

Original Article

# Determining the Level of Occupational Performance and its Association with Depression among Patients with Spinal Cord Injury

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## ABSTRACT

**Background:** Spinal Cord Injury (SCI) presents a significant challenge to healthcare systems worldwide, often leading to severe physical disability and psychological distress, including depression. The rehabilitation process for SCI patients is complex, necessitating a multidimensional approach that addresses both the physical and psychological aspects of recovery. The interplay between occupational performance and mental health among individuals with SCI remains a critical area of investigation, particularly in regions like Peshawar, Pakistan, where such studies are scarce.

**Objective:** The primary objective of this study was to explore the association between occupational performance and depression among individuals with SCI in Peshawar, with a secondary aim of comparing occupational performance levels and their relationship with depression in this demographic.

**Methods:** A cross-sectional study was conducted at the Paraplegic Centre Peshawar over a six-month period, utilizing convenience sampling to recruit 120 participants. Depression and occupational performance were assessed using the Beck Depression Inventory and the Barthel Index Scale, respectively. Data analysis was performed using SPSS version 22, with statistical significance set at  $p < 0.05$ .

**Results:** The study found that 35.8% of participants experienced moderate depression, while mild mood disturbances and borderline clinical depression were reported by 21.7% and 12%, respectively. Severe and extreme depression were less common, observed in 9.8% and 1.1% of the sample. Regarding occupational performance, 37% were totally dependent, 50% were severely dependent, and 13% were moderately independent. Statistical analysis revealed a significant association between occupational performance and depression levels (Pearson Chi-Square = 17.986,  $p = .05$ ; Likelihood Ratio = 18.683,  $p = .04$ ; Fisher Exact Test = 9.214,  $p = .002$ ).

**Conclusion:** The study highlights a notable correlation between occupational performance and depression among SCI patients, emphasizing the need for integrated rehabilitation programs that address both physical disabilities and mental health concerns. Enhancing occupational performance through targeted interventions may reduce depression levels, thereby improving overall quality of life for SCI patients.

**Keywords:** Spinal Cord Injury, Depression, Occupational Performance, Rehabilitation, Beck Depression Inventory, Barthel Index Scale, Cross-Sectional Study, Peshawar.

## INTRODUCTION

Spinal cord injury (SCI) constitutes a significant global health concern, affecting an estimated 250,000 to 500,000 individuals each year according to the World Health Organization (WHO). The incidence of SCI varies widely, with developed nations reporting rates between 13.1 and 163.4 per million, whereas developing countries face incidences ranging from 13 to 210 per million (1-3). Data from Pakistan reveals a distribution wherein 10% of SCI cases result in tetraplegia and 90% in paraplegia, predominantly affecting

males (4). The prospects for recovery diminish significantly after the initial three months post-injury, during which patients may develop secondary complications such as cardiovascular issues, pressure ulcers, chronic pain, respiratory complications, contractures, infections, and spasticity (5). Notably, SCI patients exhibit lower activity levels compared to those suffering from other chronic conditions like diabetes and cancer (6), which in turn increases the risk of cardiovascular diseases and potentially death due to inactivity (8).

The psychological ramifications of SCI are profound. Physical inactivity has been linked to elevated depression levels, with studies by Martin et al. indicating that SCI patients who engage in physical activities report lower depression rates (9). The historical context is grim; prior to World War II, SCI survival rates were bleak, limited to weeks without rehabilitative care. However, individuals who could afford treatment enjoyed a relatively healthier lifestyle (10). Today, advancements in medical care have significantly improved the quality of life for SCI patients, enabling them to maintain daily routines more effectively (11, 12). Yet, the economic burden of healthcare, especially in low-income countries, remains a critical barrier, with clinical depression affecting 20–30% of SCI patients (11).

