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Evaluation of General Health and Associated Factors among Patients with Spinal Cord Injuries Registered with the Rasht Welfare Organization, Iran: A Cross-Sectional Study

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Original Article

Abstract

Introduction: Spinal cord injury (SCI) is the most important lasting complication following trauma, leading to temporary or permanent changes in motor-sensory or autonomic functions. These changes disrupt the patient's life balance, often resulting in anxiety and reduced life satisfaction, which ultimately diminishes psychological well-being. This study aimed to investigate the prevalence of mental disorders and their associated factors in this population.

Materials and Methods: In this cross-sectional, descriptive-analytical study, 89 individuals with SCI were selected from a population of 115 members of the Welfare Organization of Rasht City, Iran, using the Cochran sampling formula. Participants included those who had referred to clinics and hospitals in Rasht City for rehabilitation services in 2021. Data were collected using the Goldberg and Hillier General Health Questionnaire (GHQ-28).

Results: Data analysis using t-tests and analysis of variance (ANOVA) indicated that women (mean GHQ = 39.10) exhibited significantly better mental health compared to men (mean GHQ = 46.11) (P = 0.011). Employment status also had a significant effect, with employed participants showing better general health (P = 0.012). No significant differences were observed regarding age groups, marital status, or injury level (P > 0.05). Receiving rehabilitation services did not result in a statistically significant difference in mental health (mean GHQ = 45.69 in recipients vs. 48.32 in non-recipients, t = 1.47, P = 0.228). However, the duration of injury significantly affected general health; mean GHQ scores for participants with injury durations of < 5 years, 5-10 years, and > 10 years were 45.21, 46.78, and 52.11, respectively (F = 6.79, P = 0.002), indicating a decline in mental health as the duration of injury increased.

Conclusion: This study suggests that the mental health of individuals with SCI is more heavily influenced by gender, employment, social support, and injury duration than by other demographic factors. Consequently, providing continuous rehabilitation services and strengthening psychosocial support are crucial for maintaining and improving the overall health of these patients.

Keywords: Mental disorders; Spinal cord injury; Depression; Anxiety; General health

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Introduction

Spinal cord injuries (SCIs) represent some of the most hazardous physical traumas, potentially disrupting various bodily systems and even posing life-threatening risks (1). SCI arises from damage to the spinal cord caused by trauma, disease, or congenital disabilities; it is recognized as a traumatic global occurrence that frequently results in permanent disabilities and profoundly impacts the quality of life (QOL) of affected individuals (2). The consequences of SCI can be overwhelming; in addition to primary issues such as permanent muscle paralysis below the level of injury and reduced mobility, secondary complications, including pressure ulcers, chronic pain, and adverse effects on employment and social participation, can create a state of crisis for the individual (3). The prevalence of depression and anxiety among these individuals is reported at 30–40% and 20–25%, respectively; furthermore, the incidence of post-traumatic stress disorder (PTSD) is higher in this population compared to individuals without physical impairments (4). Every year, a significant number of people sustain spinal and cervical injuries resulting from war-related incidents, accidents, falls from heights, and degenerative diseases of the spine and spinal cord (4, 5). According to the World Health Organization, the global prevalence of SCI is estimated at 15-40 million, with 12-40 million new cases annually (3). In Iran, the Spinal Cord Injury Research Center reports an incidence rate of 40 to 50 cases per million, with over 3,000 new injuries occurring each year, occurring more frequently in men than in women (6). Spinal cord injuries are considered a major challenge for human societies, inducing numerous physical and psychological hardships that entail personal, familial, and social consequences (7). SCI is a significant cause of sensory, motor, and urinary tract dysfunctions, with personal ramifications including grief, guilt, fatigue, and depression (8). Typically, individuals encounter substantial life changes following a spinal cord injury, necessitating time and support from others for successful adaptation (3).

