Anxiety and depression among traumatic spinal cord injured patients

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ABSTRACT

الأهداف: دراسة العلاقة بين الجنس، والعوامل الاجتماعية، والألم، والتدخين من جهة ومستوى القلق والاكتئاب من جهة أخرى وذلك بعد الإصابات الرضحية للحبل الشوكي وذلك لدى عينة من المرضى السعوديين.

الطريقة: أجريت هذه الدراسة المقطعية في مدينة الأمير سلطان بن عبدالعزيز للخدمات الإنسانية، الرياض، المملكة العربية السعودية خلال الفترة من نوفمبر 2009م إلى أبريل 2011م. شملت هذه الدراسة 102 مريضاً (84 ذكر، 18 أنثى) تتراوح أعمارهم من 17 الى 70 عاماً ويعانون من الإصابات الرضحية للحبل الشوكي وهم منوّمون في وحدة إصابات الحبل الشوكي. لقد قمنا بتطبيق اختبار المستشفى لقياس مستوى القلق والاكتئاب، كما جُمعت المعلومات الديموغرافية الخاصة بالعينة.

النتائج: أشارت نتائج الدراسة إلى ارتفاع مستوى القلق (p=0.0001)، والاكتئاب (p=0.0045)، ومجموع درجات اختبار المستشفى لقياس مستوى القلق والاكتئاب (p=0.0002) بين الإناث اللاتي يعانين من الإصابات الرضحية للحبل الشوكي مقارنةً بالذكور. وقد أظهرت العلاقة بين مستوى التعليم من جهة والقلق والاكتئاب من جهة أخرى مدى ارتفاع مستويات القلق بين المرضى الذين كان تعليمهم جامعياً (p=0.0115)، وارتفاع مستويات الاكتئاب (p=0.0437)، وارتفاع مجموع درجات اختبار المستشفى لقياس مستوى القلق والاكتئاب (p=0.0272) وذلك بالمقارنة مع المرضى الذين كان تعليمهم أقل من التعليم الجامعي. ولقد أظهر المرضى الذين يعانون من الألم مستويات عالية من القلق والاكتئاب مقارنة بالمرضى الذين لم يعانوا من الألم، كما أظهر المرضى المدخنين مستويات أعلى من القلق والاكتئاب ولكنها غير كبيرة من الناحية الإحصائية مقارنةً بالمرضى غير المدخنين.

خاتمة: أثبتت هذه الدراسة بأن المرضى الإناث اللاتي يعانين من إصابات الحبل الشوكي قد أظهرن مستويات عالية من القلق والاكتئاب، كما ارتبط التعليم الجامعي بارتفاع مستويات القلق والاكتئاب في عينة الدراسة.

Objectives: To investigate the relation between gender, sociodemographic factors, pain, smoking, and the level of anxiety and depressive symptoms after traumatic spinal cord injury (TSCI) in a Saudi sample.

Methods: We conducted a cross-sectional study from November 2009 to April 2011, in 102 (age range 17-70 years; 84 males, 18 females) TSCI patients admitted to the Spinal Cord Injury Unit, Sultan Bin Abdulaziz Humanitarian City, Riyadh, Saudi Arabia. We used the Hospital Anxiety and Depression Scale (HADS) to measure the level of anxiety and depression of the study population. The demographic variables were recorded.

Results: Compared to male TSCI patients, the level of anxiety (p=0.0001), depression (p=0.0045), and total HADS (p=0.0002) scores were significantly higher in females. The correlation between level of education and anxiety and depression showed that patients with a university education had higher anxiety (p=0.0115), depression (p=0.0437), and total HADS (p=0.0272) than patients with a lower education level. The TSCI patients with pain reported more anxiety and depression than patients who did not have pain. Compared to non-smokers, the smokers showed marked but insignificant higher levels of anxiety and depression.

Conclusion: Women with TSCI are at a significantly higher risk of having anxiety and depressive symptoms. Level of university education was modestly correlated with higher level anxiety and depression in this population.

