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Predictive factors for sexual dissatisfaction in men after traumatic spinal cord injury

Josepha Karinne de Oliveira Ferro[1], Andrea Lemos[1], Suzana de Melo Padilha[2], Daniella Araújo de Oliveira[1]

[1]Departamento de Fisioterapia, Universidade Federal de Pernambuco (UFPE) – Recife (PE), Brazil

[2]Curso de Fisioterapia, Centro Universitário Brasileiro (UNIBRA) – Recife (PE), Brazil

Corresponding author: Josepha Karinne de Oliveira Ferro – Universidade Federal de Pernambuco (UFPE) – Avenida Prof. Moraes Rego, 1235 – Cidade Universitária – CEP: 50670-901 – Recife (PE), Brazil – E-mail: josepha.karinne@ufpe.br

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ABSTRACT

Introduction: In addition to motor and sensory losses, the urinary tract and sexual function are also affected by spinal cord injury, with sexual dysfunction being one of the most common problems in these patients and its severity depends on the level and complexity of the injury. This alteration of sexual function occurs due to changes in the neurophysiological process, but this mechanism and its association with sexual satisfaction are not well established. **Objective:** To analyze the association between clinical and psychosocial factors and sexual satisfaction in men after traumatic spinal cord injury, as well as predictive factors for sexual dissatisfaction after the injury. **Method:** Observational study performed with 45 men, with traumatic and sexually active spinal cord injury. The International Erectile Function Index assessed sexual function, and the level and grade of the lesion were determined following the guidelines of the International Standards for Neurological Examination and Functional Classification of Spinal Cord Injury. Bi and multivariate analysis was applied to observe the association between factors, with a significance level of 0.05. **Results:** 45 individuals with mean lesion time in years 7.5 (CI 5.2 - 9.9) were evaluated. Frequency of monthly sexual intercourse is a risk factor (OR: 11.69, 95% CI: 2.16 - 63.19) for sexual dissatisfaction, as well as orgastic dysfunction (OR: 10,13; 95% CI: 1, 33-77, 18). **Conclusion:** Infrequent sexual relations and orgastic dysfunction are predictors of sexual dissatisfaction after spinal cord injury.

Keywords: sexuality; spinal cord injuries; penile erection; erectile dysfunction; sexual dysfunctions, psychological.

INTRODUCTION

The loss of autonomy in previously physically active men, as well as motor, sensory, visceral, and sexual changes after spinal cord injury, are factors that influence self-image and self-confidence, impacting quality of life[1]. Compared to the loss of functional independence, altered sexual function may seem like a minor consequence of spinal cord injury[2]. However, sexual function is a vital component of health, as well as a fundamental factor in motivation, well-being, and sexual satisfaction[3-8].

There is evidence from neuroanatomical and functional studies of the relationship between the level of injury and erectile and ejaculatory function in men with spinal cord injury, caused by impairment of the descending pathways present in the spinal cord[2,9-11]. Sexual function, traditionally divided into desire, arousal, orgasm, and resolution, is associated with neurophysiological and psychosocial factors[10,12]. The severity of the dysfunction will depend on the level and complexity of the injury[13].

Factors such as time since injury, arousal, and the presence of genital sensation are positively correlated with desire, self-confidence, and the practice of sexual activity after spinal cord injury, also influencing orgasmic sensation and sexual satisfaction[8,14]. In addition to these physiological aspects, psychological factors such as a decrease in the perception of masculinity contribute to the loss or reduction of sexual identity, reducing the motivation to find a partner and readjust sexual function to the current condition[8,12] and, although individuals with spinal cord injury maintain an interest in sexual relations, sexual desire, and frequency are most often reduced after the injury[15-17].

However, sexual performance after spinal cord injury is still a little-studied topic and, despite its relevance, is neglected during the rehabilitation process. Thus, this study aims to analyze the association between clinical and psychosocial factors and sexual satisfaction in men

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after traumatic spinal cord injury, as well as predictive factors for sexual dissatisfaction after injury.

