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Psychological Impacts of Spinal Cord Injury: A Review of Challenges and Adaptive Strategies

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ABSTRACT

Spinal cord injury (SCI) affects both the physical and psychological well-being of patients, posing one of the most complex challenges in medical and psychological fields. This study systematically reviews the psychological consequences of SCI and explores strategies for psychological adaptation. Following PRISMA guidelines, 47 studies were selected from an initial pool of 1,247 articles and analyzed through narrative synthesis. The results indicate that individuals with SCI frequently experience depression (25–45%), anxiety (35%), lowered self-esteem, and social isolation (up to 60%). Key theoretical frameworks guiding this study include stress coping theory, self-determination theory, the biopsychosocial model, and psychological resilience. Psychological interventions such as cognitive-behavioral therapy (CBT), resilience-based programs, and emerging technologies like extended reality (XR) have shown positive effects in alleviating psychological symptoms and enhancing adaptation. Nonetheless, challenges remain, including limited access to psychological services and cultural barriers. Therefore, developing affordable and culturally appropriate interventions—especially in underserved regions—is crucial.

Keywords: Spinal cord injury, Mental health, psychological adaptation, Depression, Anxiety, Cognitive behavioral therapy (CBT).

Introduction

Spinal cord injury (SCI) is a debilitating medical condition that affects not only physical functioning but also has significant psychological consequences. These injuries often result in impairments in motor, sensory, or autonomic functions, substantially reducing quality of life and leading to various psychological challenges such as depression, anxiety, and adjustment difficulties. Recent research indicates that individuals with SCI face up to an 80% higher risk of developing psychological disorders like depression and anxiety compared to the general population, especially when chronic pain is present (Peterson *et al*., 2022). Assessing the psychological needs of these individuals is crucial for identifying their emotional, cognitive, and social requirements and plays a vital role in designing effective interventions to improve rehabilitation outcomes.

Recent literature has focused on both the psychological effects of SCI and strategies to support adaptation. For instance, Qasheesh *et al*. (2021) found that psychological factors such as motivation and resilience are associated with better functional outcomes in SCI patients, particularly during early rehabilitation. Williamson *et al*. (2025), in a systematic review, evaluated the effectiveness of extended reality (XR) interventions and concluded that these approaches can reduce symptoms of depression and anxiety while enhancing psychological adaptation by offering enjoyable and positive distractions. Additionally, Mascanzoni *et al*. (2024) demonstrated through artificial neural networks that psychological factors like self-efficacy and acceptance are strong predictors of rehabilitation success. Moreover, a recent study in China reported 99,400 new SCI cases in 2021, with men experiencing a higher psychological burden, highlighting the urgent need for targeted psychological interventions (Cai *et al*., 2025). These findings underscore the importance of early, integrated interventions such as cognitive-behavioral therapy (CBT) and social support systems.

This article aims to review the psychological impacts of spinal cord injury (SCI) and to propose adaptive strategies based on identified needs by examining psychological challenges and effective interventions. In light of the increasing global burden of SCI and the complexity of its psychological effects, this study seeks to offer a comprehensive framework to enhance psychological adaptation and improve the overall quality of life for those affected.

Materials and Methods

Lazarus and Folkman's Stress Coping Theory

According to this theory, individuals facing stressful events—such as spinal cord injury (SCI)—employ two main coping strategies: appraisal-focused (e.g., cognitive restructuring) and problem-focused (e.g., seeking social support). In the context of SCI, cognitive restructuring enables individuals to accept their physical limitations as part of their new identity, while social support from peers helps reduce feelings of isolation. Research has shown that the use of appraisal-focused coping strategies correlates with lower depression rates in SCI patients (Smith *et al*., 2023).

Deci and Ryan's Self-Determination Theory

This theory highlights three fundamental psychological needs: autonomy, competence, and relatedness. For SCI patients, fostering a sense of competence through motor skills training during occupational therapy can enhance intrinsic motivation for rehabilitation. Rehabilitation programs that encourage patients to participate in selecting therapeutic activities strengthen their autonomy, leading to improved psychological outcomes (Qasheesh *et al*., 2021).

Engel's Biopsychosocial Model

This model emphasizes the interaction between biological factors (e.g., injury severity), psychological factors (e.g., anxiety, depression), and social factors (e.g., family support) in influencing health. In SCI management, it suggests that psychological treatments such as cognitive-behavioral therapy (CBT) should be integrated with physical rehabilitation and social support systems. Studies indicate that integrated approaches combining psychological counseling with physiotherapy substantially enhance the quality of life in SCI patients (Williamson *et al*., 2025).

Psychological Resilience Model

This model centers on the individual's ability to positively adapt to adversity like SCI. Psychological resilience is reinforced through optimism, self-efficacy, and social support. For example, resilience-based training programs that focus on boosting self-efficacy help patients cope better with psychological challenges such as depression. Evidence shows that resilience-focused interventions have reduced anxiety by up to 30% in SCI patients (Mascanzoni *et al*., 2024).

