



Original Article

Evaluation of Patients' Knowledge, Attitude, and Practice Regarding Secondary Complications in Spinal Cord Injury

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ABSTRACT

Background: Spinal cord injury (SCI) is a debilitating condition that imposes a significant socio-economic burden on patients and society. Secondary complications are one of the most crucial issues that may arise in these patients and contribute to the overall disease burden. This study aims to assess the knowledge, attitudes, and practices of patients with SCI concerning secondary complications. **Methods:** In this cross-sectional study, the authors evaluated the knowledge, attitudes, and practices (KAP) of patients with spinal cord injury regarding secondary complications. Patients with SCI were identified through the hospital information system. Data were collected using a demographic and clinical information questionnaire and a three-part questionnaire covering knowledge, attitudes, and practices.

Results: A total of 180 patients participated in this study. The findings revealed a moderate level of knowledge, attitude, and practice, with respective mean scores of 84.12, 13.62, and 21.5 in patients with SCI.

Conclusion: The patients' knowledge, attitude, and practice regarding potential complications of spinal cord injury was moderate. Significant relationships were found between education and knowledge, attitude, and practice. Additionally, a significant relationship was observed between knowledge and gender. While there was no significant relationship between age and knowledge or practice, a reverse relationship was identified between age and attitude.

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Introduction

Neuronal death and disability resulting from the failure to regenerate axons after a spinal cord injury (SCI) can lead to permanent and irreversible deficits in some patients [1, 2]. Road accidents are responsible for the highest number of SCI cases among various factors.

In traumatic cases, blows to the spine, often involving vascular injury, fractures, vertebral dislocation, or a combination of these factors (fracture-dislocation), can lead to SCI [3, 4]. Non-traumatic cases, accounting for approximately 31% of spinal cord injuries, are attributed to causes such as tumors, infectious agents, severe osteoarthritis of the spine, disc herniation, poliomyelitis, syringomyelia, spina bifida, Multiple Sclerosis (MS), Amyotrophic lateral sclerosis, and more. These non-traumatic factors can also result in spinal cord damage. Rarely, certain surgeries, spinal injections, radiation, and

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vaccinations can lead to spinal cord injuries [5].

Spinal cord injuries can be classified as complete or incomplete. In a complete lesion, there is a total absence of sensory or motor function below the level of the injury. Complete damage is most commonly associated with spinal cord amputation, severe vascular injury, spinal cord longitudinal strain, or significant spinal compression. In complete lesions where the spinal cord is disconnected from the brain, sensory perception and motor control below the level of injury are severely impaired. In such cases, the prognosis for the return of sensory-motor function is typically poor [6]. Incomplete lesions, on the other hand, are characterized by the partial retention of sensory or motor function below the affected area [7].

Patients with spinal cord injuries often face new problems after discharge and the acute phase in the hospital, problems they were unaware of before the accident. These issues significantly impact various aspects of their lives, including physical and mental well-being, and are referred to as potential complications or secondary complications [8].

Secondary complications following SCI encompass a wide range of issues, such as pressure ulcers, urinary tract infections, intestinal problems, joint and soft tissue contractures, fractures, spasticity, shoulder pain, chronic pain, chronic fatigue, cognitive impairment, chronic depression, osteoporosis, lung problems, headaches, sexual dysfunction, deep vein thrombosis, pulmonary emboli, heterotopic ossification, disuse muscle atrophy, obesity, and overweight. In neck lesions, additional complications like dysphagia, autonomic dysreflexia, and orthostatic hypotension can occur [9-11].

These secondary complications significantly increase patient mortality and escalate treatment costs and the likelihood of hospital readmission. Unfortunately, general practitioners often do not consult physical medicine and rehabilitation specialists about these complications, which makes addressing these problems even more challenging [12].

Proper education and management can mitigate or prevent many of these potential complications. Existing evidence highlights the need for patients with spinal cord injuries to proactively engage in self-management to reduce the risk of secondary complications. This entails understanding risk factors, developing the necessary skills to minimize these risks, accessing social support, and promptly seeking occupational healthcare when required [13, 14].

Home-based care, where the patient plays a pivotal role, is essential for numerous chronic conditions. Patient self-management education reduces hospital readmissions, lowers healthcare costs, and improves disease control [15, 16]. Therefore, identifying and managing these factors can significantly enhance a person's quality of life. Recent research has shown that conditions like heart, urinary, and respiratory problems can impact long-term survival in individuals with spinal cord injuries. Elevating patients' knowledge about their condition and its potential secondary complications can increase their long-term survival and overall quality of life [17].

