

# Impact of Social Integration on Mental Health in Individuals with Spinal Cord Injury: A Cross-sectional Study

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## ABSTRACT

**Introduction:** Individuals experiencing Spinal Cord Injury (SCI) often face physical, emotional, and social challenges. Social integration significantly influences their mental health, affecting recovery, quality of life, and overall psychological well-being.

**Aim:** To determine the impact of social integration on mental health in individuals with SCI.

**Materials and Methods:** This cross-sectional study was conducted at the Outpatient Department (OPD), Karnataka Lingayat Education (KLE), Hubli Co-operative Hospital, Hubballi, Karnataka, India, from 13<sup>th</sup> June 2025 to 13<sup>th</sup> July 2025. Data were gathered from 30 individuals with traumatic SCI using the Craig Handicap Assessment and Reporting Technique (CHART-SF) questionnaire and Positive Mental Health (PMH) Scale. An Independent sample t-test revealed a statistically significant difference in social integration scores between PMH groups among individuals with SCI ( $p$ -value=0.045). Data were analysed using Statistical Package for Social Sciences (SPSS)

version 29.0.1, with  $p$ -value<0.05 considered statistically significant.

**Results:** The study included 30 participants. A total of 30 participants were enrolled in the study, among whom 22 (73.3%) were male and 8 (26.7%) were female. Based on the American Spinal Injury Association (ASIA) impairment scale, 17 were grade C, 10 grade B, and 3 grade A. Social integration scores ranged from 16 to 80, with a mean of  $37.13 \pm 18.19$ . PMH total scored 0 and 9, with a mean of  $4.20 \pm 4.57$ . Among the participants, 16 (53.3%) had a PMH score of 0, while 14 (46.7%) had a score of 9. A comparison of social integration according to PMH score showed a "t" value of 2.10 with a  $p$ -value of 0.045.

**Conclusion:** The present research highlights the significant role of social integration in influencing the mental health of individuals with SCI. The findings emphasise a comprehensive biopsychosocial rehabilitation approach that combines mental healthcare, social reintegration, and environmental support to enhance overall quality of life.

**Keywords:** Community participation, Cord injuries, Health-related quality of life, Psychological well-being

## INTRODUCTION

Traumatic SCI is a life-altering condition that impacts not only physical functioning but also significantly influences an individual's mental well-being and social participation [1]. SCI often leads to profound physical, psychological, and social challenges [2]. Social integration plays a vital role in fostering community participation and support, while mental health influences overall adaptation and quality of life [3]. Each year, thousands of individuals experience SCI, resulting in varying degrees of motor and sensory impairment [4]. Previous research has primarily focused on the medical and functional aspects of SCI rehabilitation, such as mobility, independence in daily living, and prevention of secondary complications [5,6].

In the Indian scenario, the incidence of SCI ranges from 9.2 to 56.1 cases per million population, where approximately 20,000 new SCI cases are reported every year in India [7]. Equebal A et al., (2013) reported the mean age of male patients as 34.81 years and female patients as 38.60 years, highlighting a higher incidence among the younger, more active, and more productive population of the country [8]. A marked male predominance was observed, with male-to-female ratios ranging from 4:1 in developed countries to as high as 13.5:1 in developing nations [9]. The World Health Organisation (WHO) describes participation as engagement in life situations and considers it an essential component of health and well-being. Participation enables individuals to understand societal expectations, develop communication skills, and effectively contribute to community life [10]. Successful social integration can buffer the emotional challenges of living with disability, reduce feelings of isolation, and enhance overall well-being [11]. Conversely, social exclusion, unemployment, and limited social support are linked to

poorer mental health outcomes, such as depression, anxiety, and reduced self-esteem [12,13].

These mental health challenges can, in-turn impair rehabilitation progress and community participation, creating a negative feedback loop [14]. Some studies have explored quality of life and psychological outcomes, while others have investigated community participation [15,16]. By addressing psycho-social needs alongside physical rehabilitation, healthcare providers can improve long-term outcomes and promote fuller participation in society of individuals with SCI [17]. According to the International Classification of Functioning, Disability and Health (ICF), Environmental and social factors influence functioning; reducing barriers promotes health, prevents co-morbidities, and enhances overall quality of life [18].

Understanding the interplay between social integration and mental health is crucial for designing effective interventions that address not only functional recovery but also psychosocial adaptation. Despite growing recognition of the psychosocial dimensions of SCI, there is insufficient evidence on how social integration influences mental health outcomes in this population. Addressing this gap can inform comprehensive rehabilitation models that promote holistic recovery. Thus, need to determine the impact of social integration on mental health in individuals with SCI, as this study forms an essential component of a larger ongoing research project providing a holistic framework to inform patient-centered rehabilitation and community-based interventions. The objective of the present study was to compare mental health scores among individuals with SCI based on their levels of social integration. Hence, the present study aimed to determine the impact of social integration on mental health

in individuals with SCI. The null hypothesis ( $H_0$ ) for the study was that there is no significant difference in mental health scores among individuals with SCI based on their levels of social integration. The alternative hypothesis ( $H_1$ ) was that there is a significant difference in mental health scores among individuals with SCI based on their levels of social integration.

