



Mental Health among Patients with Traumatic Spinal Cord Injury

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ABSTRACT

Background

In this study we wanted to assess the mental health status of the patients with traumatic spinal cord injury and evaluate the association between sociodemographic factors and other factors relating to injury and their mental health.

Methods

This is a descriptive study done among 36 persons with traumatic spinal cord injury who are the beneficiaries of the Santwanam Charitable Trust. All 36 persons were willing to participate in the study. The data were collected using a semi structured questionnaire Sociodemographic and clinical data were collected.

Results

Depression was found in 20 patients (mild 8.3%, moderate 33.3%, severe 13.9%) 69.4% (25) of the patients were found to be anxious (mild 13.9%, moderate anxiety 11.1%, severe anxiety in 44.4%) 33.3% of the patients suffered from moderate depression, 44.4% suffered from severe anxiety. Depression or anxiety were not found to be significantly associated with any of the sociodemographic factors and also the disease, and its associated conditions.

Conclusion

The depression or anxiety that the study participants have, are not found to be significantly associated with sociodemographic factors or any other factors related to TSCI. This may be due to small sample size.



Keywords: Mental Health, Traumatic Spinal Cord Injury.

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INTRODUCTION

The spinal cord is one of the major components of the nervous system. It is a cylinder-shaped organ that extends from the brain stem to the low back, travels down the middle of the spine. Messages from the brain are sent to the rest of the body through this fragile system, which is made up of nerve bundles and cells. The spinal cord's main purpose is to carry nerve signals throughout the body. These nerve messages have three crucial functions. They are

Control body movements and functions

Signals from the brain to other body parts control the body movements. They also direct autonomic (involuntary) functions like breathing rate and heartbeat, as well as bowel and bladder function.

Report senses to the brain

Signals from other parts of the body help the brain record and process sensations like pressure or pain.

Manage the reflexes

The spinal cord controls some reflexes (involuntary movements) without involving the brain.^[1]

As part of the neuronal circuits known as central pattern generators, clusters of spinal interneurons are also found there. These circuits regulate the motor commands for rhythmic actions like walking.^[2]

The term 'spinal cord injury' refers to damage to the spinal cord resulting from trauma (e.g., a car crash) or from disease or degeneration (e.g., cancer). There is no reliable estimate of global prevalence, but estimated annual global incidence is 40 to 80 cases per million population. Up to 90% of these cases are due to traumatic causes, though the proportion of non-traumatic spinal cord injury appears to be growing.^[3]

WHO reports that 40 million people worldwide suffer from SCIs and nearly 3 million new cases occur every year.^[4]

Worldwide there are about 250 000 and 500 000 persons who experience spinal cord injuries (SCI) every year. The preventable causes include falls, violent acts, and traffic accidents. People with traumatic spinal cord injuries (tSCI) in the lower- and middle-income countries are 2 to 5 times more likely to die young than the people without

SCIs. There are significant personal and societal consequences associated with spinal cord injury, including reduced rates of economic involvement and enrollment in school.^[3] SCI is associated with a range of secondary health conditions which include sleep disturbances, psychological disorders, chronic pain, fatigue and autonomic nervous system dysfunction.^[5]

The intensity and location of a spinal cord injury will determine the symptoms. Loss of sensory perception or motor control over the arms, legs, or body may be one or many symptoms. The systems that control bowel or bladder control, breathing, heart rate, and blood pressure are all impacted by the most severe spinal cord injuries. Chronic pain is a common symptom of spinal cord injuries.^[3]

The danger of secondary problems like deep vein thrombosis, urinary tract infections, muscular spasms, osteoporosis, pressure ulcers, chronic pain, and respiratory issues arising after a spinal cord injury can be crippling and even fatal. To avoid and manage these illnesses, acute care, rehabilitation programs, and continuous health maintenance are crucial.

