



EFFECT OF AGE ON OUTCOME OF TRAUMATIC SPINAL CORD INJURY REHABILITATION – A RETROSPECTIVE STUDY

ORTHOPAEDICS

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ABSTRACT

INTRODUCTION: Health care professionals underestimate the rehabilitation potential of older adults with Traumatic spinal cord injury. Therefore, studies that examine the influence of age on SCI rehabilitation outcomes are important. **OBJECTIVES:** To assess the association of age with length of stay in hospital and functional scores of traumatic spinal cord injury rehabilitation. **MATERIAL AND METHODS:** A retrospective analysis of the medical records of patients with spinal cord injury admitted to the Department of Physical Medicine and Rehabilitation, K.G.M.U. Lucknow during August 2015-March 2017 was done. Records of 68 patients who fulfilled the inclusion criteria were selected for statistical analysis. **RESULTS:** The mean length of stay among patients of age ≤ 35 years and > 35 years was 34.6 ± 21.1 and 22.6 ± 12.0 days respectively ($P=0.004$). The increase of SCIM and WSCI score was more in patients of age ≤ 35 years than those of > 35 years ($P=0.043$ for SCIM and $P=0.001$ for WSCI).

KEYWORDS:

Age, spinal cord injury, functional scores, rehabilitation

INTRODUCTION

Spinal cord injury is a devastating and debilitating condition that affects all regions of the world (1). Although most people who have traumatic spinal cord injuries are 16–30 years old, there has been a progressive increase in the number who are over 70(2).

Cifu et al reported on the differences in outcome for three different age groups in a multicentre analysis of data from the model spinal cord injury centres and found significant differences between age categories with regard to American Spinal Injury Association (ASIA) motor index scores, rehabilitation length of stay and Functional Independence Measure scores (3).

It is possible for health care professionals to underestimate the rehabilitation potential of older adults. Therefore, studies that examine the influence of age on SCI rehabilitation outcomes are important. This way, the potential for ageism to limit the access of older patients with SCI to rehabilitation services can be countered by evidence (4).

AIMS AND OBJECTIVES

The main aim of this study is to assess the association of age with length of stay in hospital and neurological/functional scores of traumatic spinal cord injury rehabilitation.

MATERIAL AND METHODS

STUDY SETTING: Department of Physical Medicine and Rehabilitation, K.G.M.U. Lucknow

STUDY DESIGN: Retrospective study

STUDY TIME: - August 2015-March 2017

STUDY UNIT: Patients with traumatic spinal cord injury admitted during the study period

SAMPLE SIZE: 68 Patients

INCLUSION CRITERIA:

- 1) All patients who had no history of readmission to the department of Physical Medicine and rehabilitation, K.G.M.U., Lucknow.

- 2) All patients who had no previous history of visit to any other rehabilitation centre.
- 3) Patients who had traumatic spinal cord injury.
- 4) Patients with paraplegia.
- 5) Patients who had undergone the rehabilitation programme at the department of PM&R, K.G.M.U., Lucknow from the same consultant/medical team.
- 6) Patients with complete medical records.

EXCLUSION CRITERIA:

- 1) Patients who had history of readmission to the department of Physical Medicine and rehabilitation, K.G.M.U., Lucknow.
- 2) Patients who had previous history of visit to any other rehabilitation centre.
- 3) Patients who had non-traumatic spinal cord injury.
- 4) Patients with tetraplegia
- 5) Rehabilitation programme was taken from other consultant /medical team
- 6) Patients had incomplete hospital/medical records.

DATA COLLECTION:

A retrospective study, utilising a quantitative approach was used. The records of individuals with traumatic spinal cord injuries discharged from the hospital between 1st January 2016 and 31st May 2017 were reviewed to collect the data. A data gathering instrument was developed and was thereafter used to capture the relevant information from the patients' individual medical records. Information collected included demographic data, information relating to the injury, occurrence of medical complications and length of hospital stay. Total 110 medical records of patients discharged between 1st June 2015 and 31st May 2017 from department of Physical Medicine and Rehabilitation, K.G.M.U. Lucknow were reviewed for data extraction and finally 68 medical records of patients who fulfilled the inclusion criteria were selected for statistical analysis.

VARIABLES: The outcome variable is age which was a continuous variable so it was dichotomised into ≤ 35 years as 1 and > 35 years as 2. The independent variables are length of stay (LOS) and neurological/functional scores and they are discrete variables and mean values were used for comparisons.

DATA ANALYSIS: Data has been analysed using SPSS version 23.0. The mean values of age in both the groups 1 and 2 have been compared with the mean values of length of stay (LOS) and functional scores and association has been determined using independent T test. A two-tailed ($\alpha/2$) value $P < 0.5$ was considered statistically significant.

RESULTS

The mean length of stay in patients of age less than equal to 35 years is approximately 35 days while in those with age more than is 23 days and a significant association is observed between age and length of stay (LOS) in hospital ($P = 0.004$) [Table 1].

Modified Barthel index was not found to be significantly associated with age both at the time of admission and discharge ($P > 0.05$). The mean SCIM score was similar in both the groups at the time of admission and it has no significant association with age. However, the mean SCIM score improves more in younger patients ≤ 35 years as compared to those above 35 years of age at the time of discharge and that has significant association with discharge. WISCI score has a significant association with age ($P < 0.05$) and the mean score is more in patients with age > 35 years as compared to those with age ≤ 35 years [table 2].

