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Association between depressive symptoms and sexual dysfunction in men with traumatic spinal cord injury

Associação entre sintomas depressivos e disfunção sexual em homens com lesão medular traumática

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ABSTRACT

Introduction: Spinal cord injury results in loss of functional independence, autonomy and social status. This enormous change contributes to the appearance of depressive symptoms in this population. **Objective:** To evaluate depressive symptoms and sexual dysfunction in men with traumatic spinal cord injury, and to analyze their association. **Methods:** Observational study was performed with 44 men with traumatic spinal cord injury, age between 18 and 60 years, injury time over 1 year and active sexual life. The degree of neurological impairment was assessed through the revised 2011 ASIA Impairment Scale, depressive symptoms through the Beck Depression Inventory, and sexual function through the International Erectile Function Index. Descriptive statistics techniques and bivariate analysis were applied to verify association, using a level of significance of 0.05. **Results:** The volunteers had a mean age of 34.1 years, and an average injury time of 7.7 years. All individuals in the sample had lesion level above the medullary segment L2, with incomplete injury being the most frequent (68.2%). The mean time of the last sexual intercourse was 56.5 days and the weekly frequency of intercourse was the most reported (65.9%). Only 17.6% of the sample presented depressive symptoms, ranging from dysphoria (6.8%) to mild to moderate symptoms (6.8%). No association was found between depressive symptoms and sexual dysfunction, except for the domain of general satisfaction dysfunction (p=0.02). **Conclusion:** There is no association between depressive symptoms and sexual dysfunction in men with chronic spinal cord injury.

Keywords: sexuality; spinal cord injuries; erectile dysfunction; depression.

RESUMO

Introdução: A lesão medular acarreta em perda da independência funcional, autonomia e status social. Essa enorme mudança contribui para o aparecimento dos sintomas depressivos nessa população. **Objetivo:** Avaliar os sintomas depressivos e disfunção sexual em homens com lesão medular traumática, analisando a associação entre eles. **Métodos:** Estudo observacional, realizado com 44 homens com lesão medular traumática, idade entre 18 e 60 anos, tempo de lesão superior a um ano e vida sexual ativa. O grau de comprometimento neurológico foi avaliado através da versão revisada em 2011 da ASIA *Impairment Scale,* os sintomas depressivos através do Inventário de Depressão de Beck e a função sexual através do Índice Internacional de Função Erétil. Foram aplicadas técnicas de estatística descritiva e análise bivariada para verificar associação, utilizando um nível de significância de 0,05. **Resultados:** Os voluntários possuíam média de idade de 34,1 anos, e tempo médio de lesão de 7,7 anos. Todos os indivíduos da amostra tinham nível de lesão acima do segmento medular L2, sendo as incompletas as mais frequentes (68,2%). O tempo médio da última relação sexual foi de 56,5 dias e a frequência semanal de relação sexual foi a mais relatada (65,9%). Da amostra, apenas 17,6% tinham sintomas depressivos, sendo 6,8% com disforia e 6,8% apresentando sintomas leves a moderados. Não foi encontrada associação entre sintomas depressivos e disfunção sexual, exceto para o domínio da disfunção de satisfação geral (p=0,02). **Conclusão:** Não existe associação entre sintomas depressivos e disfunção sexual em homens com lesão medular crônica.

Palavras-chave: sexualidade; traumatismos da medula espinhal; disfunção erétil; depressão.

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INTRODUCTION

Sexual function is a very affected aspect after spinal cord injury, ranging from changes in sexual desire to erection, ejaculation and orgasm dysfunction, but severity depends on the level and complexity of the lesion[1,2]. This factor could seem minor when compared to loss of motor function and autonomy[3-7]. However, the recovery of sexual function is one of the patient's top priorities during the rehabilitation process[8].

Several studies in these individuals show the association of sexual function and quality of life[9-12]. As an important component in health and well-being, sexuality deserves special attention during the rehabilitation process, since the population affected after traumatic injury is predominantly male of reproductive and productive age[3].