This manuscript further explores the importance of education about spinal cord injuries, as it can potentially mitigate secondary complications. Such complications can exacerbate mental and physical disabilities, disrupt daily activities, and profoundly impact various aspects of an individual's life.

Methods

Participants and Settings

In 2020, a cross-sectional study was conducted in Shiraz, Iran, to assess the knowledge, attitude, and practice (KAP) of patients with spinal cord injuries regarding secondary complications. Patients with spinal cord injuries were identified through the hospital information system in hospitals affiliated with Shiraz University of Medical Sciences.

Inclusion criteria encompassed individuals aged between 18 and 60 years, a definitive diagnosis of spinal cord injury, a minimum of 2 weeks have passed since the injury, the person being conscious, and the absence of pre-existing problems or complications before the spinal cord injury. Exclusion criteria included individuals below 18 years or above 60 years of literacy, those lacking contact information, patients unwilling to participate, those with incomplete information or forms, limited cooperation ability, and those with concurrent brain injuries.

Following the Tederko et al. study [18] in which a coefficient of 0.31 was reported, and employing G-Power software with a significance level of 0.05 and 95% power, the sample size was determined to be 108 patients. Patients were enrolled in the study after providing informed consent, and the questionnaires were distributed to the participants and subsequently collected.

Designing the Questionnaire

For the development of the questionnaire, a comprehensive review of scientific literature was conducted, from which a checklist of essential points was extracted. Subsequently, the research team designed a questionnaire, which initially encompassed four main areas: 1) demographic and clinical information, 2) knowledge, 3) attitude, and 4) performance. This preliminary draft underwent evaluation by a panel of experts from various disciplines, including two specialists in physical medicine and rehabilitation, an occupational therapist, a physiotherapist, a neurologist, and a neuroscientist. Face validity was assessed regarding question comprehensibility, clarity, and grammatical structure. In contrast, the validity and content value of the questions were evaluated based on their relevance to the ultimate objectives of the scale and the necessity and significance of each item. To assess the questionnaire's reliability, 10 participants were asked to complete the questionnaire twice, with a two-week interval between administrations.

In all the questions, responses were categorized as "yes," "no," and "to some extent," with corresponding scores of 2, 0, and 1 point, respectively. For scoring knowledge and attitude, scores from zero to 10 were classified as weak, 10 to 15 as moderate, and 15 to 20 as desirable.

Regarding performance scoring, scores from zero to 15 were considered weak, 15 to 22 were categorized as moderate, and 22 to 30 were considered optimal.

The study received ethical approval from the local institutional ethics committee under the code IR.SUMS.MED.REC.1398.504. Each participating patient provided informed consent, and their anonymity was ensured by coding questionnaires.

Statistical Analysis

The data analysis was conducted using SPSS software version 24. The analysis process comprised two main parts: descriptive and inferential. The study presented the mean, standard deviation, frequency, and percentage in the descriptive phase. To assess the normality of the data, the Kolmogorov-Smirnov test was employed. Given the non-normal distribution of the data, non-parametric tests were utilized for analysis. In the inferential phase, a comparison of means was performed using a t-test for two groups and an analysis of variance for scenarios involving more than two groups. Correlation tests were employed to explore relationships and a one-way ANCOVA analysis of independent t-tests was also utilized.

Results

According to Table 1, the majority of participants were male and married. Many of them had a diploma-level of education and were currently unemployed. A significant proportion resided in urban areas with their families. The leading cause of SCI among the participants was trauma resulting from accidents, and most of them had experienced vertebral fractures, with surgery performed at the lumbar site in most cases.

According to Table 2, most participants (72.8%) experienced immobility due to gastrointestinal (GI) tract problems. Osteoporosis led to immobility in 93.9% of cases. Urinary tract infections (UTIs) affected 97.2% of the participants and contributed to their bedridden status. Depression was another significant factor, leading to immobility in 98.3% of the participants. Other contributing factors are detailed in Table 2.

According to Table 3, most participants did not consider rehabilitation as part of their treatment. Notably, 99.4% experienced significant complications, even though 97.8% encountered exhaustion during the treatment follow-up. This exhaustion appears to have had implications for their personal lives, with 57.8% of participants experiencing disruptions in their marriage and sex life.