Consequently, many individuals with spinal cord injuries experience conditions such as depression, anxiety, impaired self-concept, and feelings of loneliness (9). Compared to those without disabilities, individuals with disabilities tend to be more socially isolated and depressed, experiencing fewer intimate relationships (10). Research indicates that between 7% and 14% of men with spinal cord injuries are at risk of acute depression (4). These individuals confront numerous daily challenges, including financial difficulties, lack of social support, and health-related issues. Fortunately, medical advancements have enabled them to live for many years and lead meaningful lives; thus, individuals with spinal cord injuries must adopt a new perspective toward their bodies (11). While numerous studies have explored QOL among those with spinal cord injuries, most have been conducted outside of Iran. Given the influence of cultural, economic, and environmental factors, these results may not be directly applicable to the Iranian context. In Iran, most research has focused on comparing the QOL of individuals with spinal cord injuries to that of the healthy population. Although some of these studies have examined factors influencing QOL, the results have been inconsistent across different investigations. Social withdrawal often occurs due to disability-related unemployment and the economic burden of treatment costs.

Furthermore, dissatisfaction stemming from role crises and the inability of the disabled individual to meet their partner's needs can lead to severe tension and even divorce. Additionally, the costs of medical supplies and the human energy required for rehabilitation and care services provided by relevant organizations impose a double burden on both society and families. Collectively, these factors underscore the necessity of conducting research aimed at evaluating general health status and its contributing factors in individuals with spinal cord injuries to facilitate purposeful planning.

This study aimed to investigate the emergence and prevalence of psychological disorders resulting from spinal cord injury (SCI) at various levels.

Materials and Methods

The present study was a cross-sectional descriptive-analytical investigation conducted from September to December 2022. The research setting was the State Welfare Organization of Rasht. The study population comprised all individuals with SCI (N=115) registered with the Rasht State Welfare Organization who sought rehabilitation services at city clinics and hospitals in 2021. Inclusion criteria required a medical diagnosis of spinal cord injury and a psychiatric diagnosis of at least one of the psychological disorders addressed in this research. Exclusion criteria included the use of illicit drugs, tobacco, or alcohol during the study period, as well as the use of medications specific to psychiatric patients. Based on the Cochran formula and the total population of 115, a sample size of 89 participants was determined. Convenience sampling was employed to select eligible members from the Rasht State Welfare Organization. The sample size was calculated using the following formula:

$$n_{\circ} = \frac{Z^2 p\,(1-p)}{e^2}$$

Data were collected using a demographic characteristics questionnaire covering age, gender, marital status, education, employment, type of SCI, duration of injury, and history of rehabilitation services based on records at the State Welfare Organization of Rasht. Additionally, the Goldberg and Hiller General Health Questionnaire (GHQ-28) was used, consisting of four subscales: Somatic Symptoms, Anxiety and Sleep Disorder, Social Function, and Depression Symptoms. The 28-item questionnaire includes questions 1–7 on somatic symptoms, 8–14 on anxiety and sleep disorders, 15–21 on social functioning, and 22–28 on depression symptoms. The total score ranges from 0 to 84, with lower scores indicating better general health and mental well-being. Several researchers have examined the Persian version of this questionnaire in Iran and have found that it exhibits favorable content, construct, and convergent validity (12). Taghavi evaluated the reliability of the GHQ using test-retest, split-half, and Cronbach's alpha methods, obtaining coefficients of 0.93, 0.70, and 0.90, respectively (13).

Data analysis was performed using SPSS 26. Descriptive statistics, including frequency, percentage, mean, standard deviation, and confidence intervals, were employed. For the inferential analysis, with a Type I error rate of 5% assumed for all tests and upon confirmation of data normality, independent t-tests and one-way Analysis of Variance (ANOVA) were utilized.

Results

This study included 53 men (59.6%) and 36 women (40.4%) with spinal cord injuries. Regarding marital status, 47 participants (52.8%) were married, and 42 (47.2%) were unmarried. Based on the severity of the injury, 9 individuals (10.1%) had complete spinal cord injuries, while 80 (89.9%) had incomplete injuries. In terms of the anatomical site of the injury, 22 participants (24.7%) had cervical injuries, 5 (5.6%) had thoracic injuries, and 62 (69.7%) had lumbar injuries. The majority of participants (33.7%) belonged to the 50–60 age group. Regarding educational attainment, the largest proportion of participants (57.3%) had a diploma.

