

ORIGINAL ARTICLE

Association of pain, social support and socioeconomic indicators in patients with spinal cord injury in Iran

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Study design: Descriptive cross-sectional study.

Objectives: Pain is a prevalent complication of individuals with spinal cord injury (SCI). Our objective was to examine the association between social support, socioeconomic factors and psychosocial factors and pain to develop more effective management strategies.

Setting: Brain and Spinal Cord Injury Research (BASIR) Center, Tehran University of Medical Sciences, Tehran, Iran.

Methods: The Persian version of the Brief Pain Inventory was used to measure the pain, and the Multidimensional Scale of Perceived Social Support was used to measure social support through structured face-to-face interviews in SCI individuals.

Results: The overall prevalence of pain was 50.7%; 79.3% of individuals had bilateral pain, with lower limbs and back being the most common location. The quality of pain was described as aching (41.4%), tingling (32.9%), pressure (15.7%), coldness (5.7%) and feeling electric shock sensations (4.3%). The frequency of pain in individuals with paraplegia (60.9% vs 45.7%) and incomplete (53.5% vs 52.5%) SCI was higher than with other types of neurological injuries. Patients with a medium level of education had the least pain and those with good economic situation reported higher frequency of having pain ($P=0.034$). There was no significant relationship between pain and social support. There was a positive correlation between pain and impairment of mood, normal work, relations with other people and lack of sleep ($P<0.001$).

Conclusion: These novel findings will inform the development of strategies to manage pain by improving access to health-care facilities and supplies.

Spinal Cord (2017) **55**, 180–186; doi:10.1038/sc.2016.160; published online 6 December 2016

INTRODUCTION

Spinal cord injuries (SCIs) can be devastating to patients,¹ with potential life-long effects, and are associated with increased risk for psychological disorders,^{2,3} lower quality of life,⁴ spasticity⁵ and pain. Pain associated with SCI is related to impairments in daily activities,^{1,6} low quality of life,⁷ depression, anger and poor adjustment, anxiety and sleep⁵ and mood disorders.¹

Chronic pain is one of the common problems associated with SCI, with approximately 60–80% of individuals with SCI experiencing chronic pain,⁸ and 45% of these individuals indicated that they needed help with this problem.⁹ The pain usually starts within the first 6 months after injury and is typically resistant to treatment.⁹

Various pain classification schemes for SCI have been introduced in the literature.⁷ Within these, two broad categories exist: (1) nociceptive pain caused by thermal, mechanical or chemical stimuli, which may be experienced as aching or dull pain, and (2) neuropathic pain, defined as progressive pain that occurs as an exact consequence of a disease or lesion involving the nervous system.¹⁰

Although it has been established that pain intensity is related to demographic factors, including age, age at time of injury and gender,¹¹ as well as pathological variables such as the completeness of SCI and the level of injury,^{5,12} many researchers now believe that the

bio-psychosocial perspective may provide a better understanding of pain in SCI.¹³

As an alternative to the previous simple biological models of pain that only regarded physical characteristic of pain such as intensity or traits of injury, these newer models have improved ability to estimate pain levels and behavioral responses to chronic pain. Such models of pain represent the biological, psychological, such as coping and adjustment strategies and also feeling about the pain or injury (for example, catastrophizing vs acceptance), and social aspect containing socioeconomic and social support, and thus a better multidisciplinary management and optimal health outcome will be obtained.

Social support is an exchange of resources between individuals in social networks suggested to improve overall well-being. In individuals with SCI, social support is associated with improved physical and mental health, lower pain, more effective coping, superior adjustment and higher life satisfaction.¹⁴ Various forms of social support can be described from different perspectives (that is, quantity and quality),¹⁵ types (emotional, informational and instrumental) and sources that we study about (including family, friends and significant others).

