Education and Rehabilitation of Adult Persons with Disabilities

Thematic Collection of International Importance

Foča, 2014

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Publishers
University of East Sarajevo, Faculty of Medicine Foča, Bosnia and Herzegovina
University of Belgrade – Faculty of Special Education and Rehabilitation – Publishing Centre of the Faculty (ICF), Serbia

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Processing and printing
Planeta print, Belgrade

Cover design
Milena Milićević
Boris Petrović, MA

Technical Editor
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Circulation 100

ISBN 978-99955-733-9-3

By decision no. 01-3-169, from September, 16th 2014. The Teaching and Research Council of the Faculty of Medicine of the University of Foča in Eastern Sarajevo has given approval for the printing of Thematic Collection of international importance „Education and Rehabilitation of Adult Persons with Disabilities".

By decision no. 3/9 from March, 8th 2008. The Teaching and Research Council of the University of Belgrade – Faculty of Special Education and Rehabilitation initiated Edition: Monographs and papers.

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Vocational Training and Employment of Adult Persons with Disabilities

FUNCTIONAL INDEPENDENCE AS A PREDICTOR OF SOCIAL INTEGRATION OF PERSONS WITH SPINAL CORD INJURY

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SUMMARY

Social integration represents the final and most important goal of the rehabilitation process. In order for individual to successfully and independently perform daily activities, some level of functional independence is necessary. In this paper the research question was asked: Is social integration determined by the functional independence?

The study included 100 subjects of both gender, aged 18-65 years, residing in the territory of the Republic of Serbia. The control group (K) consisted of 56 patients without spinal cord injury or other impairments. The experimental group (E-1) consisted of 23 patients diagnosed with injury of the thoracic, lumbar or sacral part of the spinal cord injury (paraplegia). The experimental group (E-2) consisted of 21 subjects with injury of cervical (neck), part of the spinal cord (tetraplegia, quadriplegia).

The aim of this section study was to determine the degree of correlation between functional independence and social integration of adults with spinal cord injury.

The instruments used consisted of General socio-demographic questionnaire, Test for the assessment of functional independence and Social integration questionnaire.

The degree of functional independence showed significant differences among subjects with and without spinal cord injury, but also the differences between subjects with different level of injury. Also, the functional independence showed a high degree of correlation with social integration. Most of the independent variables of functional independence provided a statistically significant correlation with the independent variable of social integration.

Key words: spinal cord injury, social integration, functional independence

INTRODUCTION

As the understanding and the approach to the disability in the last few decades have significantly changed, important efforts have been made to conceptualize and document more clearly the outcome of the rehabilitation process and the degree of social participation of persons with disabilities. Given the jump rate of incidence, survival rates, extended life expectancy, as well as the occurrence of spinal-cord injuries, persons in this population have been given a significant role in practical and scientific research. The consequences of long-term impairments are worrisome, because the injured persons are at the time of the injury mostly young and physically active, and usually after the injury meet serious physical conditions and multiple medical complications with chronic outcome (Bloomfield, 1996; Dearwater et al., 1986).

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Due to functional differences in the level and structure of the spinal cord, there are also differences in the physical, social and psychological aspects when injured or damaged (Jacobs & Nash, 2004). Since the defectological rehabilitation is interdisciplinary scientific area with unique methods, resources, facilities and organization, its aim is to enable persons with disabilities or disorders as well as their environment to achieve social integration and prevention of handicap situation. From the standpoint of biopsychosocial approach to disability the significance of the role of social communities in active changes in access for people with disabilities is undeniable. Changes have to be tactically focused to family, work and social environment, having in mind the fact that this is an active process that lasts for a lifetime. Integration of persons with spinal cord injury in social community assumes knowledge of the needs of these persons in a given moment, related to age, education, and family, economic and social conditions, which are invariably well-defined physical abilities. Therefore, in this paper the research question was asked: Is the possibility of social integration determined by the functional independence? We have relied on the fact that persons with disabilities can integrate in the social environment by adequate measures and procedures, if the issue is approached in a comprehensive and complex manner. Functional independence is the individual's ability to perform daily activities safely and independently. Since defectological theory and practice clearly focus on the abilities, rather than the deficits, it is important to estimate the remaining possibilities with which the individual assess during the rehabilitation process. By improving the functions we increase the activities, motivation and self-confidence (Trgovcevic, 2013). The aim of this study was to determine the degree of correlation between functional independence and social integration of adults with spinal cord injury.

