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# Assessing Efficacy of Self-Instructional Module on Rehabilitation After Spinal Cord Injury in Terms of Knowledge and Expressed Practices Among Indian Patients and their Caregivers

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***Abstract:***
***Background:*** *Spinal Cord Injury (SCI) may lead to devastating consequences in many patients and rehabilitation enables them to learn to live with their acquired disability in their own environment by being an active participant. Although spinal cord injuries are common in India, there are few dedicated rehabilitation centres for such patients, and even fewer Self-Instructional Modules (SIM) to empower patients and their caregivers to improve patient's quality of life. This study aims to develop and assess one such SIM and evaluate its efficacy to improve knowledge and expressed practices among patients with SCI and their caregivers.*
***Material and Methods:*** *This quasi-experimental pre-test post-test evaluative study was done in two hospitals at New Delhi from September to October 2017. It involved a total of 60 subjects (30 patients of SCI and 30 caregivers) who participated in the main study after being selected by purposive sampling. An evaluative experimental research approach for quasi experimental design pre-test post-test design was done to measure the effectiveness of SIM on rehabilitation after SCI. The SIM was administered to the subjects after Pre-Test, and after 7 days post-test was conducted to assess the efficacy of the module.*
***Results:*** *The mean knowledge scores and mean expressed practice scores improved significantly after administration of SIM, among both patients and their caregivers. It was also observed that after the administration of SIM, the increase in knowledge improved the expressed practices of patients.*
***Conclusion:*** *The study highlighted inadequacy of knowledge and expressed practices regarding rehabilitation after SCI in patients with SCI. Administration of SIM improved both knowledge and practices among both patients and caregivers. There was a significant relationship between knowledge and practice in patients regarding rehabilitation after SCI. This study thus calls to attention introduction of SIMs or Similar educational material for both patients and caregivers in centres involved in rehabilitation of patients with SCI.*
***Key Word:*** *SIM, SCI, Rehabilitation, Caregivers*

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## I. Introduction

Spinal Cord Injury (SCI), which is not new to mankind, is a truly shattering injury that devastates lives and has profound impact on individual, family along with society. It has been recognised as such since antiquity. In about 2500 BC, in the Edwin Smith papyrus, an unknown Egyptian physician accurately described the clinical features of traumatic tetraplegia (quadriplegia) and revealed an awareness of the awful prognosis with the chilling advice: "an ailment not to be treated" [1]. That view prevailed until the early years of this century. It is recognized that SCI is a major medical problem because there currently is no way to repair the central nervous system (CNS) and restore function. It has a significant impact on the individual, the family, health care service delivery systems, and society in general. Although medical advancements have not yet found a restorative cure to spinal cord injuries, they most definitely have improved the likelihood of survival following SCI, and estimated life spans for persons with this condition now approach life expectancies of general population.[2,3]

Expert medical care is essential in the early management of SCI to ensure survival and to prevent unnecessary complications. Once the acute stage has passed, however, medicine can offer no cure and it is up to each individual to learn to live with the resulting disability in the context of his own environment. This is where the role of rehabilitation is vital.

Rehabilitation has frequently been defined in terms of the process of restoring an individual to his maximum potential in all areas of life - physical, intellectual, emotional and social. Rehabilitation is the process of learning to live with a disability in the context of one's own environment. A rehabilitation process that

enables an individual to learn to live with his acquired disability in his own environment is a dynamic process in which the individual must be an active participant.[4-5]

Generally, people are best able to learn when they are helped to define their own problems, decide on a course of action and evaluate the consequences of their decisions. This learning process provides the means for them to solve problems creatively, to address their own concerns and to address situations not encountered during the formal rehabilitation programme.It is now universally accepted that the outcomes of a successful learning process include self-determination, effective coping skills, participant satisfaction and, ultimately, enhanced quality of life'[5 Such learning processes are an active part of SCI rehabilitation world over. SCI rehabilitation focuses on working with patients physically and psychologically, so patients can maximize their neurological recovery and general health.

