Original Article

The Level of Depression and Anxiety in Individuals with Traumatic and Nontraumatic Spinal Cord Damage

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Abstract

Objective: The study was conducted to determine the levels of the symptoms of depression and anxiety in individuals with traumatic and non-traumatic spinal-cord damage.
Method: A descriptive design was adopted. The study sample was comprised 40 individuals with traumatic and non-traumatic spinal-cord damage (N=40). The data were collected using questionnaire form, Beck Depression Inventory and Beck Anxiety Inventory.
Results: The Beck Depression Inventory scores of traumatic and non-traumatic individuals were determined as a respectively 13.40±8.49 and 13.95±10.44; Beck Anxiety Inventory scores were determined as a respectively 17.20±10.43 and 14.55±8.16. No significant difference was found between the Beck Depression Inventory and Beck Anxiety Inventory scores. A weak, positive relationship was found between the Beck Depression Inventory and Beck Anxiety Inventory scores of traumatic and non-traumatic individuals (r=0.470).
Conclusion: This study reported the presence of the symptoms of light and moderate depression and anxiety in individuals with both traumatic and non-traumatic spinal cord damage and that there was no difference between the two groups in terms of the symptoms of depression and anxiety.

Key words: traumatic spinal cord injury, non-traumatic spinal cord injury, depression, anxiety.

Introduction

A World Health Organization (WHO) report (2013) stated that traumatic spinal cord injury (TSCI) or non-traumatic spinal cord injury (NTSCI) is seen in between 250,000 and 500,000 people each year (World Health Organization, 2013). The epidemiological data regarding spinal cord injuries varies according to each country because of differences such as the differences in research methods, the socioeconomic level of the studied society, and its sociocultural structure (Aslantas & Ozkara, 2010). Spinal cord damage that develops for numerous reasons like disease or trauma after birth or later (Aslantas & Ozkara, 2010) cause permanent physical limitations as well as serious psychological problems (Eisenberg & Saltz, 1991; Guzel et al., 2006; Pickelsimer, Shiroma & Wilson, 2010; Singh et al., 2014). Serious repercussions arise for the patient, the patient's family, and society because of its form of emergence and because it requires subsequent rehabilitation and care. Individuals can be forced to

continue living with permanent disabilities, and this situation can become a significant issue that must be dealt with (Eisenberg & Saltz, 1991).

Patients with spinal cord injuries mostly experience acute physical problems, and the most significant problems are bedsores, atelectasis/pneumonitis, deep vein thrombosis/pulmonary embolism, autonomous dysreflexia, orthostatic hypotension, depression, and bladder/intestinal problems (Fehlings & Baptiste, 2005). In later stages, the individual's exposure to spinal-cord damage and the problems that this brings seriously affect the individual and his or her relatives psychologically and socially (Senel & Kaya, 2010). It has been determined that the expectations of individuals along with their social and work adaptation decrease as a result of paralysis, which frequently develops after spinal-cord damage, and with the emergence of medical problems such as pressure ulcers, sensation disorder, anuria, incontinence, and loss of sexual functions (Somasundaram et al., 1992). Struggles regarding coping with the permanent outcomes of physical and psychological trauma facilitate the development of depression. Individuals with spinal-cord damage for reasons such as these are a group at serious risk for psychiatric disorders, primarily mood and anxiety disorders (Hancock et al., 1993; Kennedy & Rogers, 2000). Various studies have reported the existence of symptoms of depression and anxiety at serious levels in individuals with spinal cord injuries (Demirel, Yilmaz & Hacihaliloglu, 1999; Fuhrer, Rintala & Hart, 1993; Hancock et al., 1993; Shahid, Jabeen & Aslam, 2012; Williams & Murray, 2015; Yildiz et al., 2009).