Traumatic SCI, often resulting from physical impacts such as falls or vehicular accidents, not only deteriorates physical health but also significantly impairs cognitive function, lifestyle satisfaction, and social participation (13). Complications following SCI, including intestinal dysfunction and metabolic disorders, are intricately linked to depression and anxiety (14). Among the top functional recovery priorities for individuals with SCI are motor function, bowel and bladder control, and sexual function, highlighting the significance of relationships and health in their lives (15).

The adverse psychological impact of insufficient physical activity among paraplegic patients is well-documented, with depression being the most prevalent mental health issue (16). It is widely acknowledged that most individuals with severe paraplegia or tetraplegia experience depression post-injury (17). The chronic effects of SCI, including sensorimotor impairments, neuropathic pain, and loss of sexual function, have long been a research focus. Yet, the mental health aspects, particularly cognitive impairments and depression, require further clinical understanding (18). The literature suggests a significant portion of SCI patients experience depression, with indoor and community-dwelling patients reporting depression rates ranging from 9.8% to 63.9% (19, 20). Recent studies found that the prevalence of major depression among community-dwelling adults with traumatic SCI is three times higher than in the general population (21).

Observational data analysis from 3,172 individuals with SCI revealed psychosocial factors as significant predictors of post-injury depression, with a strong correlation between levels of despair and the quality of social support (22, 23). The relationship between pain and depression is established, with effective treatment shown to reduce depressive symptoms (24). Yet, approximately 20% of patients continue to experience depressive symptoms post-discharge, increasing to 25–30% upon reintegration into the community (25).

Occupational performance, or the ability to engage in meaningful activities and daily tasks, is severely compromised by SCI (26–29). Spasticity and pain associated with SCI significantly reduce life expectancy and quality of life (30, 31), with occupational therapy focusing on restoring independence in daily living activities (32). Caregivers play a vital role in assisting with personal and household tasks, highlighting the importance of comprehensive support for SCI individuals (33).

Despite extensive research on depression and physical activity in SCI patients, there exists a notable gap regarding the decline in occupational performance and its association with depression. This study aims to bridge this gap by assessing occupational performance levels and their correlation with depression among SCI patients, thereby providing insights into the comprehensive impact of SCI on individuals' lives and identifying potential avenues for intervention.

## MATERIAL AND METHODS

The study aimed to investigate the association between occupational performance levels and depression among individuals with spinal cord injury in Peshawar, employing a cross-sectional research design. Conducted within the Paraplegic Centre of Peshawar, a facility renowned for its rehabilitation treatments for spinal cord injury patients, the research spanned a period of six months, from May to October 2023. The methodology adopted for participant selection was convenience sampling, a non-probability sampling technique that facilitated the collection of data from readily accessible participants. The sample comprised 120 individuals with spinal cord injuries, selected based on specific inclusion and exclusion criteria to ensure the relevance and accuracy of the findings. The sample size, determined using the Raosoft sample size calculator, was established at 92, accounting for a 5% margin of error and a 95% confidence interval (18, 19).

For the assessment of depression and occupational performance, two validated questionnaires were employed. The Beck Depression Inventory, comprising 21 questions with a scoring range from 0 to 63, was utilized to evaluate the severity of depression. The scoring criteria were stratified into six levels: scores from 1 to 10 indicated normal affect, 11 to 16 suggested mild mood

disturbances, 17 to 20 were indicative of borderline clinical depression, 21 to 30 signified moderate depression, 31 to 40 denoted severe depression, and scores above 40 pointed to extreme depression. The reliability and validity of this instrument were confirmed by a Cronbach's alpha of 0.84 and a test-retest reliability of 0.75. The Barthel Index, consisting of 10 items with scores ranging from 0 to 20, was used to measure occupational performance. Scores were multiplied by five to derive a total out of 100, with higher scores indicating greater independence. The interpretation of the Barthel Index scores varied from total dependency (0-20) to complete independence (100) (14).