METHODOLOGY

Forming and sample description

The study included 100 subjects of both gender, aged 18-65 years, residing in the territory of the Republic of Serbia. The total sample was divided into a group of individuals without any injury and two subgroups of patients with spinal cord injury. The mean age of respondents without injury at the time of research was 39, 19 (SD=14,87), while patients with injury 40, 50 (SD=11,77). The time between occurrence of the injury and the test period was longer than a year, and all subjects were treated for at least six months in a ward for rehabilitation after the spinal cord injury. The control group (K) consisted of 56 patients without spinal cord injury or other impairments. The experimental group (E-1) consisted of 23 patients diagnosed with injuries of the thoracic, lumbal or sacral part of the spinal cord injury (*paraplegia)*. The experimental group (E-2) consisted of 21 subjects with injury of cervical (neck) part of the spinal cord (*tetraplegia, quadriplegia*).

Basic inclusion criteria for forming the sample were: *Criteria for forming of K groups*: age between 18-65 years, without characteristic of somatic diseases, without significant congenital diseases and psychiatric diseases. The sample was formed in the Health Center „Dr Simo Milosevic" in Belgrade. Corresponding data were collected from medical records, and subjects voluntarily accessed the anonymous survey. *Criteria for*

forming of E-1 group were: age between 18-65 years, diagnosed with paraplegia, without brain injury, without significant congenital diseases and psychiatric diseases. *Criteria for forming of E-2 group*: Age between 18-65 years, diagnosed with tetraplegia without brain injury, without significant congenital diseases and psychiatric diseases.

Research time and place

The survey was conducted during 2012/2013 at the Clinic for the Rehabilitation „Dr Miroslav Zotović" in Belgrade, Sokobanjska no. 13 and the Health Center „Dr Simo Milosevic", Pozeska 64, Belgrade. Relevant sample was formed in the Health Center, so that we could exclude presence of impairments, diseases or conditions that would affect the results by examining the medical records.

Instruments and techniques of research studies description

The general socio-demographic questionnaire was operationally designed questionnaire for needs of this research. It consists of data related to gender, age, and time of injury, level of education, employment and sport activities.

Functional Independence Measure – FIM; (Jovic, 2004; Hall et al., 1999; Fiedler, Granger & Post, 2000; Hamilton et al., 1997; Ditunno et al., 1997; Segal et al., 1999) with a minimum of data provides adequate, prompt, valid, general assessment of functional independence of patients with neurological impairments. It covers six areas of functioning: self-care, sphincter control, mobility, locomotion, communication and socialization, with a total of 18 tasks within those areas.

Community Integration Questionnaire – CIQ; (Dijkers, 2000; Sander et al., 1999; Willer et al., 1999) was designed to provide a measurement of social integration in a fast, reliable and easy way. The questionnaire is not discriminatory in relation to age, gender or socioeconomic status. CIQ was designed on three subscales. Subscales were developed to facilitate the analysis of integration in certain areas of daily life. Items were grouped in terms of their associations with 1) the activities relating to the house, 2) activities related to socialization and 3) education, vocational or other productive activities outside the home.

Statistical data analysis

In the analysis of data collected in order to analyze the facts related to the social integration of persons with spinal cord injury measure of frequency were used, while for determining the correlation between the dependent and independent variables techniques of multivariate analysis using ANOVA models and correlation analysis were used for statistical calculation.

RESEARCH RESULTS

General demographic and functional characteristics of respondents

In accordance with the set objectives of the research the basic socio-demographic characteristics of respondents by: gender identity, age, time of injury, level of education, employment and participation in sports were presented, in order to provide a clearer picture of the relation between the degree of functional independence and opportunities of social integration of persons with spinal cord injury.