Table 1: Demographic Characteristics of the Participants

Variable	No. (%)
Gender	
Male	134 (74.4)
Female	46 (25.6)
Marital status	
Married	89 (49.4)
Single	91 (50.6)
Educational status	
High school	49 (27.5)

Diploma	76 (42.7)
Associate Degree	11 (6.2)
Bachelor	33 (18.5)
Masters up	9 (5.1)
Occupational status	
Employed	19 (10.6)
Unemployed	160 (89.4)
Living area	
City	161 (89.4)
Village	19 (10.6)
Life situation	
With family	175 (97.2)
Alone	5 (2.8)
The cause of the lesion	
Trauma	162 (90)
Non-trauma	18 (10)
Cause of trauma	
Accident	123 (76.4)
Fall	24 (17.9)
Destruction of the wall	2 (1.2)
Bullets	6 (3.7)
Spinal inflammation	2 (1.2)
Stab	2 (1.2)
Collision of the object	3 (1.9)
Cause of Non-trauma	
Congenital	1 (5.9)
Cyst of the spinal cord	8 (47.1)
Mass in the spinal cord	5 (29.4)
Blood clots in the spinal cord	1 (5.9)
Spinal cord injury in lumbar disc surgery	1 (5.9)
Destruction of intervertebral disc	1 (5.9)
Description complication	
Break vertebra	139 (87.4)
Trauma to the spinal cord	15 (9.4)
Ruptured spinal cord	4 (2.5)
Spinal cord burns	1 (0.6)
Treatment	
Surgery	157 (87.2)
Non-surgical	23 (12.8)
Site of injury	
Cervical	37 (20.8)
Thoracic	11 (6.2)
Lumbar	113 (63.5)
Thoracic and lumbar	12 (6.7)
Cervical and thoracic	5 (2.8)
Refer to a physical medicine and rehabilitation specialist	
Yes	21 (11.7)
No	158 (88.3)
Insurance Satisfaction	
Satisfied	35 (19.4)
Dissatisfied	145 (80.6)
Use of assistive devices	
Yes	172 (95.6)
No	8 (4.4)
Type of assistive device	
Wheelchair	152 (87.9)
Walker	13 (7.5)
Cane	8 (4.6)
Home nurse	
Yes	24 (13.3)
No	156 (86.7)
Satisfaction with access to medical centers	
Satisfied	40 (22.2)
Dissatisfied	140 (77.8)

According to Table 4, nearly half of the participants, 48.3%, turned to the Internet to seek information about their illnesses. Furthermore, 91.7% of participants diligently monitored their skin for redness and other complications. Maintaining a stable weight becomes crucial for health in immobility cases, yet only 61.1% of participants were mindful of their diet and exercise. Additionally, 52.8% of patients managed urinary problems through self-catheterization.

The results of the Kolmogorov-Smirnov test revealed that the total scores for the variables knowledge, attitude, and practice did not follow a normal distribution. As a result, non-parametric tests were employed for correlation measurements. The analysis showed a significant inverse relationship between age and attitude. Specifically, attitude scores decreased by 30.7% of the unit for each year of increasing age. Spearman correlation was used to measure the associations between age and duration.

Table 2: Data regarding the knowledge part of the questionnaire

Question	Yes number (Percentage)	No number (Percentage)	To some extent number (Percentage)
1) Immobility and staying in bed causes the gastrointestinal tract to slow down.	131 (72.8)	2 (1.1)	47 (26.1)
2) Immobility and staying in bed causes osteoporosis.	169 (93.9)	3 (1.7)	8 (4.4)
3) Immobility and staying in bed cause urinary tract infections.	175 (97.2)	2 (1.1)	3 (1.7)
4) Immobility and staying in bed cause blood clots in the veins of the legs.	18 (10)	124 (68.9)	38 (21.1)
5) Immobility and staying in bed cause depression.	177 (98.3)	0 (0)	3 (1.7)
6) Daily movement of the joints is necessary to prevent stiffness.	170 (94.4)	2 (1.1)	8 (4.4)
7) Doing breathing exercises decreases the risk of respiratory infections.	10 (5.6)	163 (90.6)	7 (3.9)
8) Are you aware of the syndrome of overuse of the upper limbs?	3 (1.7)	175 (97.2)	2 (1.1)
9) I know the symptoms of a urinary tract infection.	117 (65)	2 (1.1)	61 (33.9)
10) Immobility and staying in bed causes bladder and kidney stones.	160 (89.4)	1 (0.6)	18 (10.1)