METHODS

This was an observational study conducted between March 2015 and January 2016. Forty-five men took part in the study, aged between 18 and 60, with a clinical diagnosis of traumatic spinal cord injury, heterosexuals with an active sex life and a duration of injury equal to or greater than six months, as this is the period during which they recover and readapt to their new condition. Patients with erectile dysfunctions are attributed to endocrine or metabolic disease, those who had undergone a surgical procedure in the genital region, such as radical prostatectomy or penile implantation, and those with cognitive impairment were excluded from the study. The study was approved by the Research Ethics Committee of the Federal University of Pernambuco under CAAE No. 41221414.5.0000.5208 and Opinion No. 973.648.

Participants were recruited during routinely scheduled appointments at health services in the city of Recife (PE) that provide specialized care to these people, through a sequential convenience sample. Those who agreed to take part in the study signed an informed consent form and underwent the following assessments.

After giving their consent, the participants underwent a cognition assessment using the Mini-Mental State Examination, with a cut-off point of 20 for illiterates and 29 for literates[18,19] and depressive symptoms using the Beck Depression Inventory, a self-report scale made up of 21 items[20-22]. The cutoff points adopted for assessing depressive symptoms were those determined by the Center for Cognitive Therapy, graded by the following scores: less than 15 = normal, from 15 to 20 = dysphoria, and above 20 = mild to moderate[20].

A semi-structured form was used to collect personal data (name, telephone number, age, and marital status before and after the accident), history of the injury (time of injury, cause,

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traumas associated with the spinal cord injury, surgery, level and degree of injury), habits (alcoholism, smoking, masturbation, frequency of sexual intercourse, use of medication to aid erectile function, implantation of penile prosthesis, bladder catheterization), associated diseases (cancer, diabetes, hypertension, pneumopathies, depression, psychiatric problems) and medication in use.

The detailed neurological assessment was conducted according to the guidelines of the International Standards for Neurological Examination and Functional Classification of Spinal Cord Injury (ISNCSCI) and the American Spinal Injury Association (ASIA)[23]. The ASIA Impairment Scale (AIS), which assesses the sensory and motor level in each hemibody and defines the level and complexity of the injury, was conducted by a single experienced assessor.

To assess sexual function, the International Index of Erectile Function (IIFE), an instrument translated and validated for use in Brazil, with adequate psychometric properties, was applied in the form of an interview[24-26]. The IIFE consists of 15 questions in five specific domains of male sexual function: erectile function (6 items); orgasm (2 items); sexual desire (2 items); satisfaction with sexual intercourse (3 items) and general satisfaction (2 items), resulting in a specific score for each component of sexual function separately. The erectile function domain has a minimum score of 1 and a maximum of 30, with 26 as the cut-off point. It can be classified into six categories: a score of 5 or less means that the individual does not have or has not tried to have sexual activity; scores of 6-10 mean severe erectile dysfunction; 11-16, moderate; 17-21 mild to moderate; 22-25 mild erectile dysfunction and 26-30 means no dysfunction[25].

For the domains of sexual desire, orgasmic function, and general satisfaction, 9 is used as the cut-off point, with lower scores being classified as dysfunction. For sexual satisfaction, the cut-off point is 13 for dysfunction [24].

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All the procedures were conducted in a private environment previously known to the participant, with only the evaluator, patient, and companion in the room. The importance of the research and the need for collaboration were emphasized so that the information provided was real, minimizing measurement bias.

Perceived sexual satisfaction was considered the dependent variable. Variables such as sexual function, level and degree of neurological injury, medication in use, associated diseases, age, time of injury, 5-phosphodiesterase inhibitor medication, depressive symptoms, masturbation, catheterization, urinary incontinence, type of erection, ejaculation, sexual intercourse in the last month, frequency of sexual intercourse and steady partner were classified as independent variables of interest and were possible explanatory factors for dissatisfaction.

During the statistical analysis, two variables of interest were grouped and categorized. The level of injury, based on the neurophysiology of erectile function, was classified into just one group, characterizing injuries above the L2 spinal cord segment. The degree of neurological impairment was categorized into two groups: complete lesions (AIS A) and incomplete lesions (AIS B, C, D, and E).

