QUALITY OF LIFE IN TRAUMATIC SPINAL CORD INJURED

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ABSTRACT

BACKGROUND

Traumatic myelopathies account for significant proportion of people with spinal cord injuries admitted to rehabilitation unit and it becomes important to assess the functional outcome of these individuals for formulating the treatment plan. The studies incorporating all the measures of outcome i.e., impairment, disability, handicap and quality of life with appropriate instruments in this population are sparse and very few studies have been done from our country. Hence in this study an attempt was made to evaluate the above through International Classification of Functioning, Disability and Health (ICF) model.

OBJECTIVES

1. To assess the Quality of Life (QOL) in traumatic SCI individuals 2. To study the correlation between QOL and impairment/disability/handicap.

METHODOLOGY

A cross-sectional study was carried out on fifty patients of traumatic SCI visiting our centre over a period of one year and one year post injury. Patients were assessed by ASIA impairment scale, Functional Independence Measure (FIM), Craig's Handicap Assessment and Reporting Technique (CHART) and WHOQOL-BREF after screening with MMSE.

RESULTS

90% of patients were males, more than half were in their productive years of life; 82% had incomplete SCI injuries and 76% had higher grades of impairment. Younger patients had better scores on FIM and all domains of CHART except economic self-sufficiency. All domains of QOL were negatively affected by SCI. There were significant positive correlations between impairment and disability, disability and QOL, disability and handicap. Different domains of CHART had variable correlations with QOL domains.

CONCLUSIONS

This study shows that SCI negatively influences all the conceptual components of ICF model. SCI affects QOL, activity and participation of an individual. Various factors like age, completeness of injury, marital status, etc., affects QOL of an SCI individual. This finding highlights the need for vigilance among rehabilitation personnel to look at these in every SCI individual and plan for appropriate interventions.

KEYWORDS

Traumatic SCI; QOL; ICF model.

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INTRODUCTION: An insult to spinal cord partially or completely interrupts its motor, sensory, autonomic and reflex functions. Though numerous pathologies such as infection, tumour, demyelination and vascular compromise have been noted to cause spinal cord injury, trauma exceeds the whole group in causing spinal cord injury. A traumatic SCI is defined as "The occurrence of an acute, traumatic lesion of neural elements in the spinal canal (spinal cord and cauda equina) resulting in temporary or permanent motor and/or sensory deficit or bladder dysfunction."[1]

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In India, disability due to SCI is estimated at about 20 per million of the population. At this rate, there would be around 18,000 fresh spinal cord injured patients added every year. In India, majority of the patients sustain these injuries due to fall from a height. But with increasing use of motor vehicles and poor road conditions now, more number of people suffer these injuries due to road-traffic accidents. Other causes include sports injuries, industrial accidents and acts of violence such as stabbing and gunshot wounds.

There are a few events that affect a person's entire lifestyle as profoundly as SCI.

Spinal cord injury has an immediate and long-term impact on all areas of individual's physical and psychosocial functioning. Multiple medical, social and vocational complications affect the victims who are young and in their productive stages of life. The quality of life of an individual depends on functional abilities and the interaction with the environment and the society. SCI does not affect a person's

intellectual ability or cognitive function unless a traumatic brain injury is also sustained.

A comprehensive rehabilitation program can often enable them to function adequately. Over the last five decades, the approach to SCI has been constantly upgraded and the present study with the aim of assessing Quality of Life (QOL) in these individuals is a part of the effort to aid the process.

The conceptual model developed by the World Health Organization (WHO) can explain the impact of any chronic disease on an individual's functional status. The WHO–ICF 2000 model (International Classification of Functioning, Disability and Health) is an international classification published by WHO in 2001.

As a framework, the ICF provides a series of concepts or parts that can be fitted together in a variety of ways. That is the relationship between the parts or conceptual elements are not united into one structure alone, but can be connected to each other in multiple ways that reflect the analytical questions being addressed. It is very much the same scenario in the present study of SCI individuals, where different variables are being compared.