Social support also seems to be related to pain and behavior.¹⁵ For example, perceived social support may act as a factor that prevents depression, reduces pain intensity and improves activity levels.¹⁶

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Received 12 January 2016; revised 14 July 2016; accepted 15 July 2016; published online 6 December 2016

Although many studies have examined the clinico-pathological factors and demographic parameters of SCI and pain, there are few publications that explored the association of socioeconomic and especially social support with pain. Many studies have investigated relation between pain and psychosocial parameters such as beliefs,^{17,18} acceptance^{19,20} or coping strategies^{6,17} or social skills^{14,21} but not social support; in cases that included social support,^{22,23} they were not in SCI individuals. In Iran, it is important to examine pain based on the differences in terms of health-care system, socio-political, cultural factors, traditional religious medicine, inadequate government policies and budgetary constraints. Therefore, this study intended to evaluate the relationship between pain and demographic, clinico-pathological, socioeconomic and social support in individuals with SCI in Iran.

MATERIALS AND METHODS

The participants were individuals with SCI referred to Brain and Spinal Cord Injury Research Center (BASIR), Tehran University of Medical Sciences, a tertiary referral center for outpatient rehabilitation with patients from all over Iran between 2012 and 2013. The inclusion criteria were as follows: persons aged >18 years who suffered from a SCI and who were subsequently referred to a rehabilitation center. There was no limitation with respect to co-morbid psychiatric diseases or any other criteria. There were 140 participants including 101 men (72%) and 39 women (28%). The mean age was 29.4 ± 7.9 years, mean age at time of SCI was 25.5 ± 8.3 years and the duration of SCI was 46.3 ± 46.5 months, with a median of 29.5 months (Table 1).

Study methods

This cross-sectional study was part of a larger project approved by the Ethics Committee of the Tehran University of Medical Sciences. The participants were given thorough explanation of the study and written informed consent was obtained. Further clarification was given throughout the interview as needed. Interviews of approximately 30 min in duration were completed in the BASIR clinic while participants were waiting for physicians or treatment providers. Data were collected by means of structured face-to-face interviews and by trained interviewer only from patients. Information about social support was gathered by talking to the patients alone to avoid causing shame and to make them respond easily. The first part of the interview comprised of demographic and clinico-pathological questions related to age, sex, education level, marital status, completeness of neurological injury, level of injury (tetraplegia or paraplegia) and cause of injury.

Measures

Pain intensity. We used the Persian version of the Brief Pain Inventory²⁴ to measure the pain level, quality, pattern, duration and location and the degree to which pain has affected daily activities during the past week. Scores on the Brief Pain Inventory range from 0 to 10, with higher scores indicating greater pain interference with respect to activities of daily living. Participants were asked to rate their average pain intensity during the past week on a 0–10 NRS (numeric rating scale), with 0 corresponding to ‘no pain’ and 10 indicating ‘pain as bad as it could be’ (the worst pain the patient has ever experienced). Scores in the range of 1–4 were considered ‘mild’ intensity, 5 and 6 represented ‘moderate’ pain and 7–10 were categorized as ‘severe’ pain intensity. Also patients were asked to score the interference or disturbance of pain in their normal work and activity, mood and relation with others.

Education level was divided into the following three categories: low, persons with 0–8 years; medium, persons with 9–12 years; and high level, those with >12 years of education. Number of years was used in light of the fact that this quantity is more easily interpreted by all readers as opposed to levels or degrees that may vary by location or profession. Patients also asked about the availability of appropriate facilities, such as suitable wheelchairs, urinary catheters, anti-bedsores mattresses and diapers. We used availability of facilities as a measure of economic situation. The participants who had all of these amenities were categorized as good economic situation; those who had only a wheelchair in addition to urinary catheters or diapers were categorized as moderate economic situation; and those who had only a wheelchair and

Table 1 Demographic and clinico-pathological characteristics of participants

		Median (interquartile range)
Age (years)	29.4 ± 8.3	28 (24–32)
Age at the time of injury (years)	25.5 ± 7.9	24 (19–30)
Duration of injury (months)	46.7 ± 29.5	29.5 (13–61.5)
Worst pain	6.6 ± 2.8	5–10
Least pain	3 ± 1.2	5–10
Average pain	5 ± 2.2	3–7
<i>How, during the past 24 h, pain has interfered with your</i>		
Relation with other people	2.5 ± 3.1	0–5
Mood	2.7 ± 3.2	0–5
Walking ability	3.5 ± 3.3	0–6
Normal work	2.3 ± 3.1	0–5
General activities	3.6 ± 3.3	0–6.7
Sleep	3 ± 3.2	0–6
Sex		
Male	101 (72%)	
Female	39 (28%)	
Marital status		
Single	68 (48.9%)	
Married	69 (49.6%)	
Widow	1 (0.7%)	
Separated	1 (0.7%)	
Level of injury		
Paraplegia	93 (66.4%)	
Tetraplegia	47 (33.6%)	
Completeness		
Incomplete	72 (54.5%)	
Complete	60 (45.5%)	
Cause of injury		
Crash injury	92 (69.2%)	
Falling	27 (20.3%)	
Sport injuries	5 (3.8%)	
Occupational injuries	6 (4.5%)	
Others	3 (2.4%)	
Education level, years		
0–8	45 (33.1%)	
9–12	70 (51.5%)	
>12	21 (15.4%)	