The Statistical Package for Social Sciences (SPSS) software version 16.0 was used for the analysis, using descriptive statistics with means, confidence intervals, and absolute and relative frequencies. As well as being based on clinical and neurophysiological aspects, the independent variables were selected using Pearson's chi-square test of independence, selecting variables with a p-value of up to 0.2 as candidates for the adjusted logistic regression model.

To analyze the multiple factors associated with sexual dissatisfaction, a multivariate analysis was conducted using a binary logistic regression model, calculating the Odds Ratio (95% Confidence Interval) as a measure of risk association and the probability of sexual dissatisfaction according to the possible explanatory factors. This procedure was conducted for each domain of the questionnaire separately. The Forward Stepwise Conditional method was

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used to select the model, with a probability of entering the explanatory variable of 0.05 and removing it at 0.10.

RESULTS

A total of 95 individuals with a diagnosis of traumatic spinal cord injury were consulted, but only 51 met the eligibility criteria and only 45 were able to complete all the stages of the study by completing the planned assessments and questionnaires. Of the 44 individuals excluded, 31 did not have an active sex life, one had a penile prosthesis and 12 refused to take part in the study.

Forty-five men aged between 18 and 56 years, with a mean age of 34.0 (CI 31.2 - 36.8), and time since injury between 0.5 and 32 years made up the sample (Table 1). The most common etiology of injury was firearm injury (31.1%), followed by motorcycle accidents (28.9%) and diving (15.6%).

After the neurological assessment, incomplete lesions above the L2 spinal cord segment were the most frequent (66.7%) and only 13.4% of the sample had depressive symptoms, ranging from dysphoria (6.7%) to mild to moderate symptoms (6.7%) (Table 1).

When sexual function was assessed, orgasmic dysfunction (73.3%) and sexual satisfaction (75.6%) were the components most affected after spinal cord injury. The weekly frequency of sexual intercourse was the most frequently reported in the sample studied (64.4%), ranging from one to four times a week (Table 1).

After the bivariate analysis (Table 2), the following variables were candidates for the adjusted logistic regression model: sexual intercourse in the last month (p=0.07); depressive symptoms (p=0.10); frequency of sexual intercourse after injury (p=0.0006); psychogenic erection (p=0.11); erectile dysfunction (p=0.04); orgasmic dysfunction (p=0.05); general

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dissatisfaction (IIFE) (p=0.01), and only variables with a p-value >0.05 were individually associated with sexual dissatisfaction.

Table 3 shows the multivariate analysis of sexual dissatisfaction and, when controlling for other factors (adjusted OR), only two variables were considered explanatory: frequency of sexual intercourse after the injury (weekly or monthly) and orgasmic dysfunction (yes or no). Individuals with a monthly frequency of sexual intercourse were 11.69 times more likely to be sexually dissatisfied than those with a weekly frequency (p=0.004), and men with orgasmic dysfunction were 10.13 times more likely to be dissatisfied (p=0.02). Considering the probability of sexual dissatisfaction in terms of the explanatory variables, men with a monthly frequency of sexual intercourse and orgasmic dysfunction had an 86% probability of dissatisfaction, while those with a weekly frequency had a 36% probability (Table 4).

DISCUSSION

Spinal cord injury is more prevalent in young adult men in the productive and reproductive phase, with traumatic injury being the most common cause[27-29], confirming the data found in this study.

As this is a sudden and unexpected change in the lives of individuals and their families, the uncertainty of the moment and the changes can lead to depressive symptoms. Our findings corroborate data in the literature on depressive symptoms about the chronicity of the injury, proving that the longer the injury, the better the individual adapts to the new condition, through self-knowledge and acceptance of the body after the trauma[30]. Thus, there is a reduction in psychological stress and depressive symptoms in these patients, as well as psychosocial adaptation over time as a form of coping strategies[31].

Sexual dysfunction after spinal cord injury is associated with both physiological and psychological factors[15,32]. The severity of the dysfunction will depend on the complexity of the

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injury and the integrity of the sexual function neural circuit. Thus, the preservation of the integrity of the sympathetic pathway in the thoracolumbar region and the parasympathetic sacral pathway are determining factors in maintaining erectile and ejaculatory functions, considering the difficulty of having or maintaining an erection or reaching orgasm to be the main factors that interfere with sexual satisfaction[7,10,33].