MATERIALS AND METHODS

A cross-sectional study was conducted at OPD, KLE Hubli Co-operative Hospital, Hubballi, Karnataka, India, from 13<sup>th</sup> June 2025 to 13<sup>th</sup> July 2025. The study protocol received approval from the Institutional Ethics Committee (IEC No: JGMMMC/107/2025), and written informed consent was obtained from all participants before enrollment.

**Inclusion and Exclusion criteria:** Participants were eligible if they were aged 18-65 years, had sustained a traumatic SCI at least one year before the study, and were classified within ASIA scale, grades A–D [19]. Individuals who declined to provide consent were excluded.

**Sample size:** Since the incidence of SCI is low. In the span of one month, 30 samples were collected by using convenience sampling [20].

Study Procedure

The collected data was kept confidential and was delinked from the personal identifiers. Demographic details, including age, gender, location, occupation, education level, socioeconomic status, onset of injury, and grading of SCI (assessed using the ASIA scale), were recorded.

Social integration was evaluated using the Social Integration domain of the CHART-SF and scored on a 100-point scale [21]. A score of 100 indicates no handicap in an individual's ability to participate in and maintain customary social relationships.

Mental health was evaluated using the PMH scale, a nine-item questionnaire scored on a 4-point Likert scale (scoring 0-3). It assesses the emotional, psychological, and social indicators of PMH. The total score ranges from 0-27, with higher scores indicating higher PMH [22-24]. Socioeconomic status was classified using the Modified B.G. Prasad scale [25].

STATISTICAL ANALYSIS

Data was analysed using SPSS software, version 29.0.10 (SPSS Inc., Chicago, IL). The collected data were summarised by using the descriptive statistics: frequency, percentage, mean and Standard Deviation (SD). The Independent sample t-test was used to compare social integration (%) according to PMH score.

RESULTS

A total of 30 participants were enrolled in the study, among whom 22 (73.3%) were male and 8 (26.7%) were female. A significant majority of the participants 27 (90%) resided in rural areas, while only 3 (10%) were from urban locations. Socioeconomic status, assessed using the Modified BG Prasad scale, showed that 15 participants (50%) belonged to Class III, followed by 8 (26.7%) in Class IV, 4 (13.3%) in Class I, and 3 (10%) in Class II and 0 in Class V. In terms of educational background, 11 (36.7%) had completed primary education, 7 (23.3%) were illiterate, 4 (13.3%) had studied up to middle school, and 2 (6.7%) had completed high school. A small portion of the participants were graduates 5 (16.7%) or postgraduates 1 (3.3%). Regarding occupation, the largest group comprised farmers 17 (56.7%), followed by housewives 6 (20%). The remaining participants included businessmen 2 (6.7%), policemen 2 (6.7%), teachers 2 (6.7%), and one student (3.3%). Grading of SCI using the ASIA scale showed that 17 participants (56.7%) are classified as ASIA C, suggesting an incomplete SCI with some preserved motor function. ASIA B classification accounted for 10

(33.3%), while 3 (10%) were categorised under ASIA A, indicating a complete injury with no preserved motor or sensory function in the sacral segments [Table/Fig-1].

| Variables                                       | Category       | n (%)     |
|---|----------------|-----------|
| Gender  | Male           | 22 (73.3) |
|   | Female         | 8 (26.7)  |
| Location  | Rural          | 27 (90)   |
|   | Urban          | 3 (10)    |
| Socioeconomic status (Modified BG Prasad scale) | Class I        | 4 (13.3)  |
|   | Class II       | 3 (10)    |
|   | Class III      | 15 (50)   |
|   | Class IV       | 8 (26.7)  |
|   | Class V        | 0         |
| Education                                       | Illiterate     | 7 (23.3)  |
|   | Primary school | 11 (36.7) |
|   | Middle school  | 4 (13.3)  |
|   | High school    | 2 (6.7)   |
|   | Graduate       | 5 (16.7)  |
|   | Postgraduate   | 1 (3.3)   |
| Occupation                                      | Businessman    | 2 (6.7)   |
|   | Farmer         | 17 (56.7) |
|   | Housewife      | 6 (20)    |
|   | Policeman      | 2 (6.7)   |
|   | Student        | 1 (3.3)   |
|   | Teacher        | 2 (6.7)   |
| ASIA Scale                                      | A              | 3 (10)    |
|   | B              | 10 (33.3) |
|   | C              | 17 (56.7) |

[Table/Fig-1]: Demographic characteristics N=30.

