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Effect of Yoga Therapy on Stress among Spinal Cord Injury Patients at Selected Hospitals

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KEYWORDS

Yoga, Stress, Spinal Cord Injury, Perceived Stress Scale, Severe Stress, Mild Stress

ABSTRACT:

Objective :

To assess the effectiveness of yoga therapy in reducing perceived stress levels among patients with spinal cord injury (SCI).

Methods :

A two-group pre-test and post-test quasi-experimental design was employed. A total of 100 patients with spinal cord injury were recruited through purposive sampling from selected hospitals. Eligible participants were aged ≥18 years and classified under ASIA Impairment Scale grades C, D, or E. Perceived stress was measured using a standardized Perceived Stress Scale with a reliability coefficient of 0.731. The intervention comprised a structured yoga therapy program consisting of 10 sessions completed within 15 days. Descriptive statistics and inferential analyses, including paired t-test and Fisher's exact test, were used to evaluate the effectiveness of the intervention.

Results :

At baseline, 62% of participants reported severe levels of perceived stress. Following the intervention, 72% of participants demonstrated a reduction to mild stress levels. The mean perceived stress score significantly decreased from 28.9 (SD ±3.8) at pre-test to 24.9 (SD ±4.1) at post-test ($t = 1.9$, $p = 0.043$). These findings indicate a statistically significant reduction in perceived stress among patients who received yoga therapy.

Conclusion :

Yoga therapy was found to be an effective complementary intervention for reducing perceived stress among patients with spinal cord injury. The results support the incorporation of yoga-based interventions into routine rehabilitation and nursing care programs to enhance psychological well-being in this population.

1. INTRODUCTION

Spinal cord injury (SCI) is a severely disabling condition, historically referred to as "an ailment not to be treated". Hippocrates introduced the concept of reduction through traction, while Galen discovered that traumatic lesions lead to motor function loss. Paulus later introduced decompressive laminectomy as a surgical intervention.

In India, approximately 15 lakh people live with spinal cord injuries, with 10,000 new cases reported annually. The majority (82%) are males aged 16-30 years, although a reliable national database is still

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lacking.

Yoga

Yoga is a science of holistic living, combining physical, mental, and spiritual practices. Derived from the Sanskrit word *"Yuj"*, meaning "to unite", yoga aims for the harmonious development of body, mind, and soul. It promotes mental health by fostering tranquility and mindfulness.

Yoga's effectiveness in reducing stress has been demonstrated in various studies. For instance,

F.K. Judd and J.E. Webber (1991) examined psychological adjustment following SCI and found that females and paraplegics adapted better than males and quadriplegics. [1] Similarly, Dr. M.M. Prabhakar (2001) conducted a study on dorso-lumbar injuries from the Gujarat earthquake, demonstrating that early rehabilitation through surgical intervention improved motor function in 53% of patients.[2]

Restorative yoga in adults with metabolic syndrome on a randomized, controlled pilot trial Although focused on metabolic syndrome (Cohen, B.E., Kanaya, A.M., et al. (2017), this study demonstrates the effectiveness of yoga in reducing stress and promoting relaxation, which can be applied to spinal cord injury patients in your research context.[5]

Yoga leads to multiple physical improvements after stroke (Schmid, A.A., Miller, K.K., et al. (2014) this article highlights how yoga contributes to physical and psychological improvements, including reduced stress levels and enhanced coping skills. Although focused on stroke patients, the findings are relevant to individuals with spinal cord injuries.[6]

Effectiveness of yoga as a form of exercise for individuals with spinal cord injury (Furlan, J.C., et al. (2016) and this study specifically evaluates yoga's impact on spinal cord injury patients. It concludes that yoga significantly reduces stress, enhances mood, and improves overall well- being.[7]

2. MATERIAL AND METHODS

2.1 Study Design and Variables

A two-group pre-test and post-test research design was used to evaluate stress levels before and after yoga therapy. The independent variable was yoga therapy, while the dependent variable was stress level.