Misconceptions, negative attitudes and physical barriers to basic mobility result in the exclusion of many people from full participation in society. Children with SCI are less likely than their peers to start school, and once enrolled, less likely to advance. Adults with SCI face Similar barriers to economic participation, with a global unemployment rate of more than 60%.Epidemiological and demographic data of SCI in Indian scenario are different from western countries with major cause being fall and not Road Traffic Accidents.[6,7]

Various epidemiological studies have been carried out in different parts of the world, but very few in India. The incidence of SCI varies from 9.2 to 56.1 per million, which is affected by social, economic, geographical, demographic and political characteristics of the region. Although India is the second most populous country in the world, minimal demographic data are available for SCI, and very limited standardized rehabilitation practices are followed in most centres catering to such patients.[7]A Self-Instructional Module(SIM) for patients and caregivers of patients on rehabilitation after SCI will help them to improve their knowledge and expressed practices, and thus help to improve the quality of life of such patients. This study aims to use such a SIM, to assess the present inadequacies in knowledge and practices for rehabilitation among SCI patients.

## II. Material and Methods

This quasi-experimental pre-test post-test evaluative study was done in two hospitals at New Delhi from September to October 2017. A total of 60 subjects (30 patients and 30 caregivers) participated in the main study.

**Study Design:** An evaluative experimental research approach for quasi experimental design pre-test post-test design to measure the effectiveness of SIM on rehabilitation after SCI.

**Study Location:** 1.St. Stephen's Hospital New Delhi
2. Safdarjung Hospital, New Delhi

**Study Duration:** Tryout was conducted in St. Stephen's Hospital New Delhi in September 2017. After obtaining formal administrative approval, the pilot study was conducted from 30th Sep. 2017 to 14th Oct. 2017' at St. Stephen's Hospital, New Delhi.Pre-test on knowledge & practice was conducted on 4$^{th}$ October 2017 and post-test was conducted on the 7th day, i.e. on 11$^{th}$ October 2017.

**Sample size:** 1. Try out: 5 SCI patients and 5 caregivers
2. Pilot study: 7 SCI patients and7 caregivers
3. Final study: 30 SCI patients and 30 caregivers

**Sample size calculation:** Sample size formula based on the McNemar's test was used.

$$n_{MN} = \frac{\left[z_{1-\alpha/2}\sqrt{h_{01}+h_{10}} + z_{1-\gamma}\sqrt{h_{01}+h_{10}-(h_{01}-h_{10})^2}\right]^2}{(h_{01}-h_{10})^2}.$$

**Subjects& selection method:** The sample selection was done by Purposive sampling technique. Patients with SCIparticularly paraplegia and quadriplegia attending outpatient clinic and admitted as inpatient in the hospital along with their caregiver were included in the study.

**Inclusion Criteria:**

1. Patients who are suffering from SCI particularly paraplegia and quadriplegia
2. Patients and Caregivers who could read Hindi or English

**Exclusion Criteria:**

1. Patients with poor general condition requiring ICU care
2. Patients and Caregivers who could not read Hindi or English

**Procedure methodology**

Based on the objectives and the conceptual framework of the study, following instruments were used in order to collect data

1. Structured Questionnaire – To assess the knowledge of patients with SCI and their caregivers regarding rehabilitation after SCI.
2. Structured Checklist - To assess the expressed practices of patients with SCI and their caregivers regarding rehabilitation after SCI.

A structured questionnaire and checklist were prepared for assessing the demographic details, knowledge and expressed practices of patients and caregivers regarding rehabilitation after SCI.
This was based on:

1. Review of literature and non-research literature
2. Opinions of experts in the field of SCI and rehabilitation medicine
3. Personal experience in the field
4. Blue print for knowledge test items, pertaining to the three domains of knowledge, understanding and application.