The loss of functional independence, social status, along with numerous other factors resulting from the injury, contribute to psychological consequences, leading to severe impairment in relation to any form of treatment, making it difficult for these patients to recover[11].

After traumatic spinal cord injury there is a high prevalence of depressive episode when compared to the general population, about 10 to 30%[12,13]. Depressive behavior is considered one of the top ten causes of disability worldwide, and in patients with spinal cord injury, it has been associated with length of hospital stay, reduced functionality and performance during rehabilitation, and increased morbidity and mortality[14].

Against this scenario, it is important to assess whether there is a relationship between sexual function and depressive symptoms in individuals with traumatic spinal cord injury, as there are studies that evaluate depressive symptoms after spinal cord injury, but there is a shortage when associated with sexuality[15,16].

The aim of this study was to evaluate sexual dysfunction and depressive symptoms in men with chronic traumatic spinal cord injury and to analyze its association.

METHODS

This is an observational study. The sequential convenience sample consisted of males with traumatic spinal cord injury; injury time greater than 1 year, being considered chronic injury; ages 18 to 60 and with active sex life. Patients with erectile dysfunction associated with some other disease (metabolic or endocrine) were excluded; those who had surgery on the genital area (radical prostatectomy or penile implant) and difficulty understanding questions.

They were recruited during medical appointments or motor rehabilitation treatment sessions at specialized health services and considered as reference in the medical-hospital care of spinal cord injured. This study was approved by the Institutional Ethics Committee from Campus de Ciências da Saúde da Universidade Federal de Pernambuco (CCS/UFPE) under the Nº 41221414.5.0000.5208, and registered in *ClinicalTrials.Gov* under number NCT02958904.

Those who agreed to participate signed the Informed and Consent Term (ICT), proceeding with the comprehension assessment of questions by applying the Mini Mental State Examination (MMSE). It was considered as cutoff: 20 for illiterate; 25 education levels from 1 to 4 years old; 26.5 for 5 to 8 years; 28 points with 9 to 11 years of schooling and 29 for more than 11 years[17]. After tracking and confirming the participant's eligibility, the semi-structured form to collect personal and sociodemographic data was started. The interview and assessment were conducted in a private environment known to the participant, with only the evaluator, the patient and the companion being present.

After completing the form, the neurological examination was performed according to the guidelines of the *International Standards for Neurological Examination and Functional Classification of Spinal Cord Injury (ISNCSCI)*, using the revised 2011 version of the *Impairment Scale (AIS)*[18]. This determines the degree of neurological disability and its level of injury, assessing the sensory level and motor level in each hemibody separately. The evaluation of segment S4-S5 determines the complexity of the lesion, whether complete or incomplete[16,18]. The neurological examination was always performed according to the routine of the service, by an experienced evaluator and the clinical status of each participant was confidential.

The Beck Depression Inventory was used to detect depressive symptoms and assess disease severity. It consists of a 21-item scale, each containing four alternatives. The final score ranges from 0 to 3, indicating increasing degrees of depressive symptoms. Following the recommendations of the *Center for Cognitive Therapy,* ensuing cutoffs were adopted: scores lower than 15 indicate normality; from 15 to 20, dysphoria and above 20, mild to moderate depression[19].

While the assessment of sexual function was performed through the International Index of Erectile Function (IIEF). The instrument assesses five domains separately (erectile function, orgasm, sexual desire, satisfaction in intercourse and overall satisfaction), totaling 15 questions. The score of each question ranges from 0 or 1 to 5, generating a final score by summing the answers and grading the dysfunction into: mild, mild to moderate, moderate and severe, where low values indicate worse sexual function[20,21].

Data analysis was performed using the software *Statistical Package for Social Sciences* (SPSS) version 20.0, adopting a confidence level of 95%. Descriptive statistics techniques with tables were applied and for continuous data the results were presented as mean and standard deviation, whereas qualitative data, absolute and relative frequencies (%). For the quantitative variables, the test was performed Shapiro-Wilk to test data normality, not having normal distribution.