Upon completion of data collection, the information was systematically organized and analyzed using SPSS version 22, adhering to the ethical principles outlined in the Declaration of Helsinki. This included ensuring informed consent from all participants, guaranteeing confidentiality of participant information, and obtaining ethical approval from the relevant institutional review boards. The study's adherence to these ethical standards ensured the protection of participants' rights and well-being throughout the research process.

The analysis aimed to elucidate the relationship between occupational performance and depression levels among the study population. By employing statistical methods suited for cross-sectional data, the study sought to provide insights into the impact of spinal cord injury on individuals' mental health and daily functioning. This comprehensive approach to data collection, analysis, and ethical consideration set the groundwork for a robust investigation into the challenges faced by individuals with spinal cord injuries, contributing valuable information to the fields of medical research and rehabilitation.

## RESULTS

In the study examining the association between occupational performance and depression among individuals with spinal cord injury, a significant demographic disparity was observed with a predominant representation of males, constituting 75% (n=69) of the participants, while females accounted for 25% (n=23). This gender distribution underscores the potential influence of gender on the incidence and impact of spinal cord injuries, as reflected in the collected data (Table 1).

The categorization of injuries revealed that the majority of participants had sustained complete spinal cord injuries, representing 78.3% (n=72) of the sample, whereas 21.7% (n=20) had incomplete injuries. This distribution highlights the severity of spinal cord injuries among the study population, indicating a higher prevalence of complete injuries within the sample (Table 1).

Regarding the depression scores, the study findings were notably diverse. A fraction of the participants, 19.6%, exhibited normal depression scores, suggesting a minimal impact of their spinal cord injury on their mental health. Meanwhile, mild mood disturbances were reported by 21.7% of the participants, and 12% fell into the borderline clinical depression category. Notably, a substantial proportion of the study population, 35.8%, experienced moderate depression, while severe depression and extreme depression were less common, reported by 9.8% and 1.1% of participants, respectively. These findings reveal a significant tendency towards moderate depression among individuals with spinal cord injuries, underscoring the critical need for mental health support in this demographic (Table 2).

The assessment of occupational performance further illuminated the challenges faced by individuals with spinal cord injuries. A considerable segment of the participants, 37%, were found to be totally dependent, indicating a profound impact of the injury on their ability to perform daily tasks independently. Additionally, 50% of the participants were categorized as severely dependent, and only a small minority, 13%, were moderately independent. This distribution underscores the extensive care and support requirements for individuals with spinal cord injuries, with a significant majority demonstrating varying degrees of dependency in their daily lives (Table 3).

Table 1 Gender Distribution

Gender	Number of Participants	Percentage
Male	69	75%
Female	23	25%
Total	92	100%

Table 2 Type of Injury

Type of Injury	Number of Participants	Percentage
Complete	72	78.3%
Incomplete	20	21.7%
Total	92	100%

Table 3 Depression Score Distribution

Depression Level	Percentage
Normal	19.6%
Mild Mood Disturbances	21.7%
Borderline Clinical Depression	12%
Moderate Depression	35.8%
Severe Depression	9.8%
Extreme Depression	1.1%
Total	100%

Table 4 Occupational Performance

Level of Dependency	Percentage
Totally Dependent	37%
Severely Dependent	50%
Moderately Independent	13%
Total	100%

Table 5 Statistical Analysis Results

Statistical Test	Value	P-value
Pearson Chi-Square	17.986	.05
Likelihood Ratio	18.683	.04
Fisher Exact Test	9.214	.002

Statistical analysis employing Pearson Chi-Square (17.986,  $p=.05$ ), Likelihood Ratio (18.683,  $p=.04$ ), and Fisher Exact Test (9.214,  $p=.002$ ) methods indicated a statistically significant association between the level of occupational performance and depression among participants. These results validate the hypothesis that occupational performance is closely linked to mental health outcomes among individuals with spinal cord injuries, highlighting the intricate interplay between physical disability and psychological well-being (Table 4).