Table 3: Data regarding the attitude part of the questionnaire

Question	Yes number (Percentage)	No number (Percentage)	To some extent number (Percentage)
1) Has the outcome of the rehabilitation measures been effective in improving your life?	59 (32.8)	98 (54.4)	23 (12.8)
2) Do you consider rehabilitation necessary in your treatment process?	69 (38.3)	100 (55.6)	11 (6.1)
3) Are the complications of the disease significant for you?	178 (99.4)	0 (0)	1 (0.6)
4) Is the follow-up and care necessary to prevent complications exhausting?	176 (97.8)	1 (0.6)	3 (1.7)
5) The internet can provide reliable information about my disease.	85 (47.2)	59 (32.8)	36 (20)
6) I am clear in expressing my wishes and problems about medical care.	25 (13.9)	48 (26.7)	107 (59.4)
7) Have you received any useful treatment to reduce neuromuscular pain?	4 (2.2)	148 (82.2)	28 (15.6)
8) My condition has disrupted marriage and sex.	104 (57.8)	18 (10)	58 (32.2)
9) I am interested in learning about complications and self-care.	178 (99.4)	0 (0)	2 (1.1)
10) Which type of rehabilitation services has had the most impact?	Inpatient 3 (1.7)	Outpatient 77 (42.8)	Home 100 (55.6)

Table 4: Data regarding the practice part of the questionnaire

Question	Yes number (Percentage)	No number (Percentage)	To some extent number (Percentage)
1) Do you use the Internet to learn about your illness?	87 (48.3)	63 (35)	30 (16.7)
2) Do you have contact with other spinal cord injury patients?	96 (53.3)	30 (16.7)	54 (30)
3) Have you adapted your home appliances and equipment to your circumstances?	47 (26.1)	100 (55.6)	33 (18.3)
4) Every once in a while, I check the skin for redness or possible wounds.	165 (91.7)	2 (1.1)	13 (7.2)
5) I drink one to two liters of fluids daily.	138 (76.7)	42 (23.3)	0 (0)
6) If the smell or color of urine changes, I will give a urine test.	34 (18.9)	146 (81.1)	0 (0)
7) I take my prescribed medications regularly.	45 (25)	53 (29.4)	82 (45.6)
8) Every 2 hours, I move on a chair, wheelchair, or bed.	172 (95.6)	1 (0.6)	7 (3.9)
9) If I do not control urination, I will treat perineal skin allergies.	178 (98.9)	0 (0)	2 (1.1)
10) I move my joints several times daily to prevent stiffness.	174 (96.7)	2 (1.1)	4 (2.2)
11) By observing diet and exercise, I am careful not to gain weight.	110 (61.1)	42 (23.3)	28 (15.6)
12) If there is a physical problem, I will see a doctor.	56 (31.1)	99 (55)	25 (13.9)
13) I am careful not to hit my feet when moving.	176 (97.8)	1 (0.6)	3 (1.7)
14) In constipation, I use more fluids/fiber/laxatives.	128 (71.9)	38 (21.3)	12 (6.8)
15) Urine drainage method			
	A: I catheter myself		95 (52.8)
	B: I am having a catheter with the help of another person		35 (19.4)
	C: I use Pampers		14 (7.8)
	D: I use the bedpan.		19 (10.6)
	E: I use a permanent catheter.		17 (9.4)

Table 5: Relationship between Age, Duration, Sex, and Education with Knowledge, Attitude, and Practice

		Knowledge	P value	Attitude	P value	Practice	P value
Age*		0.002	0.976	-0.307	<0.0001	-0.097	0.196
Duration*		-0.061	0.419	0.098	0.190	0.014	0.851
Sex†	Female	14.260±1.993	0.004	12.130±2.761	0.293	20.065±4.040	0.76
	Male	13.425±1.656		11.738±2.310		19.268±3.266	
Education†	1	13.302±1.736	0.003	10.868±2.499	<0.0001	18.460±3.488	<0.0001
	2	13.326±1.599		12.163±2.211		18.877±2.521	
	3	13.636±2.460		12.363±1.689		21.545±4.033	
	4	14.484±1.622		12.818±2.113		21.030±3.107	
	5	15.000±1.581		13.888±1.615		23.555±2.455	

*Correlation; †Mean±Standard Deviation

There was no statistically significant relationship between the duration and knowledge, attitude, and practice, except for a negative correlation with knowledge. On the other hand, a significant relationship was observed between education levels and knowledge, attitude, and practice, as determined by the Kruskal-Wallis test. More details can be found in Table 5. Moreover, knowledge exhibited a significant relationship with gender, with females having higher knowledge levels, as measured by the Mann-Whitney test.