The relationship between the ordinal qualitative variables was observed through Cramer's correlation V. A bivariate analysis was also performed to observe the association between depression and sexual function, using the *OddsRatio* as a measure of risk association. This procedure was performed for each domain of the questionnaire separately, using binary logistic regression, using the method *Enter* with probability of entry of explanatory variable of 0.05 and removal of 0.10. A confidence level of 95% was adopted.

RESULTS

The study included 44 men with traumatic spinal cord injury, aged 18 to 56 years (mean 34.1 years) and chronic injury (mean 7.7 years). All individuals in the sample had lesion level above the L2 medullary segment, with incomplete lesions being the most frequent (68.2%) (Table 1).

The last sexual intercourse varied widely, between 1 and 355 days (average 62.1) and 65.9% had a weekly frequency of sexual intercourse. During sexual intercourse, 44% of individuals were using some medication to help erection, and 38.6% of participants had a fixed partner (Table 1). The Beck Depression Inventory showed depressive symptoms present in only 13.6%, ranging from disability (6.8%) to mild to moderate symptoms (6.8%) (Table 1).

When analyzing the degree of injury and the severity of depressive symptoms, no statistically significant association was observed between both groups, complete injury and incomplete injury (p=0.21) (Table 2).

When examining the IIFE domains separately, it was found that the highest prevalence of sexual dysfunction was in patients with no depressive symptoms, with no statistical association, except for the general satisfaction domain (p=0.02) (Table 3). Still related to the domains, the orgasmic function, followed by the erectile function, presented the largest and most severe dysfunction (Table 4).

Of the patients without depressive symptoms, 68.8% had mild dysfunction of general satisfaction while those classified as dysphoria, most had mild to moderate dysfunction (66.7%), and those with mild to moderate depressive symptoms most had moderate general satisfaction dysfunction (66.7%). Therefore, through the descriptive data we observed a linear relationship between the analyzes, where the worse the dysfunction of general satisfaction, the worse the depressive symptom (Table 4).

Table 1: Sample Characterization (n=44).

Variables	Average ± SD or n (%)
Age (years)	34.1±9.4
Level and degree of injury	
Above L2 Complete	14 (31.8)
Above L2 Incomplete	30 (68.2)
Injury time (years)	7.7±7.8
Causes of Trauma	
Motorcycle accident	13 (29.5)
Firearm Injury	13 (29.5)
Diving	7 (15.9)
Others	5 (11.4)
Car accident	3 (6.8)
High fall	2 (4.5)
Fixed partner (yes)	17 (38.6)
Time Since Last Sex (days)	62.1±112.6
Use of 5-phosphodiesterase inhibitor medication (yes)	15 (34.1)
Catheterization (yes)	31 (70.5)
Urinary incontinence (yes)	21 (47.7)
Erection type	
Reflexogenic	44 (100)
Mixed	25 (56.8)
Ejaculation (yes)	17 (38.6)
Frequency of intercourse	
Weekly	29 (65.9)
Monthly	15 (34.1)
Depressive Symptoms (BDI)	
Normal	38 (86.4)
Dysphoria	3 (6.8)
Mild to Moderate	3 (6.8)

BDI: Beck Depression Inventory; n (%): absolute frequency (relative frequency); SD: standard deviation.

Table 2: Depressive symptoms in patients with complete injury (n = 14) and incomplete injure (n=30).

Degree of injury	Severity of depressive symptoms			*p**
Above L2	Normal	Dysphoria	Mild to moderate	
Incomplete (n=30)	26/30 (86.7)	1/30 (3.3)	3/30 (10)	0.21
Complete (n=14)	12/14 (85.7)	2/14 (14.3)	0/14 (0)	

*Cramer's Correlation V; n (%): absolute frequency (relative frequency).