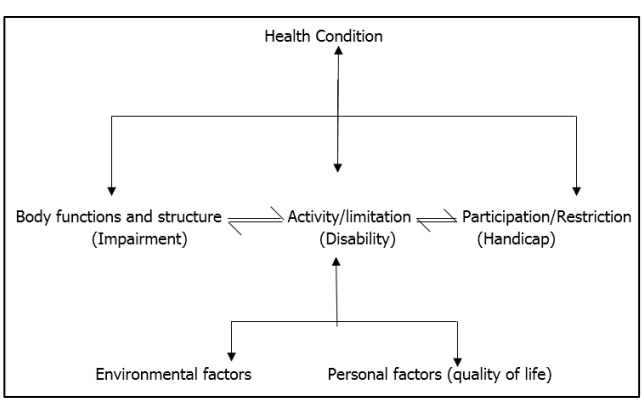
The ICF model has two parts:

- Part 1 represent the Conceptual components associated with the individual body structure/body function and activity/participation.
- Part 2 represent Conceptual components located in the individual's environmental and experiential context and include environmental and personal factors.

This includes 'Impairment' at the organ level, 'Disability' at the personal level, describing functional status and 'Handicap' at the societal level or more recently referred as 'participation' encompassing the role, one plays in the society.

The ICF model organizes information into three components: body functions and structure, activity and participation and contextual factors (environmental and personal factors) with emphasis on their interactions and impact on a person's health.

THE ICF MODEL:



Jette (1994) conceptualized the relationship of disability and handicap to quality of life.[2]

Individuals limited in functional mobility and the ability to interact within their environment and society will most likely perceive their quality of life to be poor. Optimizing function and quality of life is a self-evident goal of rehabilitation and ongoing care of SCI individuals. As a result functional assessment of patient in the rehabilitation setting may become the only means of justifying treatment effectiveness.

Rehabilitation researchers have developed various tools to assess the functional status and outcome of individuals with SCI, which focuses on measurement of various consequences of the disease, viz. impairment, disability, handicap and quality of life.

Impairment: Refers to any loss or abnormality of physiological, psychological or anatomical structure or function (function of a body part). Impairment is the direct neuro-physiologic consequence of the underlying pathology. Assessing impairment of neurologic function is one of the most objective measures of SCI.

Disability: Refers to any restriction in or lack of ability to perform an activity in the manner or range considered normal for a human being. For example the inability to transfer between surfaces, ambulate or climb stairs would all qualify as disabilities according to the ICF model. Disability is typically measured in terms of degree of independence with which an individual can perform activities of daily living.

Handicap: Is a disadvantage for a given individual, resulting from an impairment or a disability that limits or prevents the fulfilment of a role that is normal (depending on the age, sex and social and cultural factors) for that individual or that would be similar to the roles that their peers are performing. Thus for a person with SCI, handicap reflects his day-to-day functioning abilities.

The extent of handicap is assessed for individuals living within the community regardless of the number of years since their inpatient rehabilitation or the extent of their continuing involvement with the health care system.

Quality of Life: Quality of Life (QOL) has increasingly become a key outcome measure in determining the role of rehabilitation. It reflects how well an individual can cope with the burden of the disease. The concept of QOL is multi-dimensional. It is defined as the individual's perception of their position in life in the context of the culture and value systems in which they live, in relation to their goals, expectations, standards and concerns. According to the WHOQOL group 1995, it is a broad ranging concept incorporating in a complex way individual's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationships to salient features of the environment. The assessment of QOL through ICF model in SCI individuals with validated instruments in Indian context is a meaningful approach.

AIMS AND OBJECTIVES: To assess Quality of Life in Traumatic Spinal Cord Injured through ICF model. (International classification of Functioning, Disability and Health).

1. To study the correlation between QOL and disability, impairment, handicap levels.

MATERIALS AND METHODS: The present study was conducted as a cross-sectional study on individuals with traumatic Spinal Cord Injury (SCI) visiting the Department of PMR in a Tertiary Care Teaching Hospital, Bangalore.

