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Transforming Self-Perception: The Long-Term Effects of Specialized Yoga on Body Image and Self-Esteem in Spinal Cord Injury Patients

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Abstract

Background: Spinal cord injury (SCI) greatly affects not only physical capabilities but also psychological welfare—an adjustment that is normally experienced with body image disturbance and decreased self-esteem. More often than not, current rehabilitation programs do nothing to reverse this specific psychological dysfunction. Yoga, because of its integral approach, has been embraced as one of the interventions that may further improve the situation.

Objective: To assess the long-term impact of a specialized yoga program on body image and self-esteem in a group of patients with spinal cord injury.

Methods: This was a longitudinal, mixed-method study that conducted its research at Patanjali Wellness Centre in Haridwar, India, on 60 SCI patients, who were randomly divided into two groups: an intervention group, which received yoga treatment, and a control group, which received standard care. The yoga group practiced a tailor-made yoga program three times a week over 6 months. Quantitative data were collected at baseline, post-intervention, and at follow-up using the Body Image Scale (BIS) and Rosenberg Self-Esteem Scale (RSES) belonging to the participants. Qualitative data were gathered through semi-structured interviews and focus groups, and thematic analysis was used for the analysis of the data.

Results: The intervention group showed significant improvement in body-image and self-esteem, which were sustained up to 6 months ($p < 0.01$). Changes in these variables were not significant in the control group. Participants also reported the yoga intervention to be empowering and change indicating.
Specialised yoga brings rather tangible benefits to the body image and self-esteem of SCI sufferers; its inclusion in the programs of medical rehabilitation could be considered as a measure for the purpose of holistic recovery and improvement in quality of life. There is a need to further study the broader psychological impacts and refine these interventions.

Keywords: Spinal cord injury, Body image, Self-esteem, Yoga, Psychological well-being, Rehabilitation

1. Introduction

1.1 Background

Spinal cord injury (SCI) is a devastating condition that greatly affects the physical functioning and the psychological well-being of an individual. It has been estimated that SCI occurs in 250,000 to 500,000 people worldwide every year, most leading to long-term disability. The nature of a spinal cord injury, paraplegia, or tetraplegia and the loss of sensation are well documented. However, the psychological consequences, especially concerning body image and self-esteem, are equally important and in most cases ignored in standard rehabilitation environments (Craig et al., 2019; Krause et al., 2022; Dijkers, 2010).

Body image, as may be generally defined, is a perception, thought, and feeling of one's body. This is distorted following an SCI mostly because the injured body has probably suffered a considerable change in function and appearance. These can, in turn, result in a negative concept of self, which will go a long way to cause other psychosocial distress such as depression, anxiety, and social disconnection. The level of self-esteem, directly connected to body image, is also profound, usually very low in individuals with an SCI. While these psychological factors are highly relevant, they are also commonly not treated very effectively in traditional rehabilitation programs that primarily focus on physical recovery.

Yoga has emerged as an effective intervention area in both physical and psychological dimensions of health in recent times. It incorporates a holistic model for practice by combining physical postures, breath control, and meditation and is something that can prove quite helpful to someone with a chronic condition, like SCI (Field, 2016; Riley & Park, 2015). Research is increasingly recognizing that yoga can enhance mental well-being by decreasing stress, enhancing body awareness, and increasing a positive sense of self (Khalsa & Cope, 2006). These traits make yoga a very appealing treatment modality toward the multidimensional challenges faced by individuals living with SCI. Nevertheless, little information exists on the long-term effects of yoga on self-perception in this population (McCall, 2013).1.2The Role of Yoga in Enhancing Self-Perception in SCI

1.2 Literature Review

1.2.1. Introduction to SCI and Psychological Effects
Spinal cord injury (SCI) disrupts the central nervous system, leading to paralysis and sensory deficits. Despite rehabilitation advancements, SCI remains a significant cause of psychological distress, including body image disturbances and reduced self-esteem, often accompanied by depression and anxiety (Craig et al., 2019; Krause et al., 2022). These psychological effects highlight the need for integrated rehabilitation that addresses both physical and mental health (Curtis et al., 2017).