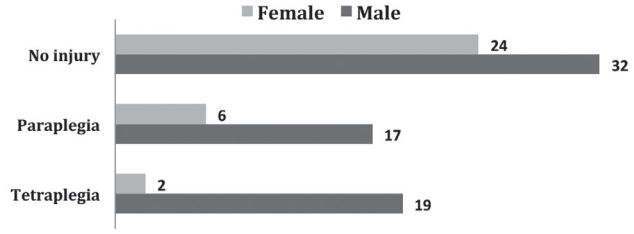

Figure 1 Structure of respondents according to gender

The Figure 1 shows the distribution of respondents by gender. In all three subgroups the formed majority of the sample consisted of male respondents (68%).

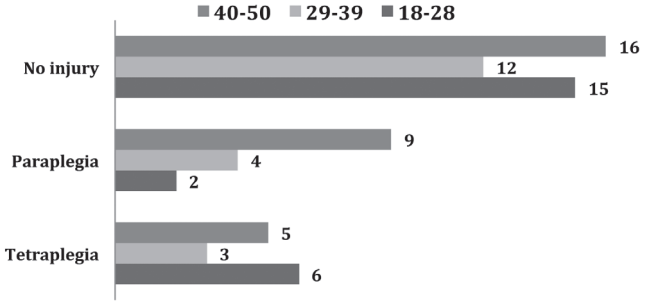

Figure 2 Structure of respondents according to age

The Figure 2 shows the age structure of respondents who were included in the sample. We see that the group with tetraplegia (E-2) and a group of subjects without injury (K) were homogeneous in age, in contrast to the subgroup with paraplegia (E-1), where heterogeneity was present in this respect.

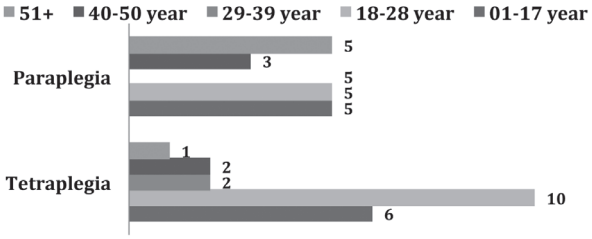

Figure 3 Structure of patients with spinal cord injury related to the time of injury

The Figure 3 shows that the time of injury is significantly different in the group E-2 and E-1 group of patients with quadriplegia (E-2), the most common injury time was a period of 18-28 years (47,6%). Slightly lower percentage of injured between 1-17 years (28,6%), while the same percentage (by 9,5%) patients injured during the period of 29-39 and 40-50 years. The minimum number of respondents suffered spinal cord injury after 51 years-only one respondent (4,8%). Unlike the data presented E-2 group, we see a different structure in patients with paraplegia (E-1). The group structure of the sample according to the time of injury is consistent. It was observed the presence of identical-by five respondents (by 21,7%) observed in each age category, except in the category of 40-50 years, in which the three respondents (13%).

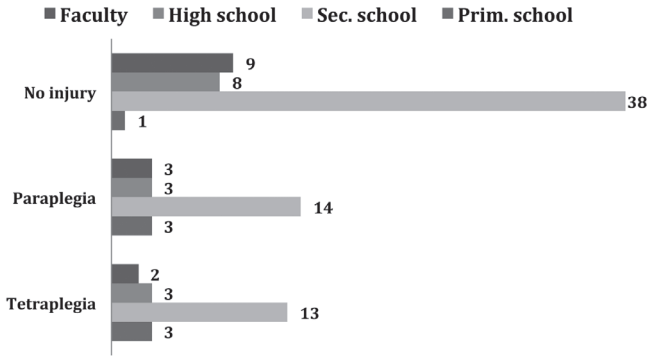

Figure 4 Structure according to education status

The Figure 4 shows the distribution of respondents according to acquired education. By analyzing the data presented, it can be seen that the dominant category of respondents is the one with medium level of education (65%). According to the level of participation the next is the category of respondents with university and college degree (by 14% of respondents), while the least common category of respondents was with elementary education (7%).

