

Relationship between Functional Status and Quality of Life in Patients with Spinal Cord Injury: A Cross - Sectional study

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ABSTRACT

Background: Spinal Cord Injury is one of the severe injuries results in loss of sensory and motor function below the level of injury which deteriorates the quality of life. The bio-psycho-social model also emphasizes on the improving the quality of life than enhancing the physical function as the primary goals of SCI rehabilitation. Many authors have reported that there is significant positive effect on activities of daily living. Therefore, improving the quality of life in individuals with SCI.

Aim: To study the Relationship between Functional Status and Quality of Life in Patients with Spinal Cord Injury.

Methodology: Ten subjects were enrolled according to the inclusion and exclusion criteria of the study. WHOQOL-BREF and SCIM was administered at 3rd, 6th and 9th month of injury to assess the Quality of life and Functional Status of the individuals with Spinal Cord Injury.

Result: There was significant correlation between SCIM Vs Psychological domain ($r=-0.66$, $p=0.03^*$) at 3rd month, SCIM Vs Social domain ($r=0.57$, $p=0.08^*$) at 3rd month, SCIM Vs Environmental domain ($r=0.57$, $p=0.07^*$) at 9th month post injury.

Conclusion: The study concluded that there was a positive association between the functional status and quality of life in patients with spinal cord injury at 3, 6 and 9 months of injury.

KEY WORDS: Spinal cord injury, Quality of Life, Functional Status, Independence Measure, WHOQOL-BREF, Spinal Cord Independence Measure.

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Access this Article online	Journal Information
Quick Response code 	International Journal of Physiotherapy and Research ISSN (E) 2321-1822 ISSN (P) 2321-8975 https://www.ijmhr.org/ijpr.html DOI-Prefix: https://dx.doi.org/10.16965/ijpr 
	Article Information
	Received: 14 Jul 2023 Peer Review: 18 Jul 2023 Revised: 28 Aug 2023
	Accepted: 23 Sep 2023 Published (O): 11 Dec 2023 Published (P): 11 Dec 2023

DOI: 10.16965/ijpr.2023.152

INTRODUCTION

Spinal cord injury is a result of insult to the spinal cord, which may be because of various pathological or traumatic factors causing loss of motor activity, and sensation below the level

of injury as the link between the brain and spinal cord is severed [1]. A gradual increase in the incidence have been recorded in SCI cases from 13.0 individuals per million to 163.3 per million people [2].

Every year the expected incidences ranges from 250,000- 500,000 cases globally [3].

For functional recovery of the patient, it is important to predict and determine the extent of injury whether it is partial or complete. Along with the time, patients tend to experience spontaneous motor and sensory recovery. In the 3 months most of the functional recovery occurs reaching to a plateau by the period of 9 months, some more recovery may occur up to 12-18 months after injury [4]. The level of injury, severity of primary injury and progression of secondary injury determines the long-term outcomes in SCI patients [5]. There is a good prognosis in patients with incomplete paraplegia (approximately 76% of patients) in regaining locomotor ability within a year whereas patients with complete paraplegia have limited lower limb functional recovery and only half of these patient regain bladder and bowel control [6].

There is also an association of motor and sensory recovery in SCI patients because it is observed that there is a spontaneous sensory recovery usually after motor recovery [7].

Impairments in gait is a result of neuromuscular changes because of loss or disturbance of balance control, speed, decreased endurance, lower limb weakness, spasticity and loss of sensations [8].

Rating scales such as Functional Independence Measure and Walking Index for Spinal Cord Injury are used to assess ability of a person with SCI. FIM measures the burden of care but scales should also describe functional achievements according to their importance to patient, which may not be described by FIM [9]. For determining treatment goals SCIM can be used as a compact guide [9,10].

The World Health Organization defined QOL as the “person’s perception of his/her position in life within the context of the culture and value systems in which he/she lives and in relation to his/her goals, expectations, standards, and concerns [11].

It is a broad-ranging concept incorporating, in a complex way, the person’s physical health, psychological state, level of independence, social relationships, personal beliefs, and

relationship to salient features of the environment” [12].

A study done by Martha et al and colleagues on community exercise and its potential influence on quality of life and functional reach for individuals with spinal cord injury where participants underwent 8 weeks of rehabilitation reveals that there was a positive impact of rehabilitation on quality of life and functional reach in individuals with SCI[13]. Considering the final aim of rehabilitation to improve functional independence and thereby quality of life as perceived by patients, it is necessary to verify if the treatment is going in right direction. Therefore this study aims to observe the relationship between functional status and quality of life in individuals with spinal cord injury at different time zones of 3, 6 and 9 months of injury following SCI.

MATERIALS AND METHODOLOGY

Descriptive cross-sectional study was conducted on individuals with Spinal cord injury at Physiotherapy unit of tertiary care hospital at Ahmednagar.

