



Quality of life in spinal cord injury patients in Eastern India

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ABSTRACT

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Background : Spinal cord injury (SCI) is a traumatic event that results in disturbances to normal sensory, motor, or autonomic function and ultimately impacts a patient's physical, psychological, and social well-being. It is a major public health issue in India. Appropriate planning is needed for prevention, rehabilitation and psychological care for SCI patients.

Objective: To assess the health-related quality of life of patients with traumatic spinal cord injury living in Eastern India.

Methods: The present study was a prospective observational study carried out at Tertiary Trauma Care Centre, IPGME&R and SSKMH, Kolkata in Eastern India. A total of 150 patients with Spinal cord injury patients admitted in our institute during a period of 1 year (04/03/2020 to 04/03/2021) were included in study. After written informed consent the following variables were recorded in all patients: Age and sex distribution, marital status, education, duration and nature of symptoms, whether an operation required or not, postoperative surgical outcome and complications, length of ICU/CCU stay, length of hospital stay. The clinical follow-up observation was carried out by outpatient review. The patients were followed up at 6 months after discharge. All the data was recorded in a pre-designed and pre-tested proforma and WHOQOL-BREF questionnaire.

Results: Present study showed no statistically significant differences in mean values of quality of life with respect to age, sex, marital status and Comorbidity. However, a significant difference in quality of life was found in the patients with respect to level of education, complication such as UTI, Bed sore, spasticity, Length of stay in ICU with QOL, need of Airway/Mechanical ventilator(MV), vasopressor support, ASIA grade and Region of spine injury.

Conclusion: HRQoL is decreased in SCI patients. Health related QoL in different domain Physical health, Psychological health, Social relation and environmental health is affected by level of injury, ASIA grade (severity of neurological deficit) and complication (UTI, bed sore, spasticity). Special unit for spinal cord injury patient needed for active and productive lives in these patients in the community.

Key words: quality of life, traumatic spinal cord injury, quadriplegia, quadriparesis, paraplegia, paraparesis, Eastern India.

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Introduction

Spinal cord injury (SCI) is a traumatic event that results in disturbances to normal sensory, motor, or autonomic function and ultimately impacts a patient's physical, psychological, and social well-being.¹⁻³ Symptoms of spinal cord injury depend on the severity of injury and its location on the spinal cord. Symptoms may include partial or complete loss of sensory function or motor control of arms, legs and/or body. The most severe spinal cord injury affects the systems that regulate bowel or bladder control, breathing, heart rate and blood pressure. Most people with spinal cord injury experience chronic pain. The management of SCI requires significant health care and can place a substantial financial burden on patients, their families, and the community.³ These costs are largely due to a need for high level acute care in the short term and associated secondary complications that occur in the long term.⁴

In 2011, Cripps et al reported the global prevalence of SCI to be between 236 and 1,009 per million, a figure similar to that estimated by Blumer and Quine in 1995 (110–1,120 per million).⁵⁻⁷

Males are most at risk in young adulthood (20-29 years) and older age (70+). Females are most at risk in adolescence (15-19) and older age (60+). Studies report male-to-female ratios of at least 2:1 among adults, sometimes much higher.

Mortality risk increases with injury level and severity and is strongly influenced by availability of timely, quality medical care. Transfer method to hospital after injury and time to hospital admission are important factors. Preventable secondary conditions (e.g. infections from untreated pressure ulcers) are no longer among the leading causes of death of people with spinal cord injury in high-income countries, but these conditions remain the main causes of death of people with spinal cord injury in low-income countries. Spinal cord injury is associated with a risk of developing secondary

conditions that can be debilitating and even life-threatening—e.g. deep vein thrombosis, urinary tract infections, muscle spasms, osteoporosis, pressure ulcers, chronic pain, and respiratory complications. Acute care, rehabilitation services and ongoing health maintenance are essential for prevention and management of these conditions.

Spinal cord injury may render a person dependent on caregivers. Assistive technology is often required to facilitate mobility, communication, self-care or domestic activities. An estimated 20-30% of people with spinal cord injury show clinically significant signs of depression, which in turn has a negative impact on improvements in functioning and overall health.

The physiological and psychological problems of patients with SCI are not generally well understood and little is known about the subjective differences in QoL of SCI patients with different backgrounds, e.g. educational level, age, marital status, and period of time since injury. In addition to these areas, more information is required about the needs of patients resulting from SCI and the QoL of persons with SCI, in comparison with other populations.