Inclusion Criteria:

1. Patients with traumatic SCI.
2. Patients with minimum one year post injury.
3. Aged between 15 to 55 years.

Exclusion Criteria:

1. Patients with non-traumatic SCI.
2. Patients within one year of injury.
3. Aged less than 15 years and more than 55 years.
4. Associated brain injury as identified on Mini Mental Status Examination (MMSE).
5. Patients with major psychiatric/physical illness before the onset of injury.
6. Patients who cannot speak English, Kannada, Telugu or Hindi.

Those who met the above criteria were contacted and the nature of the study was explained. Informed consent was taken from the patient and ethical committee approval was taken. Information about socio-demographic characteristics of the patient was collected. This included age, gender and marital status, educational status of the patient and clinical details of the spinal cord injury.

All together 50 individuals with SCI were interviewed during the study period of one year. SCI individuals were screened with MMSE (cut-off of 20/25) and assessed for their impairment by ASIA scale, disability by FIM, handicap by CHART and quality of life by WHOQOL-BREF.

Scales Used:

1. American Spinal Injury Association (ASIA) impairment scale.
2. Functional Independence Measure (FIM).
3. Craig's Handicap Assessment and Reporting Technique (CHART).
4. WHOQOL-BREF.
5. Mini Mental Status Examination (MMSE).

American Spinal Injury Association (ASIA) Impairment Scale: The American Spinal Injury Association (ASIA) initially developed standards for neurological classification of spinal cord injury in 1982 and were endorsed by the International Medical Society of Paraplegia (IMSOP) in September 1992.[3]

This ASIA Impairment scale is the most valid, precise and reliable minimum data set being utilized in most of the rehabilitation Center's across the world. These standards had put forth new definitions for tetraplegia, paraplegia and neurological level, complete and incomplete injuries.

Functional Independence Measure (FIM): FIM is the most widely accepted functional assessment measure in use in the rehabilitation community worldwide. It is found to have acceptable validity and reliability when used in people with SCI. The total FIM had a median inter-rater reliability value of 0.95 and median test-retest and equivalence reliability values of 0.95 and 0.92 respectively.[4,5]

The FIM is an 18-item ordinal scale. Scores on the individual items range from 1 to 7. An FIM item score of 7 is categorized as 'complete independence;' a score of 1 is 'total assist' (performs less than 25% of task). Scores falling below 6 requires another person for supervision or assistance. The total score ranges from 18 to 126 and takes about 15 minutes to administer.

Craig's Handicap Assessment and Reporting Technique (CHART): The best-developed and well-known measure for assessing handicap in SCI is Craig Handicap Assessment and Reporting Technique (CHART). Whiteneck and Colleagues (1992) developed it to quantify the domains of handicap identified in the WHO disablement model.[6]

Chart includes six domains: Physical independence, Cognitive independence, Mobility, Occupation, Social integration and economic self-sufficiency. The 32 items of CHART include relatively objective questions. Scoring CHART yields six 100-point scales, this is summed for a total score with a possible maximum 600 points.

Psychometric properties of CHART were evaluated in patients with SCI by the investigators who developed the scale. The test-retest reliability co-efficient for the overall CHART score was 0.93. Considering individual dimensions, the co-efficient were 0.92 for physical independence, 0.95 for mobility, 0.89 for occupation, 0.80 for economic self-sufficiency and 0.81 for social integration. In the same report, subject proxy person correlations were 0.83 for the total CHART score and ranged from 0.69 to 0.84 for most dimensions with the social integration dimension having the lowest subject proxy correlation. It is validated specifically for persons with SCI.

WHOQOL-BREF: WHOQOL-BREF is a quality of life instrument, which can be applied across different cultural settings, was developed in 1998.[7] It includes one question from each of the 24 facets relating to QOL, two items from the overall QOL and general health facets. It contains a total of 26 questions, produces scores for four domains: Physical, Psychological, Social relationships and Environment as in WHO QOL-100 assessment. The WHOQOL-BREF has been shown to assess adequately domains relevant to QOL in a large number of studies worldwide. Domain scores produced by the WHOQOL-BREF have been shown to correlate at around 0.9 with the WHO QOL-100 domain scores, which has itself demonstrated criterion validity. They have also

been shown to display good discrimination validity, content validity and test-retest reliability.