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Traumatic spinal cord injury (TSCI) is an acute devastating neurological disorder that has profound influence on modern society from physical, psychosocial, and socioeconomic perspectives.[1] It is a major life event that leads to serious physical disability and secondary medical problems, which seriously impact the quality of life (QoL) of the persons involved.[2-4] The TSCI is associated with abnormal levels of psychological morbidity,[5] substance abuse, and risk of suicide.[6] Consequently, psychosocial issues have become more prominent in TSCI research in the last few decades.[7] This decade has been labeled as the "Decade of the Spine" to emphasize the importance of TSCI and other spinal disorders.[1]

The impact of TSCI on mental health and psychological function has been variously debated.[5,8] Studies have ascertained that anxiety and depression are more prevalent in the TSCI population than in the general population.[9,10] Studies report that depressive symptoms have been associated with increased stays in hospital, less functional improvement in TSCI rehabilitation,[10,11] and increased mortality and morbidity.[12] Moreover, it has been demonstrated that depressed individuals are less able to perform activities of daily living than are patients with chronic medical conditions such as diabetes and arthritis.[13] Also, depressive behavior in TSCI patients has been associated with the occurrence of secondary complications (pressure sores, urinary tract infections).[14] Persons with higher self-report depression scores spent more days in bed, fewer days outside the home, and had greater use of paid personal care attendants, and greater general medical expenses than those with lower scores.[15] The risk of depressive symptoms after discharge from rehabilitation has been estimated to be around 15-60%.[16,17] Studies reported that diagnoses of depression and anxiety disorders are time-consuming and expensive. Access to quick and inexpensive instruments to screen for disorders or assess the severity of symptoms to determine the need for additional evaluation is invaluable. The Hospital Anxiety and Depression Scale (HADS) is one of the most important instruments that have subscales to screen for both depression and anxiety symptoms and to assess symptom severity.[18] Unfortunately, there is a lack of studies on the mental health of the Saudi TSCI population. This lack of research may reflect the fact that until recently there were no specialized multidisciplinary rehabilitation centers in Saudi Arabia.

The purpose of this study was to investigate the association between gender, sociodemographic factors, pain, smoking, and level of anxiety and depressive symptoms following TSCI in the Saudi population.

Methods. *Sample and study design.* From November 2009 to April 2011, we conducted a cross-sectional study at the Spinal Cord Injury Unit, Sultan Bin Abdulaziz Humanitarian City (SBAHC), Riyadh, Kingdom of Saudi Arabia. The SBAHC is the specialized rehabilitation center in the country and provides various levels of rehabilitation service. We approached all (197) patients who had sustained an unintentional spinal cord injury requiring a comprehensive rehabilitation program. A total of 102 were eligible to participate in this survey. Ninety-five patients were excluded from the study, as they did not meet the inclusion criteria. The inclusion criteria were: age range between 17-70 years; Arabic speaking, and 3 months or more post-injury. Exclusion criteria included a history of psychopathology before the TSCI, medically unstable patients, preexisting psychiatric or organic mental disorder, previous psychiatric treatment, and patients with cognitive impairment. All subjects who were willing to participate in this research were asked to sign an informed consent agreement to participate in this study. The demographic data of the subjects were collected as follows; age, gender, marital status, and level of education. The Research & Ethics Committee of SBAHC approved the study.

Measures. The anxiety and depression symptoms were assessed using the Arabic version of the HADS. This test was validated on the Arab population, and could discriminate patients from controls at a sensitivity of 79%, and a specificity of 87%.[19,20] A study in the United Kingdom (UK) established preliminary psychometric properties of the HADS with an outpatient sample of people with TSCI in the UK. The 2-factor structure of the HADS was detected with good internal consistency (HADS-A was 0.85, and HADS-D was 0.79), and promising content validity (HADS-A: 7.419, p5.001; HADS-D: 7.660, p5.001) and the HADS total score (7.585, p5.001).[18,21,22]

The HADS scale is easy, fast to apply, and can be carried out by the patient, or by the interviewer (patients who cannot read or who present motor or visual deficits). Finally, this test excludes somatic items of anxiety and depression. Previous research criticized the use of standardized rating scales such as the Beck Depression Inventory (BDI) in the TSCI population because these instruments contain somatic items. Somatic items may compromise the validity of measures that rely on these types of symptoms.[18,23] The HADS consists of 7 items for anxiety (HADS-A), and 7 for depression (HADS-D). The items are scored on a 4-point scale from zero (not present) to 3 (considerable). The item scores are added, giving sub-scale scores on the HADS-A and the