The aims of this study were to provide information about the significant problems encountered in daily life by people with SCI and to compare the QoL of people with SCI in eastern India

Methods

Subjects

All patients attending the TCC of the IPGME&R and SSKM Hospital with spinal cord injury, during April 2020 to April 2021 being admitted and treated to our institute during the study period were included in the study

The current study focuses on the investigation of QoL of patients with spinal cord injury (SCI).



Inclusion criteria :All patients attending the TCC of the IPGME&R and SSKM Hospital with spinal cord injury .**Exclusion criteria :** Patients who refuse to give consent .

The study was conducted from April 2020 to October 2021. During this period, a total of 150 patients who met the inclusion criteria were recruited at the time of admission and were given a questionnaire .Involvement in the study was completely voluntary.Among these 50 patient died so only 100 patients included in this study .

Subjects with SCI recruited to this study were classified according to the 1992 international standars for neurological and functional classification of spinal cord injury made by American Spinal Injury Association (ASIA).

Questionnaire

The questionnaire comprised of (i) QoL assessment; (ii) basic data

The World Health Organization Quality of Life Measure Abbreviated version, WHOQOL-BREF questionnaire used . This questionnaire comprises 28 questions, including 2 overall questions and 4 domains: physical health (domain 1), psychological well-being (domain 2), social relationships (domain 3) and environment (domain 4).

The basic data included some personal information, such as age, sex, marital status, educational background and time since the onset of injury.

In addition to the QoL assessment and basic data collection, we invited subjects to describe their individual situations or requirements in the comments or request section. This part included a statement of the most troublesome

complication and the greatest problem encountered during their daily lives.

The QoL was quantified by calculating the QLI, Neurotoolkit is used to calculate score in these domains.

In this study, levels of QLI are classified into 4 categories: poor (< 50%), barely (50–65%), modest (66–75%) and high (> 75%).

Data analysis

Data so collected was tabulated in an excel sheet. The means and standard deviations of the measurements per group were used for statistical analysis (SPSS 22.00 for windows; SPSS inc, Chicago, USA). Association between the variables were established by different tool like Anova test , Student t test and chi square test. The level of significance was set at $p < 0.05$.

Results :

Demographic characteristics of the participants

1.In this study 150 subjects included, including 137(91.33%) male and 13 (8.67%) female.

2.Mean age of patient was 40.2 years with minimum age of the patient was 7 years and maximum age was 72 years .

3.In the present study, the most common cause of spine injury was fall from height (62.7%) including roof, trees, hills, electricity pole, and stairs followed by Road Traffic accidents (34%) and others (3.3%) .

4.In present study , out of 150 patients , 50 patients (33.33%) were died and 100 patients (66.67%) were survived.

6.Out of 50 died patients , 45 patients were male and 5 patients were female. Out of 50 died patients , 46 patients were cervical spine injury and 4 were dorsal spine injury .

Table 1: shows the summarized QLI results of the patients with respect to different parameter

QOL	Education	Mean	SD	p-value
PhysicalHealth	Primary	52.39	12.691	<0.05
	Middle	56.20	13.864	
	Secondary	52.76	15.821	



	HS	58.39	14.405	
	Graduate	66.92	12.672	
Psychological	Primary	43.86	13.689	<0.05
	Middle	48.80	20.241	
	Secondary	47.67	18.350	
	HS	53.06	17.548	
	Graduate	61.92	16.983	
SocialRelationship	Primary	42.14	12.545	<0.05
	Middle	45.00	17.986	
	Secondary	47.33	16.032	
	HS	51.27	16.258	
	Graduate	61.00	12.014	
Environmental	Primary	51.93	11.411	>0.0
	Middle	55.00	11.180	
	Secondary	54.48	12.644	
	HS	57.39	11.898	
	Graduate	62.46	10.875	
QOL	NeedofAirway/MV	Mean	SD	p-value
PhysicalHealth	Yes	44.46	7.355	<0.001
	No	60.77	14.102	
Psychological	Yes	36.15	7.827	<0.001
	No	55.26	17.170	
SocialRelationship	Yes	38.92	8.850	<0.001
	No	52.32	16.114	
Environmental	Yes	45.19	7.077	<0.001
	No	59.51	11.155	
QOL	UTI	Mean	SD	p-value
PhysicalHealth	Yes	45.89	6.420	<0.001
	No	60.70	14.362	
Psychological	Yes	38.14	7.043	<0.001
	No	54.94	17.620	
SocialRelationship	Yes	35.86	7.327	<0.001
	No	53.91	14.782	
Environmental	Yes	47.18	5.869	<0.001
	No	58.70	12.019	
QOL	Bedsore	Mean	SD	p-value
PhysicalHealth	Yes	47.10	5.384	<0.001