A person with a spinal cord injury could become dependent on others. In order to help mobility, communication, self-care, or domestic tasks, assistive technology is frequently needed. An estimated 20–30% of those who have had a spinal cord injury display clinically significant symptoms of depression, which has a detrimental effect on functional gains and general health.^[3]

Types of Spinal Cord Injury

Automobile accidents, slips and falls, gunshot wounds, sports injuries, and surgical complications are some of the most frequent causes of spinal cord damage. Most spinal cord injuries fall into one of two categories namely complete or incomplete (partial):

A complete injury causes total paralysis (loss of function) below the level of the injury. It affects both sides of the body. A complete injury may cause paralysis of all four limbs (quadriplegia) or the lower half of the body (paraplegia).

After an incomplete injury, some function



remains on one or both sides of the body. The body and brain can still communicate along certain pathways.^[3]

Levels of Spinal Cord Injury

There are four sections of the spinal cord that impact the level of spinal cord injury: cervical, thoracic, lumbar and sacral.^[4]

Several classic patterns of injury are present like Complete Transection of the Spinal Cord, Central Cord Syndrome, Anterior Cord Syndrome, Posterior Cord Syndrome, Brown-Sequard Syndrome, Conus medullaris Syndrome, Neurogenic Shock etc.^[6]

The long-term effects of a spinal cord injury will affect the regulation of having trouble regulating your body's temperature or blood pressure. Increased chance of lung or heart complications. A loss of bowel or bladder control. Arms or legs are paralyzed. Persistent pain Joint contracture and spasm. And also, Sexual dysfunction

The long-term objectives of Treatment of SCI^[3] include Enhancing quality of life and independence. Lowering the danger of developing chronic (ongoing) medical disorders. Restoring some nerve function in incomplete damage.

Spinal cord injury is very stressful and overwhelming for the patient and the families. Patient education must be an important part of the clinical management of patients with this condition. Counselling is necessary regarding prognosis, complications, and outcomes. Support groups can help with the management of issues like anxiety, frustration, loneliness, and depression. The patient should receive counselling regarding the diagnosis and the prognosis. Prevention centers can help with mitigating factors leading to traumatic injuries like improvement in motor vehicle safety, gun control, and social programs aimed at the prevention of violence.^[6]

Santhanam Charitable Trust in Pyrimethamine is an NGO formed with the vision to give proper assistance to the members /beneficiaries of the trust for their physical and mental wellbeing and help them to be economically independent. Their mission is to rehabilitate the differently abled persons.

There are persons with tSCI among its members.

Also, there aren't many studies done in Kerala / Malappuram district on the mental health status of persons with tSCI. Assessing the mental health status of these persons with SCI may help the organization to make appropriate interventions.

A qualitative study conducted by Fateme Mohammad et al on Perception of facing life's challenges in patients with spinal cord injury in Iran in 2022 found out the emergence of three themes and nine sub-themes. The three main themes were emotional shock (crisis making and mental rumination, persistent depressive disorder, pitying behaviors, fear of the future), loss of dignity (poor self-care, sexual dysfunction, loss of job and educational status), and lack of effective support (lack of financial institutions and sponsors, lack of social support).^[4]

A cross sectional study conducted among 511 participants in 2019 by Carmen Zurrche et al on Mental health in individuals with spinal cord injury: The role of socioeconomic conditions and social relationships found that Lower household income was predominantly associated with poor structural social relationships, whereas financial strain was robustly linked to poor functional social relationships. Financial strain was associated with general mental health problems and depressive symptomatology, even after controlling for social relationships. Education and household income were not linked to mental health. Poor structural and functional social relationships were related to general mental health problems and depressive symptomatology. Notably, trends remained stable after accounting for socioeconomic conditions.^[7]

A cross sectional study on Spinal cord injury and mental health by Christine Migliorini et al in Australia in 2008 found that nearly half (48.5%) of the population with spinal cord injury suffered mental health problems of depression (37%), anxiety (30%), clinical-level stress (25%) or post-traumatic stress disorder (8.4%). Overall, there was a twofold or more increase in the probability of emotional disorders compared to the general population. Of those with one mental health disorder, 60% also had at least one other emotional disorder, representing a substantial 56% increase over the general population in the probability of comorbidity of psychopathology.^[8]