Mini Mental Status Examination (MMSE): The MMSE is a very brief, easily administered mental status examination that had proved to be a highly reliable and valid instrument for detecting and tracking the progression of the cognitive impairment.[8]

It is an 11-item measure that tests five areas of cognitive function: orientation, registration, attention and calculation, recall and language. The maximum score is 30.

A score of 23 or lesser is indicative of cognitive impairment. It takes only 5-10 minutes to administer. Extensive psychometric data on the MMSE confirms that the test has very good test-retest and joint reliability and excellent validity. Here in this study, a cut-off of 20/25 is chosen to maintain uniformity in testing both paraplegics and tetraplegics. The questions 8, 10 and 11 which check for following the command, writing and copying are excluded/not scored.

STATISTICS: Mean and standard deviation were used to describe continuous variables and frequency distributions were obtained for categorical data. Student 't' test has been used to find the significance of QOL score between marital status and level of injury. Analysis of variance has been used to find the significance of study parameters with age. Pearson's correlation coefficients were determined for the associations between FIM score, chart parameters and quality of life scores.

Significance of p-value is + suggestive at $0.05 < P < 0.10$, * moderately significant at $0.01 < P \leq 0.05$ and ** strongly significant at $P \leq 0.01$.

RESULTS: Fifty patients with traumatic SCI were assessed one-year post injury. More than 50% were in their productive years of life. Their age at injury ranged from 15 to 55 years, mean age being 33.12±10.05 years. There were 45 men and 5 women. Thirty-seven patients (74%) were married; 70% of them were minimally educated up to high school. Nine patients had complete injuries. Seven had paraplegia and two had tetraplegia.

Majority about 41 (82%) had incomplete injuries at the time of evaluation, i.e. one year post injury. Nine patients remained at Grade A (of ASIA impairment scale). Almost three-fourths, about 38 of them (76%) had reached Grades C and D.

FIM scores showed better values in the younger age groups. The mean was 92.36±22.74. The younger patients fared well in all the domains of CHART except the economic self-sufficiency domain (score<50%) and the domain scores declined progressively with age. Mean was less than 75% in all domains and lowest was the occupational domain (42.6). Quality of life scores revealed that all the domains of the quality of life were negatively affected by the injury. The 41-50 years age group had lowest scores compared to other age groups and younger age groups had relatively better scores.

Quality of life scores were better in the married group and there was significant correlation (p-value<0.01) only with physical and social relationship domains as shown in table 10. The level of injury did not show any correlation with the domains of QOL. The completeness of the injury had significant correlation with physical and psychological domains of quality of life.

Relationship between Disability, Handicap and Quality of life: The Pearson's correlation co-efficient was significant between FIM and all domains of CHART (p-value <0.001). There was a positive correlation between disability and impairment (Table 13). Higher the FIM score and CHART scores, lesser the disability and impairment. FIM score also correlated significantly with all the domains of WHOQOL-BREF. The p-value was <0.001 (Table 14).

The relationship between various domains of handicap and QOL was assessed using Pearson's correlation coefficient (Table 15). Physical independence, Cognitive independence, Mobility and Occupation domains of CHART had significant positive correlation with all the four domains of quality of life (p-value <0.001). Social integration correlated significantly with Physical, Psychological and Environmental domains of QOL. Economic self-sufficiency correlated significantly only with physical domain of QOL.

