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ORIGINAL REPORT

SPORTS PRACTICE, RESILIENCE, BODY AND SEXUAL ESTEEM, AND HIGHER EDUCATIONAL LEVEL ARE ASSOCIATED WITH BETTER SEXUAL ADJUSTMENT IN MEN WITH ACQUIRED PARAPLEGIA

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Objective: **To analyse the association of team sports practice and physical and psychological factors with sexual adjustment in men with paraplegia. More specifically, we aimed to compare athletes and non-athletes regarding sexual adjustment, resilience, body and sexual self-esteem, and functional independence.**

Design: **Cross-sectional study with a paired design.**

Participants: **The study included 60 men with paraplegia (30 athletes and 30 non-athletes).**

Methods: **We used a sociodemographic questionnaire (age, education, and time since injury); a physical and sexual esteem questionnaire; a resilience questionnaire; and Functional Independence Measure (FIM). The dependent variable, sexual adjustment, was determined by the sum of 5 questions about sexual frequency, desire, and satisfaction and physical and psychological adjustment. Data were analysed by using the χ^2 test, Wilcoxon's test, Spearman's correlation test, and hierarchical multiple linear regression analysis, with $p < 0.05$.**

Results: **The mean age of the participants was 34.8 years (standard deviation (SD) 8.5). Athletes had significantly higher sexual adjustment ($p = 0.001$) and higher body and sexual esteem ($p < 0.007$) and functional independence ($p = 0.019$). Variables associated with better sexual adjustment in the final model were sports practice, higher body and sexual esteem, higher educational level, and higher resilience levels ($R^2 = 58\%$). There was an interaction between sports practice and body and sexual esteem ($p = 0.024$; $R^2 = 62\%$).**

Conclusion: **Participation in sports influenced the sexual adjustment of the men with paraplegia, even when controlled for psychological (resilience and body and sexual esteem) and physical (functional independence) aspects.**

Key words: spinal cord injuries; sexuality; sexual function; sports; paraplegia.

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INTRODUCTION

Spinal cord injury (SCI) has profound consequences that affect the biological, psychological, emotional, social, and cultural spheres of the patient's life. Sexuality can become a critical component of self-expression in patients with SCI due to changes ranging from sexual inadequacies of a psychological or environmental origin to sexual dysfunction of a physiological nature (1–3).

The term sexual adjustment began to be studied as a variable of the sexuality of patients with SCI based on survey-type studies (3–5). These studies created scales of sexual adjustment, encompassing sexual satisfaction, desire, and frequency. By studying the sexual adjustment of men with SCI, Phelps et al. (3) found that perceived partner satisfaction, sexual desire, and sexual repertoire were correlated with sexual adjustment.

The loss of genital sensation and erectile function and difficulties with bowel and bladder control interfere with body image, sexual function, and self-esteem (4). Some authors report that psychosocial factors are most important for satisfaction with sex life and relationships (5). Others cite physical and social independence and a good sense of humour as positive determinants of sexual adaptation after the injury, given that the neurological level and magnitude of the injury showed no significant correlation with sexuality (6). In line with these data, Phelps et al. (3) found that function and genital sensation were not significantly related to sexual satisfaction.

Other aspects of sexuality in SCI that have also been studied are the issues of physical and sexual esteem. Most of the studies that evaluated the effect of disability on these aspects reported a deleterious effect (7). Another aspect that influences the sexuality of individuals with SCI is resilience (8). The level of resilience can demonstrate to what extent a person with an altered physical state is prepared to accept their disability, breaking free from preconceived notions in order to be integrated into society (9).

Sports practice is another important aspect related to greater satisfaction with sex life and overall satisfaction in men with spinal cord injury (10). It is estimated that the practice of physical activity in people with disabilities helps them to discover their potential and their limitations and leads to better self-knowledge, which, combined with successful experiences,

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contributes to increased confidence, improved self-image, self-esteem, and initiative.

The characteristics mentioned above are often studied separately, which leads to the question of which of these would be most important to predict sexual adjustment in men with SCI. Thus, the main objective of this study was to analyse the association of team sports practice and physical and psychological factors with sexual adjustment in men with paraplegia. More specifically, we aimed to compare athletes and non-athletes regarding sexual adjustment, resilience, body and sexual self-esteem, and functional independence.

METHODS

Study design

This research is characterized as a cross-sectional comparative and association study with a paired design. This research used this peculiar methodological design to optimize the control of neurological level and completeness of the injury. Therefore, we firstly evaluated available athletes with SCI who participated in regional competitions, and as a control group, we selected men with SCI who were non-athletes (i.e. who did not practice any kind of sports after they acquired paraplegia) and who best paired with each athlete evaluated in this study.

