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Assessment of Quality of Life in Patients with Spinal Cord Injury within the Period of First 6 Months after Injury

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Abstract **Original Research Article**

Introduction: Spinal cord injury (SCI) is a devastating neurological state resulting in long-term physical dependency, increased morbidity, emotional, and financial burden. This study sought to assess the quality of life in patients with spinal cord injury within the first six months after injury. ***Aim of the study:*** The aim of this study was to assess the quality of life in patients with spinal cord injury within the first six months after injury. ***Methods:*** This cross-sectional study was conducted at the Department of Physical Medicine & Rehabilitation and Department of Neurosurgery in Bangabandhu Sheikh Mujib Medical University (BSMMU) over a period between October 2021 to September 2022. 21 patients with SCI within 6 months of injury were recruited. Interviews with a semi-structured questionnaire assessed demographics, SCI details, and QoL (WHOQOL-BREF). Neurological injury classification followed ASIA standards. Statistical analysis was performed using SPSS 24. ***Result:*** The majority of the studied patients (23.8%) were within the 41-50 and 51-60-year age groups. More than two-thirds of the studied patients (71.4%) were male. with falls (42.9%) and spinal tumors (19.0%) as leading causes. Among all, 33.3% of the patients had complete motor involvement. According to the score of the physical domain, 66.7% of patients had low QoL. Age was positively significantly correlated with the environmental QoL score (r: 0.532, p value: 0.013) ***Conclusion:*** SCI significantly impairs all aspects of quality of life, with complete SCI patients facing notably worse physical conditions. A collaborative approach involving health entities, families, and communities is essential to improve quality of life and self-care abilities for SCI survivors.

Keywords: Spinal Cord Injury (SCI), Quality of Life (QoL), WHOQOL-BREF**,** Neurological injury, Epidemiological Assessment.

INTRODUCTION

Spinal cord injury (SCI) is a devastating neurological state resulting in long-term physical dependency, increased morbidity, emotional, and financial burden [1]. Each year, the approximate global rate of SCI falls between 250,000 and 500,000 individuals, highlighting its significant impact on a global scale [1]. In the realm of chronic spinal cord injury, patients endure prolonged treatment regimens, emphasizing the pressing need to address their quality of life (QoL) to facilitate the restoration of their highest possible physical activity [2].

Several studies have been published evaluating the QoL among chronic spinal cord injury patients. A cross-sectional study in mainland China reported decreased quality of life among chronic spinal cord injury patients who had history of injury more than a year [3]. Studies also reported poorer quality of life among SCI patients due to chronic pain [4, 5].

Spinal cord injury according to neurological classification divided as complete and incomplete injuries based on sparing below the level of injury [6].

During rehabilitation period, patients with SCI face more complications than other injuries or diseases [7]. Most frequently reported complications are urinary tract infections, respiratory complications, neuropathic pain and pressure ulcers. They may present one by one or may occur together [8-11]. A systematic review revealed substantial cognitive impairment in individuals with SCI; most of the studies found more than 50% patients with SCI developed cognitive impairment [12].

Studies have been published in Bangladesh [13,14] regarding spinal cord injury patients and their quality of life. Specific information is needed according to their type of injury and its impact on their quality of life. Our study will emphasize on the assessment of the quality of life among those patients. The World Health Organization (WHO) has developed a quality-of-life instrument, the World Health Organization Quality-of-Life Scale (WHOQOL-BREF), which captures many subjective aspects of quality of life. The WHOQOL-BREF is one of the best-known instruments that has been developed for cross-cultural comparisons of quality of life and is available in more than 40 languages. This study sought to assess the quality of life in patients with spinal cord injury within the first six months after injury.

Objectives

- The aim of this study was to assess the quality of life in patients with spinal cord injury within the first six months after injury.

