Article

Arq Neuropsiquiatr 2011;69(3):513-518

Application of International Classification of Functioning, Disability and Health (ICF) in individuals with spinal cord injury

Janaina Vall[1], Carlos Mauricio de Castro Costa[2], Laura França Pereira[3], Tatiane Temmy Friesen[3]

ABSTRACT

After spinal cord injury is common functionality is affected. **Objective:** To evaluate the functionality of patients with spinal cord injury. **Method:** Cross-sectional study by means of the International Classification of Functionality (ICF). 109 adults with spinal cord injury in the city of Curitiba, Brazil were evaluated. **Results:** The categories most compromised in body were intestines and bladder, sexuality, energy, sleep, emotion and weight. In the domain activities and participation, there was greater difficulty in tasks of bathing, toilet and dressing, self care and leisure. In the domain environmental factors, the categories classified as facilitators were: medications, orthoses and wheelchair, attitude of family, transport, social foresight and health services. The categories classified as barriers were: attitude of authorities, social attitudes, education and work. **Conclusion:** The application of the ICF in persons with spinal cord injury demonstrated a series of disabilities and limitations.

Key words: spinal cord injury, International Classification of Functioning, disability and health, rehabilitation.

CIF - Classificação Internacional de Funcionalidade após lesão medular

RESUMO

Após uma lesão medular, a funcionalidade do indivíduo é comumente afetada e fatores diversos estão envolvidos neste processo. **Objetivo:** Classificar a funcionalidade de pacientes com lesão medular. **Método:** Estudo transversal por meio da aplicação da Classificação Internacional de Funcionalidade (CIF). Foram avaliados 109 adultos com lesão medular na cidade de Curitiba, Brasil. **Resultados:** As categorias mais comprometidas em relação às funções do corpo foram intestino e bexiga, sexualidade, energia, sono, emoção e peso. No domínio atividades e participação, as maiores dificuldades foram nas tarefas de tomar banho, toalete, vestuário, autocuidado e lazer. No domínio fatores ambientais, as categorias classificadas como facilitadores foram: medicamentos, órteses e cadeira de rodas, atitude da família, transporte, previdência social e serviços de saúde. As categorias classificadas como barreiras foram: atitude de autoridades, atitudes sociais, educação e trabalho. **Conclusão:** A aplicação da CIF em pessoas com lesão medular permitiu demonstrar uma série de limitações nesses pacientes.

Palavras-chave: paraplegia, Classificação Internacional de Funcionalidade, incapacidade e saúde, reabilitação.

A spinal cord injury is a chronic health condition in which the individual loses certain functions, no longer being able to exercise them in the same way as before the injury. These persons acquire disabilities, in which they are no longer seen

Correspondence
Janaina Vall
Rua José Nicco 105
81200-300 Curitiba PR - Brasil
E-mail: janaina_vall@yahoo.com.br

Received 19 April 2010
Received in final form 20 December 2010
Accepted 10 January 2011

[1]PhD in Medical Sciences, MSc in Nursing, Federal University of Ceará. Coordinator of the "Liga sem Dor", Curitiba PR, Brazil; [2]Full Professor of Physiology/Neurology of the Federal University of Ceará, Fortaleza CE, Brazil (in memoriam); [3]Nurses Graduation of UniBrasil, Members of "Liga sem Dor", Curitiba PR, Brazil.

under a linear model (in which, there is a disease that leads to a disability, incapacity and handicap), but under the interactive model (with neutral terminology, which emphasizes positive experiences instead of "disability"). In the interactive model, the disability is seen as a limitation that restricts the participation of affected persons in activities, not necessarily leaving them handicapped in relation to people without disabilities[1].

In Brazil, there are more than 130,000 people with spinal cord injury, with increasing annual incidence due to automobile accidents and urban violence[2]. Thus, the rehabilitation of these persons is of great importance, because his successful aims to diminish symptoms, increase independence and a return to regular activities. Above all, the goal of rehabilitation is to enhance quality of life, since a cure is rarely not achieved.