DISCUSSION

The present study found that spinal cord injury negatively interferes with sexual response. However, depressive symptoms are uncommon after six months of traumatic spinal cord injury and are not associated with sexual function except for general satisfaction dysfunction in men with incomplete spinal cord injury above the L2 spinal cord segment.

In the studied sample, all men had lesion level above L2, being the most frequent incomplete lesion (68.2%), besides maintaining an active sex life. This finding corroborates studies reporting incomplete injuries above the thoracolumbar level as predictors of active sexual life and satisfactory erections[2,22].

It is suggested that a longer injury time may be considered a facilitating agent for a more satisfactory sexual relationship, since with the chronicity of the lesion, there is usually a recovery of

sexual function through re-adaptation to the new condition, as well as the plasticity of nerve pathways responsible for autonomic commands and sexual function. Moreover, there is an improvement in testosterone levels and the discovery of other erogenous zones that compensate for the absence of genital sensation[23].

The present study, most of the lessons, has nothing to do with sexual comorbidity throughout the week, although it was one of the smallest causes of many factors, including related to non-physical factors such as: need for intimacy, self-esteem and presence of a partner[24].

However, although studies show that the presence of a steady partner can positively influence the maintenance of sexual practice after injury, rehabilitation and recovery of sexual function[25,26], in the sample studied, less than 40% had a fixed partner, which did not affect the frequency of sexual activity.

A small portion made use of 5-phosphodiesterase inhibitor drugs. For improving the erectile function of man, it can lead to a more satisfying sex life and fewer agents inhibiting pleasure and satisfaction, contributing positively to the patient's self-esteem,

Table 3: Bivariate analysis of sexual function and depressive symptoms (n=44).

Domains of IIEF (Dysfunction)	Depressive symptoms		p*	*Odds Ratio* (CI)**
	Yes (n=6) n (%)	No (n=38) n (%)		
Erectile (n=24)	4 (16.7)	20 (83.3)	0.67	1.8 (0.29 – 11.03)
Sexual desire (n=25)	5 (20.0)	20 (80.0)	0.21	4.5 (0.47 – 42.24)
Orgasmic (n=32)	5 (15.6)	27 (84.4)	1.00	2.0 (0.21 – 19.49)
Satisfaction in sexual intercourse (n=33)	6 (18.2)	27 (81.8)	0.31	-
Overall Satisfaction (n=22)	6 (27.3)	16 (72.7)	0.02	-

*Fisher's exact chi-square test corrected; **Odds Ratio as a measure of risk association between depressive symptoms and sexual dysfunction obtained through binary logistic regression; CI: Confidence Interval (95%); IIEF: International Index of Erectile Function.

Table 4: Profile of depressive symptoms in patients with different degrees of sexual dysfunction (n=44).

Severity of depressive symptoms	Degree of erectile dysfunction (n=24)			
	Light n (%)	Mild to moderate n (%)	Moderate n (%)	Severe n (%)
Normal (n=20)	13 (65.0)	4 (20.0)	3 (15.0)	0/20 (0)
Dysphoria (n=2)	0 (0)	1 (50.0)	1 (50.0)	0/2 (0)
Mild to moderate (n=2)	1 (50.0)	0 (0)	1 (50.0)	0/2 (0)
	Degree of dysfunction of sexual desire (n=24)			
	Light n (%)	Mild to moderate n (%)	Moderate n (%)	Severe n (%)
Normal (n=19)	15 (78.9)	4 (21.1)	0 (0)	0 (0)
Dysphoria (n=2)	1 (50.0)	0 (0)	1 (50.0)	0 (0)
Mild to moderate (n=3)	1 (33.3)	1 (33.3)	1 (33.3)	0 (0)
	Degree of orgasmic dysfunction (n= 32)			
	Light n (%)	Mild to moderate n (%)	Moderate n (%)	Severe n (%)
Normal (n=27)	0 (0)	12 (44.4)	9 (33.3)	6 (22.2)
Dysphoria (n=2)	0 (0)	0 (0)	0 (0)	2 (100)
Mild to moderate (n=3)	0 (0)	1 (33.3)	1 (33.3)	1 (33.3)
	Degree of sexual satisfaction dysfunction (n= 33)			
	Light n (%)	Mild to moderate n (%)	Moderate n (%)	Severe n (%)
Normal (n=27)	19 (70.4)	6 (22.2)	2 (7.4)	0 (0)
Dysphoria (n=3)	1 (33.3)	0 (0)	2 (66.7)	0 (0)
Mild to moderate (n=3)	0 (0)	2 (66.7)	1 (33.3)	0 (0)
	Degree of general satisfaction dysfunction (n=22)			
	Light n (%)	Mild to moderate n (%)	Moderate n (%)	Severe n (%)
Normal (n=16)	11 (68.8)	3 (18.8)	1 (6.2)	1 (6.2)
Dysphoria (n=3)	0 (0)	2 (66.7)	0 (0)	1 (33.3)
Mild to moderate (n=3)	0 (0)	1 (33.3)	2 (66.7)	0 (0)

