

Comparison of perceived disability and functional independence in individuals with spinal cord injury athletes and non-athletes

Comparação da incapacidade percebida e independência funcional em indivíduos com lesão medular atletas e não atletas

Comparación de incapacidad percibida e independencia funcional en individuos con lesión medular atletas y no atletas

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ABSTRACT | Functional impairment in individuals with spinal cord injury (SCI) generate secondary complications, with preponderant physical deconditioning and an exacerbation of injury complications. The objective was to evaluate the perceived disability and functional independence in athletes and non-athletes with SCI. The WHODAS 2.0 and SCIM III questionnaires were applied to 37 volunteers with SCI and their sociodemographic data were collected. The total scores of WHODAS 2.0 and SCIM III of individuals with thoracic SCI and cervical SCI were compared using the Mann-Whitney test. Regarding the perceived disability, a significant difference was found in WHODAS 2.0 among athletes and non-athletes with thoracic SCI. As to functional independence, no significant differences were found between groups in SCIM III. Although the sports practice promotes health benefits, no significant differences were found in the group of individuals with cervical SCI, which can be explained by these individual's higher degree of motor impairment.

Keywords | International Classification of Functioning; Disability and Health; Physical Therapy Specialty; Spinal Cord Injuries; Physical Activity.

RESUMO | Os comprometimentos da funcionalidade em indivíduos com lesão medular (LM) geram complicações secundárias, sendo o descondicionamento físico preponderante e um exacerbador das complicações da lesão. O objetivo foi avaliar em atletas e não atletas com LM a incapacidade percebida e a independência funcional. Os questionários WHODAS 2.0 e SCIM III foram aplicados em 37 voluntários com LM e seus dados sociodemográficos foram coletados. Os escores totais do WHODAS 2.0 e SCIM III de indivíduos com LM torácica e LM cervical foram comparados por meio do teste de Mann-Whitney. Quanto à incapacidade percebida observou-se diferença significativa no WHODAS 2.0 entre atletas e não atletas com LM torácica. Em relação à independência funcional não houve diferenças significativas entre os grupos no SCIM III. Apesar de a prática esportiva promover benefícios para a saúde, no grupo de indivíduos com LM cervical não foram encontradas diferenças significativas, o que pode ser explicado pelo maior grau de comprometimento motor desses indivíduos.

Descritores | Classificação Internacional de Funcionalidade; Incapacidade e Saúde; Fisioterapia; Traumatismos da Medula Espinal; Atividade Física.

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RESUMEN | Las disfunciones funcionales en personas con lesión de médula espinal (LME) generan complicaciones secundarias. El malo condicionamiento físico es preponderante y un exacerbador de las complicaciones de la lesión. El objetivo fue evaluar la discapacidad percibida y la independencia funcional en atletas y no atletas con LME. Los cuestionarios WHODAS 2.0 y SCIM III se aplicaron a 37 voluntarios con LME que tuvieron sus datos sociodemográficos colectados. Se compararon las puntuaciones totales de WHODAS 2.0 y SCIM III de individuos con LM torácica y cervical mediante la prueba de Mann-Whitney. Con respecto a la discapacidad percibida,

se observó una diferencia significativa en WHODAS 2.0 entre atletas y no atletas con LME torácico. En cuanto a la independencia funcional, no hubo diferencias significativas entre los grupos en SCIM III. Aunque los deportes promueven beneficios para la salud, no se encontraron diferencias significativas en el grupo de individuos con LME cervical, lo que puede explicarse por el mayor grado de deterioro motor en estos individuos.

Palabras clave | Clasificación Internacional del Funcionamiento, de la Discapacidad y de la Salud; Fisioterapia; Lesiones de Médula Espinal; Actividad Física.

INTRODUCTION

Spinal cord injury (SCI) is an aggression to the spinal cord that generates neurological damage and causes alterations in the lifestyle, with partial or total loss of motricity and sensitivity, besides causing vasomotor, bowel, bladder and sexual dysfunction^{1,2}. Functional impairment in individuals with SCI may vary and restrict their activities of daily living (ADL), causing different levels of dependence.

Although the loss of movements is the main consequence after a SCI, those who live with functional sequelae are usually prone to complications that affect their quality of life and often increase the use of health services^{1,3}. Physical deconditioning, musculoskeletal injuries, pain, osteoporosis, and depression are among the most common complications²⁻⁴. Physical deconditioning is preponderant among people with SCI, and it may exacerbate injury complications, since the loss of physical fitness and reduction in the independence associated with inactivity directly affect the physical and psychosocial well-being^{3,5}.