Age in Years	Number	%
Up to 20	5	10.0
21-30	19	38.0
31-40	14	28.0
41-50	9	18.0
51-60	3	6.0
Total	50	100.0
Mean±SD	**33.12±10.05**	

Table 1: Age distribution of patients studied

Sex	Number	%
Male	45	90.0
Female	5	10.0
Total	**50**	**100.0**

Table 2: Sex distribution of patients studied

Marital Status	Number	%
Unmarried	13	26.0
Married	37	74.0
Total	**50**	**100.0**

Table 3: Marital status of patients studied

Educational Level	Number	%
Illiterate	7	14.0
Upto High school	28	56.0
PUC	8	16.0
Degree and above	7	14.0
Total	**50**	**100.0**

Table 4: Education levels of patients studied

Level of Injury	Number	%
Paraparesis	24	48.0
Paraplegia	7	14.0
Tetraparesis	17	34.0
Tetraplegia	2	4.0
Total	**50**	**100.0**

Table 5: Level of Injury of patients studied

Age in Years	Number of Patients	FIM	
		Mean	SD
Up to 20	5	103.00	24.78
21-30	19	96.32	21.98
31-40	14	98.86	13.97
41-50	9	74.00	26.25
51-60	3	74.33	18.18
Total	**50**	**92.36**	**22.74**
P-value	**0.741**		

Table 6: ASIA Impairment Levels

GRADE	Number	%
A	9	18.0
B	-	-
C	20	40.0
D	18	36.0
E	3	6.0
Total	**50**	**100.0**

Table 7: Age and Functional Independence Measure score

Age in Years	CHART Score											
	Physical Independence		Cognitive Independence		Mobility		Occupation		Social Integration		Economic Self Sufficiency	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Up to 20	69.0	28.5	76.0	17.2	62.0	32.3	71.2	37.4	73.2	11.8	40.0	28.5
21-30	70.2	21.2	77.8	15.5	65.0	29.2	49.4	31.8	63.7	17.2	42.1	28.9
31-40	71.8	19.5	73.3	17.0	65.8	28.1	38.7	17.8	61.8	21.3	37.5	23.5
41-50	51.4	23.9	69.3	20.6	44.6	28.1	24.6	19.0	55.7	14.4	38.9	39.7
51-60	41.3	11.5	54.7	6.1	26.7	21.0	23.3	20.2	52.7	19.0	25.0	25.0
Total	65.4	22.9	73.5	17.1	58.9	29.8	42.6	28.9	62.0	17.8	39.0	28.6
P-value	0.061		0.244		0.124		0.019		0.400		0.920	

Table 8: Association of age in years with CHART score

Age in Years	Quality of Life Score							
	Physical		Psychological		Environmental		Social Relationship	
	Mean	SD	Mean	Sd	Mean	SD	Mean	SD
Up to 20	75.2	9.8	75.0	14.7	62.6	21.7	65.2	20.5
21-30	56.1	22.7	56.6	20.1	50.9	17.9	63.9	17.8
31-40	54.2	13.6	57.4	15.8	54.0	20.1	56.4	16.7
41-50	36.9	21.4	33.4	18.2	40.2	17.4	46.2	13.0
51-60	39.7	15.6	50.3	11.0	50.0	22.6	50.0	19.0
Total	**53.0**	**21.1**	**54.1**	**20.5**	**51.0**	**19.3**	**57.9**	**17.8**
P value	**0.009****		**0.002****		**0.296**		**0.101**	

Table 9: Association of age in years with Quality of Life score

Quality of Life Mean± SD	Marital Status		P Value
	Married	Unmarried	
Physical	66.54±16.89	48.30±20.48	0.006**
Psychological	62.46±20.73	51.19±19.89	0.088+
Environmental	57.23±18.36	48.78±19.34	0.177
Social relationship	69.00±17.19	54.03±16.49	0.008**

Table 10: Correlation of quality of life with marital status

Quality of Life Mean± SD	Level of Injury		P Value
	Paraparesis+ Paraplegia	Tetraparesis+ Tetraplegia	
Physical	55.81±21.65	48.53±19.84	0.240
Psychological	56.61±19.53	50.05±21.94	0.277
Environmental	52.42±18.61	48.63±20.61	0.506
Social relationship	57.61±18.43	58.42±17.17	0.878