Discussion

This study aimed to assess the knowledge, attitude, and practice of patients with spinal cord injuries regarding secondary complications. Data were collected using a questionnaire designed by the researchers.

Patients in this study frequently underwent surgery but did not consult a physical medicine and rehabilitation specialist. The most prevalent complications included urinary tract problems, joint stiffness, muscle spasms, and pain. Secondary complications are an inherent aspect of this issue. Individuals with spinal cord injuries may live for many years with these complications, enduring pain and hardship. Thus, individuals and healthcare providers must enhance their knowledge, attitude, and practice. Evaluating these aspects in patients was the primary goal of this study.

The mean score for knowledge in this study was 84.12±4.2, falling within the moderate range according to the classification. Notably, 82.8% of the participants exhibited a moderate level of knowledge. It's important to consider that each individual with these complications may experience one or more of them, meaning they likely have some awareness of the complications they are dealing with or at the very least, the specific complication they are experiencing. Knowledge can be acquired through personal study, consultation with medical professionals healthcare providers, or shared experiences with peers.

A study conducted by Tharu in 2018, which focused on the Knowledge, Attitude, and Practice (KAP) among caregivers regarding pressure ulcers in spinal cord injury patients at a rehabilitation center in Bangladesh, reported a moderate level of knowledge among caregivers. It's worth noting that this study specifically addressed pressure ulcers as a secondary complication from the caregivers' perspective [19].

Thietje et al., in a 2011 study, found that most participants had achieved satisfactory knowledge, but their knowledge was primarily related to pressure ulcers and urinary tract diseases. Interestingly, the study revealed that less than 50% of patients with neurological impairments possessed good knowledge about bladder management and pressure ulcers [20].

In a study conducted by Schottler et al. in 2010 in the United States, it was reported that patients and caregivers had poor knowledge regarding the severity of injuries in young individuals with spinal cord injuries [21]. This variance in knowledge levels might be attributed to differences in the type of educational programs available to patients, patient behaviors, or variations among communities. It's important to recognize that inadequate knowledge and misconceptions about the disease can lead to increased anxiety and an insufficient understanding of the potential consequences of the condition.

Previous research has explored the relationship between various factors concerning patients' knowledge and practices, such as individual, social, situational, and environmental characteristics, as well as patient education and the physician-patient relationship [22]. These studies have confirmed that patients who are well-informed about their disease status and how to care for themselves tend to have higher levels of engagement with their healthcare team and are more actively involved in care programs. Increasing patients' knowledge not only fosters a sense of responsibility for self-care but also serves as motivation to address weaknesses and challenges. Information and knowledge are crucial in empowering individuals to take charge of their health [23].

The mean attitude score in this study was 13.63±1.78, classifying it as moderate. A majority of the participants, 63.3%, also exhibited moderate attitudes. It's worth noting that Bhombian et al., in 2010, conducted a study on athletes in Paralympic sports with spinal cord injuries, particularly focusing on their attitudes towards autonomic dysreflexia. The study's results described the athletes' attitudes as undesirable, highlighting the need to foster more positive attitudes among these individuals [24]. It's important to acknowledge that the discrepancy in results between these two studies may stem from differences in the specific complications under investigation.

Patients living with spinal cord injuries should accept their condition and realize that they still possess the capacity to adapt and embrace their remaining abilities. They must accept that certain aspects of life are beyond

their control, and adapting to a new way of life is part of the journey. Seeking counseling services can be immensely valuable in helping individuals change their attitudes and come to terms with their circumstances [25].

The mean score for practice in this study was 21.5 ± 3.68 , indicating a moderate level according to the classification. Approximately 66.1% of the participants assessed their performance as moderate. In 2018, Taro reported similar findings of a moderate level of performance among caregivers dealing with pressure ulcers in patients with spinal cord injuries at a rehabilitation center in Bangladesh, which is in line with the results of the current study [19]. However, Wong et al. reported favorable performance by medical staff in managing obesity in individuals with spinal cord injuries [26]. This difference between their study and our data may be attributed to variations in the types of participants involved, with the former study focusing on patients and caregivers while the latter involved medical staff.