	No	58.68	14.981	
Psychological	Yes	39.00	6.124	<0.001
	No	52.81	17.964	
SocialRelationship	Yes	33.19	5.528	<0.001
	No	52.67	14.602	
Environmental	Yes	49.38	4.801	<0.001
	No	56.89	12.589	
QOL	Spasticity	Mean	SD	p-value
PhysicalHealth	Yes	43.95	6.737	<0.001
	No	59.16	14.071	
Psychological	Yes	37.95	8.270	<0.001
	No	52.71	17.474	
Social Relationship	Yes	34.11	7.172	<0.001
	No	51.94	14.887	
Environmental	Yes	46.26	7.887	<0.001
	No	57.47	11.517	

There is statistically significant differences in mean values of quality of life with respect to Level of education, Need of Airway /MV, UTI, Bed sore and Spasticity as the p-value is < 0.001, at 0.01 level of significance.

Table 2 : QoL in SCI patients with respect to length of ICU stay.

QOL	Length of stay in ICU				Length of stay in Hospital			
	Mean	SD	Corr.Coeff(r)	p-value	Mean	SD	Corr.Coeff(r)	p-value
PhysicalHealth	56.53	14.560	-0.296	<0.05	56.53	14.560	0.940	<0.001
Psychological	50.29	17.429	-0.262	<0.05	50.29	17.429	0.892	<0.001
SocialRelationship	48.84	15.689	-0.190	>0.05	48.84	15.689	0.935	<0.001



Environmental	55.79	12.011	-0.297	<0.05	55.79	12.011	-0.136	>0.05
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Student t test

There is statistically significant relationship between Length of stay in ICU with QOL (all domain) but in negative way as the correlation coefficient is negative. For Length of stay in Hospital , there is statistically significant relationship between QOL with Length of stay in Hospital except domain Environmental .

Table 3: QoL in SCI patients with different parameters.

QOL	Vasopressor support	Mean	SD	p-value		
Physical Health	Y	44.00	6.000	<0.05		
	N	57.77	14.585			
Psychological	Y	39.56	9.914	>0.05		
	N	51.35	17.685			
Social Relationship	Y	41.78	6.418	>0.05		
	N	49.54	16.175			
Environmental	Y	46.67	6.782	<0.05		
	N	56.69	12.061			
QOL	ASIA Grade	Mean	SD	p-value		
Physical Health	Grade A	48.00	4.899	<0.001		
	Grade B	48.36	4.717			
	Grade C	49.05	10.293			
	Grade D	64.53	14.672			
	Grade E	81.00	.000			
Psychological	Grade A	35.67	3.615	<0.001		
	Grade B	39.64	3.880			
	Grade C	42.89	12.183			
	Grade D	59.28	18.031			
	Grade E	81.00	.000			
Social Relationship	Grade A	31.00	.000	<0.001		
	Grade B	33.36	5.259			
	Grade C	43.57	10.511			
	Grade D	58.00	14.542			
	Grade E	75.00	.000			
Environmental	Grade A	49.00	2.449	<0.001		
	Grade B	50.00	.000			
	Grade C	50.32	10.138			
	Grade D	61.58	12.201			
	Grade E	75.00	.000			
Region of Spine Injury		N	Mean	Std.Deviation	p-value	



PhysicalHealth(Domain1)	Cervical	45	49.36	11.302	P<0.001	
	Dorsal	28	56.96	13.623		
	Lumbar	27	68.04	13.096		
Psychological(Domain2)	Cervical	45	42.31	13.635	P<0.001	
	Dorsal	28	49.46	15.169		
	Lumbar	27	64.44	16.858		
Social Relationship(Domain3)	Cervical	45	45.44	10.459	P<0.001	
	Dorsal	28	43.86	16.635		
	Lumbar	27	59.67	17.216		
Environmental(Domain4)	Cervical	45	49.71	10.173	P<0.001	
	Dorsal	28	56.21	9.624		
	Lumbar	27	65.48	10.786		

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There is statistically significant differences in mean values of quality of life with respect to Vasopressor support, ASIA grade , Region of injury .

There is no statistically significant differences in mean values of quality of life with respect to age, sex, marital status , mode of injury , comorbidities and operative status, as the p-value is > 0.05, at 0.05 level of significance.