According to the WHO report (2013), individuals and their families enter a process in which they experience emotions such as denial, anger, sorrow, fear, and disappointment after spinal-cord injuries (World Health Organization, 2013). The most frequently seen psychological disorders in spinal-cord injuries are thus depression and anxiety. It is asserted that anxiety and depression are unavoidable in the adjustment period following spinal-cord injuries, and it is reported that clinically significant degrees of depression are seen in 20-45% of patients after spinal-cord injuries (Fuhrer, Rintala & Hart, 1993). The study in which Hancock et al. (1993) compared 41 patients with spinal-cord injuries and 41 healthy patients in terms of anxiety and depression scores reported that of the group with spinal-cord injuries, 25% had anxiety and 25% had depression, and this rate was 5% and 3%, respectively, for the healthy group. Shahid, Jabeen & Aslam, (2012) in their study identified symptoms of anxiety in 40 (25 light and 15 moderate and severe) and depression in 28 (23 light and 5 moderate and severe) of 50 patients with traumatic and non-traumatic spinal cord injuries. Williams and Murray (2015) in their study found the prevalence of depression after spinal-cord damage to be higher than the prevalence in the general population. The WHO report (2013) reported that 20-30% of individuals with spinal-cord injuries displayed serious symptoms of depression (World Health Organization, 2013).

Demirel, Yilmaz & Hacihaliloglu, (1999) in their research detected anxiety in 52% and depression in 61% of patients with spinal-cord injuries. A study that compared the demographic, clinical, and functional characteristics of patients with NTSCI and those with TSCI determined that, of 50 patients, 37 were admitted to the hospital with traumatic and 13 were admitted to the hospital with non-traumatic spinal-cord injuries, and depression was identified in 23.1% of the NTSCI patient group and in 54.1% of the TSCI patient group (Yildiz et al., 2009).

It was reported that the prevalence of depression in TSCI and NTSCI individuals was related to secondary complications. The rates of suicide in individuals with spinal-cord injuries is 2-6 times the normal rate, and suicide is the most frequent cause of death in individuals under the age of 55 (On, 2010). The study in which McCullumsmith et al. (2015) researched suicidal thoughts in individuals with spinal-cord injuries reported that of the 2533 people who participated in the study, 323 had suicidal thoughts and 179 attempted suicide in the previous two weeks. It was reported that 47% of suicidal acts are related to spinal-cord injuries and occur after injury. It was also found that suicidal thoughts are related to the present level of depression, societal norms and spirituality of the individual, inadequate education, young age, history of depression, history of bipolar disorder, and history of schizophrenia.

Both traumatic and non-traumatic spinal cord damage lead to crisis in patients. The crisis status that emerges in those with traumatic injuries develops in a sudden and unexpected manner (Bayraktar, 2012), and the degree of damage can be severe. Even if a situation emerges in an unexpected manner in non-traumatic damage, the period that passes for examinations and treatment is longer. However high the level of injury is in the spinal cord is generally how bad the damage will be. In situations of both traumatic and non-traumatic injury, various psychological reactions occur based on the level and size, and mechanism occurrence of the damage. Some studies conducted have demonstrated the height of the psychiatric symptoms of individuals with spinal-cord damage (Demirel, Yilmaz & Hacihaliloglu, 1999; Hancock et al., 1993; Shahid, Jabeen & Aslam, 2012; Williams & Murray, 2015; Yildiz et al., 2009), but the number of studies conducted regarding this issue is limited. The present study will constitute evidence regarding the levels of the symptoms of depression and anxiety in individuals with traumatic and non-traumatic spinal-cord damage.

Aim of research: This research was conducted to determine the levels of the symptoms of depression and anxiety in individuals with traumatic and non-traumatic spinal-cord damage.

Research questions

- What is the level of symptoms of depression and anxiety in the individuals with traumatic spinal-cord damage?
- What is the level of symptoms of depression and anxiety in the individuals with non-traumatic spinal-cord damage?
- Is there a difference in terms of the levels of the symptoms of depression and anxiety in individuals with traumatic and non-traumatic spinal-cord damage?