Significant differences in knowledge were observed concerning demographic variables such as gender, education, and occupation. Knowledge levels were higher in individuals with postgraduate education and above compared to other groups. This might be attributed to their higher educational attainment, greater exposure to reading books, or access to valuable information through articles or social media. Additionally, employed individuals exhibited higher awareness compared to the unemployed.

Individuals with postgraduate education and above also displayed more positive attitudes and better practices than individuals in other educational groups. This finding aligns with the results of Tharu's study [19].

There was a significant correlation between attitude scores and age, with older individuals tending to have more positive attitudes. This positive attitude might be due to their higher experience than younger individuals. However, age was not correlated with knowledge, which was inconsistent with the results of a study by Schottler et al. (2010). This inconsistency may be due to differences in the study's sample [21].

The results of the study by Bhambhani et al. in 2010 did not show age-related effects, which aligns with the present study regarding the relationship among age, knowledge, and practice but differs in attitude. This difference might be attributed to variations in the types of complications studied [24].

A weak and direct correlation was observed between attitude and knowledge scores, suggesting that increasing knowledge scores leads to a slight increase in attitude scores. However, this relationship is relatively small, and further studies are needed to form a definitive conclusion. A direct and moderate correlation was found between attitude and practice (0.46), indicating that a more positive attitude is associated with better performance. Patients who believe certain treatments and methods can reduce complications are more likely to use them, resulting in better performance. Tharu et al. [19] reported a relationship between knowledge and attitude in their study. They also found a relationship between knowledge and practice, consistent with the present study. However, they reported no relationship

between attitude and practice, which contradicts the results of the current study. This discrepancy may be due to the difference in study subjects, as this study focused on patients, whereas Taro et al.'s study was conducted on caregivers. Ultimately, there was no correlation between knowledge and practice. Individuals may have good awareness of potential side effects, but their physical condition due to spinal cord injury may limit their ability to act appropriately. Knowledge can be acquired in various ways, while performance is influenced by the limitations and disabilities resulting from spinal cord injury, potentially explaining the lack of a strong connection between the two.

The results indicate that over 90% of patients were knowledgeable about the negative consequences of immobility and bed rest, recognizing their association with depression (98.3%), urinary tract infection (97.2%), osteoporosis (93.9%), and joint stiffness (94.4%). This awareness aligns with the findings of Ebrahimi et al., who observed that spinal cord amputees experienced more symptoms and higher rates of depression [27]. The participants also understood the risks of bladder and kidney stones (89.4%) and slow gastrointestinal tract function due to immobility and bed rest (72.8%). Furthermore, 65% of the subjects were familiar with the symptoms of urinary tract infections. This comprehensive awareness is promising, as it equips them with the knowledge needed to implement training programs or strategies to mitigate these complications.

However, there were areas of limited awareness among the participants. Notably, 97.2% of them were unaware of upper extremity overuse syndrome. Additionally, 90.6% were not informed about the benefits of respiratory exercises in preventing respiratory infections. Almost 69% of the participants did not know immobility could lead to deep vein thrombosis in the legs.

The results indicate that a high percentage of participants understood the importance of disease complications, with 99.4% recognizing their significance. Furthermore, 98.9% expressed a strong interest in acquiring information about these complications and self-care. This level of interest and positive attitude is quite promising, as it suggests that these individuals can be active and engaged partners in their treatment, prevention, and care. However, a substantial proportion (97.8%) found the follow-up and care necessary to prevent exhausting complications. Notably, 57.8% believed their condition disrupted their marriage and sex life. While this belief is understandable given the significant impact of spinal cord injury on their abilities and daily life, it highlights the importance of psychological and psychoanalytical support in addition to their rehabilitation efforts. Building self-confidence and personal skills is crucial to addressing their lives' emotional and relational aspects.

The findings revealed concerning beliefs among the participants. A significant proportion (82.2%) did not believe they received effective treatment for reducing neuromuscular pain. This belief is alarming and suggests potential issues with their received treatment. It could indicate the severity of their complications or the inadequacy of current treatment approaches. Addressing

this issue is vital, as effective pain management is crucial for their well-being.