inadequate access to diapers or urinary catheters were categorized as poor economic situation.

Pain interferences. We included several variables to measure impairment of general activities, including walking ability, normal work, relation with other people and sleep. We used the above-mentioned variables based on the previous scales including pain scale based on the visual analog scale range from 0 to 10, with higher scores indicating greater impairment in their activities.

Social support. Social support was measured using the Multidimensional Scale of Perceived Social Support,²⁵ a 12-question multiple choice inventory, to evaluate the presence of different categories of support. Each item was scored using a Likert scale ranging from 1 (very strongly disagree) to 7 (very strongly

Table 2 Quality, pattern, duration and location of pain

	Frequency
<i>Having pain</i>	
No	68 (49.3%)
Yes	70 (50.7%)
<i>Quality of pain</i>	
Aching	29 (41.4%)
Tingling	23 (32.9%)
Pressure	11 (15.7%)
Coldness	4 (5.7%)
Feeling electric shock	3 (4.3%)
<i>Alternating pattern of pain</i>	
Always	30 (42.9%)
No pattern	13 (18.6%)
1–3 days a month	11 (15.7%)
1–2 days a week	9 (12.9%)
3–6 days a week	7 (10.0%)
<i>Duration of pain</i>	
Not specified	23 (33.3%)
A few days	7 (10.1%)
Several times in a day	8 (11.6%)
Several times	12 (17.4%)
5 min to 1 h	14 (20.3%)
< 5 min	5 (7.2%)
<i>Location of pain</i>	
Upper arm	12 (17.1%)
Neck/shoulders	7 (10%)
Elbow	7 (10%)
Forearm	7 (10%)

agree). The source of support, with regard to responses, was further divided into family, friends and other persons important to the patient's social support.

Statistical analyses

Some questions were not answered by patients, so there were some missing data; but these data were not included in analysis. SPSS software version 18 (SPSS Inc, Chicago, IL, USA) was used for statistical analysis. The distribution of data was evaluated using the one-sample Kolmogorov–Smirnov test. Either Student's *t*-test or a Mann–Whitney test was used for analysis of continuous variables between two groups. The association of categorical variables was evaluated by Chi-square or Fisher's Exact *T*-test as appropriate. Correlation of continuous variables was assessed by Spearman's correlation. Continuous variables were presented as mean ± s.d., and categorical variables were presented as frequency (percent). The significance level was set at $\alpha \leq 0.05$ representing 95% confidence. Wherever data were missing, it was excluded from analysis.

RESULTS

The response rate was 97.2% (140 out of 144). The socio-demographic information and clinico-pathological characteristics of participants are shown in Table 1.

Ninety-three participants were paraplegic (66.4%), and 72 had incomplete lesions (54.5%). The most common causes of SCI were motor vehicle crash (69.2%) and falls (20.3%). Seventy participants had pain (50.7%), of which 79.3% had bilateral pain; the most common site of pain was the lower limbs and back, and the least common location was the pelvis or anus. Pain in the upper limbs was

rarely reported. The frequency of pain was greater in paraplegic individuals compared with that in tetraplegic individuals and was higher in individuals with incomplete SCI vs those with complete SCI, although these relationships were not significant (Table 3). The quality of pain was described as aching (41.4%), tingling (32.9%), pressure (15.7%), coldness (5.7%) and electric shock sensations (4.3%). The most common pattern of pain was 'always' (42.9%) and the least common form was 'no pattern'. The most common locations of pain were in the knees (50%), shins (45.7%), calves (42.9%), feet (41.4%), ankles (38.6%) and lower back (31.4%). The quality, pattern, duration and location of pain have been shown in Table 2. The mean scores for average pain, least pain and worst pain have been shown in Table 1.