Methods

The study was conducted in a descriptive research type and the study data were collected at an Education and Research Hospital Neurosurgery Clinic in the Bursa, Turkey. The clinic has a total of 24 beds, and the rooms are single-person.The population of the study comprised individuals with traumatic and non-traumatic spinal-cord damage who were admitted to the neurosurgery clinic on the dates upon which the research was conducted (N=40). The sampling number was calculated with the confidence analysis using the G*Power (v3.1.7) program. In the double comparisons to be conducted according to the Beck Depression Inventory and Beck Anxiety Inventory, it was calculated that there must be 17 people from each group, for a total of 34, to acquire 80% confidence at a level of α=0.05, taking influence size as d=1.000, predicting that a difference of 5 points will express clinical significance. The research data were collected with a total of 40 patients.The criteria for inclusion were determined as age between 18 and 65, no mental retardation, no previous treatment due to any mental disorder, no problems hearing, understanding, or seeing, agreeing to participate in the research.

Measurements

Questionnaire Form*:* The researcher used a survey form developed by conducting a literature review and obtaining the views of experts. This form is a survey comprising 19 questions that include information such as individual characteristics, including age, gender, marital status, occupation, and economic status, patient diagnosis, number of times admitted to the clinic, existence of chronic illness, and whether there is a history of trauma.

The Beck Depression Inventory (BDI): The Inventory was developed by Beck et al. (1961) and measures the risk of depression and the levels and changes in severity of the symptoms of depression in individuals. It is a 21-item, 4-point Likert type, self-evaluation scale. The Inventory asks individuals to respond by evaluating their statuses in the previous week, including today. The Inventory scores the items between 0 and 3, and the total score is acquired through the sum of the item scores. The lowest score and the highest score that can be earned from the scale are 0 and 63 points, respectively. The height of the total score indicates the severity of depression. In the scale, 0-9 points is classified as minimal symptoms of depression, 10-16 is classified as light depression, 17-29 is classified as moderate depression, and 30-63 is classified as severe symptoms of depression (Beck et al., 1961). Hisli (1989) reported the reliability coefficient to be 0.80 in a Turkish adaptation study (Hisli, 1989). The present study determined the Cronbach's alpha value to be 0.87.

Beck Anxiety Inventory (BAI): Beck et al. (1988) developed the inventory to determine the frequency of the level of symptoms of anxiety that individuals experience. The Inventory is a Likert-type, self-evaluation scale comprising 21 items that score between 0 and 3 points. The height of the total score demonstrates the height of the anxiety that the person experiences. The score ranges between 0 and 63. The assessment of the scale is the manner of 0-7 points indicates no symptoms of anxiety, 8-15 points indicates light anxiety, 16-25 indicates moderate anxiety, and 26-63 indicates severe symptoms of anxiety (Beck et al. 1988). Ulusoy, Şahin & Erkman (1998) conducted a validity and reliability study in our country. The present study determined the Cronbach's alpha value to be 0.80.

Research Process: The researcher included in the study the patients who met the research criteria by visiting the clinic throughout the period in which the research was conducted. The research was conducted in the patients' rooms when the patient was available to be interviewed. It took about 30-45 minutes to complete the Inventory. The interviews were conducted in the first week that the patients were admitted to the hospital.

Ethical Considerations: This study was approved by the Uludag University Education and Research Hospital Clinical Research Ethical Board (16.7.2014 ve B.30.2.ULU.0.20.70.02-050.99/275). Participations were informed according to the Helsinki Declaration, and their written and verbal consent was obtained. The individuals who participated in the research were assured that their information would not be disclosed to anyone other than the researcher and were bound to the principle of confidentiality.

Data Analysis: The NCSS (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA) program was used for the statistical analyses. The descriptive statistical methods (mean, standard deviation, median, frequency, rate, minimum, maximum) were used to describe the demographic characteristics of participations. The Student's t test was used in the comparison of the two groups for the variables that displayed normal distribution and the Fisher Freeman Halton test, Fisher's exact test, and Yates' continuity correction test (Chi-square) were used in the comparison of the two groups for the variables that did not display normal distribution in the comparison. The Spearman correlation analysis was used to determine the relationship between the inventories and variables.