Athletes with SCI are individuals with SCI who practice sports⁶. Physical, recreational or sporting activities, proposed to individuals with SCI, have great therapeutic value. Their benefits include improvement of wheelchair propulsion, dynamic and static equilibrium, motor coordination, physical endurance, as well as the improvement of neuromotor aspects, physical rehabilitation and insertion in social groups, which minimizes the vulnerability to which these individuals are exposed^{3,7-10}.

ADL are fundamental skills that involve caring for oneself and the body, personal care, mobility and feeding¹¹. Individual functionality in a specific domain

is a complex interaction or relationship between the health condition and contextual (environmental and personal) factors¹².

Considering the functionality of individuals with SCI relates to their levels of physical activity, which interferes in their activities, participation and quality of life, this study evaluated the perceived disability and functional independence in ADL through the questionnaire World Health Organization Disability Assessment Schedule (WHODAS 2.0) and quantified functional independence, through the instrument Spinal Cord Independence Measure – Self Reported Version (SCIM III), in athletes and non-athletes with SCI and between subgroups by injury level.

METHODOLOGY

A cross-sectional study was performed, which consisted of individuals with SCI, athletes and non-athletes. To participate in the study, the following criteria were considered in both groups: (1) volunteers between 18 and 50 years; (2) post-injury time exceeding one year; (3) signature of the informed consent form. In addition, practicing sports for more than six months was a criterion for athletes. Individuals who presented other neurological dysfunctions besides SCI were excluded. Patients who reported receiving only physical therapy were considered non-athletes.

For the characterization of the sample, sociodemographic data were collected, and the functionality was assessed using the WHODAS 2.0¹³⁻¹⁷, and the ADL, using SCIM III. We opted to apply the questionnaires during interviews to avoid interpretation errors.

Sociodemographic data were assessed using descriptive statistics (mean and standard deviation). The frequency distribution of sex between groups was analyzed using the Fisher's exact test. The total scores of WHODAS 2.0 and SCIM III were compared among individuals with thoracic SCI and cervical SCI, using the Mann-Whitney test. The adopted significance level was $p < 0.05$. For statistical analyses, we used the free statistical program R, version 3.4.3.

RESULTS

Table 1 shows a profile of the sample with sociodemographic data¹⁸, such as: schooling, sex, time of injury, and time of sports practice. The sample consisted mainly of young adults with SCI, with a mean age of 33.4 ± 8.1 (athletes) and 38.3 ± 10.5 (non-athletes). In both groups, we observed the time of injury was longer than 10 years (12.4 ± 7.5 among athletes; 13.2 ± 8.8 among non-athletes).

Table 1. Sociodemographic data of the sample and results of the questionnaires WHODAS 2.0 and SCIM III

Variable	n (%)	Athletes (n=24)	Non-athletes (n=12)	P-value
Sex				
Female	5 (13.9)	3 (12.5)	2 (16.7)	0.99
Male	31 (86.1)	21 (87.5)	10 (83.3)	
Age - years		33.4±8.1	38.3±10.5	0.179
Time of injury - years		12.4±7.5	13.2±8.8	0.920
Schooling				
Illiterate	0 (0)	0 (0%)	0 (0%)	
Elementary school	2 (5.6)	1 (50%)	1 (50%)	
Some high school	3 (8.3)	0 (0%)	3 (100%)	
High school	18 (50)	16 (88.9%)	2 (11.1%)	
Technical level	1 (2.8)	0 (0%)	1 (100%)	
Some college	7 (19.4)	4 (57.1)	3 (42.9%)	
College degree	5 (13.9)	3 (60%)	2 (40%)	
Total		24 (66.7%)	12 (33.3%)	
Injury level				
Cervical SCI	16 (47.2)			
Thoracic SCI	18 (50%)			
Lumbar SCI	3 (8.3%)			
Sacral SCI	0 (0.5%)			
Time of injury - years (mean ± standard deviation)	12.6±7.8			
Activity level				
Athlete	24 (66.7)			
Non-athlete	12 (33.3)			
Time of practice - months (mean ± standard deviation)	64.8±24.5			
WHODAS 2.0 (mean ± standard deviation)	64.6±15.8	61.5±15.6	71.0±14.9	0.059
SCIM III (mean ± standard deviation)	48.9±14.2	49.9±13.8	46.7±15.3	0.391

SCI: Spinal cord Injury, WHODAS 2.0: World Health Organization Disability Assessment Schedule; SCIM III: Spinal Cord Independence Measure - Self Reported Version.

Considering the variables age and the total score in WHODAS 2.0 and in SCIM III, no significant differences were found regarding functionality and independence among athletes and non-athletes in the total sample. In the subgroup analysis by the WHODAS 2.0 questionnaire, comparing the

individuals by the injury level, a difference was observed in the functionality among athletes and non-athletes with thoracic SCI, with better results for the group of athletes (Table 2). Since the number of individuals with lumbar SCI was little expressive, we did not include them in this analysis.