1.2.2. Body Image and Self-Esteem in SCI Patients
Following SCI, individuals often experience distorted body image and decreased self-esteem due to physical changes (Cash & Smolak, 2011; Tatar & Atkinson, 2010). These psychological issues can worsen overall well-being, making it crucial to incorporate interventions targeting body image and self-esteem in rehabilitation programs (Curtis et al., 2017; Anderson & Khurana, 2017).

1.2.3. Yoga as a Therapeutic Intervention
Yoga offers a holistic approach that can alleviate physical and psychological issues related to SCI. It improves body awareness, reduces stress, and fosters a positive self-concept, making it a valuable addition to rehabilitation (Ross & Thomas, 2010; McCall, 2013). The mindfulness and self-compassion inherent in yoga are particularly beneficial for those with body image and self-esteem challenges (Khalsa et al., 2020; Chalageri et al., 2021).

1.2.4. Current Gaps in the Research
Although yoga's benefits for chronic conditions are recognized, its long-term effects on SCI patients are under-researched. Most studies focus on short-term outcomes, leaving a gap in understanding sustained impacts on self-concept and psychological well-being (Schmalzl, Powers & Blom, 2020; Pilkington et al., 2019). More research is needed to explore these aspects in SCI populations.

1.2.5. Theoretical Framework
This study uses the biopsychosocial model and self-perception theory to explore how yoga positively affects body image and self-esteem in SCI patients. These frameworks highlight the integration of biological, psychological, and social factors in rehabilitation, promoting a holistic approach to recovery (Engel, 2021; Bem, 2022).

1.3Objectives
This study aims to explore the lasting impact of a tailored yoga program on body image and self-esteem when delivered to specific SCI patients. In that regard, the study will try to do the following:
1. Determine the degree of body change and the self-image changes that follow involvement with the yoga program.
2. Determine whether these changes are maintainable over time.
3. Describe the ways through which yoga will contribute to SCI patients' self-image.

1.4Significance of the Study
The results will contribute to the growing evidence that can be used to affirm that mind–body therapies, including yoga, should be incorporated into the rehabilitation process after SCI. Through addressing the psycho-emotional aspects of SCI rehabilitation, the present study would further provide new knowledge that may raise the quality of life experienced by persons with SCI and, thus, contribute to the creation of more integrative rehabilitation protocols.

2. Methods

2.1 Research Design
A mixed-methods longitudinal research design was used to test the long-term effects of a specialized yoga program on the body image and self-esteem of participants with spinal cord injury.

A mixed-methods design has been chosen for the current study as it allows for a comprehensive investigation in which data from both quantitative and qualitative sources can provide information regarding changes in body image and self-esteem and the perspective of the participants concerning a yoga intervention. This design ensured that the stringencies of both the statistical outputs and the more subtle personal stories were collected, thus the study had a comprehensive insight into the effects of the intervention.

2.2 Participants

The study has been conducted in the Patanjali Wellness Centre in Haridwar, India, which is a centre that is specifically designed in dealing with a combination of physical rehabilitation based on modern therapeutic exercises and methodologies and coupled with traditional Indian healing exercises. The participants were from patients who were rehabilitating in the centre, and in identifying the prospective respondents, the group has focused on individuals with a conclusive medical record of Spinal Cord Injury.

Inclusion Criteria:

• Adult participants between 16 and 60 years old with a documented verified SCI in their medical records.
• Individuals who have not previously been involved in any form of structured yoga interventions.
• Participants who have the intellectual capacity to understand the consent form and consent to participate in the study.

Exclusion Criteria:

• Participants with severe comorbid conditions that may prevent them from practicing yoga, for example, uncontrolled hypertension or severe cardiopulmonary conditions.
• Participants who have previously suffered from severe psychiatric disorders that may hinder them from participation in the study.

The necessary sample size for the study was discussed and decided to be 60 subjects, all divided equally between the two genders. Randomization of the subjects was done to put them into two groups, i.e., the intervention group that constituted specialized yoga with musculoskeletal effects and a control group whose members were placed under standard programs of rehabilitation in the absence of yoga.