A purposive sampling strategy was utilized to enroll subjects after obtaining the ethical clearance. Ten SCI subjects aged between 18 to 60 years participated in the study. Thoracic level of SCI, traumatic or, vascular or orthopaedic pathology were included into the study. Participants were undertaking the physiotherapy treatment on regular basis. Patients with any other psychological and neurological disorder, aged above 60 years and the person who did not received physiotherapy treatment were excluded from the study.

The SCIM assess 3 areas: Self-care, Respiratory and Sphincter Management, and Mobility (including toileting). Range of the total score is 0 to 100 i.e. Self-care (0-20), Respiratory and Sphincter Management (0-40) and Mobility (0-60). The interpretation of score 0 defines total dependence and a score of 100 defines complete independence. To measure quality of life, Marathi Version of WHOQOL-BREF Questionnaire was used which was taken at 3,6 and 9 months of injury. It is an 26 items scale which has four domains viz. Physical, Psychological,

Social and Environmental. It also emphasis on general health and overall quality of life. It produces the domain-wise scoring and not the facet score. The QOL assessment by WHO contains 4 domains that are physical health, psychological health, social relationships and environment which limitedly get a place in other assessments which are necessary to depict the QOL overall in patient suffering from SCI since a long time.

After receiving the ethical clearance from Institutional Ethical Committee, participants with Spinal Cord Injury met the inclusion criteria were enrolled in this study. Written

informed consent was obtained in the regional language from all the participants. The demographic data including name, age, gender, address, level of injury, dominance was noted. WHO QOL-BREF, SCIM data was collected at 3, 6, and 9 months of injury respectively.

RESULTS

Descriptive Statistics was obtained and normality of the data was checked using Kolmogorov-Smirnov Normality test. Pearson's Correlation was used to find out the association between two variables. Categorical variables were measured by graph and tables.

Table 1: Demographic characteristics of the subjects.

Age (in years)		31 ±5.03			
Gender (male: female)		6:04			
Level of Injury	T5	T6	T11	T12	
	1	2	4	3	
ASIA grade	A		B		C
	5		3		2

Table 2: Mean and Standard Deviation of WHOQOL-BREF domain and Total SCIM at 3, 6 and 9 months of injury.

	3 months	6 months	9 months
Physical	25.2±9.37	40.4±5.37	55.2±9.64
Psychological	36±13.32	40.4±5.37	54.7±8.89
Social	32.8±7.03	44.5±15.89	51.4±15.51
Environmental	46.3±8.65	49.9±4.49	68.3±6.32
Total SCIM score	23.6±7.41	38.1±15.21	50.7±12.93

Table 3: Correlation between domains of WHOQOL-BREF and SCIM at 3, 6, and 9 months of injury.

Variables	3 months		6 months		9 months	
	r	p	r	p	r	p
SCIM Vs Physical	-0.19	0.59	0.26	0.45	0.52	0.12
SCIM Vs Psychological	-0.66	0.03*	0.26	0.45	0.4	0.23
SCIM Vs Social	-0.57	0.08*	0.1	0.78	-0.5	0.13
SCIM Vs Environmental	0.39	0.25	0.086	0.81	0.57	0.07*

* - Significant Correlation

* - Significant Correlation

DISCUSSION

The aim of the study was to find out the Relationship Between Functional Status and Quality of Life in Patients with Spinal Cord Injury.

All thoracic level of spinal cord injured patients was included in the study so as to maintain the homogeneity in the results. It is also

suggested that there is no influence of level of injury and neurological level on the long-term effect on quality of life in individuals with spinal cord injury though findings are still controversial [14].

In the present study mean score of SCIM were observed, the functional activities of daily living showed gradual significant improvement

at given timeline when the mean of 3rd month is compared with 9th month. Similar findings were concluded by Xiaorong at in 2012 they compared functional status, quality of life and community integration in earthquake survivors with spinal cord injury showed a significant increase in the total score quality of life in patients with spinal cord injury at hospital discharge and one year follow up after the injury [15].

Nicole Mittman et al on conducted a similar study for predicting the health preference in chronic spinal cord injury According to their concept, measures of physical function play an important role in management of SCI. The relationship between the score of SCIM and physical functioning was associated with the quality of life in long term. And they further added that there is a need for taking into account the overall health status of the individual while planning management [16].

A Marathi Version WHOQOL BREF that is a patient report questionnaire and to assess the functional status SCIM was administered at 3 different timelines i.e. 3, 6 and 9 months after the spinal cord injury. In present study, when comparison of domains of WHO QOL-BREF was done at 3,6, and 9 months after the injury significant improvements were seen in all domains at 9 months post injury which signifies that quality of life improved with the time. A study conducted by P Lude et al on the quality of life in patients with spinal cord injury investigated the WHOQOL-BREF domains in individuals with SCI. The study found differences mostly in the physical domain indicating that QOL increases for persons with SCI from onset and physical QOL improves continuously [17].

