup>[12]</sup> has reported that students were the second highest (23.33%) category.

While in this study most of the patients have completed primary (31.7%) and secondary education (38.3%), another study conducted in México has found that 63% of the population have a low education level (less than 9 years). The level of education is an important indicator as it has been regarded as a key determinant of the return to work in patients with SCI, (pagliacci *et al.* 2003<sup>[14]</sup>, and Fekete *et al.*, 2014<sup>[15]</sup>). Lower education levels are associated with jobs that demand an excess of physical activity and, when it comes to SCI patients, their physical capacity is limited and it becomes difficult to rehabilitate them to remunerative jobs (Ku 2007<sup>[16]</sup>).

In the current study, falls (18.3%) were the highest reason of SCI followed by RTA (10.0%) which is similar to the studies conducted in Bangladesh (34.8%), other Asian countries (Hoque *et al.*, 1999<sup>[17]</sup>; Islam *et al.*, 2011<sup>[18]</sup>; Razzak *et al.*, 2011<sup>[19]</sup>) such as

India (Chhabra and Arora, 2012<sup>[20]</sup>), Nepal (68.2% according to Lakhey *et al.*, 2005<sup>[21]</sup>), and Pakistan (63% according to Cripps *et al.*, 2014<sup>[22]</sup> and Rathore *et al.*, 2008<sup>[23]</sup>), and studies from Finland (64.9% according to Koskinen *et al.*, 2014<sup>[24]</sup>) and Nigeria (Nwankwo and Uche, 2013<sup>[25]</sup>).

In the current study, 68.3% of the patients were diagnosed with non-TSCI, the possible reason is that NIMHANS being a premier hospital with specialities of neurology and neurosurgery receive referrals for infection, inflammation, tumour, osteoporosis, and arthritis. Over a period, the number of non-TSCI cases is increasing. In the current study, there is significant difference in the anxiety and depression levels associated with the type of injury. The prevalence of anxiety and depression is high among persons with SCI<sup>[26-28]</sup> and the current study also has revealed the same. While most of the non-TSCI patients have reported high HADS score, a study from Australia<sup>[11]</sup> have also reported similar findings.

The probability of depression, anxiety, or stress in respondents with NT-SCI did not differ from persons with T-SCI ( $P > 0.05$ ). Depressive symptoms are associated with a myriad of negative outcomes among persons with SCI including lower functional independence (Malec 1983<sup>[29]</sup>), more secondary complications (Herrick *et al.*, 1994<sup>[30]</sup>), poorer community and social integration (Elliot *et al.*, 1995<sup>[31]</sup>, Fuhrer *et al.*, 1993<sup>[32]</sup>, Macdonald 1987<sup>[33]</sup>), and lower self-appraised health (Schulz 1985<sup>[34]</sup>).

Given the critical role of depression in the health and well-being of persons with SCI, mandatory screening for depression and anxiety are crucial for comprehensive treatment. Arango-Lasprilla *et al.* (2011)<sup>[35]</sup> have examined the prevalence of depression among people with SCI during the first 5 years after their injuries and found that prevalence of depression ranged from 11.9% at 1 year to 9.7% at 5 years post-SCI. They concluded that demographic characteristics, injury causes, and rehabilitation discharge factors were the possible factors that influence depression. The prevalence of depressive mood was high (68%) among person with TSCI and it was significantly associated with gender, education, lesion type, and duration since the injury.<sup>[36]</sup>

Another longitudinal study was conducted by Kennedy and Roger (2000)<sup>[37]</sup> conducted to investigate 104 patients with SCI using Beck Depression Inventory, Beck Hopelessness Scale, State Anxiety Inventory, and Social Support Questionnaire. Their results demonstrated a significant correlation between anxiety and depression in individuals with SCI. Furthermore, the longitudinal results provided an indicator of subtle changes in anxiety and depression over time because of the long-term psychosocial care and rehabilitation programme.