Table 11: Correlation of quality of life with level of injury

Quality of Life Mean± SD	Level of Injury		P Value
	Paraparesis+ Tetraparesis	Paraplegia+ Tetraplegia	
Physical	57.17±19.19	34.22±19.66	0.002**
Psychological	57.59±20.06	38.33±19.19	0.009**
Environmental	52.41±19.38	44.44±18.43	0.266
Social relationship	58.68±18.84	54.44±12.09	0.523

Table 12: Correlation of quality of life with completeness of injury

Chart Score	FIM SCORE	
	R-value	P-value
Physical independence	0.844	<0.001**
Cognitive independence	0.557	<0.001**
Mobility	0.783	<0.001**
Occupation	0.678	<0.001**
Social integration	0.465	<0.001**
Economic self-sufficiency	0.410	<0.003**

Table 13: Correlation of FIM score with CHART scores

QOL Score	FIM SCORE	
	r-value	p-value
Physical domain	0.816	<0.001**
Psychological domain	0.721	<0.001**
Environmental domain	0.63	<0.001**
Social relationship domain	0.497	<0.001**

Table 14: Correlation of FIM with QOL scores

CHART Parameters	Correlation	Quality of Life Parameters			
		Physical	Psychological	Environmental	Social Relationship
Physical independence	r -value	0.774	0.703	0.576	0.468
	p-value	<0.001**	<0.001**	<0.001**	0.001**
Cognitive independence	r -value	0.535	0.478	0.379	0.362
	p-value	<0.001**	<0.001**	0.007**	0.010**
Mobility	r -value	0.739	0.650	0.709	0.595
	p-value	<0.001**	<0.001**	<0.001**	<0.001**
Occupation	r -value	0.612	0.667	0.582	0.610
	p-value	<0.001**	<0.001**	<0.001**	<0.001**
Social integration	r- value	0.518	0.515	0.523	0.213
	p-value	<0.001**	<0.001**	<0.001**	0.137
Economic self sufficiency	r -value	0.448	0.344	0.257	0.334
	p value	0.001**	0.015*	0.072+	0.018+

Table 15: Correlation between CHART scores and the quality of life scores

DISCUSSION: In this study, the most validated instruments for measurement were used. Functional independence was influenced by age at injury. The influence of age on disability is constantly debated. Pentland et al. in 1995 observed a negative influence of age on short-term functional recovery as well as long-term health outcome.[9] However, FIM scores in this study were better in younger patients.

The present study is the first to focus on assessment of handicap in individuals with traumatic SCI in India through the ICF model. Mean scores of all domains were less than 70% of the maximum score indicating that patients with SCI had significant handicap. The disease affected all the domains of handicap negatively. Patients had lowest scores in the domain of economic self-sufficiency followed by occupation.

Cognitive independence scores were less affected, though this appears to be the result of query ignorance/restrictions imposed by the family members even in terms of decision-making. Very low scores on economic self-sufficiency in these individuals could be due to the expenses incurred after SCI exceeding the total family annual income. Occupation and social integration scores could be falsely high in under 20 population as time spent in studying and the number of people met obviously changes the scenario. The physical independence and mobility scores were also affected by SCI.

Age at injury had significant negative influence on all the domains of CHART. This is in agreement with the study of Whiteneck et al.[6] carried out on broad range of population with SCI who observed that patients with older age reported low scores on these domains.

In the present study, disability score correlated significantly with all the domains of handicap (P-value <0.001). Daverat et al. in 1995 noted significant correlation between handicap score as measured by reintegration to Normal Living Index (RNLI) and FIM.[10] This supports the hypothesis that disability and handicap can affect each other. This bidirectional relationship further emphasizes the importance and scope of assessment in rehabilitation to optimize activity and participation in the society.