2.2 Research Tool and Sampling

The study used a three-section tool:

- Section A: Demographic data (age, gender, income, marital status, education)
- Section B: SCI history (cause of injury, level of injury, emergency treatment, surgery)
- Section C: Perceived Stress Scale to measure stress levels before and after yoga therapy

A purposive sampling method was applied to select 100 SCI patients from selected hospitals, meeting the inclusion criteria:

- SCI patients with ASIA Impairment Scale Score C, D, or E
- Age above 18 years
- Willingness to participate

2.3 Data Collection and Analysis

Data collection involved:

- Pre-test: Administering the standard tool to assess stress levels
- Yoga intervention: Implementation of yoga therapy
- Post-test: Reassessing stress levels post-intervention

The nursing intervention comprised three structured components delivered in each session, with the central element being the psychological intervention through yoga (15 minutes). A total of 10 sessions were planned for every participant. Of these, two sessions were administered during hospital admission, one session during the scheduled follow-up, and the remaining seven sessions were completed independently by the patient after discharge, following the guided instructions provided by the care team.

The intervention was designed with a flexible scheduling approach, allowing sessions to be conducted either daily depending on the patient's clinical readiness

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and engagement capacity.

Importantly, the complete set of 10 sessions was required to be completed within a maximum duration of 15 days to ensure consistency, continuity, and therapeutic effectiveness.

Data analysis was conducted using:

- Descriptive statistics: Mean, standard deviation, mean difference
- Inferential statistics: Paired t-test and Fisher's exact test

2.4 Ethical Considerations

The study was approved by the Ethics Committee at Shalby Academy of Shalby Limited.

3. RESULTS

3.1 Section I – Demographic Characteristics

Demographic variable	Experimental		Control	
	Frequency	%	Frequency	%
Age				
20-25 Years	69	69%	73	73%
26-30 Years	18	18%	13	13%
31-35 Years	9	9%	8	8%
36-40 Years	3	3%	4	4%
More than 40 Years	1	1%	2	2%
Income Before Injury				
Rs. 47348 and above	18	18%	16	16%
Rs. 23674-47347	71	71%	67	67%
Rs. 11756-23673	9	9%	8	8%
Rs. 11837-17755	1	1%	8	8%
Rs. 7102-11836	1	1%	1	1%
Rs. 2391-7101	0	0%	0	0%
Less than 2390	0	0%	0	0%
Income After Injury				
Rs. 47348 and above	7	7%	6	6%
Rs. 23674-47347	61	61%	63	63%
Rs. 11756-23673	15	15%	14	14%
Rs. 11837-17755	11	11%	10	10%

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Rs. 7102-11836	6	6%	7	7%
Rs. 2391-7101	0	0%	0	0%
Less than 2390	0	0%	0	0%
Type of family				
Joint	87	87%	89	89%
Nuclear	13	13%	11	11%
Gender of Patient		0%		0%
Male	84	84%	87	87%
Female	16	16%	13	13%
Marital status		0%		0%
Married	78	78%	84	84%
Unmarried	22	22%	16	16%
Education Status				
Illiterate	0	0%	0	0%
Graduate	88	88%	87	87%
Post graduate	12	12%	13	13%
Others	0	0%	0	0%

The majority of participants in the experimental group were:

- 69% aged 20-25 years, while 73% of the control group were in the same age range
- 84% male and 16% female in the experimental group, compared to 87% male and

  13% female in the control group
- 78% married in the experimental group and 84% in the control group
- 88% graduates in the experimental group and 87% in the control group

In the experimental group, 69% of the patients with spinal cord injury were aged 20–25 years, followed by 18% aged 26–30 years, 9% aged 31–35 years, 3% aged 36–40 years, and 1% aged more than 40 years, while in the control group, 73% were aged 20–25 years, 13% aged 26–30 years, 8% aged 31–35 years, 4% aged 36–40 years, and 2% aged more than 40 years. Regarding income before injury, 71% of the experimental group earned Rs. 23,674-47,347, 18% earned Rs. 47,348 and above, 9% earned Rs. 11,756-23,673, while 1% earned Rs. 11,837-17,755 and

1% earned Rs. 7,102-11,836; in the control group, 67% earned Rs. 23,674-47,347, 16% earned

Rs. 47,348 and above, 8% earned Rs. 11,756-23,673, 8% earned Rs. 11,837-17,755, and 1% earned Rs. 7,102-11,836. In terms of income after injury, 61% of the experimental group earned Rs. 23,674-47,347, 15% earned Rs. 11,756-23,673, 11% earned Rs. 11,837-17,755, 7% earned