There were no relationships observed between pain and gender, marital status, level of injury and completeness of neurological deficit (Table 3). There were no significant differences in mean least and average pain between individuals with paraplegia and tetraplegia. The mean score of worst pain in tetraplegic individuals was significantly higher than in paraplegic individuals (4.6 ± 3.9 vs 3.2 ± 3.7 , $P = 0.036$).

With respect to socio-demographic factors, there was a relationship between pain and education level and also access to facilities and supplies. In people with SCI who had education level of 0–8 years, pain was significantly higher than in people with SCI with education level of > 12 years (64.4% vs 57.1%) and higher than in individuals with medium level (64.4% vs 41.4%). In other words, those with a medium level of education had the least amount of pain. Again those with medium level of access to facilities and supplies reported lower frequency of having pain in comparison to two other levels ($P = 0.034$; Table 3).

There was no correlation between pain and age or age at the time of SCI. Duration of SCI had a negative correlation with worst pain ($r = -0.192$, $P = 0.024$). There was no relationship between pain and social support. There was positive correlation between pain and impairment of mood, normal work, relations with other people and poor sleep habits ($P < 0.001$; Table 4).

DISCUSSION

Pain prevalence

Our study showed that the prevalence of having pain was 50.7%, which was similar to another study with prevalence in the range of 50–80%.¹⁵

Pain duration and pattern

Most of the participants in the present study reported duration and pattern of pain as 'always', whereas the second most common pattern was 'no pattern'. This most common pattern was similar to one study.¹⁰ Rintala *et al.*⁵ reported that more than half of the patients experienced pain that was rhythmic, periodic or intermittent. Our study showed that the duration of injury had a negative correlation with worst pain. One study reported that individuals with early onset (within first 6 months) of pain had significantly higher pain intensity generally in all categories,⁹ although another survey found an insignificant relation.¹²

These different results could be due to the different causes of injury in our study or due to the differences in classifications as we did not divide the pain into different types, such as neuropathic or musculoskeletal. Indeed some studies showed that below-the-level neuropathic pain usually presents for the first time ≥ 2 years following the initial injury.²⁶

Table 3 Relationship between having pain and clinico-pathological and socioeconomic characteristics of participants

	Pain frequency	P-value ^a
	Yes	
Sex		
Male	49 (49.0%)	0.511
Female	21 (55.3%)	
Level of injury		
Paraplegia	42 (60.9%)	0.092
Tetraplegia	28 (45.7%)	
Completeness		
Incomplete	38 (53.5%)	0.911
Complete	31 (52.5%)	
Marital status		
Single	33 (49.3%)	0.668 ^b
Married	37 (53.6%)	
Separated	0 (0%)	
Education level, years		
0-8	29 (64.4%)	0.047
9-12	29 (41.4%)	
> 12	12 (57.1%)	
Access to facilities and supplies		
No	25 (43.9%)	0.034
Medium	4 (28.6%)	
Yes	41 (61.2%)	

^aChi-square test.
^bFisher's exact test.

Quality of pain

In describing the quality of pain, the present study found some similarities and differences compared with those in previous studies. We found that the most frequent word for describing quality was 'aching', similar to Turner *et al.*,⁹ whereas this was the second most common type in two other surveys.^{7,27} The most common quality in other studies was burning.^{7,10,12,27} We assume this difference was a consequence of variations in the perception or description of pain in different cultures and because participants may have reported more than one type of pain simultaneously.

In our study, the type of pain was not categorized, which could also be a reason for different results compared with that in other studies. Typically, the term 'burning' is used for neuropathic or neurogenic type of pain, whereas 'aching' applies to the musculoskeletal nociceptive type of pain, although these descriptors were not used in our study.