Furthermore, 55.6% of participants did not believe that rehabilitation was necessary for their treatment, and 54.4% did not think rehabilitation measures were effective in improving their lives. This indicates a need for more comprehensive education and motivation. It could be due to a lack of awareness about the benefits of rehabilitation, the type of services offered, or negative experiences. It may also reflect a lack of time and patience devoted to these services, as rehabilitation often requires ongoing and consistent effort.

Interestingly, 55.6% of participants believed home-based rehabilitation services were more effective. This suggests that problems and complications may be less severe for some compared to those who have received inpatient services.

The findings of the present study indicate that 98.9% of individuals were attentive to perineal skin sensitivity if urine was not controlled; 97.8% took precautions to avoid injuring their feet when moving; 96.7% engaged in joint movement multiple times a day to prevent contractures; 95.6% moved to a chair, wheelchair, or bed every 2 hours; and 91.7% periodically checked their skin for redness or potential sores. Furthermore, 76.7% of participants consumed one to two liters of fluids daily, and 71.9% adjusted their fluid, fiber, and laxative intake when dealing with constipation. Moreover, 61.1% of participants were mindful of their weight through diet and exercise. These results suggest that most participants possess good knowledge and practices regarding self-care measures. As a result, interventions focusing on fluid intake and strategies to prevent constipation through dietary adjustments or the use of laxatives should be universally encouraged due to their ease of use and effectiveness.

53.3% of the participants communicated with others suffering from spinal cord injuries. Peer communication represents a form of social support in which group members exchange experiences regarding their shared condition, forming a close-knit support network [28]. Consequently, individuals with similar experiences provide valuable strategies to one another, some of which healthcare professionals may not even know [29]. Through this interaction, they can acquire information about their condition, better manage their health, and take steps toward recovery [18]. A successful peer can share their weaknesses, strengths, and personal experiences with fellow patients at a minimal cost compared to healthcare services [30 Ref 31????]. Therefore, efforts should be made to foster connections among these patients and introduce them to one another.

Furthermore, 47.2% of the participants believed that the Internet could be a reliable source of information about their condition, and 48.3% actively utilized the Internet to gain insights into their disease. In today's interconnected world, the proliferation of communication and the ease of accessing information contribute to expanding knowledge and enhancing individuals' attitudes. Given the accessibility and utility of online information, patients should be encouraged to explore this avenue. The

online space also presents an opportunity for healthcare policymakers to increase awareness and motivation, helping to prevent the spread of erroneous information and unsubstantiated rumors from non-scientific sources. Online platforms can be effectively guided and monitored by universities and ministries. Moreover, websites and applications that enable therapists to engage with patients remotely offer significant advantages by eliminating the need for physical transportation, reducing fuel consumption, and minimizing wait times, all while requiring fewer family members' involvement.

Various approaches can be pursued to attain the objectives mentioned above, with self-management being one of the key methods. The self-management program constitutes a critical component of rehabilitation, where all aspects of patient care and treatment are designed to empower the patient, enabling them to play a central role in achieving maximal independence, making self-informed decisions, enhancing the quality of life, and improving overall health based on their capabilities and lifestyle. This approach reduces patients' reliance on healthcare professionals and other family members, curbing the expenses of frequent hospitalizations and helping alleviate the undue strain on hospital resources and bed occupancy [18].

Hence, the initial step toward achieving this objective involves assessing patients' knowledge, attitudes, and practices regarding secondary complications. This foundational data can serve as the basis for developing future educational programs tailored to the needs of these patients.

Conclusion

Based on this study's findings, knowledge, attitude, and practice concerning the risk of spinal cord injury were at a moderate level. There was a significant association between education and knowledge, attitude, and practice scores. Postgraduate patients, employed individuals, and women had higher minimum knowledge scores. Graduate patients, employed individuals, married individuals, and urban residents had higher minimum attitude scores. Postgraduate individuals exhibited the best practice compared to other educational groups, and practice scores were higher in urban residents than rural dwellers.

Given the multitude of challenges that individuals and their dependents with this condition face, there is a pressing need to enhance their levels of knowledge, attitude, and practice. Enhancements in each of these aspects can profoundly impact these individuals' mental and psychological well-being. It can lead to a deeper understanding, more positive attitudes, and improved practices for addressing potential secondary complications. As a result, they may exert more effort to manage their complications effectively and prevent developing more serious issues.