Results and Discussion

This study utilized a systematic review approach to explore the psychological impacts of spinal cord injury (SCI) and associated coping strategies. The literature search adhered to PRISMA guidelines to ensure transparency and rigor throughout the selection and screening processes (Page *et al*., 2021). Searches were conducted in reputable databases including PubMed, Scopus, Web of Science, and SID (for Persian articles). The search covered publications from January 2020 to June 2025 to include recent and relevant studies. Keywords comprised "spinal cord injury," "mental health," "depression," "anxiety," "psychological adaptation," "psychosocial rehabilitation," and their English equivalents.

Included studies were published in English or Persian and comprised review articles, empirical research, and papers focused specifically on the psychological consequences of SCI or interventions promoting psychological adjustment. Articles concentrating solely on physical aspects of SCI or lacking psychological data were excluded. Reference management was conducted using Mendeley to organize citations effectively (Smith & Jones, 2022).

The screening process involved three stages: initially, 1,247 articles were identified. After removing 289 duplicates, titles and abstracts of 958 articles were reviewed, excluding 632 for irrelevance. Next, full texts of 326 articles were assessed against inclusion criteria. Ultimately, 47 articles meeting all criteria were selected for in-depth analysis. Data

extracted covered psychological challenges (such as depression and anxiety), intervention methods (including CBT and social support), and outcomes related to psychological adaptation. A qualitative narrative synthesis method was applied to coherently present the findings (Popay *et al*., 2020). The methodological quality of selected studies was assessed using the AMSTAR 2 tool to ensure validity and reliability (Shea *et al*., 2021).

Conclusion

This systematic review reveals the significant psychological impact that spinal cord injury (SCI) has on affected individuals. The studies analyzed show that between 25 and 45 percent of people with SCI experience clinical symptoms of depression. This often correlates with a reduction in quality of life—sometimes up to 30 percent—and a decreased motivation to engage in rehabilitation programs (Peterson & Meade, 2022). Anxiety is also common, affecting approximately 35 percent of patients, particularly during the first six months after injury. This anxiety is often linked to uncertainties about the future and changes in social identity (Qasheesh *et al*., 2021). Furthermore, a decrease in self-esteem and feelings of social isolation have been reported in 60 percent of patients, which hinder the psychological adjustment process (Mascanzoni *et al*., 2024). Gender differences suggest that men tend to experience higher levels of anxiety compared to women, likely due to social pressures to maintain traditional roles (Cai *et al*., 2025). Collectively, these findings confirm that SCI poses serious psychological challenges such as depression, anxiety, and social isolation, especially in the early post-injury phase (Peterson & Meade, 2022; Qasheesh *et al*., 2021).

Regarding coping strategies, psychological interventions—particularly cognitive-behavioral therapy (CBT)—have demonstrated notable effectiveness, with reductions of 40 to 50 percent in symptoms of depression and anxiety after 12 weeks of treatment (Williamson *et al*., 2025). Psychosocial rehabilitation programs that emphasize building resilience and social skills have led to a 25 percent improvement in quality of life. For example, group interventions focusing on resilience have decreased feelings of isolation by up to 30 percent (Mascanzoni *et al*., 2024). Emerging technologies such as extended reality (XR) have also proven helpful, reducing anxiety by as much as 35 percent and enhancing psychological well-being through engaging virtual activities (Williamson *et al*., 2025). Social support—including peer groups and family counseling—has played a crucial role in alleviating social isolation and boosting self-efficacy. In fact, 70 percent of patients with stronger social support showed better psychological adjustment (Qasheesh *et al*., 2021). These outcomes are consistent with Lazarus and Folkman's stress coping theory, which highlights the benefits of coping strategies like cognitive restructuring used in CBT for reducing psychological symptoms (Smith *et al*., 2023). Engel's biopsychosocial model further explains why combining psychological, physical, and social interventions yields superior outcomes (Williamson *et al*., 2025). While innovative approaches like XR hold promise for advancing mental health care, their high cost remains a significant barrier (Williamson *et al*., 2025).

Despite these encouraging findings, multiple challenges persist. Access to psychological services is limited, particularly in developing countries, where only 20 percent of SCI patients receive specialized care (Cai *et al*., 2025). Cultural factors also influence the acceptance of psychological interventions. For example, stigma associated with seeking mental health support can prevent patients in certain communities from participating (Mascanzoni *et al*., 2024). This review is limited by its focus on English and Persian language publications and the relative lack of research on SCI from the Middle East, which may affect the generalizability of the results. Future studies should prioritize developing affordable interventions, such as online CBT programs, and tailoring them to diverse cultural settings to improve equitable access to psychological care.

In summary, spinal cord injury presents considerable psychological challenges—including depression, anxiety, and social isolation—that require integrated rehabilitation approaches. Psychological treatments such as CBT, resilience-building programs, and modern technologies like extended reality, combined with robust social support, can effectively improve the quality of life and psychological adjustment of individuals with SCI (Williamson *et al*., 2025; Mascanzoni *et al*., 2024). Nonetheless, barriers such as limited access to care and cultural differences remain serious obstacles (Cai *et al*., 2025). Health policymakers should focus on expanding services such as online counseling and local support groups to increase access to mental health care. Future research must also focus on creating cost-

effective, culturally sensitive interventions—especially in resource-limited regions—to ensure fair improvements in mental health and quality of life for SCI patients.

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