The Study Tool was divided into various Sections as follows
Section I consisted of items on demographic information for both patients and their caregivers. Total number of items 10 (1-10) for patients and items 5 (1-5) for caregivers.
Section II consisted of 20 knowledge items for patients with SCI. Each item had one correct answer. Each correct answer got one-point score.
Section III consisted of 20 knowledge items for caregivers of patients with SCI. each item had one correct answer. Each correct answer got one-point score.
Section IV consisted of checklist to assess the expressed practices of patients with SCI. No. of items in checklist were 20. Each checklist item had a yes/no option. Each correct option got a one-point score.
Section IV consisted of checklist to assess the expressed practices of caregivers of patients with SCI. No. of items in checklist were 20. Each checklist item had a yes/no option. Each correct option got a one-point score.

Reliability of the tool was established by using Kuder-Richardson Formula 20. Reliability coefficient for knowledge test was 0.77 and for expressed practices checklist it was 0.82. The tool was found to be reliable.
The first draft of the self-instruction module was prepared on the basis of blueprint, criteria rating scale, review of research and non-research material on rehabilitation after SCI, and opinion of experts in the field of SCI and rehabilitation medicine. The self-instruction module was developed in English and later translated to Hindi which was validated by one expert in Hindi literature and language.
SIM included the following sections:

1. SCI Basics
2. Acute Care and Rehabilitation
3. SCI Outcomes
4. Education after Spinal Injury

C. Living on your own
D. Complications
E. Conclusion

For the content validity of self-instruction module, a criteria rating scale was prepared. It consisted of items with three responses for rating against each criterion – "Fully Met", "Partially Met" and "Not Met". The self-instruction module with criteria rating scale was submitted to 7 experts in the field of Orthopaedics, Neurology, and medical surgical nursingfor validation. Experts were requested to give their opinion and suggestion on content with the criteria rating scale prepared by researcher. There was 100% agreement on the content of the self-instruction module.The tool was translated from English to Hindi, the validity of which was established by language experts. It was translated back to English and was re-validated by language expert.
Pre-test was done on day 1 following which the SIM was administered to patients and their caregivers. After 7 days the post-test was done.

**Table-1. Research methodology**

| **Day 1** | **Day 1** | **Day 7** |
|---|---|---|
| **Pre-Test** | **SIM** | **Post-Test** |
| 1. Knowledge test<br>2. Practice Score | Administration of SIM on rehabilitation after SCI | 1. Knowledge test<br>2. Practice Score |

**Statistical analysis**

Data analysis was done using Descriptive and Inferential Statistics

1. Frequency and percentage distribution of various attributes was done
2. Mean, Median and Standard Deviation to assess the level of knowledge and expressed practices among patients and caregivers.
3. The Pearson product-moment correlation coefficient was used to determine the relationship between post-test knowledge and post-test expressed practice scores
4. Chi-square test was used to seek association of selected factors and post-test knowledge scores of patients