A Nationwide Population-Based Cohort Study on



Anxiety and Depression in 3556 Patients with Traumatic Spinal Cord Injury by Sher-Wei Lim et al in 2017 showed that the tSCI patients (n = 3556) had a 1.33 times greater incidence of new-onset anxiety or depression (95% confidence interval [CI]: 1.12–1.57) compared to the other health conditions group (n = 3556). After adjusting for potential risk factors, the tSCI patients had a significant 1.29-fold increased risk of anxiety or depression compared to the group with other health conditions (95% CI: 1.09–1.53). Individuals with tSCI, including patients who were under the age of 35, patients who were males, patients who had a low income, and patients without a Charlson Comorbidity Index score, all had a higher long-term risk of anxiety or depression than the other health conditions group (IRRs: 1.84, 1.63, 1.29, and 1.39, respectively).^[9]

A cross sectional study on Mental health, pain, and sleep factors associated with subjective cognitive difficulties in 553 individuals with spinal cord injury from a specialty hospital in the southeastern United States and two midwestern university hospitals by Jillian M R Clark et al on found that greater subjective cognitive difficulties were associated with being female, elevated anxiety and depressive symptoms, sleep disturbance, cardiovascular disease, worse pain, polypharmacy, worse self-rated diet, and tobacco use. A hierarchical linear regression analysis including sociodemographic and SCI-related variables (Step 1) and physical, mental health, and health variables (added in Step 2) explained 33% of the variance in subjective cognitive difficulties, $F(16, 421) = 13.45, p \leq .001$. Depressive, anxiety, and pain symptoms; sleep disturbance; and injury level remained significant predictors of variance in subjective cognitive symptoms when considering all variables simultaneously.^[10]

AIM OF THE STUDY

1. To assess the mental health status of the patients with traumatic spinal cord injury who are the beneficiaries of Santhwanam Charitable Trust, Perinthalmanna
2. To find out association between sociodemographic factors and other factors relating to injury and their mental health.

MATERIALS & METHODS

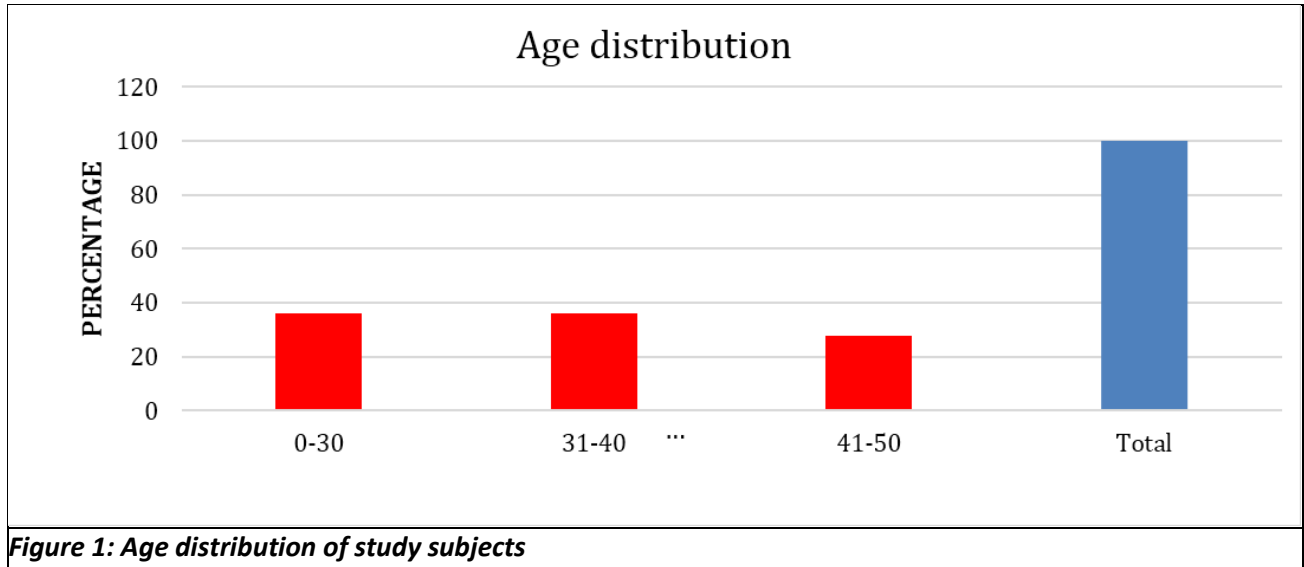
This is a descriptive study done among 36 persons with traumatic spinal cord injury who are the beneficiaries of the Santwanam Charitable Trust. All 36 persons were willing to participate in the study. The data were collected using a semi structured questionnaire Sociodemographic and clinical data were collected. Clinical examination, classification of the injury was done by the principal investigator. Montgomery and Asberg Depression Rating Scale (MADRS) and Hamilton Anxiety Rating Scale (HAM - A) were used to assess depression and anxiety in these persons. The data were entered in to MS EXCEL Data will be compiled into EXCEL Sheet categorical variables will be expressed as proportions and quantitative variables as mean and standard deviation chi square test is used for categorical variables analysis of data will be done using SPSS software Version 25.