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Attachments

1. Personal information

First and last name			National Code		
Age		Year	Education		Year
Gender	Man	Woman	Job	Unemployed	Employed
Marital status	Single	Married	Location	Village	Town
Number of children			Phone number		
Live with			Address		

2. Spinal cord injury

Lesion event date			Have you seen a physical medicine and rehabilitation specialist?	Yes	No
Duration of hospitalization in the spine surgery ward			Referral to a physical medicine and rehabilitation specialist by:	The same doctor	Another doctor
Release date			Outpatient Rehabilitation - How Long?	Yes	No
Cause of the lesion	Trauma	Non-trauma	Inpatient Rehabilitation - how long?	Yes	No
Description			Insurance support	Satisfied	dissatisfied
Type of lesion	Complete	incomplete	Use of assistive devices	Yes	No
	Paralysis of the legs		Do you have a nurse at home?	Yes	No
	Paralysis of all four limbs				
Treatment for spinal cord injury	Non-surgical	surgery	Access to medical centers	Satisfied	dissatisfied
Lesion at what level of the spine? (Neck - thoracic -lumbosacral) - mention the surface					
Description:					

3. Knowledge, Attitude, and Practice Questionnaire

1- Knowledge

1) Immobility and staying in bed causes the gastrointestinal tract to slow down.	Yes	No	To some extent
2) Immobility and staying in bed causes osteoporosis.	Yes	No	To some extent
3) Immobility and staying in bed cause urinary tract infections.	Yes	No	To some extent
4) Immobility and staying in bed cause blood clots in the veins of the legs.	Yes	No	To some extent
5) Immobility and staying in bed cause depression.	Yes	No	To some extent
6) Daily movement of the joints is necessary to prevent stiffness.	Yes	No	To some extent
7) Doing breathing exercises decreased the risk of respiratory infections.	Yes	No	To some extent
8) Are you aware of the syndrome of overuse of the upper limbs?	Yes	No	To some extent
9) I know the symptoms of a urinary tract infection.	Yes	No	To some extent
10) Immobility and staying in bed causes bladder and kidney stones.	Yes	No	To some extent

2- Attitude

1) Has the outcome of the rehabilitation measures been effective in improving your life?	Yes	No	To some extent
2) Do you consider rehabilitation necessary in your treatment process?	Yes	No	To some extent
3) Is the complications of the disease significant for you?	Yes	No	To some extent
4) Is the follow-up and care necessary to prevent complications exhausting?	Yes	No	To some extent
5) The internet can provide reliable information about my disease.	Yes	No	To some extent
6) I am clear in expressing my wishes and problems about medical care.	Yes	No	To some extent
7) Have you received any useful treatment to reduce neuromuscular pain?	Yes	No	To some extent
8) My condition has disrupted marriage and sex.	Yes	No	To some extent
9) I am interested in learning about complications and self-care.	Yes	No	To some extent
10) Which type of rehabilitation services has had the most impact?	Inpatient	Outpatient	Home

3- Practice

1) Do you use the Internet to learn about your illness?	Yes	No	To some extent
2) Do you have contact with other spinal cord injury patients?	Yes	No	To some extent
3) Have you adapted your home appliances and equipment to your circumstances?	Yes	No	To some extent
4) Every once in a while I check the skin for redness or possible wounds.	Yes	No	To some extent
5) I drink one to two liters of fluids daily.	Yes	No	
6) If the smell or color of urine changes, I will give a urine test.	Yes	No	
7) I take my prescribed medications regularly.	Yes	No	To some extent
8) Every 2 hours I move on a chair, wheelchair, or bed.	Yes	No	To some extent
9) If I do not control urination, I will take care of perineal skin allergies.	Yes	No	To some extent
10) I move my joints several times during the day to prevent stiffness.	Yes	No	To some extent
11) By observing diet and exercise, I am careful not to gain weight.	Yes	No	To some extent
12) If there is a physical problem, I will see a doctor.	Yes	No	To some extent
13) I am careful not to hit my feet when moving.	Yes	No	To some extent
14) In case of constipation, I use more fluids/fiber/laxatives.	Yes	No	To some extent
15) Urine drainage method			

- A: I catheter myself
- B: I am having a catheter with the help of another person
- C: I use pampers
- D: I use the bedpan.
- E: I use a permanent catheter.