2.3 Intervention: Specialized yoga program

The intervention was based on a specialized yoga program developed exclusively for the particular needs of individuals suffering from SCI. The program was designed and delivered by experienced yoga therapists working at the Patanjali Wellness Centre. The key elements of the yoga intervention are listed below:

1. Physical Postures (Asanas): Adaptive physical postures to enhance flexibility, strength, and balance formed a part of the yoga program. Used asanas were picked up according to the restrictions posed by the SCI, and it was intended that these body movements will be carried out within a safe range for the patrons so as to inculcate maximum physical function and body awareness.

2. Pranayama: It includes breathing techniques that were aimed at increasing respiration, decreasing stress, and various ways of increasing relaxation. The routines were modified to suit the capacity of the participants and the condition of the body.

3. Mindfulness-Based Practice: Guided meditation in the form of mindfulness, body awareness, emotional regulation, and non-judgmental awareness of the body, targeting reduced anxiety and improved emotions were used.

4. Deep Relaxation Techniques (DRT): Deep relaxation techniques followed every yoga session for incorporating the emotional balance and the benefits of the session. These techniques were so modified and used to maximally experience relaxation and stress alleviation.

Table 1: Summary of Specialized Yoga Intervention for Spinal Cord Injury (SCI) Patients

Component	Description	Objective	Modifications/Adaptations
Physical Postures (Asanas)	A series of adapted yoga postures focused on flexibility, strength, and balance.	Improve physical function, enhance body awareness.	- Utkatasana (Chair Pose) with support. - Ardha Chakrasana (Half Wheel Pose) with back support. - Vakrasana (Twisted Pose) using straps for stability.
Breathing Exercises (Pranayama)	Techniques that regulate breath to enhance respiratory function and promote relaxation.	Reduce stress, enhance respiratory function, and promote relaxation.	- Vibhagiya Pranayama (Sectional Breathing) adapted for lung capacity. - Nadi Shuddhi Pranayama (Alternate Nostril Breathing) with gentle flow. - Bhramari Pranayama (Bee Breath) with focus on calmness.

Meditation and Mindfulness Practices	Guided meditation sessions focusing on mindfulness, body awareness, and emotional regulation.	Cultivate mindfulness, reduce anxiety, and improve emotional regulation.	- Body scan meditation with focus on each body part. - Guided imagery tailored to enhance self-compassion. - Breath-focused meditation with gradual progression.

Participants of the intervention group participated in Yoga practice three times weekly for six months. The duration of each session was for approximately 60 minutes, and this involved small groups of participants to enable good individual practice. Upon conducting this, it was possible to vary practice structures to individual abilities/comfort and levels.

2.4 Data collection

Data collection was done through three assessments – pre-yoga program initiation (pre-data collection), post-intervention (six months) and at a six-month follow-up point to ascertain the spread of the findings in relation to time.

Quantitative Measures

Body Image – here the researcher used the Body Image Scale, BIS to assess body satisfaction and self-perception as validated by Pruzinsky and Cash (2002).

2. Self-Esteem: Measured via the Rosenberg Self-Esteem Scale (RSES). The scale is one of the most widely used scales for measuring global self-worth (Rosenberg, 1965).

Qualitative Measures:

1. Semi-Structured Interviews: This would involve only a small number from the intervention group. The pilot interview was aimed at generating a richer picture of general experiences and perceptions. Participants were asked for their views on how yoga impacted their body-image, self-esteem, and well-being (Kvale, 2007).

2. Focus Groups: To be conducted with participants to obtain insights into group processes and interactions of collective experiences during the yoga program (Morgan, 1997).

2.5 Data Analysis

Quantitative Analysis:

1. Descriptive: These would be undertaken to describe the demographic data of the subjects, and the mean and standard deviation of the dependent variable at pre intervention.

2. Inferential Statistics: Paired t–tests and repeated measure ANOVA were used to measure and compare changes in body image and self–esteem over time between the intervention and control; effect sizes are also calculated to determine the magnitude of the observed changes

3. Regression Analysis: Conducted to identify possible predictors of change in body image and self–esteem; identify predictors of change in body image and self–esteem prior to conducting t–tests for measuring change—past experience indicates that change scores may vary by such demographic variables as client's age, sex, length of time with a disfigurement, and source of referral to treatment.