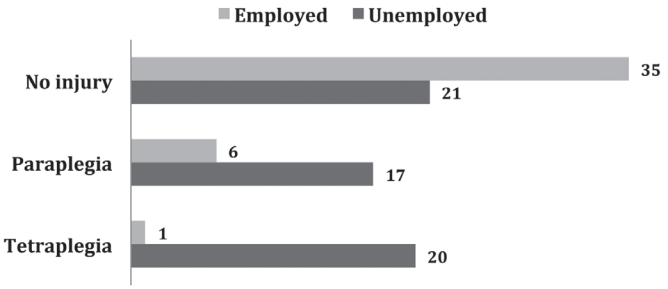

Figure 5 Structure according employment status

The Figure 5 shows the distribution of respondents by employment. We see that unemployment is a problem that affects both the population with spinal cord injury, and the population without injury. Generally, unemployment is a feature in 58% of cases. The dramatic situation is observed by reassessing the results displayed in relation to

specific subcategories, where we find that in a group of paraplegia (E-1), unfavorable structure of respondents according to the employment, as 73,9% of respondents were unemployed. The most difficult situation is observed in the group of subjects E-2, because we see that 95,2% were not employed.

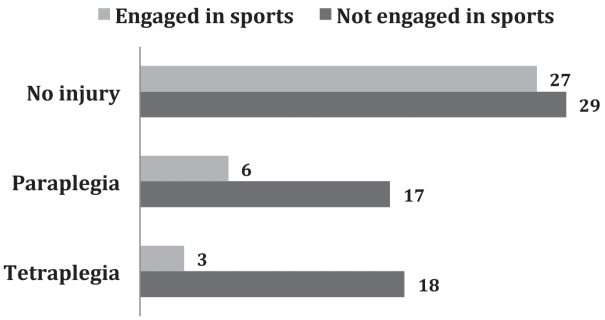

Figure 6 Distribution of respondents according to involvement in sports activities

Based on the presented data in the Figure 6, we can see that respondents in all three groups are not often included in sport activities (64%). The answers given depending on the subgroups provide even less favorable picture. The respondents of the K groups are in the most favorable situation. They are involved in sports in 48,2% of cases. In group E-1, 73,9% of respondents are not involved in sports activities. In group E-2, 85,7% of respondents do not practice any sports activities.

The level of functional independence of patients with and without spinal cord injury

In accordance with the set objectives of the research, which require the determination of differences in the degree of functional independence of persons with and without spinal cord injury, as well as the difference between respondents with different heights of the lesion in order to evaluate the possibilities of social integration, we used test Functional Independence Measure FIM. The test covers six areas of functioning: self-care, sphincter control, mobility, locomotion, communication and socialization. This paper presents the results obtained in the field related exclusively to motor skills, and motor subtotal sum of achievement of respondent.

Table 1 Values of Functional Independence Measure FIM subscale test in patients with and without spinal cord injury

S	Group	n	M	SD	df	F	p
	SCI	44	5,07	2,48			
1*	Control	56	7,00	0,00	1	34,03	0,00
	Summary	100	6,15	1,90			
	SCI	44	4,73	2,66			
2*	Control	56	6,98	0,13	1	40,16	0,00
	Summary	100	5,99	2,09			
	SCI	44	4,18	2,86			
3*	Control	56	7,00	0,00	1	54,40	0,00
	Summary	100	5,76	2,35			
	SCI	44	4,52	2,89			
4*	Control	56	7,00	0,00	1	41,28	0,00
	Summary	100	5,91	2,27			
	SCI	44	4,20	2,93			
5*	Control	56	7,00	0,00	1	51,12	0,00
	Summary	100	5,77	2,38			
	SCI	44	4,00	2,90			
6*	Control	56	7,00	0,00	1	60,03	0,00
	Summary	100	5,68	2,43			
	SCI	44	1,64	1,74			
7*	Control	56	6,95	0,23	1	511,85	0,00
	Summary	100	4,61	2,90			
	SCI	44	1,91	1,97			
8*	Control	56	6,91	0,29	1	346,79	0,00
	Summary	100	4,71	2,83			
	SCI	44	4,25	2,85			
9*	Control	56	7,00	0,00	1	52,43	0,00
	Summary	100	5,79	2,32			
	SCI	44	4,14	2,86			
10*	Control	56	7,00	0,00	1	56,39	0,00
	Summary	100	5,74	2,36			
	SCI	44	3,95	2,74			
11*	Control	56	7,00	0,00	1	69,57	0,00
	Summary	100	5,66	2,36			
	SCI	44	5,77	0,91			
12*	Control	56	6,98	0,13	1	96,21	0,00
	Summary	100	6,45	0,86			
	SCI	44	1,00	0,00			
13*	Control	56	6,82	0,39	1	9962,22	0,00
	Summary	100	4,26	2,92			
	SCI	44	49,25	25,63			
14*	Control	56	90,66	0,82	1	146,46	0,00
	Summary	100	72,44	26,70			