TABLE 1: ASSOCIATION OF AGE WITH LENGTH OF STAY (LOS) IN HOSPITAL

	AGE		t value	P value
	≤ 35 YEARS	> 35 YEARS		
LENGTH OF STAY (LOS)	34.6 \pm 21.1	22.6 \pm 12.0	2.97	0.004*

P value < 0.5 is significant after independent T test.

TABLE 2: ASSOCIATION OF AGE WITH THE NEUROLOGICAL OUTCOMES IN SPINAL CORD INJURY REHABILITATION

NEUROLOGICAL/ FUNCTIONAL SCORES	AGE		t value	P value
	≤ 35 YEARS	> 35 YEARS		
AT THE TIME OF ADMISSION				
MBI	14.3 \pm 2.3	13.2 \pm 2.7	1.85	0.069
SCIM	70.5 \pm 7.9	69.1 \pm 8.5	.69	0.495
WISCI	12.5 \pm 2.9	14.8 \pm 2.1	-3.4	0.001*
AT THE TIME OF DISCHARGE				
MBI	15.6 \pm 2.3	15.2 \pm 2.1	.79	0.453
SCIM	76.8 \pm 6.5	72.8 \pm 6.0	2.45	0.017*
WISCI	15.1 \pm 2.3	16.2 \pm 1.3	-2.09	0.04*
MBI Increase	1.3 \pm 1.2	2.0 \pm 1.9	-1.54	0.134
SCIM Increase	6.3 \pm 5.9	3.7 \pm 4.3	2.07	0.043*
WISCI Increase	2.6 \pm 1.7	1.4 \pm 1.1	3.52	0.001*

MBI – MODIFIED BARTHEL INDEX, SCIM – SPINAL CORD INDEPENDENCE MEASURE, WISCI – WALKING INDEX IN SPINAL CORD INJURY, *P value < 0.5 is significant after independent T test.

DISCUSSION

Previous studies of traumatic SCI have shown that age is a significant predictor of discharge from a hospital. Age not only affects the neurological recovery of the traumatic SCI patients but also predicts the length of stay in the rehabilitation centre. Moreover, in a developing country like India where majority of the population belongs to the working class slow neurological recovery and longer stay in hospital affects the family both socially and financially.

In our study, patients with age more than equal to 35 years have lesser length of stay (LOS) in hospital as compared to the younger age group. Our findings are similar to a study by Scivoletto *et al* (3) where older patients had a smaller LOS as compared to the younger patients. Similar findings were also reported by Roth *et al* (7), but opposite to Cifu's (13) data on paraplegic subjects. This can be attributed to the fact that older patients suffer spinal cord injuries from low-energy falls like fall from height and so they have less severe and neurologically incomplete injuries. Younger patients are more likely to experience motor vehicle injuries which are more severe and neurologically

complete injuries.

With regard to age, we also examined the differences of neurological scores at the time of admission and discharge. There were no age group significant differences in MBI and SCIM scores at the time of admission. There is a greater increase of SCIM score and WISCI score among patients with age less than equal to 35 years as compared to those of age > 35 years and this is significantly associated with age. Our findings are in consistent with a study by Scivoletto *et al* (3) which was conducted on both traumatic as well as non-traumatic SCI patients. Compared with younger patients, older patients with Traumatic SCI have reduced functional reserves and greater comorbidity (5) and are more likely to have been physically disabled prior to SCI (6,7). Due to this, older patients with SCI have care needs that require specialized medical and nursing considerations during hospitalization (8) and optimal planning of their discharge destination and support services.

There are conflicting results in the literature about the influence of age on outcomes of traumatic SCI rehabilitation (6,7,9–11). A review by Mc Kinley *et al* in 2003 had highlighted that the variation in findings in previous studies may be related to methodological issues (12). These include small sample size, narrow age spectrum, inadequate use of statistical analysis, and not controlling for the interaction between injury characteristics and age. Some recent studies have better methodologies, including studies in which results were analysed while controlling for level and severity of injury (13,14) or matching patients with traumatic SCI with those with non-traumatic SCI (3,15,16).

Our study has assessed the association of age with length of stay (LOS) and functional recovery scores only without taking into account the aetiology and level of spinal cord injury which can be one of the limitations. Moreover, the study sample size is also small. However not many studies have been conducted in India in this regard so this study describes the role of age in predicting the outcome of neurorehabilitation in traumatic SCI patients. Our study has shown a significant difference in functional recovery of younger and older traumatic SCI patients which concludes that proper health care supportive and rehabilitation services should be planned accordingly in both age groups.

CONCLUSION:

The mean LOS was approximately 35 days in ≤ 35 years age patients and 23 days in > 35 years patients clearly indicating that LOS was more in younger age group as compared to adult and older individuals. Functional and neurologic recovery was better among the younger patients as compared to the adults and older age group.

CONFLICT OF INTEREST: None

FUNDING: None

ACKNOWLEDGEMENT: I am thankful to my teachers of PM&R, K.G.M.U. Lucknow for helping me in carrying out this study.

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