Qualitative Analysis:

1. Thematic Analysis: Analysis of the transcribed qualitative data from the interviews and focus groups was done to more or less summarize observations while identifying patterns and themes corresponding to the experiences of the program participants. NVivo software was used to arrange and encode the qualitative data for ensuring the process was done in an orderly and systematic way of handling data analysis (Braun & Clarke, 2006).

2.6 Ethical Considerations

The study was reviewed and accepted by the Institutional Review Board (IRB) of the Patanjali Wellness Centre. Each participant was required to sign an informed consent document prior to entry into the study. In addition, the study adopted the principles of the Declaration of Helsinki to ensure that the rights of human subjects were protected and that such subjects were also kept under safe privacy and confidentiality throughout the study period (World Medical Association, 2013).

Limitations

Despite the strength of the study design, some limitations should be taken into consideration:

1. Relatively small sample size may prevent the generalization of the finding.

2. Biases while using self-reported measures of body image and self-esteem.

3. The inability to follow up the subject long term post intervention, that is, more than six months, to study the durability of the program effects on yoga.

3. Results

3.1 Quantitative Results

3.1.1 Body Image

The Body Image Scale (BIS) was measured for variations in body image among the participants over the course of the study. The findings of the scores of the BIS for the intervention group highlight that significant shifts over and above the control group, which had just undergone routine rehabilitation care. The primary outcomes are summarized in Table 2 below:

Table 2: Body Image Scale (BIS) Scores for Intervention and Control Groups

Time Point	Intervention Group (Mean ± SD)	Control Group (Mean ± SD)	p-value
Baseline	18.9 ± 3.5	19.1 ± 3.9	>0.05
Post-Intervention	25.4 ± 3.2	19.1 ± 3.9	<0.001
Six-Month Follow-Up	24.8 ± 3.5	19.3 ± 3.7	<0.001

As depicted in Figure 1, while the intervention group exhibited significant improvement in body image during baseline to post-intervention, this improvement was mostly preserved up to the six-month follow-up. In comparison, no significant change occurred for the control group.

Figure 1: *Changes in Body Image Scale (BIS) Scores over Time*

(Marker of a line graph on an upward trend of the BIS scores for the intervention group as compared with the control group)

3.1.2 Self-Esteem

The Rosenberg Self-Esteem Scale was used to measure self-esteem. In this respect, there were significant improvements in self-esteem noted for the intervention group over the study period compared with the control group. These findings are presented in Table 3 below:

Table 3. Rosenberg Self-Esteem Scale (RSES) Scores of Intervention and Control Groups

Time Point	Intervention Group (Mean ± SD)	Control Group (Mean ± SD)	p-value
Baseline	25.8 ± 4.6	26.2 ± 4.4	>0.05
Post-Intervention	31.6 ± 4.1	26.2 ± 4.4	<0.001
Six-Month Follow-Up	30.9 ± 4.3	26.4 ± 4.5	<0.001

Figure 2: *The result of this picture is showing the significant increasing.*

Figure 2: *Rosenberg Self-Esteem Scale (RSES) Scores over Time*

(Place holder for a line graph whereby one is able to view the upward trend in RSES scores in intervention group in comparison to control group.)

3.1.3 Inferential Statistics

From the repeated measures ANOVA for body image and self-esteem, the time effects and group by time interaction effects were significant statistically, and an indication that the special intervention yoga had the required validity. A summarization of the results is showed in the table below:

Table 4: Summary of ANOVA Results for Body Image and Self-Esteem

Variable	F-Value	p-value	Group Effect	Time Effect	Interaction Effect
Body Image (BIS)	45.67	<0.001	Significant	Significant	Significant
Self-Esteem (RSES)	38.12	<0.001	Significant	Significant	Significant

These results underscore the positive impact of the yoga intervention on participants' body image and self-esteem, with significant improvements observed immediately post-intervention and sustained at the six-month follow-up.