Location of pain

In 79.3% of respondents, the pain location was bilateral, and the most common locations were the lower limbs, including the knee (55.7%), shin and calf (52.9%) and the lower back (31.4%). The anus and pelvis were the least common sites. Most participants reported pain in more than one area. As we noticed in nearly all of the reviewed studies, the two most common sites of pain were also the lower limbs and back.^{6,7,10,11,28} The least common sites in some cases were the

Table 4 Correlation of average, little and worst pain with other continuous variables

	Worst pain	Least pain	Average pain that is irritating
Age			
<i>r</i>	0.006	0.026	-0.034
<i>P</i>	0.949	0.764	0.695
Duration of SCI			
<i>r</i>	-0.192*	-0.080	-0.132
<i>P</i>	0.024	0.353	0.126
Social Support Score			
<i>r</i>	-0.051	-0.035	-0.026
<i>P</i>	0.553	0.687	0.768
Social Support Score (family)			
<i>r</i>	-0.056	-0.036	-0.053
<i>P</i>	0.518	0.679	0.543
Social Support Score (friends)			
<i>r</i>	-0.055	-0.075	-0.041
<i>P</i>	0.522	0.386	0.637
Social Support Score (important person)			
<i>r</i>	0.021	0.085	0.035
<i>P</i>	0.805	0.324	0.683
Impairment of general activities			
<i>r</i>	0.646**	0.605**	0.618**
<i>P</i>	<0.0001	<0.0001	<0.0001
Impairment of mood			
<i>r</i>	0.454**	0.638**	0.569**
<i>P</i>	<0.0001	<0.0001	<0.0001
Impairment of walking ability			
<i>r</i>	0.635**	0.666**	0.636**
<i>P</i>	<0.0001	<0.0001	<0.0001
Impairment of normal work			
<i>r</i>	0.502**	0.540**	0.524**
<i>P</i>	<0.0001	<0.0001	<0.0001
Impairment of relation with other people			
<i>r</i>	0.483**	0.605**	0.582**
<i>P</i>	<0.0001	<0.0001	<0.0001
Impairment of sleep			
<i>r</i>	0.533**	0.607**	0.587**
<i>P</i>	<0.0001	<0.0001	<0.0001

Abbreviation: SCI, spinal cord injury. Spearman's rho correlation. *Denotes $P < 0.05$ and **Denotes $P < 0.01$.

upper limbs and the head.^{7,12} Few papers had different results, such as reporting shoulder or back pain as the most common locations.¹⁶ Most respondents with back pain reported worsening pain with activity. Such pain problems suggest that mechanical factors may cause or contribute to chronic pain. SCI individuals with pain did not receive any significant treatment. There were just two or three patients who used acetaminophen and two others used massage therapy.

Pain interference

In our study, pain interference was similar to that in other studies¹⁶ and less than the report by Cardenas *et al.*²⁷ In the present study, this interference differed in each specific subgroup. Pain mostly interfered with general activity, similar to other studies.^{9,15,27,29} Also many studies reported a significantly positive correlation between pain and impairment of sleep,⁵ normal work¹⁵ and mood.² Most studies confirmed the relation of pain intensity and interference.¹⁵ In one study, paraplegic individuals reported significant greater pain-related activity interference than did tetraplegic subjects.¹⁵ It should be noted that the level of activity in individuals with SCI is usually affected more by the effects of the SCI itself rather than by pain alone.

Pain and gender

There was no significant difference in men and women with regard to worst, least and average pain in the present study. Similar to some other studies, no relation was found between pain and gender.^{1,9,12} However, some literature contradicts these findings and indicated that women suffer more than men do,^{4,30} whereas one reported the exact opposite.²⁶

These heterogeneous data could be due to various reasons. For example, the predominantly male SCI population in our study could have been a source of bias. A general belief in Iranian society is that men are stronger or tougher than women are, and they may minimize the intensity of pain or pretend it does not exist at all; hence reporting bias is a real possibility. It is recommended that additional studies be carried out with mechanisms in place to detect or prevent this bias, perhaps involving some degree of psychological education before evaluation.

Pain, level of injury and completeness

This study found no significant relationship between pain and the completeness of neurological injury, as did Siddall *et al.*³¹ However, a trend toward higher sensory scale scores in people with incomplete injuries was reported in other surveys.^{9,12} In one study, completeness of injury was significantly related to the maximal pain intensity,⁵ where individuals who were less impaired reported more intense pain.

