RESEARCH LETTER

Sociodemographic and neurological profile of patients with spinal cord injury in a trauma hospital in Bangladesh

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Traumatic spinal cord injury (TSCI) is a severe public health problem associated with long-term motor, sensory, and autonomic impairments, resulting in substantial physical, psychological, and socio-economic consequences for affected individuals and health systems [1, 2]. The global incidence of TSCI ranges from 15 to 40 cases per million population annually, with clear disparities between high-income countries and low- and middle-income countries (LMICs) [3]. Although improved safety measures have contributed to stable or declining trends in many developed settings, the burden of TSCI continues to increase in LMICs due to rapid urbanisation, expanding road traffic, inadequate enforcement of safety regulations, and persistent occupational hazards [4, 5].

In South Asia, including Bangladesh, reliable epidemiological data on TSCI remain limited because of under-reporting and weak health information systems. Available evidence suggests that falls and road traffic accidents are the leading causes of injury. Individuals with TSCI frequently experience long-term complications that necessitate prolonged and multidisciplinary rehabilitation. However, access to specialized rehabilitation services in resource-constrained settings is often insufficient, exacerbating disability, loss of productivity, and socioeconomic vulnerability for patients and their families.

Neurological classification is fundamental for assessing injury severity and guiding clinical management. Comprehensive data on the socio-demographic and neurological characteristics of TSCI patients in Bangladesh are scarce, particularly for injuries related to rural and occupational exposures. This lack of context-specific evidence limits the development of targeted prevention strategies and the effective allocation of healthcare resources. To address this gap, the present study aims to investigate the socio-demographic and neurological profiles of patients with TSCI admitted through the emergency department of a specialised hospital.

This cross-sectional study was conducted at the National Institute of Traumatology, Orthopaedics and Rehabilitation, Dhaka, the largest tertiary-level referral centre for trauma and rehabilitation in Bangladesh. Adult patients (aged ≥18 years) with a confirmed diagnosis of TSCI admitted between June 2022 and November 2023 were included. Diagnosis was established through clinical evaluation and radiological investigations. Patients with non-traumatic spinal cord conditions, pre-existing neurological deficits that could confound assessment, or those who died before complete evaluation were excluded. A convenience sampling strategy was applied, enrolling all eligible patients admitted during the study period.

Key messages

Traumatic spinal cord injury in Bangladesh predominantly affects young rural males, often due to preventable falls from trees. Lumbar injuries and paraplegia are most common, with over one-third presenting complete neurological deficits. These findings underscore the need for early neurological assessment, targeted prevention strategies, and improved rehabilitation services, particularly in underserved rural communities.

Table 1 Clinical presentation and cause of spinal cord injuries (n=182)

Variable	Number (%)
Clinical presentation	
Unable to move lower limb	67 (36.8)
Unable to move all four limbs	16 (8.2)
Muscle weakness in lower limb	79 (43.4)
Muscle weakness in all four limbs	13 (7.1)
Bladder - catheter in situ	118 (64.8)
Bladder - incontinence	24 (13.2)
Bowel - not passed yet	66 (36.3)
Breathing difficulty	26 (14.3)
Swelling in affected part	91 (50.0)
Difficulty in standing/sitting	87 (47.8)
Vital signs and clinical signs	
Tachycardia	25 (13.7)
Hypertension	17 (9.3)
Tachypnea	30 (16.5)
Absent bowel sound	23 (12.6)
Sensory involvement present	118 (64.8)
Motor involvement present	120 (65.9)
Decreased muscle tone	83 (45.6)
Radiological injury type	
Compression	115 (63.2)
Translation	49 (26.9)
Mixed pattern	18 (9.9)
Region of injury	
Lumbar	91 (50.0)
Thoracic	48 (26.4)
Cervical	30 (16.5)
Combined (thoracolumbar, cervicothoracic)	13 (7.1)
Clinical Status	
Paraplegia	158 (86.8)
Tetraplegia	24 (13.2)
Pain Severity	
Severe (Visual Analogue Scale ≥ 7)	105 (57.7)
Moderate (Visual Analogue Scale 4–6)	60 (33.0)
Mild (VAS 1–3)	17 (9.3)
Autonomic Dysreflexia	4 (2.2)
Cause of injury	
Fall from height	121 (66.5)
Fall from tree	78 (64.5)
Fall from rooftop	43 (35.5)
Fall of heavy object	30 (16.4)
Road traffic accident	26 (14.2)
Other (workplace, bull attack, etc.)	5 (2.7)
Spinal region of injury	
Lumbar	91 (50.0)
Thoracic	48 (26.4)
Cervical	30 (16.5)
Others (thoracolumbar, etc.)	13 (7.1)
Clinical status	
Paraplegia	158 (86.8)
Tetraplegia	24 (13.2)
Type of bony injury	
Compression	115 (63.2)
Translation	49 (26.9)
Others (destruction/facet)	18 (9.9)