To compare the mean general health scores across age groups (under 40, 40-50, 50-60, and over 60 years), a one-way ANOVA was conducted. The results indicated that although the mean general health score was higher in the under-40 group than in the other age groups, there was no overall statistically significant difference between the age groups (F=0.96, P = 0.410). Therefore, it can be stated that age did not significantly influence the participants' general health. Independent t-test results revealed that the mean general health score in men (46.11 ± 15.97) was significantly higher than in women (39.10 ± 10.33) (t=6.69, P = 0.011). Since a higher GHQ score indicates lower mental health, it can be concluded that women exhibited better mental health than men. Comparing mean general health scores between married and single individuals showed no significant difference (t=1.077, P=0.302). Consequently, marital status did not have a significant impact on general health (Table 1).

An independent t-test was conducted to examine the difference in mean general health scores between employed and unemployed individuals, revealing a significant difference (t = 5.68, P = 0.012). The mean GHQ score was 43.89 ± 10.9 for employed individuals and 52.38 ± 11.56 for the unemployed; thus, employed participants demonstrated superior general health. One-way ANOVA results indicated significant differences across educational levels (F = 6.79, P = 0.002). The mean general health scores for below-diploma, diploma, and university-educated groups were 40.98, 44.15, and 54.36, respectively. This result suggests that as educational attainment increases, GHQ scores rise, signifying a decline in general health.

Regarding the site of the spinal cord injury, the results showed no significant difference in general health scores among patients with cervical, thoracic, or lumbar injuries (F = 0.096, P = 0.909). Consequently, the lesion's anatomical location was not significantly associated with general health. The mean general health score in patients with complete SCI (36.44 ± 7.17) was lower than in those with incomplete SCI (40.40 ± 11.82).

Table 1. Normality Test for Data Distribution

Sub-scale	Mean ± SD	Min	Max	P-value*	P-value**
Somatic sub-scale point	13.74 ± 3.31	5	20	0.038	0.025
Anxiety sub-scale point	11.11 ± 3.83	1	19	0.166	0.401
Social function disruption sub-scale point	9.38 ± 3.73	2	18	0.083	0.035
Depression sub-scale point	9.36 ± 5.61	1	21	0.001	0.002
General health sub-scale point	43.60 ± 11.66	15	72	0.019	0.052

*Kolmogorov-Smirnov test; **Shapiro–Wilk test

Although this difference was at the threshold of significance (t = -1.97, P = 0.052), it suggests a trend in which patients with complete injuries may have better general health.

A comparison of mean general health scores between those who received rehabilitation services (45.69 ± 11.43) and those who did not (48.32 ±12.38) showed no statistically significant difference (t = 1.47, P = 0.228). However, the lower mean score among service recipients (indicating better health) may suggest a potential positive effect of rehabilitation that warrants further investigation in future studies. One-way ANOVA results demonstrated a significant difference in mean general health scores among groups with injury durations of less than 5 years, 5–10 years, and more than 10 years (F = 6.79, P = 0.002). The mean GHQ scores for these groups were 45.21, 46.78, and 52.11, respectively. This indicates that as the duration of the injury increases, general health declines, suggesting a cumulative negative impact of chronic injury on mental health (Table 2).

Discussion

The objective of the present study was to investigate the status of general health in individuals with spinal cord injury (SCI) and its association with specific demographic and clinical variables. The results indicated no statistically significant differences across age groups in general health scores; in effect, age did not exert a substantial influence on general health among individuals with SCI. This result is consistent with previous research suggesting that age, in isolation, is not a primary determinant of mental health in these patients; rather, factors such as social support, physical function levels, and access to rehabilitation services play more pivotal roles (14, 15). Some studies have shown that while younger individuals may experience higher levels of psychological distress in the initial years following the injury, psychological adaptation increases over time, and age-related differences in mental health indices diminish (16). Conversely, other research suggests that older adults may exhibit greater psychological adjustment due to greater acceptance and lower expectations regarding physical functioning (17). Therefore, the results of the current study may reflect a form of psychological equilibrium established over time through lived experience, familial support, and cognitive adaptation in SCI patients. Overall, the lack of significant differences across age groups suggests that psychological and social interventions for this patient population should be tailored to individual needs and social support systems.