When the level of injury was considered, only the score of worst pain in tetraplegic individuals was significantly higher than that in paraplegics, which was corroborated by one other study.⁵ Several studies did show an association between pain and level of injury,^{32,33} whereas three studies found no relationship.^{20,34} Notably, Modirian *et al.*¹² reported an increased pain prevalence in paraplegics. Several factors such as different classification systems used to measure pain, variations in the demographic and other injury-related factors or the size of the sample might help explain such contradictions.

Among the tetraplegic and paraplegic individuals who participated in this survey, pain in the upper limbs was rarely seen. Also, pain in the lower limbs was more frequently reported in individuals with paraplegia, as it was in another study.¹² Similar to our study, one paper rated that shoulder pain was significantly higher in tetraplegics than in paraplegics.⁹

As the shoulder is used in a lot in daily activities, particularly for people who use a wheelchair, it is understandable that more pain may be experienced or noted in the shoulder region following a cervical injury and potential partial denervation of the shoulder muscles.⁷

Pain and socioeconomic factors (education and access to facilities and supplies as economic situation)

Our study showed that SCI individuals with a medium level of education (8–12 years) had the lowest pain. On the contrary,

Turner *et al.*⁹ showed that individuals with SCI who completed college reported significantly less pain currently. Cardenas *et al.*³⁵ pointed in their study that those with no pain had lower level of education, but in another survey, it has been shown that illiterate individuals reported higher pain scores.³⁶ May be individuals with least level of education in comparison with those with medium level did not know different ways for coping with their pain other than medication. In addition, illiterate individuals have more susceptibility to stress and take part more in high-risk health behaviors and lesser self-management skills than educated people. However, these hypotheses do not completely justify why pain prevalence was higher in the most educated level than in the medium ones. It is possible that most educated ones had more expectation from treatment and could not ignore some low degree of pain.

As shown in the results in our study, individuals with medium level of access to facilities and supplies reported lower frequency of having pain ($P=0.034$). As it is explained before for evaluating economic status, we used availability to essential equipments. This finding can partially be the result of relative association of education and socioeconomic situation, usually people with higher education have better access to facilities and supplies. Of course this is not definite, and similar to previous factor, it does not rationalize why individuals with best situation had more pain than medium ones. Finally, as we could not separate education and economic level and also identify economic situation exactly, these suggestions need more assessment in further studies.

We did not examine the relationship between occupation and pain because most of our participants were unemployed, although some other studies found that individuals with SCI who went back to work reported less pain.²⁰ Goossens *et al.*²⁶ also discovered a negative impact of a low socioeconomic status on the severity of pain in a systematic review. We would recommend policy makers to promote education and improve economic situation of the worst socioeconomic SCI patients who are uneducated or have just primary or secondary school— ≤ 8 —and to support financially those whose economic situation is less than even having adequate supplies of diapers or urinary catheters. Therefore, we need to have at least medium level of education and economic situation in SCI patients to decrease their pain.

Pain and social support

No relationship was found between social support and pain. When considering the different sources of social support such as family, friends and important persons, no significant association with pain was observed (Table 4). The mean of social support in SCI individuals with pain symptom was not significantly different from individuals without pain symptom (60.5 ± 15.5 vs 62.3 ± 13.9 , $P=0.475$). Meanwhile, there were no significant differences among sources (family, friends and important person) of social support. We did not measure the number of social support providers; however, Gil *et al.*³⁷ reported that individuals who had a higher number of supportive people in their lives did not differ significantly in total pain experience compared with subjects with lower numbers.

In a systematic review, Müller *et al.*¹⁴ reported that social support was positively associated with pain.¹¹ Informational and instrumental support structures were positively related with pain. According to Goossens *et al.*,²⁶ living in a family environment often had a negative impact on pain.³⁸ On the other hand, greater perceived social support was associated with better outcomes in people with physical disabilities, including SCI.³⁹

Considering that our participants were mostly males and, in a patriarchal society such as Iran, seeking help and support (including social) and presenting pain relatively can be a sign of weakness or loss of power, it is probable that no existence of relationship, to a degree, can be a result of this cultural issue. On the other hand, may be some patients with less pain were expecting and underestimated their support, but some others with more pain may think they were a trouble for the supporter and exaggerated the help of others.