However, rehabilitation requires knowledge of the alterations physics, psychic and social, that each individual shows and his special needs. There is no rehabilitation package in which all achieve the same activities. Therefore, there are scales, inventories and questionnaires, among others, which may guide the health care professional in the elaboration of a rehabilitation care plan for these persons, where the principles of integrality are followed. In rehabilitation, the health professional's vision of this process is very important[3].

Among these instruments is the International Classification of Functionality, Disability and Health (ICF). This is one of the members of the International Classification Family of the World Health Organization - WHO and describes how people live with their health condition. The ICF is a classification of health that describes the functions and structures of the body and activities and participation of individuals in society. The domains are classified as Body Functions and Body Structures, Activities and Participations, and Environmental Factors.

This study, was structured according to the Brazil's Human Rights Program, designed to evaluate the functionality of patients with spinal cord injury, through the use of the International Classification of Functionality.

METHOD

A cross-sectional study was carried out in 109 patients with spinal cord injury (traumatic and non-traumatic - infections and tumors), followed in different referral centers caring for these persons in the city of Curitiba, Parana, Brazil, appraised during 2008. The following characteristics of the participants were analyzed: sex, age, marital status, occupation, schooling, etiology, neurological status, type of injury and time with injury.

The instrument for collecting data was the ICF, translated and validated for the Portuguese[1], which encompasses all aspects of human health related to well-being and describes them in terms of domains of health and domains related to health. It provides a description of situations related to functions of the human being and restrictions and serves as a structure for organizing this information. It organizes the information in a manner that is significant, integrated and easily accessible. The ICF places information into two sections. The first part refers to functionality and to disability, while the second covers the contextual factors. In the first part, the structures and functions of the body and activities of participations are evaluated, and in the second, the approaches with regard to environmental factors are considered[1].

ICF was already used in Brazil in other pathologies as fibromyalgia, stroke and hypertension, but not for spinal cord injury.

In the case of the spinal cord injury, ICF is an important tool, because it evaluates from the functions of the body, forms of accomplishment of the activities of daily life and involved environmental factors. Other instruments cannot embrace that amount of information.

The qualifiers of Body Functions "slight disability" and "moderate disability" were grouped together, as well as "serious disability" and "complete disability." In the same manner for Activities and Participation, so were "slight difficulty" and "moderate difficulty" and "serious difficulty" and "complete difficulty." However, in the Environmental Factors the only qualifiers utilized were "no barrier or facilitator," "facilitator" or "barrier," without considering degree (slight, moderate, serious or complete).

The study was approved by the Committee of Ethics of the State Ministry of Health of Curitiba, and followed as well the guidelines and laws of Brazil concerning research in humans and the patients signed an informed consent.

For statistical analysis, the distributions of frequencies, means, medians and standard deviations were calculated for the variables studied. The chi-squared test was utilized for univariate analysis. The tests where the probability (p) was equal or less than 0.05 were considered significant.

RESULTS

The demographic and clinical characteristics of the participants are summarized in Table 1, where we can see a predominance of males and that most of the patients are young literate adults. Clinically, the etiology of their spinal cord injury was gunshot or traffic accident, and most of them remained paraplegic. There was not a significant difference as to the type of injury (complete or incomplete). Most of the patients were chronic as to the time of injury.

Table 1. Demographic and clinical characteristics of patients with spinal cord injury (n=109).

Category		Total N	Total %
Sex			
Male		92	(84.4)
Female		17	(15.6)
Age			
<21		9	(8.3)
21 to 40		73	(67.0)
41 to 50		14	(12.8)
>51		13	(11.9)
Mean	32.88		
Standard deviation	11.72		
Median	30		
Marital status			
Single		44	(40.4)
Married		50	(45.9)
Other		15	(13.8)
Occupation			
Not working		28	(25.7)
Working		22	(20.2)
Retired		35	(32.1)
Other		24	(22.0)
Schooling			
Illiterate		11	(10.1)
Basic education		54	(49.5)
Moderate education		38	(34.9)
Higher education		6	(5.5)
Etiology			
Gunshot wound		49	(45.0)
Fall from height		12	(11.0)
Knife wound		5	(4.6)
Traffic accident		36	(33.0)
Non-traumatic		7	(6.4)
Neurological status			
Paraplegic		79	(72.5)
Tetraplegic		30	(27.5)
Type of injury			
Incomplete		43	(39.4)
Complete		66	(60.6)
Time with injury			
<1 year		17	(15.6)
1 to 5 years		55	(50.5)
>5 years		37	(33.9)

The administration of the ICF to individuals with spinal cord injury demonstrated a series of disabilities and limitations related to body functions, activities and participation and environmental factors, as shown in Table 2, 3 and 4, which present only the categories that reached statistical significance.