HADS-D from zero to 21. The HAD scale defines <7 score as non-case (absence anxiety or depression), 8-10 score as borderline (anxiety or depression symptoms), and >= 11 score as definite (anxiety or depression symptoms).[20]

Statistical analysis. Data analysis was carried out using Microsoft Excel 2002 (Microsoft Corporation, Seattle, WA, USA) and Graph Pad InStat Version 3 (Graph Pad Software, San Diego, CA, USA). The demographic data of spinal cord injured patients are presented as numbers as well as percentage, whereas the anxiety, depression, and total HADS data are presented as mean ± standard error of mean. Tukey-Kramer multiple comparison test, and Student's t-test were used for analyzing the anxiety, depression, and total HADS of traumatic spinal cord injured patients. A *p*-value of <0.05 was considered statistically significant.

Results. A total of 102 TSCI patients were included in this study (mean age 34.5 years; 84 males, and 18 females). Most (80.4%) were victims of motor vehicle accident (MVA). The disproportionate number of males (82.3%) is consistent with the gender distribution in the TSCI population in Saudi Arabia, which is related to distribution of victims of road traffic accidents.

The patients' demographic data (marital status, level of education, socioeconomic status, residence status, and social support) are shown in **Table 1**. Type and characteristics of TSCI are shown in **Table 2**. The level of anxiety, depression, and total HADS score in traumatic spinal cord injured patients are shown in **Table 3**. Age versus anxiety, depression, and total HADS score of the TSCI patients is shown in **Table 4**. Groups were compared using the Tukey-Kramer multiple comparisons test, and results showed that age was not a significant predictor of the development of anxiety and depression. Gender differences in anxiety, depression, and total HADS score are shown in **Figure 1**. Compared to the male TSCI patients, the level of

Table 1 - Demographic data of spinal cord injured patients.

Variables	No. of patients	(%)
Gender		
Male	84	(82.3)
Female	18	(17.7)
Marital status		
Single	48	(47.0)
Married	49	(48.0)
Divorced	5	(5.0)
Level of education		
Primary	13	(12.8)
Intermediate	21	(20.6)
High school	41	(40.2)
University	27	(26.4)
Socio economic status		
Above average	12	(11.8)
Average	69	(67.6)
Below average	21	(20.6)
Residence		
Alone	7	(6.9)
Family	95	(93.1)
Social support		
No	6	(5.9)
Yes	96	(94.1)

Table 2 - Type and characteristics of traumatic spinal cord injury.

Causes of injury	No. of patients	(%)
Motor vehicle accident (MVA)	82	(80.4)
Others	20	(19.6)
Time of injury		
1-3 years	65	(63.7)
4-6 years	25	(24.5)
7-10 years	6	(5.9)
>10 years	6	(5.9)
Injury level		
Cervical	47	(46.1)
Thoracic	43	(42.1)
Lumber	12	(11.8)
Pain		
Yes	39	(38.2)
No	63	(61.8)
Smoking		
Non-Smokers	84	(82.4)
Smokers	18	(17.6)
Current medical comorbidity		
Yes	15	(14.7)
No	87	(85.3)

Table 3 - Level of anxiety, depression, and total hospital anxiety and depression scale (HADS) of spinal cord injured patients.

Level of anxiety and depression	Anxiety	Depression	Total HADS score
	No. of patients		
No (<7)	54	59	56
Borderline (8-10)	29	20	27
Definite (≥11)	19	23	19

Table 4 - Age versus anxiety, depression, and total hospital anxiety and depression scale (HADS) of spinal cord injured patients.

Age groups (years)	No. of patients	Age	Anxiety score	Depression	Total HADS
			mean±SEM		
16-25	33	20.6±0.4	6.0±0.71	6.18±0.5	12.1±0.9
26-35	33	30.1±0.4	6.42±0.8	7.3±0.8	13.7±1.1
36-45	17	40±0.5	7.9±1	8.3±1.1	16.2±1.3
>46	19	61.9±1.7	6.7±0.9	8±0.8	14.7±1.2