## III. Result

### A. Description of sample characteristics.

**Table-2.Frequency and percentage distribution of patients with SCI by sample characteristics.**

| Description of Sample Characteristics of Patients after SCI n = 30 | | | |
|---|---|---|---|
| S. No. | Sample Characteristics | Frequency | Percentage |
| 1 | **Age in years** | | |
| | 20 | 3 | 10.00% |
| | 21 - 40 | 10 | 33.33% |
| | 41 - 60 | 9 | 30.00% |
| | > 60 | 8 | 26.67% |
| 2 | **Religion** | | |
| | Hindu | 17 | 56.67% |
| | Muslim | 7 | 23.33% |
| | Christian | 3 | 10.00% |
| | Sikh | 2 | 6.67% |
| | Others | 1 | 3.33% |
| 3 | **Sex** | | |
| | Male | 18 | 60.00% |
| | Female | 12 | 40.00% |
| 4 | **Marital Status** | | |
| | Single | 11 | 36.67% |
| | Married | 13 | 43.33% |
| | Widow/Widower | 4 | 13.33% |
| | Divorced | 2 | 6.67% |
| 5 | **Education** | | |
| | Primary | 6 | 20.00% |
| | Secondary | 7 | 23.33% |
| | Higher Secondary | 7 | 23.33% |
| | Graduate | 6 | 20.00% |
| | Post Graduate | 4 | 13.33% |
| 6 | **Occupation** | | |
| | Govt. Job | 4 | 13.33% |
| | Private Job | 10 | 33.33% |
| | Business | 5 | 16.67% |
| | Retired | 2 | 6.67% |
| | Others | 9 | 30.00% |
| 7 | **Monthly Income** | | |
| | Below 5000 | 9 | 30.00% |
| | 6000 – 10000 | 12 | 40.00% |
| | 11000 – 25000 | 6 | 20.00% |
| | Above 25000 | 3 | 10.00% |
| 8 | **Duration of Illness** | | |
| | Less than 1 month | 6 | 20.00% |
| | 1 month to 6 months | 12 | 40.00% |
| | 6 months to 1 year | 8 | 26.67% |
| | More than 1 year | 4 | 13.33% |
| 9 | **Cause of Illness** | | |
| | Fall | 9 | 30.00% |
| | Motor Vehicle Accident | 13 | 43.33% |
| | Violence | 2 | 6.67% |
| | Sports and recreation injury | 2 | 6.67% |
| | Diseases | 4 | 13.33% |
| 10 | **Associated Complications** | | |
| | Spasticity | 9 | 30.00% |
| | Pressure Ulcers | 7 | 23.33% |
| | Autonomic Dysreflexia | 2 | 6.67% |
| | Contracture | 7 | 23.33% |

| | | | |
|---|---|---|---|
| | Pain | 5 | 16.67% |

Majority of the patients were young males with less than 6 months of SCI. Most of them suffered SCI following road traffic accident. ·Spasticity was the most common complication associated (30%) followed by pressure ulcers and contractures in 23.3 percent each. Only 6.6 % cases had autonomic dysreflexia.

**Table-3. Frequency and percentage distribution of caregivers of patients with SCI by sample characteristics.**

| **Description of Sample Characteristics of Caregivers n=30** | | | |
|---|---|---|---|
| S. No. | Sample Characteristics | Frequency | Percentage |
| 1 | **Age in years** | | |
| | 20 | 5 | 16.67% |
| | 21 - 40 | 7 | 23.33% |
| | 41 - 60 | 12 | 40.00% |
| | > 60 | 6 | 20.00% |
| | | | |
| 2 | **Religion** | | |
| | Hindu | 15 | 50.00% |
| | Muslim | 8 | 26.67% |
| | Christian | 4 | 13.33% |
| | Sikh | 2 | 6.67% |
| | Others | 1 | 3.33% |
| | | | |
| 3 | **Sex** | | |
| | Male | 14 | 46.67% |
| | Female | 16 | 53.33% |
| | | | |
| 4 | **Relationship with patient** | | |
| | Husband | 4 | 13.33% |
| | Wife | 7 | 23.33% |
| | Father | 5 | 16.67% |
| | Mother | 6 | 20.00% |
| | Brother | 3 | 10.00% |
| | Sister | 3 | 10.00% |
| | Others | 2 | 6.67% |
| | | | |
| 5 | **Education** | | |
| | Primary | 12 | 40.00% |
| | Secondary | 5 | 16.67% |
| | Higher Secondary | 3 | 10.00% |
| | Graduate | 6 | 20.00% |
| | Post Graduate | 4 | 13.33% |

Majority of caregivers were less than 60 years of age, with almost equalmale (53.3%) and female (46.7%) distribution. Most common relation between caregivers and patients was either a spouse or a parent (36.6% each).·Majority of caregivers had undergone Primary education (40%) while 20 percent and 13.3 percent of caregivers were graduate and post graduate respectively by educational qualification.