The results also revealed that the mean general health score in men was significantly higher than in women (with higher GHQ scores indicating poorer health).

Table 2. Comparison of General Health Scores Relative to Demographic Variables

Variable		n (%)	Mean ± SD	Statistics	P-value
Age (years)	≤ 40	27 (30.3)	46.29 ±11.88	0.96	0.41**
	40-50	19 (21.3)	44.37 ± 8.31		
	50-60	30 (33.7)	41.83 ± 13.42		
	≥ 60	13 (14.6)	40.92 ± 10.95		
Gender	Male	53 (59.6)	46.15 ± 11.97	6.69	0.011*
	Female	36 (40.4)	39.83 ± 10.23		
Marital status	Married	42 (47.2)	42.38 ± 11.85	1.077	0.302*
	Single	47 (52.8)	44.95 ± 11.43		
Employment status	Employed	32 (35.95)	43.89 ± 10.90	5.68	0.012*
	Unemployed	57 (64.05)	52.38 ± 11.56		
Education	Below high school diploma	51 (57.3)	40.98 ± 10.27	6.79	0.002**
	High school diploma	27 (30.3)	44.15 ± 11.66		
	University education	11 (12.4)	54.36 ± 12.36		
SCI type based on the site of injury	Cervical	22 (24.7)	43.90 ± 11.43	0.096	0.909**
	Thoracic	5 (5.6)	41.40 ± 11.37		
	Lumbar	62 (69.7)	43.66 ± 11.37		
SCI based on injury severity	Complete	9 (10.1)	36.44 ± 7.17	-1.97	0.052*
	Incomplete	80 (89.9)	44.40 ± 11.82		
Receipt of rehabilitation services	Yes	41 (46.06)	45.69 ± 11.43	1.47	0.228*
	No	48 (53.94)	48.32 ± 12.38		
Duration of injury	Less than 5 years	24 (26.96)	45.21 ± 11.86	6.79	0.002**
	5-10	31 (34.83)	46.78 ± 11.50		
	More than 10 years	34 (38.21)	52.11 ± 12.51		

*Independent sample t-test; **one-way ANOVA test

This result aligns with several recent studies. An international study involving 22 countries reported significant gender differences in the experiences of patients with SCI, noting that women experienced higher levels of satisfaction compared to men, which can be effective in maintaining mental health (18). Furthermore, a study by Taylor et al. (19) on women with SCI showed that this group, despite facing psychological pressures resulting from their physical condition, utilized more effective coping strategies than men. These results corroborate the results of the present study and may indicate the protective role of social and psychological factors in women.

In contrast, some research has suggested that women with SCI might be more vulnerable to psychological problems due to hormonal factors, the pressure of familial roles, or gender discrimination (20). Nonetheless, the support system and social conditions can shift the direction of gender's impact on mental health across different studies. Regarding marital status, the results showed no significant difference in general health between married and single individuals. This result is consistent with similar studies indicating that marriage alone does not guarantee better mental health in chronic patients (21). In fact, the quality of the marital relationship and the level of emotional support can be more decisive factors than marital status itself (22). Especially among individuals with SCI, if a spouse provides effective caregiving, marriage can facilitate psychological adjustment; however, in the absence of such support, it may increase the individual's psychological burden (23). Therefore, it appears that differences in the mental health of SCI patients are more closely related to social and psycho-cultural factors than purely biological differences, and marital status serves as a protective factor only when accompanied by effective emotional support.

The results of the present study demonstrated that the mean general health scores were significantly lower among employed participants than among their unemployed counterparts; in effect, employed individuals had superior mental health. This result aligns with several similar studies that have identified employment as a protective factor against psychological problems in individuals with spinal cord injury (SCI) (24). In a study conducted in South Korea, employment was associated with reduced depression and improved QOL among SCI patients (25). Furthermore, Post et al. (26) reported that employed individuals with spinal cord injuries were in a better mental health state than those who were unemployed. Conversely, unemployment, particularly in the context of physical disability, can lead to feelings of isolation and decreased self-esteem, all of which threaten mental health (21). Therefore, supporting vocational opportunities tailored to these patients' physical capabilities could play a vital role in promoting their overall health.