METHODOLOGY & MATERIALS

This cross-sectional study was conducted at the Department of Physical Medicine & Rehabilitation and Department of Neurosurgery in Bangabandhu Sheikh Mujib Medical University (BSMMU) over a period between October 2021 to September 2022. A total of 21 diagnosed cases of patients with spinal cord injury (SCI) were included in the study using purposive sampling. Inclusion criteria comprised patients aged 18 years and above, diagnosed with SCI within the first 6 months after injury, and willing to participate. Exclusion criteria excluded patients with congenital causes of SCI, those admitted to ICU or HDU, and those with co-existing conditions such as Parkinson's disease, end-stage renal disease, cirrhosis of the liver, heart failure, pre-existing disability, and diagnosed psychiatric disorders. Data were collected through interviews using a semi-structured questionnaire covering socio-demographic parameters and SCI-related information. Quality of life was assessed using the WHOQOL-BREF questionnaire, and neurological injury was classified according to ASIA standards. Statistical analysis was performed using SPSS 24, and descriptive statistics, chi-square test, Fisher's exact test, independent student's t-test, one-way ANOVA test, and Pearson's correlation coefficient test were employed. Ethical clearance was obtained from the Institutional Review Board (IRB) of BSMMU, and informed written consent was obtained from all participants, ensuring confidentiality throughout the study.

RESULT

The majority of the studied patients (23.8%) were within the 41-50 and 51-60-year age groups. The mean age±SD of the studied patients was 48.47±16.00 years. More than two-thirds of the studied patients (71.4%) were male (Table 1). Among all the studied patients, 12 were suffering from traumatic SCI and only 9 from non-traumatic SCI. The causes of SCI included Road Traffic Accidents (14.3%), falls from height (42.9%), spinal tumors (19.0%), transverse myelitis (4.8%), and tuberculosis of the spine (19.0%) (Table 2). Among all, 33.3% of the patients had complete motor involvement (Table 3). The mean score for the overall Quality of Life (QoL) from Q1 (ranging from 1 to 5) was 2.48±1.03 (SD), and the overall mean score for perception of health was 2.52±0.67 (SD). The mean scores for the physical, psychological, social, and environmental domains were 42.29±10.74 (SD), 48.71±11.79 (SD), 50.05±20.32 (SD), and 51.38±13.42 (SD), respectively (Table 4). According to the score of the physical domain, 66.7% of patients had low QoL, while 33.3% had moderate QoL. Similarly, based on the psychological domain, 52.4% had low QoL, 38.1% had moderate QoL, and 9.5% had high QoL. In terms of the social and environmental domains, 42.9% had low QoL, 23.8% had moderate QoL, and 33.3% had high QoL (Table 5). The mean scores of QoL in the physical and psychological domains were low for patients with complete motor involvement, while the mean scores of QoL in the social and environmental domains were lower among patients with incomplete motor involvement. The difference in mean QoL scores in the physical domain was significantly lower in the complete motor involvement group compared to the incomplete motor involvement group (p=0.003). The mean QoL scores for all domains were insignificantly low for patients with paraplegia (Table 6). Figure 1 shows a significant moderate positive correlation between age and the environmental domain of QoL (r: 0.532, p value: 0.013) (Figure 1).

Table 1: Age and Gender of the study population (N=21)

Variables		Frequency	Percentage (%)
Age	18-30	4	19.00%
	31-40	3	14.30%
	41-50	5	23.80%
	51-60	5	23.80%
	61-70	3	14.30%
	71-80	1	4.80%
	Mean±SD 48.47±16.00		
Gender	Male	15	71.40%
	Female	6	28.60%

Table 2: Distribution of the studied patients by the causes of SCI (n=21)

Causes of SCI		Frequency (n)	Percentage (%)
Traumatic			
RTA	Struck by Train	1	4.80
	Motor Bike accident	1	4.80
	Struck by Van	1	4.80
Fall	Fall from Height	5	23.80
	Fall on ground	4	19.00
Non-traumatic			
Spinal tumour		4	19.00
Inflammatory disease (Transverse myelitis)		1	4.80
Tuberculosis of spine (Pott's disease)		4	19.00

Table 3: Motor completeness of the studied patients by the SCI related informations (n=21)

Motor completeness	Frequency (n)	Percentage (%)
Complete	7	33.30%
Incomplete	14	66.70%

Table 4: Distribution of the studied patients by the domain-specific average (n=21)