**B. Findings related to evaluation of effectiveness of SIM in terms of patient's gain in knowledge.**
The knowledge of patients was analysed by computing mean, median and standard deviation. The results are shown in table 4.

**Table-4. Mean, median, standard deviation of pre-test & post-test knowledge scores of patients with SCI**

**N=30**

| Knowledge of Patient | Mean | Median | SD |
|---|---|---|---|
| **Pre-Test** | 9.33 | 9.00 | 2.12 |
| **Post-Test** | 17.03 | 17.00 | 1.10 |

Maximum Possible Score=20
Results indicated that the mean pre-test knowledge scores and post-test knowledge scores among patients are 9.33 and 17.03 respectively.

**Table-5. Mean, mean difference, standard error of mean difference and "t" values of pre-test and post-test knowledge scores of patients**

**N=30**

| Knowledge of patients | Mean Score | Mean difference | SDD | SEMD | "t" |
|---|---|---|---|---|---|
| **Pre-test** | **9.33** | **7.70** | **1.12** | **0.19** | **18.91** |
| **Post-test** | **17.03** | | | | |

Maximum Possible Score=20
Significance at 0.05 level, df =29, 't' Table Value 2.04

The median of pre-test knowledge scores and post-test knowledge scores are 9.00 and 17.00 respectively. The findings suggested that the mean post-test knowledge scores (17.03) in patients with SCI was higher than the mean pre-test knowledge scores (9.33) which was found to be statistically significant.

**C. Findings related to effectiveness of SIM in terms of patient's gain in expressed practice score.**

**TABLE-6.Mean, median and standard deviation of pre-test expressed practices scores and post-test expressed practice scores of patients withSCI**

**N=30**

| Expressed Practice of Patient | Mean | Median | SD |
|---|---|---|---|
| **Pre-Test Score** | 7.60 | 7.00 | 1.96 |
| **Post-Test Score** | 18.67 | 19.00 | 1.15 |

Maximum Possible Score=20

Results showed that the mean post-test (18.67) score for expressed practices among patients was higher than the mean pre-test (7.60) score. The median scores for both pre-test and post-test were Similar to their respective mean scores.

**Table-7. Mean, mean difference, standard error of mean difference and "t" values of pre-test and post-test expressed practice scores of patients**

**N=30**

| Expressed Practice Patients | Mean | Mean Difference | SDD | SEM D | 't' |
|---|---|---|---|---|---|
| **Pre-Test** | 7.60 | 11.07 | 0.81 | 0.15 | 25.82 |
| **Post-Test** | 18.67 | | | | |

Maximum Possible Score=20
**Significance at 0.05 level, df =29, 't' Table Value 2.04**
Results showed that the mean post-test expressed practice score (18.67) was higher than the mean pre-test score (7.60) with a mean difference of 11.07. The obtained mean difference was found to be statistically significant

**D. Findings related to effectiveness of SIM in terms of caregiver's gain in knowledge and expressed practice score.**

**Table-8. Mean, median and standard deviation of pre-test expressed practices scores and post-test knowledge scores of caregivers**

**N=30**

| Knowledge of Caregivers | Mean | Median | SD |
|---|---|---|---|
| **Pre-Test** | 8.07 | 8 | 1.53 |
| **Post-Test** | 17.27 | 17 | 1.46 |

Maximum Possible Score=20

The results showed that the mean pre-test knowledge scores and post-test knowledge scores of caregivers were 8.07 and 17.27 respectively.

The median of pre-test knowledge scores and post-test knowledge scores are 8.00 and 17.00 respectively. The standard deviation for pre-test knowledge score and post-test knowledge scores are 1.53 and 1.46 respectively which shows that the standard deviation for expressed practice score decreased after administration of SIM. The findings indicated that the mean post-test knowledge scores (17.27) in caregivers of patients with SCI is higher than the mean pre-test knowledge scores (8.07).