Providing the early rehabilitation services including physiotherapy and occupational therapy within 90 days after the injury was associated with a lowered risk of affective and other psychiatric disorders including depression, anxiety, and bipolar disorder in the TSCI cohort.<sup>[38]</sup> The paucity of prehospital care, improper/



inadequate emergency medical services in the community providing initial treatment, and the delay in reaching the hospital may be some of the factors responsible for the increased disability and burden of care.

## Implications

Majority of them were victims of falls from a height and road traffic accidents. The primitive conditions of prehospital trauma care and lack of occupational safety increase their suffering. Therefore, the priority should be to establish and strengthen preventive measures. The public should be aware of SCI and the provision of occupational safety measures need to be initiated and adhered to. To ensure better rehabilitation of SCI clients, a comprehensive SCI management be launched as soon as possible across the country.

There is an urgent need for intensive public awareness and increased government support for the prevention of SCI. Measures includes environmental modification, legislation for change in people's behaviour, and education about occupational safety of persons at risk for injury. There is an urgent need for convergence between International and national professional organizations, nongovernment organizations, and rehabilitation experts who not only need to work together for comprehensive effort but also to advocate and strengthen the health system.

## Study limitations

Data were included only for people with SCI who availed neurorehabilitation services. Many people with SCI do take treatment in the neurosurgery OPD at NIMHANS but were not included in the study. Therefore, generalizing the results would be one of the limitations of the study.

Although the unit is a national referral center, people with SCI do not get representation from the entire country. People with SCI from few states utilize the services mainly due to accessibility and affordability.

Our study provides information, which gives insight into the demographics of SCI in our country. It would be worthwhile to have information from different regions as well. It would also be useful to study the pre-hospital care and survival rate. Similarly, information about the long-term outcomes upon follow-up including social and vocational outcomes is desirable. We hope to look into these aspects in subsequent studies. Another limitation of our study would be that this study had a small sample size, lack of longitudinal assessment, and consecutive sampling due to the time constraints.

## Recommendations

1. Multidisciplinary teamwork approach is the need of the hour to improve the comprehensive care for people with SCI.
2. Information regarding disability to be well disseminated far and wide for the early detection of disabilities and timely intervention to reduce disability and facilitate early rehabilitation programme.

3. As deficits are in physical functioning with bowel bladder dysfunction, difficulties in sexual performance, difficulties in engaging in remunerative jobs etc., a holistic perspective is encouraged.
4. In general, disability is found to be present, and the need for individualizing the biopsychosocial intervention like supportive intervention, neuroeducation, employment, and vocational training are mandatory for a better outcome.
5. Partnering with the community for recovery and rehabilitation.
6. Further longitudinal study with larger sample size including other variables is needed to assess the impact of SCI on the lives of people with SCI.

## Conclusion

SCI affects the QoL and well-being of both the injured individuals and their families. Our population has a basic level of education. Men are affected in a higher proportion and occupational involvement is the main cause of injury. The main mode of injury was falls and accidents. Individuals with SCI have a higher risk of anxiety or depression. Thus, physicians and family members should pay attention to the mental health of patients and their relatives.

The primary care physician will get an insight about the sociodemographic and clinical profiles of SCI. Since they are in the first line of treatment, this information will help them to act fast in providing emergency care and refer them to specialized district hospitals or trauma care centers for continuous care. This study also reports the anxiety and depression of the patients, which indicates that the primary physicians have to provide emotional first aid along with routine care for distressed patients.

## New message

The goal of treatment must be to improve psychosocial functioning through comprehensive care addressing the biopsychosocial perspective of persons with spinal cord injury.

## Key points

The current study reveals the sociodemographic and illness profiles of persons with spinal cord injury in India. It highlights the importance of routine psychological assessment throughout the spinal rehabilitation process. The focus should be on the preventive and promotive strategies to deal with the consequences of SCI.

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## Conflicts of interest

There are no conflicts of interest.

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