Note:S*Subscale; **1***Feeding; **2***Personal hygiene; **3***Bathing; **4***Dress upper garment; **5***Dress the lower part of the garment; **6***Toilet; **7***Bladder control; **8***Bowel control; **9***Transfer bed, chair, wheelchair; **10***Transfer toilet; **11***Transfer shower; **12***Walk, wheelchair; **13***Stairs; **14*** MSZ-motor subtotal sum

Table 1 shows the values of the achievements of subjects with and without spinal cord injury in the FIM instrument. Applying ANOVA model analysis of mean differences showed statistically significant mean differences on all subscales. The results show that the groups of patients with and without spinal cord injury significantly differ in the domain of self-care, sphincter control, mobility and locomotion.

Table 2 Values of Functional Independence Measure FIM subscale test in patients of the E-1 and E-2 group

S	Group	n	M	SD	df	F	p
	E-2	21	2,95	2,06			
1*	E-1	23	7,00	0,00	1	88,91	0,00
	Summary	44	5,069	2,48			
	E-2	21	2,48	1,97			
2*	E-1	23	6,78	1,04	1	84,52	0,00
	Summary	44	4,73	2,66			
	E-2	21	1,67	1,56			
3*	E-1	23	6,48	1,50	1	108,47	0,00
	Summary	44	4,18	2,86			
	E-2	21	2,09	2,09			
4*	E-1	23	6,74	1,25	1	81,34	0,00
	Summary	44	4,52	2,89			
	E-2	21	1,81	1,91			
5*	E-1	23	6,39	1,73	1	69,77	0,00
	Summary	44	4,20	2,93			
	E-2	21	1,48	1,44			
6*	E-1	23	6,30	1,72	1	101,29	0,00
	Summary	44	4,00	2,90			
	E-2	21	1,57	1,66			
7*	E-1	23	1,69	1,84	1	0,06	0,82
	Summary	44	1,64	1,74			
	E-2	21	1,48	1,44			
8*	E-1	23	2,30	2,34	1	1,95	0,17
	Summary	44	1,91	1,99			
	E-2	21	1,81	1,63			
9*	E-1	23	6,48	1,59	1	92,22	0,00
	Summary	44	4,25	2,85			
	E-2	21	1,71	1,55			
10*	E-1	23	6,35	1,75	1	85,70	0,00
	Summary	44	4,14	2,86			
	E-2	21	1,67	1,49			
11*	E-1	23	6,04	1,74	1	79,12	0,00
	Summary	44	3,95	2,74			
	E-2	21	5,62	1,24			
12*	E-1	23	5,91	0,42	1	1,15	0,29
	Summary	44	5,77	0,91			

S	Group	n	M	SD	df	F	p
	E-2	21	1,00	0,00			
13*	E-1	23	1,00	0,00	1	/	/
	Summary	44	1,00	0,00			
	E-2	21	27,48	16,46			
14*	E-1	23	69,13	13,09	1	87,05	0,00
	Summary	44	49,25	25,63			

Note:S *Subscale; **1***Feeding; **2***Personal hygiene; **3***Bathing; **4***Dress upper garment; **5***Dress the lower part of the garment; **6***Toilet; **7***Bladder control; **8***Bowel control; **9***Transfer bed, chair, wheelchair; **10***Transfer toilet; **11***Transfer shower; **12*** Walk, wheelchair; **13***Stairs; **14*** MSS-motor subtotal sum

Table 2 shows the values of the achievements of the respondents E-1 and E-2 group in the FIM test. Applying ANOVA model analysis of mean differences showed statistically significant mean differences in the following subscales: Feeding (F = 88,91 p = 0,00); Personal hygiene (F = 84,53 p = 0,00); Bathing (F = 108,47 p = 0,00); Dress upper garment (F = 81,34 p = 0,00); Dress the lower part of the clothing (F = 69,77 p = 0,00); Toilet (F = 101,29 p = 0,00); Transfer bed, chair, wheelchair (F = 92,21 p = 0,00); Transfer toilet (F = 85,70 p = 0,00); Transfer shower (F = 79,12 p = 0,00) and MSS-motor subtotal sum (F = 87,05 p = 0,00).