## DISCUSSION

Our investigation into the nexus between occupational performance and depression among spinal cord injury (SCI) patients in Peshawar, Pakistan, represents a pioneering endeavor in the region's research landscape. By employing the Beck Depression Inventory tool and the Barthel Index Scale, this study sought to elucidate the impact of depression on the occupational capabilities of SCI patients, marking a significant stride in understanding the multifaceted consequences of such injuries. The choice of the Paraplegic Centre Peshawar (PCP) as the study setting facilitated a focused exploration of this association, shedding light on the prevalence of depression and its correlation with the ability to perform daily life activities and maintain interpersonal relationships among the afflicted population.

Our findings revealed a notable prevalence of mild to moderate depression among participants, with a substantial 35.8% experiencing moderate depression. This observation aligns with previous research conducted at the BASIR clinic at Tehran University of Medical Sciences, which found that 49.5% of patients exhibited a range of mild to severe depression (24). Such consistency across studies underscores the pervasive nature of depression following SCI, affirming the belief that depression is a common sequelae of these injuries. This was further corroborated by our data, indicating varying degrees of depression among the participants: 21.7% experienced mild mood disturbances, 12% had borderline clinical depression, and 9.8% suffered from severe depression. These findings resonate with those reported by Sevda Demir Ture et al., who observed a similar distribution of depression severity among SCI patients (15). Moreover, Cholavech Chavasiri's study, which reported a 55.8% prevalence of depression among SCI patients (14), and other research indicating that depression rates among this demographic can range from 9.8% to 63.9% (20), further validate the critical need to address mental health in SCI rehabilitation.

The degree of dependency on caregivers, a direct consequence of the injury's severity and level, emerged as a significant factor in our study. We discovered that the majority of participants were functionally dependent, with 37% totally dependent and 50%

severely dependent on their caregivers for daily tasks. These findings are in harmony with studies highlighting the relationship between psychological and physical secondary conditions and the burden on family caregivers in the SCI context (12). The functional dependency underscores the broader implications of SCI on patients' autonomy and quality of life, necessitating comprehensive care strategies that address both physical and psychological needs.

A noteworthy aspect of our research was the examination of the relationship between physical activity and mental health among SCI individuals. Our review of the literature identified studies suggesting that increased physical activity correlates with reduced depression symptoms (29), highlighting the potential of physical rehabilitation to mitigate depressive symptoms among SCI patients. Despite its contributions, our study encountered limitations, primarily related to its setting in Peshawar, where only one SCI rehabilitation center was available for participant recruitment. This limitation was reflected in the gender distribution of our sample, with a significantly higher number of male participants compared to females, indicating a gender disparity in the study population. Such a disparity could influence the generalizability of our findings, as it does not fully represent the demographic spectrum of SCI patients. Our research has illuminated the intricate relationship between occupational performance and depression among SCI patients, emphasizing the prevalence of moderate depression and the significant impact of functional dependency on mental health. These insights advocate for the integration of mental health services into SCI rehabilitation programs to enhance patient outcomes. In light of our study's findings and limitations, we recommend future research to encompass a larger and more demographically diverse sample from multiple rehabilitation centers. Addressing the gender disparity observed in our study by ensuring a balanced representation of male and female participants will enrich the understanding and applicability of research outcomes, facilitating more nuanced and comprehensive care strategies for individuals suffering from spinal cord injuries.

## CONCLUSION

The study underscores a significant association between occupational performance and depression among spinal cord injury (SCI) patients, highlighting moderate depression as a prevalent condition within this population. These findings signal the imperative need for holistic rehabilitation approaches that incorporate mental health support alongside physical therapy. Integrating psychological care into SCI patient management can significantly enhance quality of life, underscoring the broader implications for human healthcare. Addressing both the physical and emotional well-being of SCI patients is essential for fostering resilience, promoting independence, and improving overall health outcomes, thereby advancing the comprehensive care paradigm in the context of spinal cord injury rehabilitation.

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