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Rs. 47,348 and above, and 6% earned Rs. 7,102-11,836, while in the control group, 63% earned Rs. 23,674-47,347, 14% earned Rs. 11,756-23,673, 10% earned Rs. 11,837-17,755, 6% earned

Rs. 47,348 and above, and 7% earned Rs. 7,102-11,836. Regarding family type, 87% of the experimental group belonged to joint families and 13% to nuclear families, while in the control group, 89% were from joint families and 11% from nuclear families. In terms of gender, 84% of the experimental group were male and 16% were female, whereas in the control group, 87% were male and 13% were female. Regarding marital status, 78% of the experimental group were married and 22% were unmarried, while in the control group, 84% were married and 16% were unmarried. Finally, in terms of education, 88% of the experimental group were graduates and 12% were postgraduates, while in the control group, 87% were graduates and 13% were postgraduate

Table3.2

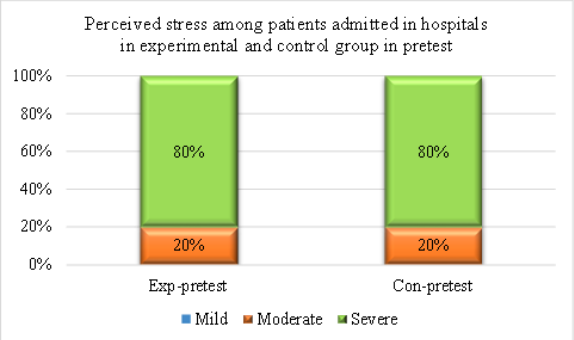
Spinal cord injury analysis:

Demographic variable	**Experimental**		**Control**	
	Frequency	**%**	**Frequency**	**%**
Case of injury				
Accident	77	77%	69	69%
Fall	22	22%	28	28%
Natural disaster	1	1%	3	3%
Suicide attempt	0	0%	0	0%
Level of Injury				
Cervical Injury	0	0%	0	0%
Thoracic Injury	53	53%	55	55%
Lumber Injury	26	26%	27	27%
Sacral Injury	17	17%	14	14%
Coccygeal Injury	4	4%	4	4%
Emergency Treatment				
Received	100	100 %	100	100 %
Not Received	0	0%	0	0%
Surgical Treatment		0%		0%
Perform	16	16%	0	0%
Not Perform	84	84%	100	100 %

In the experimental group, 77% of the patients sustained their spinal cord injury due to an accident, 22% due to a fall, and 1% from a natural disaster, while in the control group, 69% were injured in an accident, 28% from a fall, and 3% due to a natural disaster. Regarding the level of injury, 53% of the experimental group had a thoracic injury, 26% had a lumbar injury, 17% had a sacral injury, and 4% had a coccygeal injury, while in the control group, 55% had a thoracic injury, 27% had a lumbar injury, 14% had a sacral injury, and 4% had a coccygeal injury. In terms of emergency treatment, 100% of the patients in both groups received

treatment. For surgical treatment, 16% of the experimental group underwent surgery, while 84% did not, whereas in the control group, 100% did not undergo surgery.

3.2 Section II – Stress Levels Before and After Yoga



Pre-intervention, 62% of participants experienced severe stress, while post-intervention, 72%

demonstrated mild stress, indicating a significant reduction.

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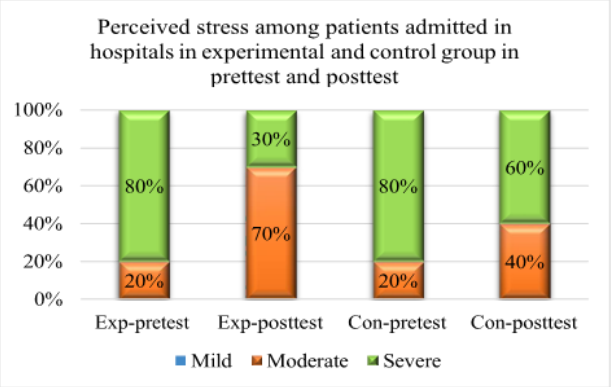
3.3 Section III – Effect of Yoga on Stress