n (%): absolute frequency (relative frequency).

being a factor in the onset of depressive symptoms related to sexual aspect[27]. However, other studies show that despite the effects relevant to erection, the use of the medication mentioned above did not result in satisfaction with sex life[11,28,29].

On the other hand, the presence of sexual dysfunction is considered as predictors of sexual satisfaction, either due to the inability to reach an orgasm, as well as reduced erection function and quality by overriding the restriction of mobility or type of disability[29].

This fact could be observed in this study, in which the orgasmic function was the domain that presented the largest and most severe dysfunction. Dalberg *et al.*[9], concludes that inability to reach orgasm among spinal cord injury patients is present in 35% of them, which may be explained by physiological effects and loss of sensory elements in male genital organs.

From the collected data, it was observed that a small part of the sample (17.6%) presented depressive symptoms, corroborating previous findings of low prevalence in patients with chronic spinal cord injury[30,31]. This finding could be related to the longer time after the injury, since there is evidence that the longer this time, greater knowledge of the injured body, in which the adaptation phase was passed and men begin to accept its trauma condition, learning to live with it as best as possible[32,33].

However, other authors defend the opinion that the existence of depressive symptoms would be more related to the characteristics inherent to each individual, and the spinal cord injury itself is not the determining factor in the manifestation of depressive symptoms[33]. However, psychological distress and depression have the greatest impact on health condition and quality of life[34].

Based on unscientific observations it is known that the worse the life of an individual with physical limitations, the higher the risk of developing high rates of depression, anxiety and hopelessness[33]. And all these factors are related to sexual dysfunction as well as sexual satisfaction after the injury[31].

When assessing the association between sexual function and depressive symptoms, no statistical difference was observed in most domains of IIFE, except that related to overall satisfaction. This fact could be explained by the predominance of the type of injury, difference in age and the duration of the participants injuries, which could have provided a good adaptation during this time after the injury.

Our findings on general satisfaction dysfunction show a direct relationship between depressive symptoms and dissatisfaction, noting that the worse the dysfunction, the worse the depressive symptoms presented. Therefore we can relate the magnitude of psychic suffering to the extent of physical harm.

The limitations of the study may be related to the relatively small sample size, the non-inclusion of patients with acute spinal cord injury, as well as the level of injury found. In addition, the research does not consist of objective tests, only questionnaires, relying on the patient's subjective report. Although this association was not found in most domains, the study was important because of the shortage of research about sexuality after spinal cord lesion, regarding the patient and the partner. It is important that healthcare professionals providing care to this audience are prepared to evaluate, treat and guide beyond the physical aspects, important issues for quality of life in order to improve attention during the rehabilitation process, with sexuality and the presence of depressive symptoms being a constant target of evaluation and treatment in this process.

In conclusion, the present study found no association between depressive symptoms and sexual dysfunction in men with chronic pain, except for the domain of general satisfaction.

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