Table 2 shows that in the domain "Body Functions," the categories most compromised were intestines and sexuality, qualified as "serious or complete disability." The

Table 2. ICF Part 1: Body functions in individuals with spinal cord injury (n=109).

	Category / Qualifier	Total Freq.	Total %	P value*
b130 Energy	Disability none	26	23.9	0.0001
	Disability slight or moderate	54	49.5	
	Disability serious or complete	29	26.6	
b134 Sleep	Disability none	41	37.6	0.0091
	Disability slight or moderate	43	39.4	
	Disability serious or complete	25	22.9	
b152 Emotion	Disability none	31	28.4	0.0000
	Disability serious or moderate	54	49.5	
	Disability serious or complete	24	22.0	
b530 Weight	Disability none	31	28.4	0.0000
	Disability serious or moderate	54	49.5	
	Disability serious or complete	24	22.0	
b525 Intestines	Disability slight or moderate	24	22.0	0.0000
	Disability serious or complete	85	78.0	
b620 Bladder	Disability slight or moderate	89	81.7	0.0000
	Disability serious or complete	20	18.3	
b640 Sexuality	Disability slight or moderate	42	38.5	0.0000
	Disability serious or complete	67	61.5	
b8 Skin	Disability none	56	51.4	0.0040
	Disability slight or moderate	30	27.5	
	Disability serious or complete	23	21.1	

*Result obtained by chi-squared test. ICF: International Classification of Functionality.

Table 3. ICF Part 2: Activities and participation in individuals with spinal cord injury (n=109)

	Category / Qualifier	Total Freq.	Total %	P value*
D510 Bathing	Difficulty none	4	3.7	0.0000
	Difficulty slight or moderate	70	64.2	
	Difficulty serious or complete	35	32.1	
D530 Toilet	Difficulty none	3	2.8	0.0000
	Difficulty slight or moderate	71	65.1	
	Difficulty serious or complete	35	32.1	
D540 Dressing	Difficulty none	2	1.8	0.0000
	Difficulty slight or moderate	71	65.1	
	Difficulty serious or complete	36	33.0	
D550 Eating	Difficulty none	80	73.4	0.0000
	Difficulty slight or moderate	3	2.8	
	Difficulty serious or complete	26	23.9	
D570 Self care	Difficulty none	4	3.7	0.0104
	Difficulty slight or moderate	62	56.9	
	Difficulty serious or complete	43	39.4	
D760 Family Relations	Difficulty none	83	76.1	0.0000
	Difficulty slight or moderate	15	13.8	
	Difficulty serious or complete	11	10.1	
D920 Leisure	Difficulty none	11	10.1	0.0000
	Difficulty slight or moderate	65	59.6	
	Difficulty serious or complete	33	30.3	

*Result obtained by chi-squared test. ICF: International Classification of Functionality.

categories energy, sleep, emotion, weight and bladder were found to be compromised, but qualified as "slight or moderate disability." Skin was the least compromised, as it was qualified as "no disability."

In the domain "Activities and Participation," as shown in Table 3, the categories bathing, toilet, dressing, self care and leisure showed "slight or moderate difficulty" to carry out, where no item indicated "serious or complete difficulty." This result can be explained by the fact that the sample involved in this work consisted mainly of paraplegics and not tetraplegics who have greater difficulty in performing these tasks. The categories eating and relation with family were qualified as "no difficulty." The item eating can be explained in the same manner.

In the domain "Environmental Factors," as shown in Table 4, the categories classified as "facilitator" were: medications, orthoses, wheelchair/crutches, attitude of family, transportation, social foresight and health services. However, the categories classified as "barrier" were: attitude of authorities, social attitudes, home policies, education and work. The attitudes of friends were classified as "no facilitator or barrier."