**Table-9. Mean, mean difference, standard error of mean difference and "t" values of pre-test and post-test knowledge scores of caregivers**

| Knowledge Caregiver | Mean | Mean Difference | SDD | SEM D | 't' |
|---|---|---|---|---|---|
| **Pre-Test** | 8.07 | 9.20 | 0.06 | 0.01 | 26.51 |
| **Post-Test** | 17.27 | | | | |

**N=30**

Maximum Possible Score=20

Significance at 0.05 level, df =29, 't' Table Value 2.04

The mean post-test knowledge scores (17.27) was higher than the mean pre-test scores (8.07) with a mean difference of 9.20. The obtained mean difference was found to be statistically significant.

**E. Findings related to effectiveness of SIM in terms of caregiver's gain in expressed practice score.**

**Table-10. Mean, median and standard deviation of pre-test expressed practices scores and post-test expressed practice scores of caregivers**

**N=30**

| Expressed Practice of Caregivers | Mean | Median | SD |
|---|---|---|---|
| **Pre-Test** | 7.83 | 7.00 | 2.35 |
| **Post-Test** | 16.70 | 16.50 | 1.74 |

Maximum Possible Score=20

The mean post-test (16.70) scores for expressed practices among caregivers was higher than the mean pre-test (7.83) score. The median scores for both pre-test and post-test were Similar to their respective mean scores.

**Table-11. Mean, mean difference, standard error of mean difference and "t" values of pre-test and post-test expressed practice scores of caregivers**

**N=30**

| Expressed Practice Caregivers | Mean | Mean Difference | SDD | SEM D | 't' |
|---|---|---|---|---|---|
| **Pre-Test** | 7.83 | 8.87 | 0.61 | 0.11 | 15.82 |
| **Post-Test** | 16.70 | | | | |

Maximum Possible Score=20

Significance at 0.05 level, df =29, 't' Table Value 2.04

The results showed that the mean post-test expressed practice score (16.70) was higher than the mean pre-test score (7.83) with a mean difference of 8.87. The obtained mean difference was found to be statistically significant.

**F. Findings of the correlation between post-test knowledge and expressed practice scores of patients with SCI.**

**Table no.-12. Coefficient of correlation between post-test knowledge and expressed practice score of patients with SCI**

**N=30**

| Variables | Mean | Standard Deviation | Coefficient of Correlation "r" |
|---|---|---|---|
| **Post –test Knowledge score** | 17.03 | 1.10 | **0.83** |
| **Post-test Expressed Practice score** | 18.67 | 1.15 | |

Maximum Possible Score=20

The results showed that the coefficient of correlation between post-test knowledge and expressed practice score of patients with SCI is 0.83 signifying a strong positive correlation. The correlation is significant as depicted by the calculated r value of 0.83. The above finding suggested that the gain in expressed practice is dependent on gain in knowledge score of patients with SCI regarding their rehabilitation. Hence after the administration of SIM, the increase in knowledge improved the expressed practices of patients.

**G. Findings related to association between post-test knowledge scores of patients and selected factors.**

**Table no.-13.Chi square values showing association between selected factors and post-test score of patient's knowledge.**