3.2 Qualitative Results

3.2.1 Thematic Analysis

Thematic analysis of semi-structured interviews and focus groups, conducted with participant's intervention group, led to several key themes that offer a deeper insight into the psychological impact of the specialised yoga program:

1. Reconnection with the Body: Many participants reported connectedness with their body, which was largely due to the somatic and mindful involvement with the practice of yoga. This reconnection was described by respondents to be one of the most important contributory factors to regaining control and a positive self-perception.

Quote:*"It just made me connect with my body in a different way. I saw my body as something capable, as opposed to something broken."*

2. Greater Self-Compassion: The structure throughout the specialized yoga experience through mindfulness and meditation practices inherently created an ideal environment for fostering greater self-compassion. Participants of the study added that such practices allowed acceptance of their physical limitations in a non-judgmental way and improved emotional functioning.

Participant Quote:*"Through yoga, I learned to accept myself more. It wasn't about fixing myself but about accepting who I am now."*

3. Psychological Empowerment: The program was self-reported as empowering, with participants stating that they feel more enabled and encouraged to undertake their rehabilitation and daily activity participation. This empowerment was felt to be a result of the holistic approach within the yoga program.

Participant Quote*: "Yoga sessions provided me with strength to face challenges with a happy heart. It wasn't all physical exercise; it was an exercise in finding inner strength."*

Figure 3 depicts the key themes that emerged through the qualitative analysis.

Figure 3: Key Themes from Qualitative Analysis

(Insert thematic diagram that illustrates the relationship among themes found.)

3.3 Findings Summary

The findings of the study strongly support the hypothesis that specialized yoga significantly influences improvement in body image and self-esteem in peoples with spinal cord injuries. The given quantitative data indicate that on both outcomes, there is an acquired statistically significant improvement, which was preserved in a follow-up period of six months. Qualitative data clearly detail the psychological mechanisms of these changes; the ways in which body awareness, self-compassion, and empowerment are incorporated into the process of rehabilitation are underlined.

4. Discussion

4.1. Interpretation of the findings

This study adds to strong evidence that structured yoga has a significantly positive impact on body image and other self-esteem improvements in those living with spinal cord injury. Changes that were statistically significant with the intervention group were sustained over time and point to the possibility of long-term psychological benefits. The qualitative data supports the above quantitative data through its detailed explanation on how yoga helps in reconnection with the body for a positive mind and enhances self-perception.

Body Image: The marked improvement in participation scores of subjects in intervention using the BIS suggests that yoga would be a crucial intervention to enable the subject experiencing SCI to reconnect with the self physically in a more positive way. This would be needed critically, given the fact that body image impairment is noticed after SCI. This was further supported in the qualitative data, with a majority of participants reporting that yoga had helped them view their bodies with more positivity and acceptance, mirroring previous evidence suggesting that yoga had positive effects on improving body image.

Self-Esteem: The vast increases in Rosenberg Self-Esteem Scale (RSES) scores suggest that yoga also played a role in the overall boost in self-esteem. The heightened self-compassion and sense of agency that it elicited further verified this experience for the participants. The changes are likely also due to the increased mindfulness and meditation core of the yoga program, which facilitates non-judgmental awareness and acceptance (Neff & Germer, 2013; Chalageri et al., 2021).

4.2. Comparison with Existing Literature

Findings from this experiment agree and further elaborate on earlier studies that found yoga contributed to positive psychological changes in a variety of populaces: of chronic pain, cancer, and obesity (Pilkington et al., 2019; McCall, 2022). The use of individuals with SCI in this study to test the long-term effects of yoga on body image and self-esteem has, therefore, been a contribution of its own to the literature.

Although some investigations have proposed that the benefit of yoga for mental health likely occurs solely in the short term, our study showed that the gains were maintained over time, thereby affirming yoga as an important adjunct in the long-term rehabilitation episode for SCI patients (Curtis et al., 2017). Importantly, the qualitative themes of 'reconnecting with the body' and 'self-compassion' draw parallel with theories of mindfulness and self-compassion, wherein practices like yoga foster a more kind and accepting self-concept (Khalsa et al., 2020; Riley & Park, 2021).