Patients were initially identified from hospital records and subsequently screened in the inpatient departments based on predefined eligibility criteria. After obtaining written informed consent, data were collected using a structured case record form by trained postgraduate residents in physical medicine and rehabilitation. Information was gathered through patient interviews, caregiver reports when required, clinical examinations, and review of medical records. Collected data included socio-demographic characteristics (age, sex, residence, and occupation), mechanism and level of injury, associated injuries, and time since injury.

Neurological assessment was performed within 24 hours of admission using the International Standards for Neurological Classification of Spinal Cord Injury, and injury severity was graded according to the Asia Impairment Scale. Participant confidentiality and anonymity were strictly maintained throughout the research process.

Data were analysed using SPSS statistics software. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize sociodemographic and clinical characteristics, while neurological profiles were presented by injury level and Impairment Scale grades.

Sociodemographic factors

A total of 182 patients with TSCI were analysed. Majority (63.7%) of them were examined within three days of the injury. The mean (standard deviation) of age was 38.0 (14.6) years; most patients were male (93%) and from rural areas (90%). One-third (32%) of them were farmers and one-fourth (24.7%) had no formal education. Fifteen per cent of them had injuries other than spinal injuries.

Clinical profile

Paraplegia was the most common clinical presentation (87%), with 37% unable to move their lower limbs at admission **(Table 1)**. Bladder catheterisation was required in 64.8% of patients. The lumbar spine was most frequently affected (50%), followed by the thoracic spine (26%). Moderate to severe pain was reported by 91% of patients. Falls from height were the leading cause of injury (67%), particularly falls from trees (43%), while road traffic accidents accounted for 14.2%. According to the Impairment Scale, 36.2% had complete spinal cord injury (Grade A).

This study highlights the substantial burden of TSCI in Bangladesh, disproportionately affecting young males from rural areas who are engaged in physically demanding, low-income occupations. Falls from trees emerged as the leading cause of injury, reflecting a context-specific occupational hazard within rural agrarian communities and aligning with findings from regional studies that emphasize the need for locally tailored prevention strategies [6]. The predominance of male patients and rural residents is consistent with evidence from other LMICs, where TSCI commonly affects individuals involved in high-risk manual labour such as farming and day labour [7]. Low household income and limited educational attainment further underscore the socioeconomic vulnerabilities that may hinder timely care, access to rehabilitation, and social reintegration.

Falls from height, particularly tree-related falls, accounted for over two-thirds of injuries, while road traffic accidents contributed a smaller proportion. This pattern contrasts with high-income countries, where road traffic accidents are often the primary cause, but are consistent with LMIC settings where occupational and environmental risks play a dominant role [8]. These findings support the need for targeted public health interventions, including safety education, use of protective equipment, and community-based injury prevention initiatives.

The lumbar spine was the most frequently affected region, differing from injury patterns reported in many high-income countries and reflecting variability in trauma mechanisms across regions. Similar regional variation has been reported in neighboring South Asian countries [9]. Although most patients presented within three days of injury, delays among a substantial proportion indicate gaps in pre-hospital care, emergency transport, and public awareness.

Neurologically, more than one-third of patients sustained complete spinal cord injuries, while the majority had incomplete injuries, suggesting potential for functional recovery with timely rehabilitation. This pattern is consistent with reports from Bangladesh and comparable LMICs [10, 11]. High levels of pain, bladder dysfunction, and paraplegia highlight the need for comprehensive, multidisciplinary management. Study limitations include recall bias, lack of longitudinal follow-up, and absence of standardised rehabilitation outcome measures.

In conclusion, TSCI in Bangladesh primarily affects socioeconomically deprived rural males and is largely driven by preventable causes such as falls from trees, underscoring the urgent need for culturally appropriate prevention strategies, improved emergency care, and accessible rehabilitation services.

Author contributions

Conception and design: MM, TU. *Acquisition, analysis, and interpretation of data:* MM, MMI, MIR, TU. *Manuscript drafting and revising it critically:* MM, MMI, MIR, TU. *Approval of the final version of the manuscript:* MM, MMI, MIR, TU. *Guarantor of accuracy and integrity of the work:* TU.

Conflict of interest

We do not have any conflict of interest.

Data availability statement

We confirm that the data supporting the findings of the study will be shared upon reasonable request.

Supplementary file

None

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