Table 2. Sociodemographic data of the sample and scores of the questionnaires WHODAS 2.0 and SCIM III

Injury	Variable	Athlete	Non-athlete	P-value
Cervical	AGE	n=12 34.3±8.4	n=4 41.8±9.5	- -
	WHODAS 2.0	69.9±12.6	73.8±18.9	0.855
	SCIM III	44.0±14.8	42.5±15.8	0.503
	AGE	n=10 33.6±7.8	n=8 36.5±11.1	- -
Thoracic	WHODAS 2.0	54.2±15.1	69.6±13.7	0.013*
	SCIM III	55.6±10.3	48.8±15.7	0.154

*significant differences for $p < 0.05$.

DISCUSSION

The levels of perceived disability and functional independence were not influenced by the sociodemographic characteristics, but rather the injury level. The statistical analysis showed a difference among athletes and non-athletes with thoracic SCI, in the result of WHODAS 2.0.

Regarding socioeconomic variables, the findings of this study are in line with the literature, as the average age between the groups of athletes and non-athletes with SCI corresponds to the economically active portion¹⁹⁻²¹. The prevalence of SCI in this population is a social problem because it strongly affects professional activity and life perspective, including the people around it.

Regarding schooling, the studies found no connection between the schooling level and the aptitude for self-efficacy in disability management. However, education programs aimed at these individuals show a promising approach to help them manage secondary conditions, often preventable²²⁻²⁴.

The time of injury was longer than 10 years in this sample, indicating adapted and functional individuals in their health conditions. Although SCI requires a continuous rehabilitation program, a high number of individuals do not attend it, and less frequent is the practice of physical activity^{25,26}.

This is the first study investigating the relationship between perceived disability and functional independence in individuals with SCI, athletes and non-athletes, through WHODAS 2.0 and SCIM III. Several studies use SCIM III in the population with SCI to assess functional independence in ADL. Osterthun et al.²⁷ used SCIM III to assess functional recovery in people with SCI and verified the existence of a strong correlation of the motor score of upper limbs with the domain of self-care²⁸⁻³⁰.

Studies confirmed that in a large and heterogeneous sample, SCIM III is a valid and reliable measure of functional recovery of the individual with SCI³¹⁻³⁶. Mulcahey et al.³⁷ assessed the psychometric properties of SCIM-III in a population with acute and chronic SCI and, through the analysis of the total scores of the self-care subscale, confirmed that there were differences between the neurological level and internal and external mobility, even though they have observed a ceiling effect. We conjecture that this has occurred due to the high functional level shown by the sample studied.

In this study, the non-athletes received physical therapy, being functionally trained. Thus, possible differences among athletes and non-athletes could be noticeable in other untested physiological parameters, for example, oxygen consumption.

As to WHODAS 2.0, the scientific literature is scarce in studies on the assessment of functionality in individuals with SCI. The study by Kuo et al.³⁸ was conducted with patients with traumatic brain injury (TBI) and SCI, observing that patients with TBI presented higher difficulties in cognition, Interaction and participation, while patients with SCI showed difficulties in mobility and self-care. Studies comparing the efficiency of WHODAS 2.0 with other scales, linking quality of life, activity and participation affirmed that WHODAS 2.0 is ideal, as it contains objective and subjective information and presents minimum floor and ceiling effects^{37,39}.

Hossain et al.⁴⁰ developed a study with a sample composed of individuals with SCI after hospital discharge. By using several scales and the participation component of WHODAS 2.0, they reported the harsh reality about the quality of life of these people, showing that many are in a situation of vulnerability and social risk. They observed that most participants had a schooling level up to high school and probably low income or pension values. The study by Kader et al.⁴¹, using WHODAS 2.0, identified sociodemographic factors and elements related to SCI that limited activities and participation, indicating injury level and place of residence as major aggravating circumstances.

The non-significant difference in relation to the SCIM III can be attributed to a young profile of the sample and to the fact that the individuals receive neurofunctional rehabilitation. In contrast, WHODAS 2.0 provides a broader biopsychosocial vision, allowing us to perceive a significant difference between the groups of athletes and non-athletes with thoracic SCI.

It is unknown how some aspects not covered in this study influence the results obtained, for example, the athletes do not practice the same sport modality; not all of them have physical therapeutic follow-up in their clubs, and they do not have the same schooling or socioeconomic level.

CONCLUSION

Although sports practice promotes health benefits, we verified the difference among athletes and non-athletes with thoracic SCI only in the WHODAS 2.0 result. Among the participants with cervical injury, no significant differences were observed, which can be explained by these individuals' higher degree of motor impairment. The limitation of a small number of participants shall be considered, especially in the group of non-athletes with cervical injury.

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