Participants and settings

The study comprised 60 men with acquired paraplegia, regardless of cause, including 30 wheelchair basketball and/or handball athletes and 30 non-athletes. The inclusion criteria for athletes were as follows: men with SCI with paraplegia level; age > 18 years; at least one year since injury; participation in wheelchair sports (basketball and handball) and regional competitions for at least 6 months. For non-athletes, the criteria were no sports practice, and similar characteristics to the athletes assessed as to type of injury (complete or incomplete) and neurological level of injury.

Athletes were selected from the wheelchair basketball and handball teams. The non-athletes were selected from the database of the State Rehabilitation Center (SRC) of the last 10 years. Out of 260 records, 85 were eligible. Of these, we selected 30 individuals who could be paired with the athletes according to type and level of injury and included those who were more accessible, i.e. who lived in the Greater Florianópolis area. After telephone contact, the evaluations were performed at home or at the SRC. In both data collection settings, participation in this study was voluntarily. For sample size determination, we considered the availability of athletes with SCI and the time we had to finish the research dissertation.

This study was submitted to the Ethics Committee of the State University of Santa Catarina and approved under number 31018914.2.0000.0118. All participants signed an informed consent form to be included in the study.

Instruments

In the interview, we used a structured questionnaire with demographic data (age, marital status, education, and time since injury in years), questionnaire on physical and sexual esteem, a resilience scale, and the Functional Independence Measure (FIM), which are the independent variables of the study. We applied the questionnaires in interview form to all participants because the low educational level of some of them might have interfered with the comprehension of the questions. The interviewer was a woman. The entire procedure took approximately 30 min per participant.

The neurological level was obtained based on the International Standards for Neurological Classification of Spinal Cord Injury. Severity/completeness of injury was obtained with the American Spinal Injury Association (ASIA) impairment scale (AIS), in which patients were classified into 2 categories: complete (Level A) and incomplete (Levels B, C, D, and E). This evaluation was performed by an experienced physiatrist of a public institution using international recommendations (11).

The dependent variable, sexual adjustment, was determined by the sum of 5 questions about sexuality: "What is your sexual frequency?" (0 = none, 1 = once a week, 2 = twice a week; 3 = 3 times a week; 4 = 4 times a week; 5 = 5 times a week; 6 = 6 times a week; 7 = daily); "How would you rate your desire to have sex after spinal cord injury?" (visual analogue scale of 0–10, where 0 is no desire and 10 is great desire); "How satisfied are you sexually after SCI?" (0–10, where 0 is not at all and 10 is very satisfied); "How well do you think you have adapted sexually in physical terms (ability to do what you want to do physically during sex) after SCI"? (0–10, where 0 is not well and 10 is very well); "How well do you think you have adapted sexually in psychological terms (self-esteem, sexual esteem, self-confidence, assurance) after SCI?" (0–10, where 0 is not well and 10 is very well). The total score ranges from 0 to 47. The selection of these items was based on previous studies that analysed sexual adjustment in individuals with SCI (3–5). Internal consistency was assessed in the present study with a Cronbach's alpha of 0.87.

The questionnaire on physical and sexual esteem was developed by Taleporos & McCabe (12) and validated in Brazil for people with physical disabilities (13). The respondents answer 10 questions on a 5-point Likert scale (1 = strongly agree to 5 = strongly disagree), based on the convention that higher values on the scale denote higher body and sexual self-esteem. The total score ranges from 10 to 50.

Resilience was assessed with the Resilience Scale (14) validated in Brazil for people with physical disabilities (15). It consists of 25 items described positively with Likert-type responses ranging from 1 (strongly disagree) to 7 (strongly agree). The score ranges from 25 to 175 points, with higher scores indicating greater resilience.

The Functional Independence Measure (FIM) is an assessment tool of disability of people with functional restrictions. Its objective is to evaluate quantitatively the load of care required to perform a series of motor and cognitive tasks of daily living. Among the activities evaluated are self-care, mobility, walking, toilet training, communication, and social cognition, which includes memory, social interaction, and problem solving. Each of these activities is evaluated and given a score of 1 (total dependence) to 7 (complete independence), so the total score ranges from 18 to 126. This functional assessment tool was translated into Portuguese in Brazil in 2000 (16).