Working Definition

Depression scoring is done using Montgomery and Asberg Depression Rating Scale (MADRS). The rating is based on a clinical interview. Done only once here. There are 10 questions which move from broadly phrased ones about symptoms to the more detailed ones. The rater / principal investigator decided whether the rating lies on the defined scale steps (0, 2, 4, 6) or between them (1, 3, 5) (0 – 6 Normal, 7 – 19 Mild Depression, 20 – 34 Moderate Depression, 35 – 60 Severe Depression). Anxiety scoring using Hamilton Anxiety Rating Scale (HAM-A) measure the severity of anxiety symptoms which measures both the psychic anxiety and the somatic anxiety. The scale consists of 14 items, each is scored on a scale of 0 (not present) to 4 (severe). Total score ranges from 0 to 56. Those with a score of <10 is considered normal, 0 – 13 is considered as having mild anxiety, 14 – 17 as having moderate anxiety and > 17 as having severe anxiety Traumatic spinal cord injury is categorized using medical records, clinical examination. Equines deformity and fixed flexion Deformity (of knee) were assessed using goniometer. Socio economic status was assessed using modified Kuppusamy scale.



RESULTS



In our study there were 30 males & 6 females who were victims of traumatic spinal cord injury. All of them were aged less than 50 years. Most of them (41.7%) were educated up to high school level. There were 7 graduates and 5 post graduates. Half of them (52.8%) belonged to low socioeconomic group, only 3 of them were from high socioeconomic group. 63.9% were married, 33.3 % were unmarried and one person was a divorcee. 21 (%) belonged to family with less than or equal to 4 whereas 15 of them belonged to a larger family (family size >4 members).

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Marital Status and family size	Frequency	Percent
Divorced	1	2.8
Married	23	63.9
Unmarried	12	33.3
Total	36	100.0
Family Size		
2	9	25.0
3	3	8.3
4	9	25.0
5	6	16.7
<=6	9	25.0
Total	36	100.0

Table 1: Marital status and family size of study participants

Diagnosis, type, duration of injury	Frequency	Percent
Paraplegia	28	77.8
Quadriplegia	8	8.3
Total	36	100.0
Duration of injury		
0-5 Years	12	33.3
6-10 Years	8	22.2
>10 Years	16	44.4



Total	36	100.0
Type of Injury		
Dislocation	6	16.7
Fracture	25	69.4
SCIWORA	5	13.9
Total	36	100.0

Table 2: Diagnosis, type and duration of injury in study participants

SCIWORA: Spinal Cord Injury without Radiological Abnormality

Anxiety score	Frequency	Percent
Normal	11	30.6
Mild	5	13.9
Moderate	4	11.1
Severe	16	44.4
Total	36	100.0