SEM - standard error of mean

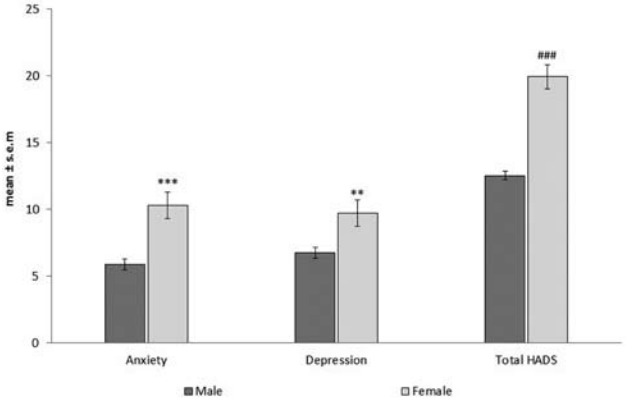

Figure 1 - Gender differences in anxiety, depression, and total hospital anxiety and depression scale (HADS). Groups were compared using the Student's t-test. $^{***}p$=0.0001, $^{**}p$=0.0045, $^{###}p$=0.0002.

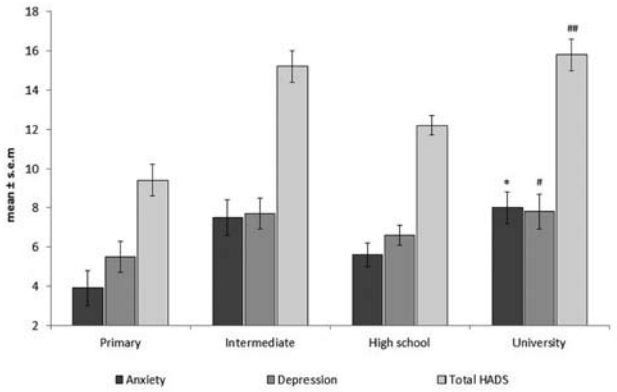

Figure 2 - Educational level differences in anxiety, depression, and total hospital anxiety and depression scale (HADS). Groups were compared using the Tukey-Kramer multiple comparisons test. $^{*}p$=0.0115, $^{\#}p$=0.0437, $^{\#\#}p$=0.0272.

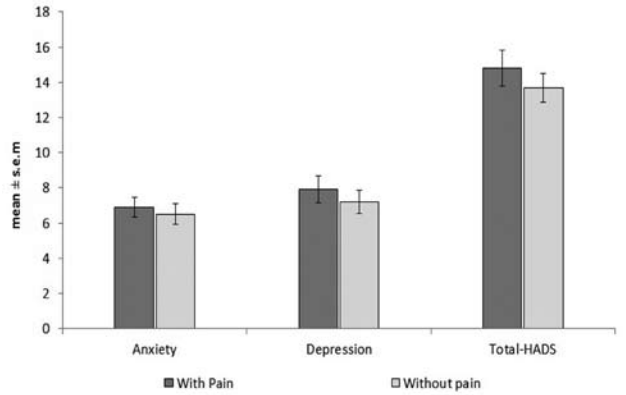

Figure 3 - Differences in anxiety, depression, and total hospital anxiety and depression scale (HADS) among patients with and without pain. Groups were compared using the Student's t-test.

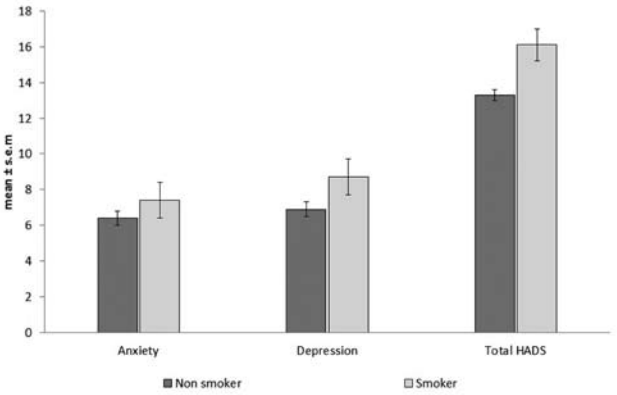

Figure 4 - Differences in anxiety, depression, and total hospital anxiety and depression scale (HADS) among smokers and non-smokers. Groups were compared using the Student's t-test.

anxiety (p=0.0001), depression (p=0.0045), and total HADS scores (p=0.0002) were significantly higher in female patients. Educational level differences in anxiety, depression, and total HADS score are shown in **Figure 2**. Results showed that a higher anxiety (p=0.0115), depression (p=0.0437), and total HADS (p=0.0272) were found in university educated patients compared with primary educated patients. Differences in anxiety, depression, and total HADS among those that reported pain and no pain are shown in **Figure 3**. Around 38.2% of our TSCI sample experienced significant pain and reported insignificantly higher levels of anxiety, depression, and total HADS. Differences in anxiety, depression, and total HADS among smokers and non-smokers are shown in **Figure 4**. Almost 17.6% of the patients were current smokers. The findings showed that when compared to non-smokers, smokers showed a marked, but insignificant increase in anxiety, depression, and total HADS.