Data analysis

The data were analysed in SPSS with descriptive statistics reporting frequencies, means, standard deviations, medians, and interquartile ranges. In both groups (athletes and non-athletes), we tested the normality distribution of age, time since injury, sexual adjustment, resilience, sexual and body esteem, and FIM with the Shapiro-Wilk test. Of these variables, only sexual adjustment was normally distributed. Therefore, to compare athletes and non-athletes who had been paired for this study, we used a paired *t*-test for sexual adjustment and the Wilcoxon test for all other previously specified variables. To compare sexual adjustment between men who lived with their partner and those who did not, we used an independent *t*-test.

We calculated the Spearman's correlation coefficient for each pair of variables. The data followed the assumptions for linear regression, which consists in linearity and normality of residuals (Kolmogorov-Smirnov, $p = 0.200$), normal dependent variable, homoscedasticity (residuals graph showed random distribution of the points around 0), and no perfect multicollinearity. The variance inflation factor (VIF) was calculated to assess multicollinearity; values above 10 can be considered an indication of multicollinearity (17). In addition, bivariate correlations between variables were less than 0.95 (17).

A hierarchical multiple linear regression model was developed with 3 blocks: (*i*) time since injury, educational level; (*ii*) physical and psychological: resilience score, body and sexual esteem score, and FIM score; (*iii*) team sports practice (yes, no). The significance level was set at $p < 0.05$ for all tests. For sample size, a minimum of 10 events for each independent variable was assumed (17). Based on the scientific

Table I. *Age, time since injury, sexual adjustment, body and sexual esteem, resilience, and Functional Independence Measure (FIM) of athletes and non-athletes with spinal cord injury*

Variables	All ($n=60$)	Athletes ($n=30$)	Non-athletes ($n=30$)	p-value
Age, years, median (IQR)	33 (12)	32 (7)	34.5 (14)	0.465*
Time since injury, years, median (IQR)	5 (4)	7 (4)	3 (3)	<0.001*
Sexual adjustment (0–47), mean (SD)	25.1 (8.7)	29.3 (7.6)	21.0 (7.7)	0.001**
Sexual and body esteem (10–50), median (IQR)	37 (15)	40.5 (15)	32 (17)	0.007*
Resilience (25–75), median (IQR)	154 (28)	154 (11)	143.5 (39)	0.063*
FIM (18–126), median (IQR)	115 (4)	117 (3)	114 (9)	0.019*

*Wilcoxon test; **paired Student's *t*-test. SD: standard deviation; IQR: interquartile range.

literature, the order of entry was defined in a hierarchical fashion so that well-known predictors were inserted first, according to their importance (Fig. 1). After that, we inserted the innovative factor "sports practice" in the model as a dummy variable with finite values (0=no; 1=yes). Educational level was also dummy coded (1=incomplete secondary education or lower, 2=complete secondary education or higher).

The interaction terms between the team sports practice variable adjusted for the other independent variables of the final model were tested on STATA. We did not use centred variables in order to simplify the interpretation of coefficients.

RESULTS

Characterization of the participants

The participants of this study had a mean age of 34.3 years (standard deviation (SD) 8.5; range: 19–60), with a mean of 5.4 years of time since injury (SD 3.6; range 1–17). Regarding educational level, 31.7% (($n=19$) had elementary education, 48.3% ($n=29$) had high school education, and 20% ($n=12$) had higher education.

Most participants (53.3%; $n=32$) lived with their partner. There was no difference in sexual adjustment between the men who lived with their partner (mean 24.8, SD 9.7) and those who did not (mean 25.5, SD 7.5) (t=0.3; df=58; $p=0.763$).

Age, time since injury, sexual adjustment, and psychological and physical characteristics were compared in terms of sports practice (Table I). Sexual adjustment was significantly higher among athletes, as well as the variables body and sexual esteem, and FIM (Table I). In contrast, age and resilience did not differ between athletes and non-athletes ($p>0.05$). The percentage of male athletes and non-athletes who lived with their partners showed no significant difference in the distribution according to the χ^2 test (non-athletes=12; athletes=20; $p=0.07$).

The level and completeness of injury of each pair of participants (Table II) was between T1 incomplete and L3 complete injury.