**N=30**

| S. No. | Post-Test Knowledge Score | | No. of Patients | | $\chi^2$ value | Degree of Freedom | Table value Significant or Non-Significant |
|---|---|---|---|---|---|---|---|
| | | | Above Median | Below Median | | | |
| 1. | Age in years | □ 20 | 2 | 1 | 1.30 | 3 | **Not Significant** |
| | | 21 – 40 | 5 | 5 | | | |
| | | 41 – 60 | 5 | 4 | | | |
| | | > 60 | 6 | 2 | | | |
| 2. | Level of Education | Primary | 4 | 2 | 2.82 | 4 | **Not Significant** |
| | | Secondary | 5 | 2 | | | |
| | | Higher Secondary | 5 | 2 | | | |
| | | Graduate | 2 | 4 | | | |
| | | Post Graduate | 2 | 2 | | | |
| 3. | Duration of Illness | Less than 1 month | 3 | 3 | 1.18 | 3 | **Not Significant** |
| | | 1 month to 6 months | 7 | 5 | | | |
| | | 6 months to 1 year | 6 | 2 | | | |
| | | More than 1 year | 2 | 2 | | | |
| 4. | Associated Complications | Spasticity | 4 | 5 | 2.23 | 4 | **Not Significant** |
| | | Pressure Ulcer | 5 | 2 | | | |
| | | Autonomic Dysreflexia | 1 | 1 | | | |
| | | Contracture | 4 | 3 | | | |
| | | Pain | 4 | 1 | | | |

The calculated chi square value between post-test knowledge scores of patients, for the selected variables: age of patients (1.30), Level of Education (2.82), Associated Complications (2.23) and duration of illness (1.18) were all found to be non-significant at 0.05 level of significance. This suggested that the SIM was simple and concise enough to be easily comprehended by patients of all age and education level.

**Table no.-14. Chi square values showing association between selected factors and post-test score of patient's expressed practices**

**N=30**

| S. No. | Post-Test Expressed Practice Score | | No. of Patients | | $\chi^2$ value | Degree of Freedom | Significant or Non-Significant at 0.05 level |
|---|---|---|---|---|---|---|---|
| | | | Above Median | Below Median | | | |
| 1. | Age in years | □ 20 | 1 | 2 | 9.34 | 3 | **Significant** |
| | | 21 – 40 | 2 | 8 | | | |
| | | 41 – 60 | 6 | 3 | | | |
| | | > 60 | 7 | 1 | | | |
| 2. | Level of Education | Primary | 2 | 4 | 3.65 | 4 | **Not Significant** |
| | | Secondary | 4 | 3 | | | |
| | | Higher Secondary | 5 | 2 | | | |
| | | Graduate | 4 | 2 | | | |
| | | Post Graduate | 1 | 3 | | | |
| 3. | Duration of Illness | Less than 1 month | 3 | 3 | 0.20 | 3 | **Not Significant** |
| | | 1 month to 6 months | 7 | 5 | | | |
| | | 6 months to 1 year | 4 | 4 | | | |
| | | More than 1 year | 2 | 2 | | | |
| 4. | Associated Complications | Spasticity | 6 | 3 | 4.11 | 4 | **Not Significant** |
| | | Pressure Ulcer | 3 | 4 | | | |
| | | Autonomic Dysreflexia | 1 | 1 | | | |
| | | Contracture | 2 | 5 | | | |
| | | Pain | 4 | 1 | | | |

The calculated chi square value between post-test expressed practice scores of patients, for the selected variables: age of patients (9.34) was found to be significant, although the calculated $\chi 2$ square values for Level of Education (3.65), Associated Complications (4.11) and duration of illness (0.20) were all found to be non-significant at 0.05 level of significance. This also signified ease of comprehension of the SIM to improve expressed practices.

## IV. Discussion

The present study was aimed to assess and evaluate effectiveness of SIM on rehabilitation after SCI among patients and their caregivers in terms of knowledge and expressed practices.

In this section the major findings of the present study have been discussed with reference to results obtained by other investigators of Similar studies.

The present study found the Self Instructional Module to be significantly efficacious in improving the mean Knowledge Score of patients (9.33 ± 2.12 to 17.03 ± 1.1) and caregivers (8.07 ± 1.53 to 17.27 ± 1.46) in addition to bettering the mean Expressed Practice Score of both patients (7.60 ± 1.96 to 18.67 ± 1.15) and caregivers (7.83 ± 2.35 to 16.70 ± 1.74). Although there has been no published study regarding effectiveness of a SIM in rehabilitation after SCI, a study[8] showed that effective patient education is a critical part of rehabilitation for people with SCI. Efficacy of SIM in improving knowledge has been proven[9] where it has been shown that as in the present study, the mean pre-test score for knowledge regarding the topic of their research was low, but increased in the post-test following administration of the SIM. Similarly it has been shown that the pre-test knowledge score on their topic of research improved after administration of SIM and that the SIM on their topic of research was effective in improving the knowledge of subjects and they felt it more useful in identifying the possible problems.[10] These findings are consistent with those of the present study.