Decreased or lost ejaculatory function and sensitivity below the spinal cord segment, including the genital region, is another contributing factor to sexual dysfunction, especially reduced arousal, satisfaction, and orgasm[8,14,34], confirming our findings on sexual dysfunction, in which orgasmic function (73.3%) and sexual satisfaction (75.6%) were the most compromised in men with lesions below the L2 spinal cord segment.

Esses dados divergem de outros estudos que descrevem a disfunção erétil como a mais acometida, sendo superior a 75% dos indivíduos[7,17,29]. No entanto, essas divergências encontradas podem ser devido às diferenças clínicas dos indivíduos, bem como o tempo e a cronicidade da lesão.

The length of time since the injury is an important variable when it comes to recovering sexual activity and function, as recovery and readaptation to the new condition occur after six months of injury. Individuals in the chronic phase accept their conditions and allow themselves to develop skills, stimulation, and rediscovery of new erogenous areas that often compensate for the absence of genital sensation[27,35]. After the spinal cord shock phase, in addition to the neuroplasticity of sexual function, there is an increase in testosterone levels, improving sexual desire and arousal[36].

The return to activity and recovery of sexual function after the injury is considered one of the main priorities for recovery, remaining a motivating factor and improving self-esteem[37]. Thus, the impact of the injury goes beyond the loss of functional independence and affects the psychological and socialization of the individual, since the alteration of sexual orientation and

the feeling of inferiority are influential factors for readaptation, reintegration, development of self-confidence and consequent post-injury satisfaction[1].

Despite the reduction in performance and frequency after the injury, studies show that sexual interest remains high and, as the years go by and the sexual response adapts, the frequency can be re-established[1,35]. The return to sexual activity is influenced by the presence of a relationship after the injury, contributing to the maintenance of sexual practice, rediscovery of stimuli and erogenous areas, and sexual satisfaction[12]. This fact corroborates our findings that infrequent sexual relations are associated with dissatisfaction.

Psychogenic erection occurs through the excitation of the brain with sensory stimuli and is responsible for maintaining erection during penetration[9]. The ability to maintain an erection and the sensation of orgasm is related to satisfaction in sexual intercourse[8,27], confirming the data found in this study in which orgasmic function and psychogenic erection were possible explanatory variables for dissatisfaction. In addition to physiological factors, psychosocial conditions, knowledge, and society's perception of sexuality after spinal cord injury influence satisfaction[12,29,35].

Orgasm is defined as the sensation of pleasure derived from sexual intercourse, and after injury, it also undergoes considerable changes due to the difficulty in getting or maintaining an erection and altered genital sensations and is positively correlated with sexual satisfaction[15,27]. Our data shows that orgasmic dysfunction and the frequency of sexual intercourse are predictive factors of sexual dissatisfaction.

Despite its relevance, sexuality after spinal cord injury is still a topic that is rarely addressed in rehabilitation centers, whether in terms of guidance or treatment. There is a need to encourage research that evaluates sexual function in all genders and sexual orientations, as well as intervention and clinical applicability studies to improve the performance and sexual

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and general satisfaction of these affected individuals. Our results are limited by the size and characterization of the sample, as well as by the fact that this is a self-report observational study.

Conclusion

There is an association between infrequent sexual intercourse, orgasmic dysfunction, and sexual satisfaction in men after spinal cord injury, and these are considered predictors of dissatisfaction.