Table 4. ICF Part 3: Environmental factors in individuals with spinal cord injury (n=109).

		Total		p
	Category / Qualifier	Freq.	%	value*
E110 Medications	No barrier or facilitator	15	13.8	0.0050
	Facilitator	64	58.7	
	Barrier	11	10.1	
	Not applicable	19	17.4	
E115 Orthoses	Facilitator	55	50.5	0.0000
	Barrier	6	5.5	
	Not applicable	48	44.0	
E120 Wheel chair/ crutches	Facilitator	98	89.9	0.0000
	Not applicable	11	10.1	
E310 Attitude of family	No barrier or facilitator	11	10.1	0.0000
	Facilitator	84	77.1	
	Barrier	14	12.8	
E320 Attitude of friends	No barrier or facilitator	68	62.4	0.0000
	Facilitator	21	19.3	
	Barrier	20	18.3	
E330 Attitude of authorities	No barrier or facilitator	28	25.7	0.0004
	Facilitator	27	24.8	
	Barrier	54	49.5	
E360 Social attitudes	No barrier or facilitator	12	11.0	0.0000
	Facilitator	17	15.6	
	Barrier	80	73.4	
E525 Home	No barrier or facilitator	9	8.3	0.0000
	Facilitator	7	6.4	
	Barrier	93	85.3	
E540 Transport	No barrier or facilitator	4	3.7	0.0000
	Facilitator	98	89.9	
	Barrier	7	6.4	
E570 Social foresight	No barrier or facilitator	6	5.5	0.0000
	Facilitator	71	65.1	
	Barrier	32	29.4	
E580 Health	No barrier or facilitator	8	7.3	0.0000
	Facilitator	67	61.5	
	Barrier	34	31.2	
E585 Education	No barrier or facilitator	13	11.9	0.0000
	Facilitator	15	13.8	
	Barrier	81	74.3	
E590 Work	No barrier or facilitator	13	11.9	0.0000
	Facilitator	15	13.8	
	Barrier	81	74.3	

*Result obtained by chi-squared test. ICF: International Classification of Functionality.

DISCUSSION

Since very few studies with ICF and spinal cord injury exist, this study has as purpose to verify in details the body, activities and participation, as well as environmental factors in patients with spinal cord injury[4]. Thus, the discussion of the results of this study is carried out in the light of other general publications related to individuals with of spinal cord injury and their quality of life and specific complications.

In a doctoral thesis presented in a public hospital in São Paulo in 2002, ICF was administered to 40 patients with sequelae of chronic diseases and injuries due to external causes, including spinal cord injuries. In this study, the main disabilities were related to urinary and fecal continence function of force and muscle tone[5].

Nicastro and coworkers[6] showed common alterations mainly in weight gain, so that these individuals tend to increase their body mass index after a spinal cord injury due mainly to diminution in mobility[6].

According to the National Spinal Cord Injury Database[7], 87.8% of people with spinal cord injury live at home. Before the injury, the majority were single (52.3%), and for married individuals, the probability of the marriage remaining stable after the injury is lower compared to the population in general[7].

Skin was classified as not being affected in this study, but it is known that lesions of the skin, caused mainly by pressure ulcers are common in patients with spinal cord injury, in which these sores predominate in earlier phases of the injury. Obalum[8] reports that the major complication after spinal cord injury is ulceration due to pressure, occurring in 59.9% of patients[8]. In the present study, skin lesions were not often detected, perhaps because the sample studied consisted mainly of patients between one and five years of injury.

A study that analyzed 165 persons with spinal cord injury in Denmark showed that the main complications due to spinal cord injury are: neurogenic intes-

tines in 7% of cases, pressure ulcers in 4%, spasticity in 1%, mental health in 3% and neurogenic bladder in 14%[9]. Other studies also confirm these findings, showing that the main sequelae are pressure ulcers (most times in the sacral region) and intestinal and vesical sphincter alterations[10].

In the emotional aspect, Antunes[11] reports a transformation in the identity of individuals who acquire a physical disability in adulthood. In a study of persons who use a wheelchair due to spinal cord injury, patients reported in the acute phase disorganization and moving toward emotional hegemony[11].