The present study also showed a significant positive correlation (r = 0.83) between post SIM administration Knowledge Score and Expressed Practice Score. Similar findings were shown in a study by proving a significant moderate positive correlation between knowledge and expressed practice scores as obtained 'r' value (0.56).[11] The findings were also consistent with those of another study which showed that there was a positive correlation (positive trend r=.0466) between knowledge and practice of their research topic in question.[12] Similarly it has been shown that the association between Knowledge and Expressed Practices were positively correlated in all study settings (hospital and whole population) and the whole of the respondents (Spearman's rank correlation coefficient approximately 0.40).[13] These findings are Similar to those found in the present study.

In the present study population, the commonest age group with SCI was found to be 21 to 40 years (33.3%) followed closely by 41 to 60 years (30%). This is consistent with the reported average age of 41.5 years by Herzer.[14] Tricot also found the maximum incidence of SCI in the mean age group of 38.2 years.[15] Epidemiological studies have also found the highest incidence of SCI in the mean age group of 35.5 years and 33 years respectively,[16,17] which are consistent with the findings of the present study.

Sex distribution of the patients in the present study showed 60% of patients being males. This is Similar to the results found by multiple studies, all of which found incidence of SCI higher in male gender.[6,15-18]

Among caregivers, the present study found 53.4% to be women with 23.3% being wife and 20% being mother of the patient. These findings are consistent with those found by in a systematic review of the literature which showed that caregiving services in SCI were predominantly provided by informal caregivers who were female.[19] These findings are also consistent with another study which also found that 68.63% of caregivers of patients with SCI were women with 29.41% being patients mother and 23.5% being patient's wife.[20] These findings are similar to those observed in the present study.

The commonest cause of SCI in the present study was Motor Vehicle Accident (43%) followed by fall (30%). This is in corroboration with the results from another study who found that 50% of SCI are caused by Motor Vehicle Accidents.[18] This is also confirmed by others who found that road traffic accident was the most common (45%) and fall from height the second most common (39.63%) mode of injury in patients with SCI.[21] Similarly another Indian study has found that among the causes of injury, maximum patients had suffered from either road traffic accidents or a fall from height.[6]

The present study found that the commonest complication associated with SCI was Spasticity (30%) followed by Bed Sores and Contractures (23.3% each). These findings are consistent with those of another study which also found that spasticity and pressure ulcers were the most frequent secondary medical complications in all years, and individuals with SCI.[22] Similarly a large study found that spasticity affects 70% of patients with SCI and causes considerable disability for most patients with SCI.[23]It was also found that pressure ulcers were reported as the second most common etiology for rehospitalisation at most time intervals (years 1, 10, 15, 20) in a multicentre analysis with SCI patients.[24]

## V. Conclusion

The study highlighted inadequacy of knowledge regarding rehabilitation after SCI in patients with SCI. The practice of patients and their caregivers regarding rehabilitation after SCI was also not satisfactory.There was a significant difference in knowledge score of patients with SCI and their caregivers before and after administration of SIM emphasizing on the need of such self-instruction material in rehabilitation programmes. There was a significant difference in practice score of patients with SCI and their caregivers before and after administration of SIM. There was a significant relationship between knowledge and practice in patients with SCI regarding rehabilitation after SCI. This study calls to attention introduction of SIMs or Similar educational material for both patients and caregivers in centres involved in rehabilitation of patients with SCI.

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