Regarding education, the results of this research indicated that as educational attainment increased, mean GHQ scores also rose, signifying a decline in general health. This result is contrary to initial expectations, as higher education is typically associated with better coping skills and greater access to supportive resources (27). However, similar results have been observed in other studies, suggesting that among SCI patients, those with higher education may experience higher levels of anxiety due to a greater awareness of their limitations and negative social comparisons (28). Additionally, in Iranian society, educated individuals may hold higher social expectations, which, if unfulfilled following the onset of injury, lead to a decline in mental health. Overall, these results highlight the importance of employment-based rehabilitation programs, while indicating that education alone does not guarantee mental health in SCI patients; psychological and environmental factors must also be considered.

The results of the current study showed no significant difference in general health scores between the spinal cord injury sites (cervical, thoracic, and lumbar) and the general health scores. This result is consistent with much of the recent literature. New studies have shown that the severity and location of the injury alone are not strong predictors of mental health status; rather, psychosocial factors play a more decisive role (26, 28). Differences related to the site of injury (cervical or lumbar) exert little impact on mental health, whereas the individual's perception of social support and functional independence is of greater importance (26).

Regarding injury severity, the results revealed that patients with complete injuries had better mental health than those with incomplete injuries, although this difference was at the threshold of significance. This result is somewhat consistent with the results of Craig et al. (21), which showed that individuals with complete injuries demonstrate greater psychological adjustment over time as they adapt to the reality of their limitations and develop more realistic functional expectations. In contrast, in patients with incomplete injuries, the presence of partial motor ability may lead to constant comparison with their pre-injury state and functional anxiety regarding a full recovery, which ultimately increases psychological pressure (15).

Since SCI is a major factor in sensory, motor, and

combined impairments, its consequences in the personal realm often involve grief and feelings of guilt (29-31). The disability resulting from immobility in these individuals leads to increased resentment (32). Typically, the adjustment of individuals with SCI requires support from those around them (33, 34). Initial psychological reactions to the injury can include denial, disbelief, shock, and anger, while secondary negative psychological complications may include anxiety, post-traumatic stress disorder (PTSD), and suicidal ideation (3). These negative psychological states are associated with factors such as pain, feelings of helplessness, and frequent hospitalizations. The emergence of numerous physical and psychological problems, the permanence of most disabilities, and the resulting high level of dependency cause significant life changes that can hinder adjustment to the injury (35). Although adverse life events are often potentially debilitating, not all individuals react in the same way, and research has shown individual differences in the manifestation of psychological outcomes (36, 37). Adjustment to disability is a general process of dynamic development through which individuals gradually reach a state more congruent with their immediate environment (29). While adjustment to disability emphasizes the individual's interactions with the surrounding world, acceptance focuses on the individual's self-concept (3). However, both represent a process of value change and are essential for individuals who adapt to life changes with willingness and interest; therefore, acceptance of disability is a prerequisite for the physical and psychological adjustment of disabled individuals to their injury (38).

The results of the current study indicated that mean general health scores were lower in individuals who received rehabilitation services than in those who did not. However, the difference was not statistically significant; the trend suggests a more favourable psychological status in the rehabilitation-receiving group. This result implies that rehabilitation services, even if their effects are not statistically significant in the short term, can improve psychological adjustment and enhance QOL. Various studies support this interpretation (39, 40). Research on individuals with spinal cord injury (SCI) has shown that regular participation in rehabilitation programs leads to an increased sense of control, self-efficacy, and social adjustment (21). Similarly, studies in Iran have demonstrated that individuals who consistently benefit from physical and psychological rehabilitation services experience lower levels of anxiety and depression (41, 42). These positive effects may stem from the multidimensional nature of rehabilitation services, which encompass psychological support, social counselling, and life skills training in addition to physical treatments.