Table 3: Anxiety among the study participants

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Depression Score	Frequency	Percent
Normal	16	44.4
Mild	3	8.3
Moderate	12	33.3
Severe	5	13.9
Total	36	100.0

Table 4: Depression among the study participants

Comorbidities, pressure sore, and contractures	Frequency	Percent
Comorbidities		
Hypertension	13	36.1
Diabetes Mellitus	9	25.0
Coronary Artery Disease	1`	2.8
Pressure Sore		
YES	19	52.8
NO	17	47.2
Total	36	100.0
Contractures		
Equinus Deformity	6	16.7
Fixed Flexion Deformity Knee	8	22.2
NIL	22	61.1
Total	36	100.0

Table 5: Comorbidities, pressure sore, and contractures among study participants

		Depression Status	P value
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		Yes	No	
Age	<=40	11	7	0.502
		55.00%	43.80%	
>40	9	9		
	45.00%	56.30%		
Marital Status	Divorced	0	1	0.481
		0.00%	6.30%	
	Married	12	11	
		60.00%	68.80%	
Unmarried	8	4	0.686	
	40%	25%		
Socio Economic Status	Lower	9	10	0.686
		45.00%	62.50%	
	Middle	9	5	
		45.00%	31.30%	
Upper	2	1	0.654	
	10.00%	6.30%		
Diagnosis	Paraplegia	15	13	0.654
		75%	81%	
Quadriplegia	5	3	0.709	
	25%	19%		
Duration of injury	less than or equal to 10 years	10	7	0.709
		50.00%	43.80%	
Greater than 10 years	10	9	0.082	
	50.00%	56.30%		
Contractures	Yes	13	1	0.082
		46%	13%	
No	15	7	0.174	
	54%	87%		

Table 6: Effect of Sociodemographic factors and other factors on depression among the study participants

		Anxiety Status		
		Yes	No	
Gender	Female	6	0	0.148
		24.00%	0.00%	
Male	19	11	0.223	
	76.00%	100.00%		
Marital Status	Divorced	0	1	0.223
		0.00%	9.10%	
	Married	15	8	
		60.00%	72.70%	
Unmarried	10	2	0.174	
	40.00%	18.20%		
Socio Economic Status	Lower	11	8	0.174



	Middle	44.00%	72.70%	
		12	2	
	48.00%	18.20%		
	Upper	2	1	
8.00%		9.10%		
Diagnosis	Paraplegia	20	8	0.238
		80%	72%	
	Quadriplegia	5	3	
		20%	28%	
Duration of injury	Less than or equal to 10 years	12	8	0.16
		48%	73%	
	Greater than 10 years	13	3	
		52%	27%	
Contractures	Yes	13	1	0.082
		46%	13%	
	No	15	7	
		54%	87%	
Table 7: Effect of Sociodemographic factors and other factors on anxiety among study participants				

There was no significant association with gender, marital status, socioeconomic status and anxiety and also the type, duration of injury comorbidity status and its presence of contractures among the study participants.

DISCUSSION

A total of 36 patients with traumatic spinal cord injury were assessed. There were 6 females and 30 (83.3%) males. All patients were aged below 50 and among them, 72% were less than 40 years of age. In the study conducted by Carmen Zucher et al,^[7] the mean age of the persons with tSCI was 52.9. In the study conducted by Christine Migliorini et al,^[8] the average age of the participants was 51.78 .In the study by Fateme Mohammadi,^[4] the mean age of the patients was 39.45 +/- 2.69 which is similar to our study. Marital status of the 36 persons with tSCI studied was 63.9% were married , 2.8% were divorced and 33.3% were unmarried.In the study by Christine Migliorini,^[8] 58% were married. In the study by Fateme Mohammadi,^[4] majority of the participants were single. In our study, the majority of the patients belonged to lower socio-economic class and 41.7% were educated up to high school level. Among the study population

(Table 2), 69.4% had fractures and 13.9% had spinal cord injury without radiographic abnormality (SCIWORA). Of the 36 patients, 78% were paraplegic and 22% had quadriplegia.