Results

The individual characteristics of the traumatic and non-traumatic individuals were showed in Table 1. The illness characteristics of the traumatic and non-traumatic individuals were showed in Table 2. The BDI and BAI scores for traumatic and non-traumatic individuals were showed in Table 3. The mean BDI scores were determined as 13.40±8.49 (2-29) for the TSCI individuals, as 13.95±10.44 (3-45) for the NTSCI individuals, and as 13.68±9.39 (2-45) for the entire group. The mean BAI scores were determined as 17.20±10.43 (4-42) for the TSCI individuals, as 14.55±8.16 (4-33) for the NTSCI individuals, and as 15.88±9.34 (4-42) for the entire group. No significant difference was found between the BDI and BAI scores of traumatic and non-traumatic individuals ($p>0.05$) (Table 3).

The BDI and BAI symptom levels for traumatic and non-traumatic individuals were showed in Table 4. No significant difference was found between the BDI and BAI symptom levels for traumatic and non-traumatic individuals ($p>0.05$). A weak, positive relationship was found between the BDI and BAI scores of traumatic and non-traumatic individuals (total group) ($r=0.47$; $p<0.01$). No relationship was determined between the BDI and BAI scores of traumatic individuals ($p>0.05$). A moderate, positive relationship was determined between the BDI and the BAI scores of non-traumatic individuals ($r=0.51$; $p<0.05$) (Table 5).

Table-1: Individual characteristics (N=40)

		Traumatic (n=20)	Non-traumatic (n=20)	Total	*p*
Age	**Min-Max**	20-69	18-67	18-68	[a]0.834 p>0.05
	Mean±SD	42..70±13,46	43.70±16.45	43.20±14.84	
		n (%)	**n (%)**	**n (%)**	
Gender	**Female**	6 (30.0)	8 (40.0)	14 (35.0)	[b]0.740 p>0.05
	Male	14 (70.0)	12 (60.0)	26 (65.0)	
Marital Status	**Married**	17 (85.0)	14 (70.0)	31 (77.5)	[c]0.693 p>0.05
	Single	3 (15.0)	6 (30.0)	9 (22.5)	
Education	**Non-literate**	1 (5.0)	0 (0.0)	1 (2.5)	[c]0.134 p>0.05
	Literate	1 (5.0)	3 (15.0)	4 (10.0)	
	Primary education	12 (60.0)	6 (30.0)	18 (45.0)	
	High school	5 (25.0)	6 (30.0)	11 (27.5)	
	University	1 (5.0)	5 (25.0)	6 (15.0)	

[a]*Student-t Test* [b]*Yates Continuity Correction Test* [c]*Fisher Freeman Halton Test*

Table -2: Illness characteristics (N=40)

		Traumatic (n=20)	Non-Traumatic (n=20)	Total	*p*
		n (%)	**n (%)**	**n (%)**	
Neurological status	Paraplegia	2 (10.0)	2 (10.0)	4 (10.0)	**0.392 p>0.05**
	Paraparesia	0 (0.0)	4 (20.0)	4 (10.0)	
	Monoplegia	1 (5.0)	1 (5.0)	2 (5.0)	
	Monoparesis	1 (5.0)	2 (10.0)	3 (7.5)	
	Hemiplegia	2 (10.0)	1 (5.0)	3 (7.5)	

	No Loss of Force	14 (70.0)	10 (50.0)	24 (60.0)
If the cause of the trauma	Traffic accident	10 (50.0)	-	10 (50.0)
	Falling from high	7 (35.0)	-	7 (35.0)
	Sports Injury	1 (5.0)	-	1 (5.0)
	Suicide Attempt	1 (5.0)	-	1 (5.0)
	Other	1 (5.0)	-	1 (5.0)
If non-traumatic cause	**Neoplastic**	-	18 (90.0)	18 (90.0)
	Degenerative	-	1 (5.0)	1 (5.0)
	Infection	-	1 (5.0)	1 (5.0)
Time Between Diagnosis and Admission	**1-4 week**	-	11 (55.0)	11 (55.0)
	4-8 week	-	5 (25.0)	5 (25.0)
	8-12 week	-	2 (10.0)	2 (10.0)
	≥16 week	-	2 (10.0)	2 (10.0)
Non-traumatic operation history	**No**	-	18 (90.0)	18 (90.0)
	Yes	-	2 (10.0)	2 (10.0)