In the experimental group:

- Pre-test: 20% moderate stress, 80% severe stress
- Post-test: 70% moderate stress, 30% severe stress

In the control group:

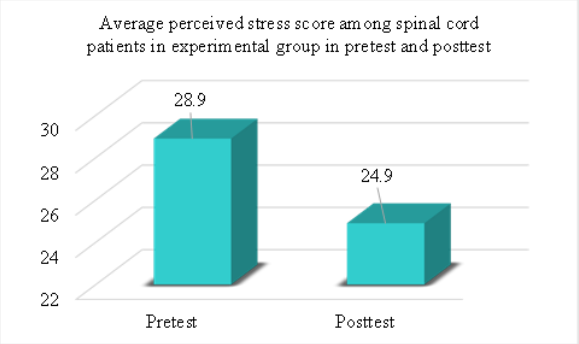
- Pre-test: 20% moderate stress, 80% severe stress
- Post-test: 40% moderate stress, 60% severe stress

The paired t-test revealed a significant reduction in stress:

Paired t-test for the effect of nursing intervention on perceived stress among spinal cord injury patients taking treatment in selected hospitals

	Mean	SD	T	df	p-value
Pretest	28.9	3.8	1.9	9	0.043
Posttest	24.9	4.1			

Researcher applied Paired t-test for the effect of nursing intervention on perceived stress among spinal cord injury patients taking treatment in selected hospitals. Average perceived stress score in pretest was 28.9 which reduced to 24.9 in posttest. T-value for this test was 1.9 with 9 degrees of freedom. Corresponding p-value was small (less than 0.0), the null hypothesis is rejected. It is evident that the nursing intervention is significantly effective in reducing the perceived stress among spinal cord injury patients admitted in hospitals.



Two sample t-test for comparison of reduction in perceived stress among spinal cord injury patients taking treatment in selected hospitals in experimental and control group

Group	Mean	SD	T	df	p-value
Experimental	4.0	6.6	0.189		0.185
Control	2.0	2.0			

Researcher applied two sample t-test for comparison of reduction in perceived stress among spinal cord injury patients taking treatment in selected hospitals in experimental and control group. Average reduction in perceived stress score in experimental group was 4 which was 2 in control group. T-value for this test was 0.9 with 18 degrees of freedom. Corresponding p- value was large (greater than 0.05), the null hypothesis is rejected. It is evident that the nursing intervention is significantly effective in reducing the perceived

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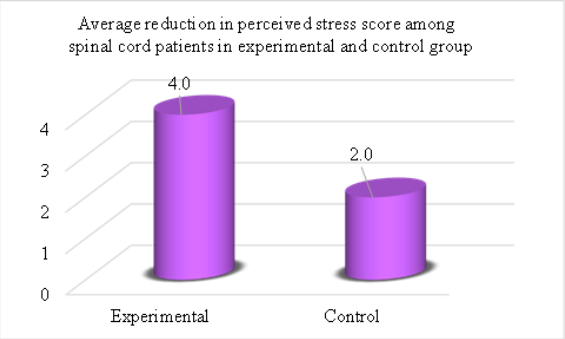
stress among spinal cord injury patients admitted in hospitals.



- Pre-test mean: 28.9 (SD = 3.8)
- Post-test mean: 24.9 (SD = 4.1)
- t-value: 1.9, p-value: 0.043

4. DISCUSSION

The study clearly demonstrates that yoga therapy significantly reduces stress in SCI patients. The post-intervention results indicate a remarkable decrease in severe stress levels, validating yoga's effectiveness as a stress-management strategy.

The findings are consistent with studies by:

- Ekta Chalageri et al. (2021), demonstrating that Rāja Yoga improves psychological outcomes in SCI patients
- Kathryn Curtis et al. (2017), who confirmed the effectiveness of specialized yoga programs for SCI patients in a randomized controlled trial

5. CONCLUSION

The study provides robust evidence that yoga therapy significantly reduces stress among spinal cord injury patients, irrespective of demographic variables. This highlights yoga's universal applicability and supports its implementation as a standard intervention for SCI patients.

ACKNOWLEDGEMENTS

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FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by the Shalby Academy Ethics Committee, and participants provided informed consent.

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