In the study conducted by Christine Migliorini,^[8] among the 443 adults with tSCI, 30.9% had incomplete paraplegia, 30.7% had complete paraplegia. 25.3% had incomplete quadriplegia and 10.2 % had complete quadriplegia.

Among our 36 patients, 44.5% have been injured for more than 10 years and 33.3% were injured for less than 5 years. In the study by Christine Migliorini,^[8] average time since the injury was 19.2 years.

In our study (Table no:5), Patients with lesions at T10 level (27.8%) were more as compared to lesion at other sites.63.8% of our participants had one or more comorbidities like DM, Hypertension and CAD. 36.1% had hypertension, 25% had diabetes mellitus and 2.8% had coronary artery disease. In the study by Sher-Wei Lim et al,^[9] 9.53 % had hypertension, 2.56% had diabetes mellitus, 1.43% had coronary artery disease. More than half of the patients had developed pressure sores and 38.9% developed contractures out of which Fixed Flexion Deformity of Knee was found in



22.2% of the patients.

In our study (Table 4), 55.6% patients were found to have depression. Among them, 33% were moderately depressed 13.9% were severely depressed. In the study by Sher-Wei Lim et al,^[9] 2.95% of the persons with tSCI studied suffered from depression compared to persons with other health conditions.

In the study by Carmen Zurcher et al,^[7] 21.3 % of the study population were found to showing symptoms of depression. 69.4% of patients were found to be anxious and out of this, 44.4% were severely anxious. In the study by Sher-Wei Lim et al^[9] 5.74% of persons with tSCI had anxiety The tSCI group had a 1.33 times greater incidence of new onset anxiety or depression compared to other health condition group

We tried to determine the association between variables like age, gender, education, marital status, socioeconomic status, type of injury, comorbidity status, presence of pressure sores and contractures vs depression as well as anxiety. We did not get any such association. This may be because of the small sample size

In our study, there were 30 males & 6 females who were victims of traumatic spinal cord injury. All of them were aged less than 50 years. Most of them (41.7%) were educated up to high school level. There were 7 graduates and 5 post graduates. Half of them (52.8%) belonged to low socioeconomic group, only 3 of them were from high socioeconomic group. 63.9% were married, 33.3

% were unmarried and one person was a divorcee. 21 (%) belonged to family with less than or equal to 4 whereas 15 of them belonged to a larger family (family size >4 members). 78% were having paraplegia and the rest (8 persons) were suffering from quadriplegia. In 61.1%, the lesion was at the thoracic spine level, 8 (%) of the patients had the lesion at the cervical spine, 6 of them at lumbar spine level. 69.4% of the condition occurred as a result of fracture of the spine, 16.7 % occurred due to dislocation of the bone, 13.9% was due to Spinal cord injury without radiological a (SCIWORA). More than half of them (55.6%) were suffering from the problem for < 10 years, the rest (44.4%) were suffering for > 10 years. (Table no: 2)

There were 14 (39%) persons who developed contractures (6 had equines deformity and 8 had fixed flexion deformity of the knee joint). Pressure sores were present in 19 (53%) of the patients 23 patients had comorbidities [hypertension 36.1%, Diabetes mellitus 25%, 1 person with coronary artery disease (2.8%)], Depression was found in 20 patients (mild 8.3%, moderate 33.3%, severe 13.9%) 69.4% (25) of the patients were found to be anxious (mild 13.9%, moderate anxiety 11.1%, severe anxiety in 44.4%) 33.3% of the patients suffered from moderate depression, 44.4% suffered from severe anxiety. (Table no: 3 & 4). Depression or anxiety were not found to be significantly associated with any of the sociodemographic factors and also the disease, and its associated conditions.

CONCLUSION

The depression or anxiety that the study participants have, are not found to be significantly associated with sociodemographic factors or any other factors related to TSCI. This may be due to small sample size.

LIMITATION

Sample size is very small.

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