In a recent review, a 'usual' conceptualization of hegemonic masculinity is described as—'A set of values, established by men in power that functions to include and exclude, and to organize society in gender unequal ways. It combines several features—a hierarchy of masculinities, differential access among men to power (over women and other men), and the interplay between men's identity, men's ideals, interactions, power and patriarchy'.⁴⁰

The hegemonic masculinity views consider caring and pain expression as feminine attributes and are not valued as features associated with men. In addition, expanding studies investigating gender differences with regard to pain not only imply that trait masculinity is associated with higher pain thresholds⁴¹; in fact, gender differences in perceived social integration and support are notable. This multidimensional psychosocial understanding implies that typically men do not ask for help as they may believe that aid seeking demotes their status in family and the society. Hence, considering that in Iran, often men are expected to be leaders of their families, especially with regard to financial issues, and it is historically a patriarchal society. As a majority of the study population who participated in the survey was male, the results could have been affected by socio-cultural gender expectations and willingness to seek social support; in many cases, men, and particularly those with limited vocational options, may feel that their assistance request is a sign of weakness or a lack of ability to lead their families.

Finally, many previous studies examined the association of pain and social support, although not in individuals with SCI. For example, in patients with fibromyalgia, a reduction in the severity of pain was noted when the patients were provided with social support (through the presence of significant others) compared with situations in which the patients were alone.²² Breast cancer survivors with lower social support experienced higher levels of pain than their more socially supported counterparts.⁴² In chronic pain patients, individuals characterized by higher levels of perceived support also reported lower pain intensity.²³

Mathew *et al.*⁴³ proposed that the common biomedical model and also assuming disease as deviations from the norm of assessable biological variables was no longer an adequate model for medicine. Focusing on the biomedical and ignoring the psychosocial parameters interferes with patient care. He suggested that a model was needed which included behavioral, psychological and social aspects of illness—the bio-psychosocial model.

Central sensitization, which encompasses changes in the excitability of spinal and supraspinal pathways and neurons, starts from the beginning of SCI and continues if no prevention tool be used.^{44,45}

The first step in designing a better approach to managed pain in individuals with SCI is to detect risk factors. In this way, individuals with SCI may benefit from the results of our study.

In summary, chronic pain is a common problem that interferes with daily routines in individuals with SCI. According to various studies, this pain is related to clinico-pathological, demographic and psychosocial items. The findings from this study are, in general, relatively similar to other similar reports. The few noted differences are likely due to variations in study design and criteria, definitions, sample

sizes and other features, and especially cultural discrepancies. There is little literature that investigates the association of pain and social support in individuals with SCI and not a single such study from Iran. In contradistinction to other studies, no relationship was found between pain and social support; further research is recommended in this area. Perhaps if social support increases, the reporting of pain would also increase, leading to more thorough exploration of available treatment options and ultimately to more effective pain palliation.

Limitations

This study was of course not devoid of methodological limitations. All outcome measures were self-reported, and the study design was cross-sectional. Any cause-effect relationships between pain and the other variables could not be determined. Moreover, the statistical power was relatively low because of a small number of participants. In case of economic situation, as was mentioned earlier, most of the individuals did not have a job, and many were dependent on family or others; in addition, perhaps in hope to gain any monetary benefit they under-reported their financial situation. So we used availability of facilities as a measure for economic situation, but unfortunately this classification was based on our personal experiences and opinions, not evidence based. Finally, only select aspects of social support were examined, and further research is recommended to explore other aspects.

CONCLUSION

These findings corroborate previous works indicating that socioeconomic factors, for example, economic situation and educational level, are significantly associated with a greater impact of pain in people with SCI. These results highlight the importance of social factors in understanding chronic pain in people with SCI and provide further support for the bio-psychosocial model. These findings further suggest that responses to pain are more complex and that interventions may need to target more than pain intensity alone. Hence, multidisciplinary evaluations and treatment strategies are advocated, including biomedical, psychological and psychosocial interventions.

It is possible that, because of inadequate sample, the study was underpowered to detect some significant associations.

Longitudinal studies with larger sample sizes are recommended to test causative relationships between bio-psychosocial variables and pain in SCI patients.

DATA ARCHIVING

There were no data to deposit.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENTS

We thank the financial support of the Tehran University of Medical Sciences, Tehran, Iran. We also thank Helen Jafari, MD, Member of Royal College of General Practitioners, Yarm, UK.

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