At the subscale of the Bladder control, Bowel control and Walk subscale there were no significant differences between the E-1 and E-2 group.

The association of social integration and individual variables

The social integration of patients with spinal cord injury (SCI) was examined by the *Community Integration Questionnaire* (CIQ). Our interest was directed towards the examination of relations of social integration and functional independence of patients, which we did by using correlation analysis. The obtained results are shown in correlation matrix in Table 3, and exclusively for variables that showed significant relation with the dependent variable of social integration.

Table 3 Correlation matrix of social integration and functional independence

Variables V*	Pearson's R	Standard error	p
Bodily pain	-0,44	0,09	0,00
Sc – Feeding	0,50	0,07	0,00
Sc – Grooming	0,54	0,07	0,00
Sc – Bathing/showering	0,61	0,06	0,00
Sc – Dressing	0,54	0,08	0,00
Sc – Transfers: toilet	0,63	0,06	0,00
Bladder management	0,60	0,07	0,00
Bowel management	0,60	0,07	0,00
Sc – Bed/chair/wheelchair	0,58	0,06	0,00
Locomotion: wheelchair	0,50	0,08	0,00

Note: V * Individual variables of functional independence

The results presented in Table 3 show that social integration is realized as a dependent variable statistically significant correlation in relationship with the individual variables, functional independence: Body pain (R = -0,44 r = 0,00); Self-feeding (R = 0,50 r = 0,00); Independently perform personal hygiene (R = 0,54 r = 0,00); Self bathing (R = 0,61 r = 0,00); Self-dressing (R = 0,54 r = 0,00); Independent transfer to the toilet (R = 0,63 r = 0,00); Self-emptying of the bladder (R = 0,60 r = 0,00); Self emptying the colon (R = 0,60 r = 0,00); Independent transfer trolley-bed (R = 0,58 r = 0,00); Wheelchair (R = 0,50 r = 0,00). In other studied variables a statistically significant relationship could not be found.

DISCUSSION

The Figure 1 shows the structure of the sample according to gender. Rationale basis for including this variable in the analysis lies in the fact that the exposure to risk situations and activities that often leads to injury (extreme sports, traffic, falls, jumps, violence, works in the field of civil engineering, etc...) mainly includes men. This situation is reflected in the greater participation of members of the males in the population of persons with spinal cord injury.

Social integration as a central theme of this paper, as a concept and as the quality of the life activities and interactions, varies depending on the life age which a person belongs. In this sense, the level of social integration differs and as expected according to dispositions, capabilities and realization of different contents, processes and relationships at different ages. This is why we have presented the structure of the sample in relation to belonging to a particular period of life. During the analysis of the results obtained in the E-2 group were observed predominantly emergence of respondents specified life span. However, in the subgroup of patients with paraplegia (E-1), we noticed the smallest representation of the youngest respondents, which leads us to the fact that people between 18-28 years rarely violate the outcome that gives a diagnosis of paraplegia.

The Figure 3 shows the structure of the respondents according to the time of injury. Baseline testing structure of respondents under this criterion lies in the fact that both types of violations vary in relation to the period of life in which they occur and according to the dynamics of life activities. Tetraplegia, or injury of the cervical spine, occurs in young, active men, who are often subjected to dangerous situations and live a more active life, while paraplegia (injury of lower party of the spinal cord), occur uniformly, regardless of age. Thus we see that the time of injury is significantly different in groups E-1 and E-second. The obtained results confirmed the justification of the foundations. Younger, more active and dynamic participants were significantly more present in persons with injury of cervical spine, while the state of paraplegia occurs independently of activity and life age in which the persons are.