Table -3: The comparison of BDI and BAI points of traumatic and non-traumatic individuals (N=40)

		Traumatic (n=20)	**Non-Traumatic (n=20)**	***Total* (n=40)**	***p***
BDI	**Mean±SD**	13.40±8.49	13.95±10.44	13.68±9.39	[a]**0,968 p>0.05**
	Min-Max	2-29	3-45	2-45	
BAI	**Mean±SD**	17.20±10.43	14.55±8.16	15.88±9.34	[a]**0,473 p>0.05**
	Min-Max	4-42	4-33	4-42	

[d]*Student-t Test* [e]*Mann Whitney U Test* *$p<0.05$

Table -4: The comparison of BDI and BAI levels of traumatic and non-traumatic individuals (N=40)

		Traumatic (n=20)	Non-Traumatic (n=20)	*Total*	*p*
		n (%)	n (%)	n (%)	
BDI	**Minimal**	7 (35.0)	8 (40.0)	15 (37.5)	
	Light	7 (35.0)	5 (25.0)	12 (30.0)	
	Moderate	6 (30.0)	6 (30.0)	12 (30.0)	[c]**0.919 p>0.05**
	Severe	0 (0.0)	1 (5.0)	1 (2.5)	
	No symptom	3 (15.0)	4 (20.0)	7 (17.5)	
BAI	**Light**	6 (30.0)	9 (45.0)	15 (37.5)	[c]**0.572 p>0.05**
	Moderate	8 (40.0)	4 (20.0)	12 (30.0)	
	Severe	3 (15.0)	3 (15.0)	6 (15.0)	

[c]*Fisher Freeman Halton Test*

Table -5: The correlation between BDI and BAI (N=40)

	BDI		
	Traumatic	Non-traumatic	Total
	r	r	r
BAI	0.40	0.51*****	0.47******

*r=Spearman's Correlation Coefficent; *p<0.05; **p<0.01*

Discussion

Spinal-cord damage leads to bodily, psychological, and social problems in the lives of individuals. For most people, spinal-cord damage is correlated to negative emotional reactions. These are various emotional reactions such as sorrow, crying, hopelessness, guilt, fear, panic, helplessness, inadequacy, anger, fatigue, loneliness, and abandonment. The present study determined that there were light and moderate symptoms of depression and anxiety in most of the individuals with spinal-cord injuries. The literature predicts that between 13% and 40% of cases after spinal-cord injury could develop anxiety disorder (Chung et al., 2006; Craig, Hancock & Dickson, 1994; Kennedy & Evans, 2001). The prevalence of depression in spinal-cord injuries ranges between 8.8% and 60% (Bombardier et al., 2004; Craig,