WHOQOL-BREF comprises of four domains (physical, psychological, social and environmental) including overall quality of life. We found that there was weak negative correlation between physical domain and SCIM after 3 months of injury. At 6 and 9 months of injury showed positive correlation between the quality of life and functional mobility. This shows that as time progresses more improvement was observed in the functional activity i.e., they were able to perform activity of daily

living independently which ultimately led to increased quality of life in individuals with SCI [18]. Findings of Tomasone et al showed positive association between overall score of Leisure time Physical Activity Questionnaire with physical, psychological and social domains of WHOQOL BREF [19].

Mokgadi K. Mashola put forward there was a positive association that affects life satisfaction, perceived social support from home and community access and participation, and also improves mental health of the individuals. Further, he added the achievements of physical goals may lead to more positive changes and will improve the quality of life and satisfaction to a greater extent with their physical abilities. Additionally, social support from the relatives and friends will eventually help the person to manage the circumstances following SCI [20]. In contrast to the study by Aby Yazid Al Busthomy Rofi'i et al which showed decreased quality of life in persons with neurogenic bladder especially in the physical domain [21].

In psychological domain, initially it was observed that due to many impairments there was inability to perform basic activities of daily living. This causes an increase in the feeling of dependency and depression after SCI. The present study showed that mental health of the individual was affected at 3 months of injury and improved significantly at 6 and 9 months. Hence there was a positive association between functional mobility and quality of life due to the satisfaction that the participants were able to achieve their physical goals. Similarly, a study done Munna Bhattarai et al showed that the anxious feeling after SCI is due to long term negative consequences i.e. restrictions in mobility, assistance required to perform activities of daily living, inability to void and financial loss [14].

There was negative association between social domain of quality of life and functional mobility at 3 months of injury later it improved but not to an extent due the individuals with SCI reported the lowest rates of satisfaction with their sexual activity due to physical disability. The reason for inversely relation at 3 months of injury could be the pain

following SCI as it directly contributes to disability and reduced quality of life and life satisfaction [20].

A study conducted by Belinda F Morrison et al evaluated sexual and fertility dysfunction in spinal cord injured men. The study concluded that majority of the men with traumatic spinal cord injury had severe erectile dysfunction. Fewer were aware of the treatment and none were referred to assisted fertility treatments. The reason behind erectile dysfunction is disruption of sensory, motor and autonomic pathways. Study also suggests the need for counselling regarding the sexual health and fertility in individuals with traumatic spinal cord injury [22].

Further, environmental barriers also affect the quality of life, health status and participation of the individual in the community. The present study showed that there was positive association between the environmental domain and functional mobility at 3, 6 and 9 months after injury. As functional mobility improved i.e. participants were able to transfer independently or with minimum assistance ultimately helped them to minimise their environmental barriers. A study done by R. Andrew Glennie et al compared environmental barriers, their health status and quality of life in persons living in urban and rural area. The results of the study showed that the persons living in rural area were more depressed and found difficulties in dealing with the environmental barriers. The reasons for this may be due to lack of local gyms and activities, access to few local services and healthcare facilities [23].

In our study as the participants were undergoing rehabilitation which focus on improving functional ability of the patients to helped them learn the coping strategies for better functioning. Therefore, there was improvement in quality of life. Response shift has been documented in various chronic condition, postulates that stable characteristics of the individual interact with cognitive, affective, and behavioural strategies to influence cognitive appraisal processes, which buffer the effect of the health state change on perceived quality of life. This psychological process allows the

patient to maintain a personal steady state, resulting in perceived QOL scores that are higher than that would be expected. With regards to SCI, it might be during the process of medical care and rehabilitation, patients' expectations are modified to match their new level of functioning. Acceptance of their condition and the limitations imposed on them might be the key to live with an improved quality of life. This phenomenon has been documented in other conditions and has been termed response shift [14].

CONCLUSION

As the time progress the individual acquires better quality of life due to the recovery. Although the recovery pattern and timeline for achieving a particular activity is different for every individual. The study concluded that there was a positive association between the functional status and quality of life in patients with spinal cord injury at 3, 6 and 9 months of injury.

Conflicts of interest: None

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How to cite this article: Quazi Ibtesaam Huma, Suvarna Ganvir, Maheshwari Harishchandre. Relationship between Functional Status and Quality of Life in Patients with Spinal Cord Injury: A Cross - Sectional study. *Int J Physiother Res* 2023;11(6):4651-4656. DOI: 10.16965/ijpr.2023.152