Domain	Findings
Overall perception of QoL	2.48±1.03
Overall perception of health	2.52±0.67
Physical	42.29±10.74
Psychological	48.71±11.79
Social	50.05±20.32
Environmental	51.38±13.42

Table 5: Distribution of the studied patients by the QoL according to WHOQOL-BREF in different domain (n=21)

WHOQOL-BREF classification	Physical	Psychological	Social	Environmental
	n (%)	n (%)	n (%)	n (%)
Low QoL	14 (66.7)	11 (52.4)	9 (42.9)	9 (42.9)
Moderate QoL	7 (33.3)	8 (38.1)	5 (23.8)	9 (42.9)
High QoL	0 (0.0)	2 (9.5)	7 (33.3)	3 (14.3)

Table 6: Distribution of the studied patients by the domain-specific average in terms of motor completeness and level of injury (n=21)

Domain	Motor completeness		p-value*
	Complete	Incomplete	
Physical	33.14±7.94	46.85±8.99	0.003
Psychological	43.14±13.24	51.50±10.37	0.129
Social	50.14±18.34	50.00±4.90	0.988
Environmental	53.71±11.84	50.21±14.42	0.586

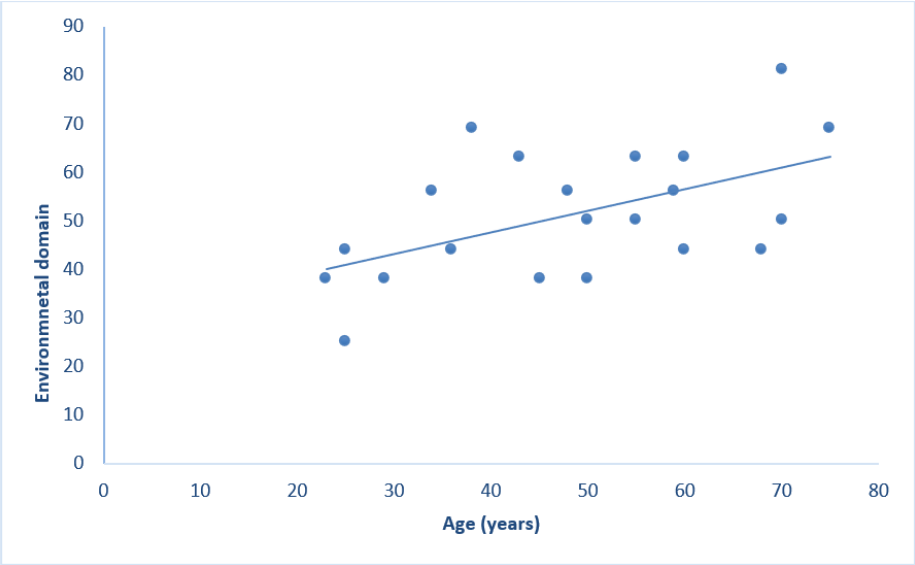

Figure 1: Scatter plot showing correlation between age and environmental domain of QoL

DISCUSSION

Spinal cord injury (SCI) is one of the most disruptive traumatic events in any human's life. SCI may cause tetraplegia or paraplegia depending on the level of injury affecting the functioning of limbs, trunk, pelvic organs, bladder, and bowel as well as sexual function. This loss of function leads to significant changes in the life of the affected individual making routine vocational, social, sexual, and recreational activities impossible. The immediate aftermath of a spinal cord injury requires critical interventions to stabilize the patient's condition. Following the acute phase of definitive management, the individual is left to cope with challenges thrown to him at physical, social, environmental, and psychological levels. Limited knowledge exists as of date regarding the analysis of factors influencing the quality of life (QoL) in SCI on long term. So, this study aimed to assess the quality of life (QoL) of patients with spinal cord injury (SCI).

In this present study, the majority of the studied patients (47.6%) were from 41-60 years of age and the mean age for the studied patients was 48.47±16.00 (SD) years. Another similar study found the mean age for the studied patients was 48±2 with an age range 23-66 years of age [15].

More than two-thirds of the studied patients (71.4%) in this current study were male with a male to female ratio of 2.49:1. Another similar study showed male predominance and 82.4% of the studied patients were males [16].