Hancock & Dickson, 1994; Kennedy et al., 2011; Kennedy & Rogers, 2000; Krause, Kemp & Coker, 2000; Migliorini & Tonge, 2009;). Demirel, Yilmaz & Hacihaliloglu, (1999) in their research detected anxiety and depression more than half of patients with spinal-cord injuries. Kessler et al. (2005) reported in their study that the prevalence of depression was minimal in individuals with spinal-cord injuries. A prospective study in which Kishi, Robinson & Forrester (1994) for six months studied 60 individuals with spinal-cord injuries who were admitted to a rehabilitation center in terms of mood disorders identified severe depression in 22% of patients and light depression in 8% of patients during the initial evaluation. Another study that evaluated depression in individuals between 1 and 5 years after spinal-cord injuries found that 21% of 1st-year participants suffered from major depression and 18% of 5th-year suffered from major depression (Hoffman et al., 2011). Somasundaram et al. (1992) reported in the study they conducted on patients with spinal-cord injuries that, minimal or light depression appeared in 70% of patients, severe depression appeared in 11% of patients, and severe anxiety appeared in 26% of patient. Shahid, Jabeen & Aslam (2012) in their study identified symptoms of anxiety in 40 and depression in 28 of 50 patients with traumatic and non-traumatic spinal cord injuries. Many studies conducted on individuals with spinal-cord injuries have reported that depression appears at various levels in individuals after such injury (Fann et al., 2011; Fuhrer, Rintala & Hart, 1993; Fullerton, Harvey & Klein, 1981; Toygar, Kotevoglu & Ahmetoglu, 2012; Yildiz et al., 2009). Crisis and related depression and anxiety are unavoidable situations in individuals with both traumatic and non-traumatic spinal-cord damage. However, the mechanism occurrence of traumatic and non-traumatic spinal-cord damage varies. While those with traumatic injuries developed in a sudden and unexpected manner, there was a clear process for diagnosis and treatment in those with non-traumatic injuries. It was thus thought that there might be difference in terms of the symptoms of depression and anxiety. But no statistically meaningful difference was found in our study between the BDI and BAI scores of traumatic and non-traumatic individuals. A study in which Yildiz et al. (2009) compared the demographic, clinical, and functional characteristics of NTSCI and TSCI patients found no statistically meaningful difference in terms of the development of depression between the two groups.

The current study found a weak, positive relationship when reviewing the relationship between the scores that all participants received from the BDI and the scores they received from the BAI. Anxiety symptom scores are expected to increase as depression symptom scores increase. But no study was encountered in the literature regarding this.

As a conclusion: this study reported the presence of the symptoms of light and moderate depression and anxiety in individuals with both traumatic and non-traumatic spinal cord damage and that there was no difference between the two groups in terms of the symptoms of depression and anxiety. It is thus important to reduce the situations that increase the risk for depression and anxiety in cases of both traumatic and non-traumatic spinal-cord injury. It could be recommended for future research that studies are conducted in which the sample group is wider, with consideration of the level of depression and anxiety seen after spinal-cord damage, and that measure the effectiveness of interventions to reduce this.

The present study did not determine psychological caused by secondary complications. The literature has shown that secondary complications can increase the symptoms of depression and anxiety in individuals with spinal-cord injuries (Hoffman et al., 2011). For this reason, the provision of the necessary treatment and care to determine the psychological problems caused by secondary complications and to prevent these could be recommended for future research. Interventions to be implemented should develop skills of awareness and self-care management in the patient and should aim to ensure the patient's active participation in his or her own care. Studies have also shown that the presence of symptoms of depression also can create risk for suicidal thoughts and attempts (Bajracharya et al., 2007; Dezernaulds & Ilcef, 2014; Fann et al., 2011; Karamehmetoğlu et al., 1997; Pajareya, 1996; Silberstein & Rabinovich, 1995; Turner, Bombardier & Rimmele, 2003). However, the present study did not report on the participants' possibility of suicide. Therefore, the

studies on whether suicidal thoughts emerge together with the symptoms of depression in individuals with spinal-cord damage and studies on the measure of the effectiveness of preventive interventions could be recommended for future research.

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References

Aslantas A, Ozkara E. (2010). Epidemiology and Classification in Spinal Cord Injury. In: E, Korfalı M, Zileli (Ed.), Basic Neurosurgery. Ankara: Turkish Neurosurgery Association Publications; 1653-54. (in Turkish)

Bajracharya S, Singh M, Singh GK, Shrestha BP. (2007). Clinico-epidemiological study of spinal injuries in a predominantly rural population of Eastern Nepal: A 10 years' analysis. Indian Journal of Orthopaedics. 41(4): 286-9.

Bayraktar S. (2012). Psychological Trauma. Istanbul: Nobel Medical Bookstore: 62-64.(in Turkish)

Beck AT, Epstein N, Brown G, Steer RA. (1988). An inventory for measuring clinical anxiety: Psychometric properties. Journal of Consulting and Clinical Psychology. 56: 893-7.

Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. (1961). An inventory for measuring depression. Archives of General Psychiatry. 4: 561-571.

Bombardier CH, Richards JS, Krause JS, Tulsky D, Tate DG. (2004). Symptoms of major depression in people with spinal cord injury: implications for screening. Physical Medicine Rehabilitation. 85: 1749-56.

Chung MC, Preveza E, Papandreou K, Prevezas N. (2006). The relationship between post-traumatic stress disorder following spinal cord injury and locus of control. Journal of Affective Disorders. 93: 229–232.

Craig AR, Hancock KM, Dickson HG. (1994). A longitudinal investigation into anxiety and depression in the first 2 years following a spinal cord injury. Paraplegia. 32: 675–679.

Demirel GG, Yilmaz H, Hacihaliloglu S. (1999). Anxiety and depression in patients with spinal cord injury. Turkey Journal of Physical Medicine and Rehabilitation.45, 4. (in Turkish)

Dezernaulds A, Ilcef R. (2014). Psychological Adjustment After Spinal Cord Injury: Useful Strategies for Health Professionals. NSW Agency for Clinical Innovation. https://www.aci.health.nsw.gov.au/__data/assets/pdf_file/0010/155197/Psychosocial-Adjustment.pdf.

Eisenberg MG, Saltz CC. (1991). Quality of life among aging spinal cord injured persons: long term rehabilitation outcomes. Paraplegia. 29: 514-520.

Fann JR, Bombardier, CH, Richards JS, Tate DG, Wilson CS, Temkin N. (2011). Depression after spinal cord injury: comorbidities, mental health service use, and adequacy of treatment. Archives of Physical Medicine and Rehabilitation. 92: 352-360.

Fehlings MG, Baptiste DC. (2005). Current status of clinical trial for acute spinal cord injury. Injury. 36: 113-22.

Fuhrer MJ, Rintala DH, Hart KA. (1993). Depressive symptomatology in persons with spinal cord injury who reside in the community. Archives of Physical Medicine and Rehabilitation. 74: 255-260.

Fullerton DT, Harvey RF, Klein MH. (1981). Psychiatric disorders in patients with spinal cord injuries. Archives of General Psychiatry. 38: 1369-71.

Guzel A, Tatli M, Okten AI, Cayli S. (2006). Pathology and physiopathology of spinal cord injury. Cumhuriyet University Faculty of Medicine Journal.28 (2): 73–78. (in Turkish)

Hancock KM, Craig AR, Dickson HG, Chang E. (1993). Anxiety and depression over the first year of spinal cord injury: A longitudinal study. Paraplegia. 31: 349-357.

Hisli N. (1989). Validity and reliability of Beck Depression Inventory for university students. Journal of Psychology. 7: 3-13. (in Turkish)

Hoffman JM, Bombardier CH, Graves DE, Kalpakjian CZ, Krause JS. (2011). A longitudinal study of depression from 1 to 5 years after spinal cord injury. Archives of Physical Medicine and Rehabilitation. 92: 411-8.

Karamehmetoglu SS, Nas K, Karacan I, Sarac AJ, Koyuncu H Ataoğlu S. (1997). Traumatic spinal cord injuries in southeast Turkey: an epidemiological study. Spinal Cord. 35(8): 531-3.

Kennedy P, Evans MJ. (2001). Evaluation of post-traumatic distress in the first 6 months following SCI. Spinal Cord. 39: 381–386.

Kennedy P, Lude P, Elfstro¨m ML, Smithson EF. (2011). Psychological contributions to functional independence: a longitudinal investigation of spinal cord injury rehabilitation. Archives of Physical Medicine and Rehabilitation. 92: 597–602.

Kennedy P, Rogers BA. (2000). Reported quality of life of people with spinal cord injuries: a longitudinal analysis of the first 6 months' post-discharge. Spinal Cord. 38: 498–503.