Discussion. It is imperative to identify levels of anxiety and depression in individuals with TSCI, to help these individuals maximize their improvements in rehabilitation and psychological well-being. Besides psychological benefits, effective screening and management of anxiety and depression will undoubtedly be beneficial to services in terms of bed space and cost.[10]

Over the past 3 decades, the gender difference in rates of depression has become an accepted truth in both research and clinical settings.[24] Several studies reported that women have higher levels of depression after spinal cord injury (SCI).[7,25,26] In contrast, it has been suggested that there were no differences as a result of gender in anxiety and depression in individuals with

SCI.[27] However, in this present study we found that anxiety, depression, and total HADS scores were higher in woman compared to their counterparts.

A recent study reported that a higher level of education is associated with a greater risk of depression.[28] In contrast, another report showed years of education negatively correlated with depressive symptoms.[29] However, the present study found that there was a positive correlation between depression, anxiety, and university education. This finding may due to higher levels of personal insight in university-educated patients regarding the losses they have sustained and the changes that their injuries will bring to their lives. Another possibility is that the increased level of depression and anxiety among university-educated participants is related to perceptions of disability in Saudi Arabia. We have found that patients in our hospital have the belief that an injury such as a SCI renders the patient virtually useless. Families of patients and patients themselves frequently report that their plan after they are discharged is simply to go home to be cared for by the family for the rest of their lives. The patient's workplace frequently encourages this option by providing a lifetime pension. There seems to be the perception that a SCI renders the patient totally useless. We have found that there is also poor knowledge of assistive devices such as voice activated computer programs, which would enable the patient to return to work. The university educated patient then faces the perceived loss of his or her professional identity, sense of purpose and time in terms of years of study due to the perception here that a SCI commonly means the end of a career and personal generativity.

Research has constantly established that chronic pain among individuals with TSCI is connected with increased psychological distress.[7,26,30-32] Within the biopsychosocial model of chronic pain, chronic pain as a psychological phenomenon following TSCI has only recently attracted systematic attention.[7,26,30-32] A study reported that the prevalence of chronic TSCI pain is variable, but averages 65%, with around one third of these people rating their pain as severe.[33] In this study, we found when compared to TSCI patients with pain, the TSCI patients without pain had less anxiety, depression, and total HADS scores. However, these differences were not statistically significant. Research shows that smoking continues to be an important problem in patients with TSCI.[34] A recent study reported that smoking increases the risk of developing depressive symptoms in traumatic spinal cord injured patients.[34] In this study, we observed that when compared to non-smokers, the smokers showed marked but insignificant higher levels of anxiety and depression.

There are a few limitations to our study. The first limitation is the cross-sectional design which precludes determination of causality, because variables are not measured over time. This common limitation is because trauma patients are a vulnerable population having recently experienced physical injury often resulting in functional limitations, pain, and related mobility difficulties; therefore, subject burden was a primary consideration. Second, the sample size, especially for female patients is small. Third, the exclusion of patients with previous psychiatric history from the study may have decreased the estimates of anxiety and depressive symptoms. Finally, the HADS test that is used to measure the levels of depression and anxiety is based on patients' self-reports. There may therefore be a risk of misinterpretation as well as under-and overestimation.

In conclusion, we have shown that female gender and the level of university education were the strongest correlates with the development of anxiety and depressive symptoms in the Saudi TSCI population. Our findings may help clinicians to better identify a subtest of TSCI patients who are at a higher risk to develop depression and anxiety after the trauma. This initial study provides foundational data for future research. Topics addressed should include interventions to prevent and manage loss and affective distress. Additional topics could include ways to improve outcome and quality of life during recovery from traumatic injury.

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