Table II. *Classification of level and completeness of injury for each pair of participants (athletes and non-athletes)*

Level of injury	Completeness of injury
T1	Incomplete
T1	Complete
T2	Incomplete
T4	Incomplete
T5	Incomplete
T5	Complete
T5	Complete
T6	Complete
T6	Complete
T6	Complete
T7	Incomplete
T7	Complete
T8	Incomplete
T8	Complete
T9	Incomplete
T9	Incomplete
T9	Complete
T10	Complete
T11	Incomplete
T11	Incomplete
T12	Incomplete
T12	Incomplete
T12	Complete
T12	Complete
L1	Incomplete
L1	Complete
L2	Complete
L2	Complete
L3	Incomplete
L3	Complete

Association between sexual adjustments with sports practice and physical and psychological factors

Sexual adjustment was correlated positively, $p<0.05$, with body and sexual esteem (r=0.633), resilience (r=0.541), FIM (r=0.322), time since injury (r=0.305), and educational level (r=0.254). Resilience was significantly correlated with body and sexual esteem (r=0.517), FIM (r=0.424) and time since injury (r=0.405). Body and sexual esteem correlated with FIM (r=0.477) and time since injury (r=0.386). FIM was correlated with time since injury (r=0.380).

In the first block (independent variables: time since injury and educational level), hierarchical multiple linear regression analysis (Table III, Fig. 1) showed a low explanatory power

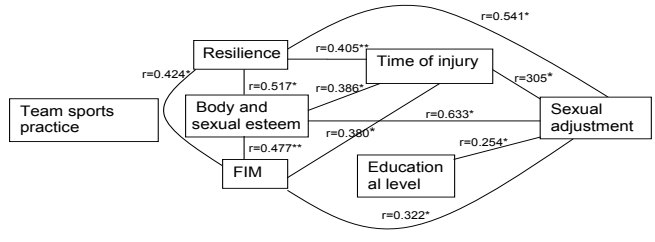

Fig. 1. Model of hierarchical analysis showing the correlations between variables (*=significant at $p<0.05$). FIM=functional independence measure.

Table III. *Variables associated with sexual adjustment in individuals with acquired paraplegia (*n = *60)*

Blocks	B	SE B	β	R2	F	*p*-value
Injury and education				0.191	6.70	
Constant	13.48	3.38				
Time since injury, years	0.48	0.320	0.187			0.138
Educational level[a]	5.98	2.139	0.346			0.007*
Physical and psychological				0.517	11.54	
Constant	12.35	15.22				
Time since injury, years	0.09	0.28	0.03			0.747
Educational level[a]	5.98	1.70	0.35			0.001*
Resilience (range 25–75)	0.98	0.03	0.32			0.003*
Body and sexual esteem (range 10–50)	0.32	0.78	0.46			<0.001*
FIM (range 18–126)	–0.21	0.14	–0.16			0.155
Team sports practice				0.586	12.51	
Constant	17.00	14.30				
Time since injury, years	–0.36	0.30	–0.01			0.235
Educational level[a]	5.12	1.62	0.30			0.003*
Resilience (range 25–75)	0.11	0.03	0.36			0.001*
Body and sexual esteem (range 10–50)	0.26	0.07	0.37			0.001*
FIM (range 18–126)	–0.24	0.14	–0.18			0.083
Team sports practice (0 = no; 1 = yes)	6.07	2.03	0.35			0.004*

*Significant for $p < 0.05$.
#Educational level (1 = incomplete secondary education or lower, 2 = complete secondary education or higher).
FIM: functional independence measure: SE B: standard error of B.

for sexual adjustment in men with SCI ($R^2 = 19\%$), and only educational level was associated with sexual adjustment. In the second block, with the inclusion of the variables resilience, body and sexual esteem, and FIM, the explanatory power increased ($R^2 = 52\%$), and educational level, resilience, and body and sexual esteem were significantly associated with sexual adjustment. In the final block, with the inclusion of team sports practice, there was a slight increase in the percentage of explained variance ($R^2 = 58\%$). Therefore, the variables that were associated with sexual adjustment were educational level, resilience, body and sexual esteem, and sports practice.

By analysing interaction terms between team sports practice and each independent variable adjusted in the final model, we identified that there was a significant interaction between sports practice and body and sexual esteem ($p = 0.024$; $R^2 = 62\%$). Meanwhile, time since injury ($p = 0.114$; $R^2 = 60\%$), educational level ($p = 0.510$; R2=59%), resilience ($p = 0.818$; $R^2 = 59\%$), and FIM ($p = 0.603$; $R^2 = 59\%$) did not present significant interactions.

DISCUSSION

The present study found that, of the variables inserted into the hierarchical regression model (time since injury, educational level, resilience, body and sexual esteem, FIM, and team sports practice), the predictors of better sexual adjustment among men with SCI were sports practice, higher body and sexual esteem, higher educational level, and higher resilience levels.