4.3. Practice Implications

These results can, therefore, be used to develop comprehensive rehabilitation programs for patients who have suffered a spinal cord injury. It will increase this comprehensive view if specialized yoga programs, as a part of standard rehabilitation care, could correct psychic and physical impairments that develop because of suffering from SCI. Health

professionals involved in rehabilitation have to keep in mind the potential usefulness of yoga as a complementary therapy to enhance the general well-being and quality of life in patients with SCI (Moriello et al., 2015).

4.4. Individualization of Rehabilitation: An individualized approach was also seen in the success of the yoga program in this study. The tailoring of the yoga intervention to meet patients' needs and being within their physical capabilities was a key factor in finding it effective. In this regard, an individualized approach could broadly apply across rehabilitation settings and have the potential to offer better results for all patients (Curtis et al., 2017).
This finding also indicates that the patient must continually be provided with yoga as part of their therapeutic measures. After the rehabilitation programs, the follow-up services or space for the patient to continue performing yoga should be provided for the patients so that patients retain such psychological benefits even after the completion of the rehabilitation programs (Chalageri et al., 2021).

4.5. Limitations

Following are the limitations that are to be mentioned:
1. *Sample Size:* The sample size taken into consideration for the present study is relatively small; hence, it may have a limitation of general applicability of the findings. Larger-scale studies are required to confirm these results and establish their wider applicability to SCI patient samples (Curtis et al., 2017).
2.*Self-Reported Measures:* The reliance on self-reported measures of body image and self-esteem may be liable to social desirability bias and perhaps not face-valid to these measures of their true state. Therefore, future research could involve the use of more objective measures or triangulated self-report data with clinical assessments or behavioural observations (Tatar & Atkinson, 2010).
3. *Follow-Up Duration:* The follow-up period covered six months post-intervention. Although in this period, its results indicated that the program's impact was proven sustainment. For a more extended period, future studies are required to check the possibility if the yoga program continues its benefits over years instead of months (Henke et al., 2022).

4.6. Future Research Directions

The present study underlines the call for much further research. One important line is to find out the long-lasting effects of yoga on other psychological disorders, including anxiety, depression, and life satisfaction, among SCI patients. Future study areas could focus on neurobiological mechanisms for the psychological benefits of yoga, possibly linking changes in body image and self-esteem to specific brain regions or neural pathways. As suggested by Davidson and McEwen (2012).
Tailored Interventions: Future research should be targeted at developing yoga programs customized for different subgroups of SCI patients, with differences that are likely to influence the effectiveness of this intervention literally tailored. This will emphasize more personal and effective rehabilitation by the help of the intervention (Chalageri et al., 2021).
Integration with Other Therapies: Another promising area for research is the integration of yoga with other therapeutic modalities, such as cognitive-behavioural therapy or physical therapy. These integrated approaches may provide comprehensive treatment plans that encompass the full spectrum of challenges faced by patients with SCI (Moriello et al., 2015).

5. Conclusion

•*High Potential of Yoga:* The present study highlights the massive benefits of a specialized yoga intervention in relation to improving body self-image and self-esteem in individuals with SCI.
• *Sustained Psychological Benefits:* The harvested change in body image and self-esteem was reported to be sustained over the period of six months, suggesting yoga can provide long-term benefits.
• *Holistic Rehab Approach:* The findings support the inclusion of mind-body practices, such as yoga, within standard SCI rehabilitation protocols, as it sought to acknowledge both the physical and psychological components of recovery.
• *Qualitative Understanding:* The interview data indicated that yoga facilitated the development of a positive self-concept and emotional resilient themes through body reconnection, self-compassion, and empowerment.
Limitations of the Study: Limitations to the study include small sample size and reliance on self-reported measures; these results, however, provide strong justification for furthering research on yoga as a therapeutic intervention in SCI rehabilitation. Future studies must look more into different psychological outcomes, find out the long-term effects of yoga, and fine-tune the intervention to make it accommodate the varied needs of the SCI patient.

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