Age of the participants (n=30) ranged from 19 to 60 years, with a mean age of 48.90±8.78 years. The onset of injury varied between two and six years, with an average duration since injury of 3.27±1.02 years. The social integration scores ranged from 16% to 80%, with a mean score of 37.13±18.19% [Table/Fig-2].

| Variables               | Range    | Mean±SD     |
|-------------------------|----------|-------------|
| Age (years)             | 19 to 60 | 48.90±8.78  |
| Onset of injury (years) | 2 to 6   | 3.27±1.02   |
| Social integration (%)  | 16 to 80 | 37.13±18.19 |

[Table/Fig-2]: Age, onset of injury and social integration N=30.

The PMH scale, scored from 0 (“do not agree”) to 3 (“agree”), revealed that participants selected only the lower response options (0 and 1). All participants’ total scores were either 0 or 9, 16 participants (53.3%) had a score of zero, while 14 (46.7%) achieved a total score of nine [Table/Fig-3].

| Variables       | Range  | Mean±SD    | Score category | n (%)     |
|-----------------|--------|------------|----------------|-----------|
| PMH Total score | 0 to 9 | 4.20± 4.57 | Zero           | 16 (53.3) |
|                 |        |            | Nine           | 14 (46.7) |

[Table/Fig-3]: PMH total score

An Independent sample t-test was conducted to compare social integration (%) based on PMH scores. Participants with a PMH score of zero had a higher mean social integration percentage (44.25±21.92) compared to those with a PMH score of nine (30.43±11.98). The difference was statistically significant (t = 2.10, p-value = 0.045), indicating that social integration varied significantly according to PMH score [Table/Fig-4].

| Variables              | PMH score | Mean±SD     | "t"  | p-value |
|------------------------|-----------|-------------|------|---------|
| Social integration (%) | Zero      | 44.25±21.92 | 2.10 | 0.045*  |
|                        | Nine      | 30.43±11.98 |      |         |

[Table/Fig-4]: Comparison of social integration (%) according to PMH score.

DISCUSSION

Individuals with SCI often experience significant lifestyle disruptions, including paralysis and increased dependence on caregivers, which can lead to social isolation and negatively impact their mental health.

The present study shows that males were more prone to SCI when compared with females. Lu Y et al., (2024), in a systematic review and meta-analysis, reported that traumatic SCI incidence in males is about 3.2 times higher than in females. This could be since in most families, males are the primary earning members of the family and hence, get exposed to greater risk [26]. The majority of participants in the present study were from rural areas (90%), while only a smaller proportion belonged to urban regions (10%). Cao Y et al., (2015) reported rural population had greater physical/structural and services/assistance barriers, which are known to be linked to poorer subjective physical and mental health among individuals with SCI [27]. Patients with SCI living in rural areas perceived greater environmental barriers compared to those in urban settings [28]. This parallels the findings, where participants from rural areas faced similar barriers affecting their social integration.

The present study found that individuals belonging to the middle and lower socioeconomic groups were more affected, aligning with previous findings by Chetty R et al., who reported that higher-income groups tend to experience better health and lower mortality rates than those with lower income [29]. Similarly, Zürcher C et al., (2019) observed that socioeconomic stressors such as financial strain and low income are associated with poorer mental health outcomes and reduced quality of social relationships [30].

The study observed that social integration differed significantly by PMH score. A study by Budd MA et al., (2022), which explored the psychosocial consequences of SCI within a biopsychosocial framework. The authors highlight that social isolation, loss of social roles, and reduced participation constitute major psychosocial challenges following SCI, which interplay with emotional distress, depression, and lower quality of life. They further emphasise that limited opportunities for social interaction and inadequate environmental support can exacerbate mental health difficulties over time [31]. Brooks R et al., (2021) emphasise that social participation serves as a protective factor against mental illness and is an effective avenue for promoting psychological well-being in individuals with neurological conditions, including SCI [32].

These factors collectively provide important context for understanding patterns of social participation and mental health outcomes in this population. Rehabilitation programs should adopt a holistic approach that simultaneously addresses mental health support, social reintegration. Routine screening for depression and social isolation, coupled with interventions aimed at strengthening social support networks, should be integral components of comprehensive SCI rehabilitation strategies. The findings underscore that, in individuals with SCI, social integration and mental health are closely interconnected, with deficits in either domain potentially amplifying adverse outcomes, particularly in resource-limited settings. These results highlight the necessity of implementing holistic, biopsychosocial rehabilitation strategies that concurrently address psychological well-being, social participation, and environmental barriers to optimise recovery and quality of life.

Limitation(s)

The study included a small, convenience sample from a single centre, which limits the generalisability of the findings and may introduce selection bias. Reliance on self-reported measures may

be subject to response bias. Despite these limitations, the findings provide preliminary insights into the association between social integration and mental health in this population.

CONCLUSION(S)

The present study highlights the significant role of social integration in influencing the mental health of individuals with SCI, thus accepting the alternative hypothesis. The findings emphasise a comprehensive biopsychosocial rehabilitation approach that combines mental health care, social reintegration, and environmental support to enhance overall quality of life.

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