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Table 1: Sociodemographic data, clinical and sexual characteristics of the sample (n=45)

Variables	Mean ± SD (95% CI) | n (%)
Age (years)	34.0 ± 9.3 (IC 31.2 – 36.8)
Time of Injury (years)	7.5 ± 94.3 (IC 5.2 – 9.9)
Time since last sexual intercourse (days)	56.5 ± 87.2 (IC 30.3 – 82.7)
Fixed partner (yes)	17 (37.8)
Use of medication before sexual intercourse (yes)	18 (40.0)
Level and Degree of Injury	
Above L2 Incomplete	30 (66.7)
Above L2 Complete	15 (33.3)
Causes of Trauma	
Firearm injury	14 (31.1)
Motorcycle accident	13 (28.9)
Diving	7 (15.6)
Other	5 (11.1)
Car Accident	3 (6.7)
Fall from height	2 (4.4)
Stab wound	1 (2.2)
Depressive symptoms (BDI)	
Normal	39 (86.7)
Dysphoria	3 (6.7)
Mild to Moderate	3 (6.7)
Catheterization	32 (71.1)
Urinary incontinence	21 (46.7)
Type of erection	
Reflexogenic	45 (44.4)
Mixed	25 (55.6)
Ejaculation (Yes)	17 (37.8)
Frequency of sexual intercourse	
Weekly	29 (64.4)
Monthly	16 (35.6)
Erectile dysfunction - IIFE (Yes)	25 (55.6)
Sexual desire dysfunction - IIFE (Yes)	26 (57.8)
Orgasmic dysfunction - IIFE (Yes)	33 (73.3)
Sexual satisfaction dysfunction - IIFE (Yes)	34 (75.6)
General satisfaction dysfunction - IIFE (Yes)	23 (51.1)

BDI - Beck Depression Inventory | n (%) = absolute frequency (relative frequency) | *SD* Standard Deviation| I.C.= Confidence Interval (95%)

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Table 2: Results of the bivariate analysis to explain sexual dissatisfaction according to the independent variables (n=45)

		Sexual dissatisfaction		
		Yes n (%)	**No n (%)**	***p-value*[a]**
Sexual intercourse in the last month b	**Yes**	11/32 (34.4)	21/32 (65.6)	0.07
	No	9/13 (69.2)	4/13 (30.8)	
Depressive symptoms (BDI) b	**Yes**	5/6 (83.3)	1/6 (16.7)	0.10
	No	15/39 (38.5)	24/39 (61.5)	
Frequency of sexual intercourse after injury	**Weekly**	8/29 (27.6)	21/29 (72.4)	0.006
	Monthly	12/16 (75.0)	4/16 (25.0)	
Psychogenic erection	**Yes**	8/25 (32.0)	17/25 (68.0)	0.11
	No	12/20 (60.0)	8/20 (40.0)	
Erectile dysfunction (IIFE)	**Yes**	15/25 (60.0)	10/25 (40.0)	0.04
	No	5/20 (25.0)	15/20 (75.0)	
Orgasmic dysfunction (IIFE)	**Yes**	18/33 (54.5)	15/33 (45.5)	0.05
	No	2/12 (16.7)	10/12 (83.3)	
General dissatisfaction (IIFE)	**Yes**	15/23 (65.2)	8/23 (34.8)	0.01
	No	5/22 (22.7)	17/22 (77.3)	

Only the results of variables with a p-value ≤ 0.2 were included in the table. CI: 95% confidence interval; a Pearson's chi-square test of independence. [b] Explanatory variables candidates for the adjusted logistic regression model.

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Table 3: Results of the multivariate analysis to explain sexual dissatisfaction.

Sexual dissatisfaction				
Explanatory variables	**Coefficient**	**Standard error**	***p-value*[a]**	***Odds Ratio Adjusted (95% CI)***
Frequency of sexual intercourse (Monthly)	2.45	0.86	0.004	11.69 (2.16 – 63.19)
Orgasmic dysfunction (Yes)	2.31	1.03	0.02	10.13 (1.33 – 77.18)
Constant	**- 2.88**	**1.05**	**0.006**	**-**

CI: 95% confidence interval; aValue obtained from the adjusted logistic regression model.

Table 4: Probabilities estimated by the logistic regression model for the occurrence of sexual dissatisfaction according to the possible explanatory factors.

Sexual Dissatisfaction (YES)			
		Frequency of sexual intercourse after injury	
Orgasmic dysfunction		Weekly	Monthly
(IIFE)	Yes	36%	86%
	No	-	39%

IIFE: International Index of Erectile Function.

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