Quality of Life (QOL) assessment approaches are being used to determine both the effectiveness of rehabilitation efforts and the impact of disabilities in patients with SCI. These evaluations of the human condition seem especially relevant to the rehabilitation process, which is holistic in nature. In the present study, QOL scores were negatively affected by the disease. Westgren et al. and Dijkers et al. reported that QOL increased with age, reflecting an adaptive process.[11,12] This is similar to the meta-analysis by Dijkers et al. in 1997, which demonstrated that persons with spinal cord injury tend to report poorer QOL.[12] Mehnert et al. has shown that QOL was better with young patients.[13] In the present study, age at injury has negatively influenced all the domains of QOL, the older SCI individuals showing poor scores in all the domains of QOL and 40-50 year group rating lowest. Post et al. (1998) also found that older age predicts lower life satisfaction.[14] Here again, the age of the patient has shown significant correlation (P-value <0.01) only with the physical and psychological domains of quality of life.

Kannisto et al. reports that tetraplegic patients estimated their QOL significantly lower than patients with incomplete paraplegia.[15] Level of injury has not affected QOL in the present study. The literature regarding relationship between QOL and impairment of body functions and structures as represented by level of injury is fairly consistent.

Westgren and Levi in 1998 did not find a significant difference in QOL subgroups of SCI (tetraplegia vs paraplegia) in a Swedish sample.[11] Other studies also found no significant difference in the QOL scores between groups based on level of injury like Decker et al. 1985 and Nieves et al. 1991.[16,17] This suggests that a person's subjective perception of his/her QOL is not related to level of injury.

The level of lesion was associated with QOL in only one group of the study, while the completeness of the SCI showed no association with either group (Kreuter et al.).[18] But the completeness of the injury had significant correlation with physical and psychological domains of quality of life in this study.

Holicky et al. in 1999 observed that marital status was significantly related to QOL with married SCI patients reporting higher quality of life.[19] The present study showed that the marital status was significantly related to physical and psychological domains of QOL, married patients showing better scores on WHOQOL-BREF.

In the study by Padua et al in 2002 involving patients with spina-bifida, the physical aspects of QOL did correlate to disability measurements.[20] Similarly Clayton et al. in 1994 observed that disability can significantly influence QOL.[21] In the present study individuals with lower disability as measured by FIM had better scores in the QOL domains.

The present study showed significant interrelationship between handicap and quality of life scores. Individuals with higher CHART scores had better quality of life. All the domains of QOL correlated significantly with physical and cognitive independence, mobility and occupational domains of CHART. The social integration domain of CHART correlated with physical, psychological and environmental domains of QOL but economic self-sufficiency correlated significantly only with physical domain of QOL. The concept of handicap as measured by CHART is more strongly correlated with measures of global satisfaction with life or subjective wellbeing than are measures of impairment and disability. Similarly in a meta-analysis, Djikers et al. observed that handicap had robust and consistent relationship to quality of life.[12] Fuhrer et al. in 1992 reported that life satisfaction was positively associated with the social integration, occupation and mobility domains of handicap.[22] This supports the Jette's concept of relationship of handicap to quality of life.[4]

LIMITATIONS: The number of subjects in the present study is relatively small in nature. The study was confined to patients who came for follow-up post one or more years of injury and hence does not reflect the characteristics of acute traumatic-SCI population. The sample was also heterogeneous with respect to level of injury, rehabilitation efforts, secondary complications, medical and surgical interventions and duration of stay in community. Hence, generalisation is not possible. Longitudinal studies with interventions at different levels would give a better picture of impact of the SCI.

CONCLUSIONS: The study found that most of the patients were young (66%) under 30 years of age; 90% were males and 74% were married. Incomplete injuries constituted 82% of the patient population. Age negatively influenced FIM and CHART scores. Quality of life was poor in the 41-50 year age group though patients above and below this age group had better scores. Level of injury had no correlation to the patients QOL. Age and marital status positively influenced the QOL and completeness of the injury had an inverse relationship with QOL.

It is evident that functional independence determines one's participation in the expected roles and one's QOL of a spinal cord injured. QOL is better when one is employed, mobile, independent cognitively and physically and to some extent it improves with integration in to the society. But the physical aspect of QOL improves significantly with economic self-sufficiency. The results from this study suggest that SCI has a negative impact on all the conceptual components of ICF model.

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