On the other hand, the lack of statistical significance may be attributed to several factors. First, sample size or the diversity of services received can affect the effect size; that is, a real effect of rehabilitation might exist but remain undetected in statistical tests due to sample size limitations. Second, differences in the quality, duration, and type of rehabilitation services among individuals could also influence the results. Furthermore, mental health is linked to numerous factors such as familial support, economic conditions, and personality traits, which may moderate the direct effect of rehabilitation services. Overall, the present results suggest that, although no significant statistical difference was observed, rehabilitation services may play an important supportive role in improving individuals with SCI's general health. The continuity and comprehensiveness of these services, particularly in psychological and social dimensions, can increase resilience and reduce psychological problems in this population (42).

Based on the current study's results, there is a significant relationship between general health and the duration of spinal cord injury. Specifically, as the duration of the injury increases, general health declines. It appears that the persistence of mobility limitations, chronic pain, and reduced social participation over time can gradually intensify psychological pressure, feelings of inadequacy, and the manifestation of depressive symptoms. This result is consistent with previous research; studies have indicated that individuals with chronic injuries experience higher levels of anxiety and depression compared to those with a shorter duration of injury (43). Psychological adjustment to SCI initially focuses on adaptation; however, in later stages, challenges such as weakened social support may undermine mental health (21).

Furthermore, these results align with the study by Rahmani-Rasa et al. (2016) titled "Aspects of Resilience in Individuals with Spinal Cord Injury," which reported that 50% of participants were resilient, 25% showed recovery, 12.8% exhibited delayed distress, and 12.5% experienced chronic dysfunction (38). In interpreting this result, it can be argued that when an SCI occurs at a younger age or when its duration is extensive, the individual may suffer from more severe psychological disorders due to the lack of health recovery.

Another explanation for this result is the diminishing effectiveness of rehabilitation interventions over time. For many individuals with

SCI, the follow-up of psychological or physical treatments tends to decrease after several years. Consequently, a lack of continuity in comprehensive care may be one of the reasons for the decline in general health among individuals with long-term injuries. Additionally, while effective coping mechanisms may be more active during the initial stages of injury, psychological and social resources can become depleted when faced with prolonged exposure to chronic stress.

Overall, the current results emphasize the necessity of implementing continuous rehabilitation programs for individuals with chronic injuries. Support groups and family education could play a crucial role in preventing the decline of mental health. From this perspective, general health in individuals with SCI is a dynamic, time-dependent phenomenon that requires a longitudinal, interdisciplinary approach to health and social policy-making.

Limitations

Several limitations were encountered in this study, including the geographical breadth and dispersion of the study population, non-response, and difficulty accessing certain individuals with SCI. Additionally, some potential participants were in a vegetative state, rendering them practically unable to respond to the research instruments.

Recommendations

Based on the research results, it is suggested that specialized training courses be designed for the spouses of individuals with SCI to facilitate the effective management of the patients' psychological challenges. Furthermore, it is recommended that enhanced facilities and more tailored rehabilitation services be provided to individuals under 40 with SCI to support their social reintegration and vocational rehabilitation.

Conclusion

Increasing attention to the welfare indicators of individuals with disabilities and SCI is imperative to mitigate and prevent the escalation of various psychological disorders. Given the complexity and diversity of factors influencing mental health in individuals with SCI, there is a clear need for further research in this area and the adoption of integrated, multi-modal approaches for intervention and management.

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Authors' Contribution

Project design and ideation and implementation: Zinat Sadat Mirpour, Zahra Jafarpasand
Attracting financial resources for the project: Zahra Jafarpasand
Project support, executive and scientific services: Zinat Sadat Mirpour
Providing equipment and study samples: Zahra Jafarpasand
Data collection: Zahra Jafarpasand
Analysis and interpretation of results: Zinat Sadat Mirpour, Zahra Jafarpasand
Specialized statistical services: Zinat Sadat Mirpour
Manuscript preparation: Fatemeh Javid
Specialized evaluation of the manuscript in terms of scientific concepts: Zinat Sadat Mirpour, Fatemeh Javid, Zahra Jafarpasand, Fatemeh Abbasian
Approval of the manuscript for submission to the journal office: Zinat Sadat Mirpour, Fatemeh Abbasian
Responsibility for maintaining and integrity of the study process from inception to publication and responding to the comments of the referees: Zinat Sadat Mirpour, Fatemeh Abbasian

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Conflict of Interest

The authors did not have a conflict of interest.

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