Discussion :

It is thought that older age reduces HRQoL after SCI because of lowered capacity to cope with the impairment (Alander DH et al 1997⁸,Hu Y 2008⁹). In contrary to this, present study showing no statistically significant differences in mean values of quality of life with respect to age .Singh R et al (2008)¹⁰ also reported no significant difference in QoL with respect to age. We found there is no statistically significant differences in mean values of quality of life with respect to Sex .Similarly, study by Hu Y et al (2008)⁹ shown there was no significant difference in quality of life between men and women. In contrary to this Singh R et al (2008)¹⁰, eISSN1303-5150

Nasidi MA et al (2019)¹¹ found mean QoL in female were higher than male.

Many studies support that married patients score higher in HRQoL subscales (Chang FH et al,¹²DeVivo MJ et al,¹³ Krause JS et al¹⁴). We determined no significant difference between single and married patients in this study, which is consistent with the findings of Lidal IB et al (2007)¹⁵ ,Singh R et al(2008)¹⁰ and Hu Y et al(2008)⁹.

Abu-Baker NN et al (2020)¹⁶,Gautam P et al (2019)¹⁷ and Clayton KS et al (1994)²¹reported in their study that higher education is a predictor of better QoL .Our data showed that the patients who had more than a high school education had higher mean QoL than those who had high school level of education or lower, as expected. In contrary to this Singh R et al (2008)¹⁰ and Hu Y et al (2008)⁹ did not find any significant positive relationship between higher education and mean QoL.

There is no statistically significant differences in mean values of quality of life with respect to Comorbidity as the p-value is > 0.05, at 0.05



level of significance. Mean QOL of No comorbidity group is higher than mean of others.

we found in our study there is statistically significant relationship between Length of stay in ICU with QOL (all domain) but in negative way as the correlation coefficient is negative.

We found in this study there is statistically significant relationship between QOL with Length of stay in Hospital except domain Environmental .

We found that the mean QOL of No need of Airway/Mechanical ventilator group is higher than mean of need of Airway/MV. Which is corroborating with the finding of Charlifue S et al (2011)¹⁸ in their study.

We found in our study that there is statistically significant differences in mean values of quality of life with respect to Vasopressor support for the domain Physical Health & Environmental as the p-value is < 0.05, at 0.05 level of significance but not with other domain of QOL. QOL is higher in no vasopressor support group than vasopressor support group.

There is no statistically significant differences in mean values of quality of life with respect to OT as the p-value is > 0.05, at 0.05 level of significance. Mean QOL of No OT group is higher than mean of OT group. Explanation for this may be many patient with spinal cord contusion does not require surgery(OT) but later gain good functional capacity ,power in limb and also many patient with ASIA grade E actually doing better have good quality of life does not require surgery.

Frankel HL et al (1998)¹⁹, Nasidi MA et al (2019)¹¹, Abu-Baker NN et al (2021)¹⁶ and Singh R et al (2008)¹⁰ found that severity of injury as graded by ASIA impairment score negatively affect QoL .This is also corroborated by the findings of this study. Mean QOL of ASIA Grade D and E is higher than mean of other grades.

Nasidi MA et al (2019)¹¹, Lin KH et al (1997)²⁰, Abu-Baker NN et al (2021)¹⁶ and Zwecker M et

al (2020)²¹ found higher level of injury (tetraplegic patients) score poor QoL than lower level of injury(paraplegic patients).This is also corroborated with the findings of this study. Mean QOL of Lumbar spine injury is higher than mean of dorsal spine injury and cervical spine injury . Mean QoL of Dorsal spine injury is higher than cervical spine injury. In contrary to this Singh R et al¹⁰ does not show any significant difference in QoL score in relation to level of injury (tetraplegic vs paraplegic).

The main findings in our study were as follows: HRQoL is decreased in SCI patients.

Health related QoL in different domain Physical health ,Psychological health, Social relation and environmental health is affected by level of injury(higher level of injury leads to poor QoL score), ASIA grade and complication(UTI, bed sore, spasticity).

Conclusion :

HRQoL is decreased in SCI patients. Health related QoL in different domain Physical health ,Psychological health, Social relation and environmental health is affected by level of injury(higher level of injury leads to poor QoL score), ASIA grade(severity of neurological deficit) and complication(UTI, bed sore, spasticity).As fall from height is major cause of spinal cord injury in India safety major at work place and at home must be increased for prevention of such devastating incidence. Special unit for spinal cord injury patient needed for active and productive lives in these patients in the community. Remedial measures like early mobilization, treating bedsores and UTI, vocational training and early reintegration into the society will lead to improvement in QoL.

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