Kessler RC, Chiu WT, Demler O, Merikangas KR, Walters EE. (2005). Prevalence, severity, and

comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. Archive Gen Psychiatry. 62: 617-27.

Kishi Y, Robinson RG, Forrester AW. (1994). Prospective longitudinal study of depression following spinal cord injury. Journal Neuropsychiatry clinical neuroscience. 6 (3): 237-44.

Krause JS, Kemp B, Coker J. (2000). Depression after spinal cord injury: relation to gender, ethnicity, aging, and socioeconomic indicators. Archives of Physical Medicine and Rehabilitation. 81: 1099–1109.

McCullumsmith CB, Kalpakjian CZ, Richards JS, Forchheimer M, Heinemann AW, Richardson EJ. (2015). Novel risk factors associated with current suicidal and lifetime suicide attempts in individuals with spinal cord injury. Archives of Physical Medicine and Rehabilitation. 96(5): 799-808.

Migliorini C, Tonge B. (2009). Reflecting on subjective well-being and spinal cord injury. Journal Medicine Rehabilitation. 41: 445–450.

On AY. (2010). Rehabilitation in Spinal Cord Injuries. In: E, Korfalı M, Zileli (Ed.), Basic Neurosurgery. Ankara: Turkish Neurosurgery Association Publications: 1731-46.(in Turkish)

Pajareya K. (1996). Traumatic spinal cord injuries in Thailand: An epidemiologic study in Siriraj Hospital. 1989- 1994. Spinal Cord. 34(10): 608-10.

Pickelsimer E, Shiroma EJ, Wilson DA. (2010). Statewide investigation of medically attended adverse health conditions of persons with spinal cord injury. Journal Spinal Cord Medicine.33: 221.

Senel A, Kaya AH. (2010). Pharmacological Treatment in Spinal Cord Injury. In: E, Korfalı M, Zileli (Ed.), Basic Neurosurgery. Ankara: Turkish Neurosurgery Association Publications; 1637. (in Turkish)

Shahid H, Jabeen S, Aslam A. (2012). Prevalence of psychological problems and the quality of life of spinal cord injury patient. Gulf Medical Journal. 1(2): 15-18 03.05.15,

Silberstein B, Rabinovich S. (1995). Epidemiology of spinal cord injuries in Novosibirsk, Russia. Paraplegia. 33(6): 322-5.

Singh A, Tetreault L, Kalsi-Ryan S, Nouri A, Fehlings MG. (2014). Global prevalence and incidence of traumatic spinal cord injury. Clinical Epidemiology. 23(6): 309-31.

Somasundaram O, Balakrishnan S, Ravindran OS, Shanmugasundaram TK. (1992). A psychological study of spinal cord injured patients involved in the Madras paraplegia Project. Paraplegia. 30: 799-802.

Toygar B, Kotevoglu N, Ahmetoglu H. (2012). A retrospective review of clinical and demographic parameters in patients with spinal cord injury within last one year. Maltepe Medical Journal. 4: 31

Turner AP, Bombardier CH, Rimmele CT. (2003). A typology of alcohol use patterns among persons with recent traumatic brain injury or spinal cord injury: implications for treatment matching. Archive Physical Medicine and Rehabilitation.84(3): 358-64.

Ulusoy M, Sahin N, Erkman H. (1998). Turkish version of The Beck Anxiety Inventory: Psychometric properties. Journal of Cognitive Psychotherapy. 12: 28-35.

Williams R, Murray A. (2015). Prevalence of depression after spinal cord injury: A Meta-analysis. Archives of Physical Medicine and Rehabilitation. 96(1): 133-40.

World Health Organization. International Perspectives on Spinal Cord Injury. (2013), http://www.who.int/en/, Geneva, iv.

Yildiz N, Alkan H, Sarsan A, Ozgen M, Topuz O, Ardıc F. (2009). Comparison of the differences between traumatic and non-traumatic spinal cord injury. Turkish Journal Physical Medicine and Rehabilitation. 55: 50-4.