The most common causes of SCI were fall (42.9%) among them fall from height 23.8%, fall on ground 19.0%, followed by decreasing order of 19% due to tuberculosis of spine, 19.0% due to spinal tumor, 14.3% by road traffic accident (RTA) among them 4.8% were struck by train, struck by van, motorbike accident respectively and 4.8% due to inflammatory diseases. That means, 57.2% of the patients had traumatic causes and 42.86% had non-traumatic causes. A study was done in Bangladesh to see the epidemiology of Spinal cord injury in Bangladesh: A five-year observational study showed that among the causes, 51.9% had the diagnosis of traumatic paraplegia, 42.6% had traumatic tetraplegia whereas non-traumatic paraplegia, non-traumatic tetraplegia was the other diagnosis having the distribution of 4.12% and 1.14%, respectively. Nearly 46% had fall from height and this was the first most common cause and RTA was the second most common cause having a distribution of 25.9% [17].

Regarding the extent of SCI, 33.3% of the patients had complete motor involvement and 42.9% had tetraplegia. Another similar study showed that 50% of the SCI patients had motor completeness and 63.89% of the patients had tetraplegia [18].

In this current study mean score for overall QoL from Q1 (ranges 1 to 5) was 2.48±1.03 (SD) and the overall mean score for the perception of health was 2.52±0.67 (SD). The mean score for the physical domain was 42.29±10.74 (SD), the psychological domain was 48.71±11.79 (SD), for social domain 50.05±20.32 (SD), and for the environmental domain was 51.38±13.42 (SD). The environmental domain had the highest mean score followed by decreasing order social relationships, psychological domain, and physical domain. In this study the environmental domain had the highest score whereas the physical domain had the lowest score but a similar study found that the social domain had the lowest score whereas the physical and environmental domain received the highest mean score, they also showed that male patients, with a higher level of education, good socio-economic status, and incomplete injury significantly predicted good QoL after SCI [14].

In this present study, it was seen that according to the score of the physical domain, 66.7% of patients had low QoL, 33.3% had moderate QoL. Besides, according to a psychological domain, 52.4% had low QoL, 38.1% had moderate QoL, 9.5% had high QoL, based on the social domain, 42.9% had low QoL, 23.8% had moderate QoL and 33.3% had high QoL. Also, according to an environmental domain, 42.9% had low QoL, 42.9% had moderate QoL and 14.3% had high QoL. So, it was seen that, based on physical and psychological domains majority of the patients had low QoL, whereas in term of social and environmental domains majority of the patients had low to moderate QoL in this study. Another study by Banita *et al.*, showed that among the patients with SCI, 43% had poor QOL, followed by 28.9% who reported very poor QOL. Neither poor nor good QOL was reported by 19.8% of patients. Only 7.4% of patients had reported good QOL. The psychological domain of QOL was most affected followed by the domain of physical health where the score was slightly lesser. The environmental and social domains were relatively less affected [19].

In this study, there was no significant difference in the mean quality of life scores across the four dimensions (physical, psychological, social, and environmental) based on either marital status or residence or gender. But a significant moderate positive correlation is found between age and environmental domain of QoL (r: 0.532, p value: 0.013).

Limitations of the study

Some limitations were perceived while performing the study. The following were the limitations of the study:

- The study place was selected purposively which might result in selection bias.
- All samples were collected from single tertiary care center, therefore it may not reflect the regional variations of the country.
- It was a hospital based study, so it would not represent community scenario of QOL of SCI patients
- Sample size was small.
- Sample was taken purposively, so randomization was not done.
- Sample was not compared with healthy subjects.
- Cross sectional design of the study was another limitation.
- Long term follow up was beyond the scope of the study.

CONCLUSION

All domains of quality of life including physical, psychological, social, and environmental were compromised among the patients with spinal cord injuries (SCI). The majority of SCI patients experienced poor physical and psychological quality of life. Complete SCI patients exhibited much lower physical quality of life than incomplete SCI. Improving the QOL and enhancing SCI survivors' capacity for self-care require collaboration between health organizations, families, and communities.

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