The patient with spinal cord injury frequently shows reactions of aggressiveness, depression, anxiety, angst, social isolation, ambivalence and hope. However, the personality structure before the injury influences the link established with the disease, with family, friends and health care professionals[12].

In the domain "Activities and Participation," other aspects connected to this aspect can be discussed.

A study conducted in Brasilia (Brazil) shows that some nursing diagnoses found in more than 50% of patients with spinal cord injury are: impaired physical mobility, deficit in self care for bathing/hygiene, dressing/grooming, alteration in bowel elimination - constipation or intestinal incontinence, total urinary incontinence, alteration in sensory perception - acute pain and risk of dysreflexia[13].

The universal deficits of self care that emerge with greater evidence in those with spinal cord lesion were: difficulty with breathing, deficit in the quality of foods eaten, deficit in sufficient intake of liquids, change in the pattern of urinary and intestinal elimination, impeded or impaired movement, necessity of third parties for inspection and massage of the skin, precarious oral hygiene, not able to leave home alone, potential for orthostatic hypotension and hypertensive autonomic crisis[14].

In the domain "Environmental Factors," it is seen that social aspects and quality of life are very affected.

According to Bampi and coworkers[15], who studied patients with spinal cord injury in a Rehabilitation Hospital in Brasilia, utilizing the WHO assessment instrument for quality of life, WHOQOL, the domains linked to the environment and to physical health had the worse evaluation scores. In this case, physical health was related to complications as a result of spinal cord injury[15].

In relation to family, indicated as facilitator by the patients, Faro[16] showed that the care of persons with spinal cord injury at home is a difficult task. The caregiver provides care in the physical sense as well emotional and social sense, even with little information to go on. The family normally has a positive outlook in relation to the recuperation of the patient, believing that the situation of dependence is temporary and that the patient will again be able to move around, even though with help[17]. However, when these expectations are not met, the patient is frustrated.

One study aimed to outline the profile of the main caregiver of the patient who had a spinal cord injury. The results showed that the majority were females (81.7%), with a mean age of 35.8 years, where 26.6% were wives and 23.4% sisters. These caregivers provided an average of 11.3 hours per day taking care of the patient, and 53.3% did this alone, without help of the family. The quality of life of these caregivers, according to SF-36, is much compromised, mainly with regard to physical aspects, pain, vitality and emotional aspects[17].

In relation to health services, classified as facilitator for these patients in this study, a study showed that there is a need for a large number of professionals and good degree of training in this area, since the costs of hospitalization or institutionalization for injuries involving trauma to the spine are relatively higher, increasing with the amount of compromise and level of the injury, that is, tetraplegics spend more[18].

In a study where the objective was to evaluate the quality of life of 32 patients with spinal cord injury, in Fortaleza, in Brazil, utilizing the SF-36, it was demonstrated that quality of life of these individuals was greatly compromised, mainly with regard to social aspects[19], because they have many difficulties in going out and "confronting" society which often has prejudice against such patients.

A study carried out 12 years ago at the University of São Paulo, in Brazil, had already analyzed the quality of life in individuals with spinal cord injury and identified that the social and psychological and social aspects were mostly affected. The main loss was social role, related mainly to the impossibility of returning to work. The changes in the conceptions of self-image and self-esteem were also identified by the feeling of disability. The most important physical loss that was mostly reported by patients was the loss of feeling and motor capacity of the limbs[20].

The application of the ICF on individuals with spinal cord injury demonstrated a series of disabilities and limitations related to body functions, activities and participation and environmental factors[21], which should be taken into account by the health care team during the process of rehabilitation, through one core set specific for spinal cord injury[22].

In conclusion, the Brazilian literature is lacking of information about the functionality and quality of the patients with spinal cord injury and those information are very useful in the elaboration of new public politics for that profile of patient.