Therefore, in this study, sports practice played a major role in predicting sexual adjustment. Regular exercise and sports practice have been identified as important means of preventing and countering different pathologies (19, 20). It is undeniable that regular exercise has an even greater significance in groups with special needs (20, 21). The literature on the therapeutic effect of sports among people with disabilities is quite extensive and shows that sports practice leads to improved motor pattern, gains in strength, cardiorespiratory fitness, and psychological benefits especially in terms of improving the self-concept and perception of body image (22, 23). However, few studies have aimed to investigate the influence of sports on the sexuality of people with SCI. A cross-sectional study in Portugal concluded that all variables related to sexuality had significantly higher means among the athletes with SCI, demonstrating the importance of sport as a sexual rehabilitation tool of these individuals (10).

In addition, we identified an interaction between sports practice and body and sexual esteem adjusted for the final regression model. In contrast, there was no interaction between sports practice and all other independent variables. It is possible that the higher level of body and sexual esteem found in athletes with SCI explains their better sexual adjustment; however, this would not apply to non-athletes with SCI. In the study by Taleporos & McCabe (24), the authors found that body and sexual esteem were positively correlated with sexual satisfaction, perceived sexual attractiveness to others, and to individual and mutual sexual activity. Later, the same authors concluded that body and sexual esteem were strong predictors of self-esteem in people with physical disability (25). We understand that sports practice can also improve body shape, which explains the athletes' better body and sexual esteem; but unfortunately, we did not control for anthropometric variables in this study.

In this study, resilience was also correlated with and predictive of sexual adjustment. Previous studies with people without SCI showed higher scores of resilience in athletes

when compared with sedentary individuals (12–15). Sport has the ability to enhance athletic identity and self-esteem, so that individuals who practice sport develop the confidence to face and deal with their deficiencies (12–15). However, we found no studies that evaluated the relationship between resilience and sexual adjustment in males with SCI. We can assume that resilience in athletes is related to an increased likelihood of athletic achievement and positive psychological effects, which contributes to sexual adjustment after SCI. According to Machida et al. (26), the development of resilience in athletes with SCI is a multifactorial process involving pre-existing factors and pre-adversity experiences, disturbing emotions, various types and sources of social support, special opportunities and experiences, different behavioural and cognitive strategies, and motivation to adapt to change.

The FIM, although not associated with sexual adjustment in the multivariate model, was positively correlated with sexual adjustment and had a significantly higher mean among the male athletes. Another study (27) concluded that sports practice in individuals with SCI resulted in gains related to transfers, general motor aspects, and total score. The functional variables evaluated in the FIM, such as reduced mobility, reliance on others to perform functional activities, and obtaining control of involuntary emptying of the bladder and bowel, may affect sexual adjustment (28, 29).

In this study, a higher educational level predicted better sexual adjustment. This result is in agreement with Kreuter et al. (5), who concluded that higher levels of education were correlated with better sexual adjustment in people with SCI. In the meantime, Martins et al. (29) found positive correlations between socioeconomic status and sexual esteem among athletes with physical disabilities.

The limitations of this study were that the study design was not randomized and the pairing did not consider time since injury, a factor that was different between groups despite not being significant in the regression model. Another possible source of bias of this study is that the interviewer was a woman, and some studies suggest that men tend to overestimate their sexual life when talking to a woman (33). However, to minimize this bias, the same female evaluator interviewed both athletes and non-athletes. We suggest that future studies test the hypothesis of this study in a randomized clinical trial to evaluate the effects of sports on sexual adjustment. We also encourage further investigations aimed at identifying these results comparing the sexes.

Nevertheless, our study has contributed to the literature as one of the few studies to compare the sexual adjustment of male athletes and non-athletes with SCI and to pair the individuals according to the level and type of injury in order to reach a more reliable result in terms of functional level.

In conclusion, based on our results, we conclude that men with SCI who practice sports and who have a higher educational level, body and sexual esteem, and resilience also have better sexual adjustment levels. There was an interaction between sports practice and body and sexual esteem. These results demonstrate another benefit of sports for individuals with SCI among those already described in the literature, i.e. improved performance in activities of daily living, better physical and social well-being, and reduced incidence of clinical complications.

Therefore, we recommend that multidisciplinary teams working with rehabilitation encourage individuals with SCI to take part in sports and recreational activities, emphasizing aspects such as self-esteem, body esteem, psychological adjustment, and cooperation. In addition, when some patients lose interest in their treatment programs, sports can be added as a break from the routine of rehabilitation, keeping in mind the health benefits that they provide to the patients.

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