Education is an important element and a prerequisite for better inclusion of citizens in the processes, relationships and institutions of a society. By itself it may or may not be an indicator of social inclusion, but he strongly reflects in the process of further social inclusion of persons in society through the labor process. The situation of the

educated or highly educated persons with disabilities due to the unemployment occurs as a user of many social benefits, more like a social problem rather than as a productive member of society which diminishes the quality of its social integration. Of course, a significant impact on the overall situation is a factor of time of injury. Injury accidence after acquiring a certain level of education or during professional engagement varies by consequences, in relation to the injuries in the period prior to employment and education for the duration of the cycle. The analysis of the data showed in the Figure4, we can note that in relation to the total sample of respondents the dominant category is the one with medium level of education (65%), followed by the level of participation with categories of respondents with university and college degree (14% of respondents), while the least represented is the category of respondents with elementary education (7%). These facts suggest a relatively favorable educational structure of our respondents. It may represent a good basis for future social integration through involvement in the employment process.

However, by analyzing the obtained results related to the engagement of patients with spinal cord injury reveals devastating condition. Conclusion that can be established on the basis of these data is directed towards social criticism in the field of employment of persons with disabilities, because in spite of relatively high-quality of pre-conditions related to education their employment is not adequately implemented, which of course affects the level of social integration. It is noted that the situation is more difficult linearly with increasing degree of injury, so that in the population of persons with quadriplegia we can not speak about any social integration through work.

A similar situation was detected in the analysis of participation in sports activities. Apart from the fact that the intensity and frequency of sports activities affect numerous factors such as seriousness and level of the injury, the time of its occurrence and the age of the respondents, the general conclusion that can be drawn on the basis of the presented data in the Graph 6, is that in all three subgroups, respondents rarely engage in various forms of sports activities. Out of the total sample, 64% said they do not participate in any form of physical activity, and the answers of respondents, depending on the membership of a particular subgroup provide even less favorable picture.

Table 1 shows the values of the individual subscales in subjects with and without spinal cord injury. By applying ANOVA model of analysis in mean differences the statistically significant differences on all subscales was found. The results show that the groups of patients with and without spinal cord injury significantly differ in the domain of self-care, sphincter control, mobility and locomotion as expected. Respondents who have spinal cord injuries achieve better results in these areas according to their better physical condition.

Table 2 shows the differences in achievement related to the functional independence of patients with tetra – and paraplegia. By applying ANOVA model analysis of mean differences the statistically significant mean differences in the following subscales was found: feeding, personal hygiene, bathing, dressing upper garment, dressing the lower part of the clothing, toilet, transfer bed, chair, wheelchair, transfer to toilet, shower transfer, and MSZ – Motor subtotal sum. At the subscale – bladder control and bowel control and walk subscale there were no significant differences between the E-1 and E-2

group, and regardless of the violation respondents are not able to control the bladder and bowel emptying, and to walk independently.

The analysis of the Table 3, we noticed that social integration as the dependent variable achieved a statistically significant correlation relationship with the majority of individual variables of functional independence. Respondents with a reduced degree of independence, showed a lower level of involvement in the community.

CONCLUSIONS

The analysis of socio-demographic characteristics of respondents related to gender, age, time of injury, education, work engagement and sport activities, led us to the conclusion that people with spinal cord injury have significantly lower achievements related in social integration, compared to people without injuries. Even more dramatic situation appears by analyzing examined groups related to the amount of injury, where people with higher violation of spinal parts show lower results related to the persons with injury of lower parts of spinal cord.

The degree of functional independence showed significant differences among subjects with and without spinal cord injury, but also the differences among subjects with different level of lesions.

Also, functional independence showed a high correlation with social integration. Most of the independent variables of functional independence provided a statistically significant correlation with the independent variable of social integration. We can conclude that a greater degree of functional independence makes the process of social integration easier and vice versa. Respondents with a reduced degree of independence showed a lower level of involvement in the community, as clearly leads to the fact that functional restoration, medical and defectological rehabilitation, constitute the basis for the inclusion of persons with SCI in the process of social integration.

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Народна и универзитетска библиотека
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316.6-056.26(082)
364-768-056.26:304(082)
376.1-056.26(082)

EDUCATION and Rehabilitation of Adult Persons with Disabilities : Thematic Collection of International Importance / [editors Milan Kulić, Danijela Ilić-Stošović]. - 1. izd. - Foča : Medicinski fakultet, 2014 (Beograd : Planeta print). - 376 str. : ilustr. ; 25 cm

Tiraž 100. - Bibliografija uz svaki rad. - Summary.

ISBN 978-99955-733-9-3

COBISS.RS-ID 4515352