REFERENCES

1. [OMS] Organização Mundial da Saúde. CIF: Classificação Internacional de Funcionalidade, Incapacidade e Saúde [Centro Colaborador da Organização Mundial da Saúde para a Família de Classificações Internacionais, org.; coordenação da tradução Cássia Maria Buchalla]. São Paulo: EDUSP, 2003.
2. Rodrigues D, Herrera G. Recursos fisioterapêuticos na prevenção da perda da densidade mineral óssea com lesão medular. Acta Ortop Bras 2004; 12:183-188.
3. Whalley KH. Experience of rehabilitation following spinal cord injury: a meta-synthesis of qualitative findings. Spinal Cord 2007;45:260-274.
4. Biering-Sorensen F, Scheuringer M, Baumberger M, et al. Developing core sets for person with spinal cord injuries based on the International Classification of Functioning, Disability and Health as a way to specify functioning. Spinal Cord 2006;44:541-546.
5. Almeida MCR. Classificação Internacional de Funcionalidade, Incapacidade e Saúde - CIF: aplicação em um hospital público. [Tese] Faculdade de Saúde Pública, USP, 2002.
6. Nicastro H, Savoldelli RD, Kattan V, Coimbra P, Frangella VS. Perfil antropométrico de indivíduos com lesão medular. J Brazilian Soc Food Nutr 2008; 33:73-87.
7. National Spinal Cord Injury Database. Reunião de dados norte-americanos sobre lesão medular. Disponível em: www.spinalcord.uab.edu. Acessado em: 14 julho 2009.
8. Obalum DC, Giwa SO, Adekoya-Cole TO, Enweluzo GO. Profile of spinal injuries in Lagos, Nigeria. Spinal Cord 2009;47:134-137.
9. Lidal IB, Veenstra M, Hjeltnes N, Biering-Sorensen F. Health-related quality of life in persons with long-standing spinal cord injury. Spinal Cord 2008; 46:710-715.
10. Maia C, Padula MPC. Caracterização dos pacientes lesados medulares que frequentaram um centro de reabilitação público na cidade de São Paulo. Med Reabil 2008;27:24-28.
11. Antunes GL. A transformação de identidade do portador de deficiência adquirida tardiamente. [Dissertação] Faculdade de Saúde Pública, USP, 2004.
12. Macedo SP, Chiattone HB, Lianza S, Vieira MSR. Avaliação dos aspectos psicológicos de pacientes portadores de lesão medular. Med Reabil 1995; 41:11-16.
13. Neves RS. Diagnósticos de enfermagem em pacientes lesados medulares segundo o modelo conceitual de Horta e a taxonomia II da NANDA. [Dissertação] Faculdade de Ciências da Saúde, Universidade de Brasília, 2003.
14. Padula MPC. Caracterização dos déficits de autocuidado universal da pessoa com lesão medular. [Dissertação] Escola Paulista de Medicina, Universidade Federal de São Paulo, 1998.
15. Bampi LNS, Guilhem D, Lima DD. Qualidade de vida em pessoas com lesão medular traumática: um estudo com o WHOQOL-bref. Rev Bras Epidemiol 2008;11: 67-77.
16. Faro ACM. Cuidar do lesado medular em casa: a vivência singular do cuidado familiar. São Paulo. [Tese de Livre-Docência] Escola de Enfermagem, USP, 1999.
17. Blanes L. Short-Form-36 e Caregiver Burden Scale em cuidados primários de paraplégicos. [Tese] Escola Paulista de Medicina, Universidade Federal de São Paulo, 2005.
18. Tuono VL. Traumas de coluna no Brasil: análise das internações hospitalares. [Dissertação] Faculdade de Saúde Pública, USP, 2008.
19. Vall J, Braga VAB, Almeida PC. Estudo da qualidade de vida em pessoas com lesão medular traumática. Arq Neuropsiquiatr 2006;64:451-455.
20. Loureiro SCC, Faro ACM, Chaves EC. Qualidade de vida sob a ótica de pessoas que apresentam lesão medular. Rev Esc Enf USP 1997;31:347-367.
21. Kirchberger I, Biering-Sørensen F, Charlifue S, et al. Identification of the most common problems in functioning of individuals with spinal cord i njury using the International Classification of Functioning, Disability and HealthCommon problems of individuals with SCI using the ICF. Spinal Cord 2010;48:221-229.
22. Post WM, Kirchberger I, Scheuringer M, Wollaars MM, Geyh S. Outcome parameters in spinal cord injury research: a systematic review using the International Classification of Functioning, Disability and Health (ICF) as a reference. Spinal Cord 2010;48:522-528.