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ORIGINAL ARTICLE

USING THE INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH (ICF) FOR THE EVALUATION OF PATIENTS WITH ANKYLOSING SPONDYLITIS

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Abstract

Introduction: International Classification of Functioning, Disability and Health is an evaluation prepared by the World Health Organization (WHO). In 2001 EU membership states adopted this classification as the basic pillar of the rehabilitation policy for people with health disadvantages. The presented paper shows the possibility of using the International classification of functioning, disability and health (ICF) in research, more specifically using the classification for the evaluation of patients with ankylosing spondylitis.

Aim: The aim was to establish in which areas of the respondents' lives (for which codes) people with ankylosing spondylitis, based on the ICF classification, experience limitation of their functioning, and to analyze the subject codes based on their potential statistically important correlation with selected demographic data (sex, age, address, level of impairment caused by ankylosing spondylitis).

Methodology: The research pool comprised 181 respondents who underwent a full spa treatment in Bertiny lázně spa in Třeboň in 2008. The two-level ICF classification was used for the evaluation, i.e. the basic component code and the basic code of a given chapter were used (e.g. b710, s430, d540...). An interview was held with each respondent, to be more precise specific functional tests were taken in order to establish qualifier values for all two-level classification codes.

Results: 121 out of all analyzed codes (265) had other than zero qualifier value. 26 in physical function components (b), 12 in physical structure components (s), 23 in activity and participation components (d), 24 in environment facilitating factor components (eI) and 11 in environment barrier factor components (eII). A significantly important dependence of monitored values from the areas of activity and participation components (d) and environment factors (e) was established for twenty codes.

Conclusion: The International classification of functioning, disability and health (ICF) can be regarded as an ideal conceptual framework for the definition and evaluation of positive, or negative impacts of various environmental aspects on the life of a given individual within the holistic context (bio-psycho-social) of understanding health and social issues. This paper can also help to "popularize" the ICF classification amongst the wider professional public as the practical knowledge of the classification is still fairly limited in this country and it has not been really applied in practice.

Key words: *ICF – disability – codes – qualifiers – components – participation*

INTRODUCTION

The International classification of functioning, disability and health is an evaluation prepared by the World Health Organization (WHO). In 2001 EU membership states adopted this classification as the basic pillar of the rehabilitation policy for persons with health disadvantage. (Švestková and Pfeiffer 2004).

In comparison to the International Classification of Diseases (WHO 2009) which encodes the diseased condition of humans and which is still in use, the ICF describes the condition of humans in terms of a number of circumstances related to their actual health condition (WHO 2008). Two persons suffering from the same illness (according to the ICD) can have a different level of their functioning (according to the ICF). In other words – the same diagnosis have different consequences for different people (for example with regard to their actual social situation) (Stucki et al. 2002).

The aim of the ICF classification is to have a unified and standardized description tool available for the evaluation of complex human conditions (Peterson and Rosenthal 2005). The classification was developed to improve communication between medical subjects, social security systems, social policy research areas and the wider professional public (Peterson 2005).

The presented paper shows the possibility of using the classification when evaluating patients with ankylosing spondylitis. Ankylosing spondylitis (spondylarthitidis), AS, also known as Bekhterev's disease, is a system disease characterized by chronic inflammation, affecting primarily the spine and intervertebral joints (Braun and Sieper 2007). Back pain and rigid spine, which restricts movement, are typical symptoms of this disease.

Classification method

Any medical condition can be defined using a relevant code from the following four human components:

1. **B**ody functions – b
2. Body **s**tructures – s
3. Activities and participation, formerly "**d**isability" – d
4. **E**nvironmental factor – e

Codes for individual components can be one-level components (e.g. b7, s4, d5...), two-level components (e.g. b710, s430, d540...) or three-level components (e.g. b7102, s4301, d5403...) in view of the fact how specific one can (or must) be in the given case (Peterson et al. 2010).

All classification codes must have one to three qualifiers added (WHO 2008). The qualifiers determine the level of health, or severity of the problem of the given body function (b) or structure (s), and also various tasks and activities done in everyday life (d), but they also determine environmental factors (e) (Stucki et al. 2003). They are shown in each code as one or more digits following a dot (or a separator) (e.g. b 7201.1, s 4300.172, d4501.12...). During the actual classification, qualifiers are allocated from a five-grade spectrum, which is further specified by percentage division of each grade (Stucki et al. 2007). If qualifier 0 is stated, no problem is present for the given code or it is negligible. Qualifier 1 refers to a slight problem, 2 to an average problem, 3 to a serious problem and 4 to an absolute problem.

A detailed explanation of classification principles, including the method of allocation of individual qualifiers, is stated in an electronic format (pdf format) in the information manual which is available on http://www.zsf.jcu.cz/Members/zemanm03/Publikace. This project was prepared as part of the ZSF Grant Agency in 2009.

The overview of all classification codes is stated in the Czech translation of the ICF "International classification of functioning, disability and health".

The aim of this paper is to evaluate respondents with ankylosing spondylitis based on the International classification of functioning, disability and health (ICF) and to establish in which areas of their life these respondents experience the biggest restriction of their functioning. The subsequent aim is to analyze the subject codes based on their potential statically important correlation with selected demographic data.

METHODOLOGY AND MATERIAL

All patients with ankylosing spondylitis, who participated in the full spa treatment in

Bertiny lázně in Třeboň in 2008, were included into the research pool. The total number of patients was 185 but four patients refused to participate. The research pool comprises 181 respondents. Out of the total number of 181 respondents, there were 59 women and 122 men. The average age of all respondents was 51.4, the average age for women 51.1. and for men 51.5.

A two-level ICF classification was used for the evaluation of respondents in the sample, i.e. using the basic component code and the basic code of a given chapter (e.g. b710, s430, d540...). This was done with regard to the size of the pool and the extensive capacity of the classification. In order to make the processing of data easier, the activity and participation qualifiers (d) were listed in separate data rows as performance qualifiers (d_I) and capacity qualifiers (d_II), although they were of course evaluated at the same time, the facilitation qualifiers (as e_I) and barrier qualifiers (as e_II) for environment factors (e) were also evaluated together.

An interview was held with each respondent, to be more precise specific functional tests were taken in order to establish qualifier values for all two-level classification codes. In total, 265 codes were analyzed for each respondent. The data was recorded in previously prepared tables in an electronic format, the data was processed using the SPSS statistical program. Basic descriptive statistics for variables were made, i.e. arithmetic average, modus and median. As the next step, the frequency and percentage distribution of respondents for individual variables and the dependency of individual variables were carried out using the chi-square test.

Table 1. Overview of codes with higher average value of qualifiers (higher than 1), in descending order (by the qualifier value)

Code	Code description (discrimination of qualifiers)	Average qualifier value
d455_II	Movement (capacity)	2,309
d455_I	Movement (performance)	2,193
e445_II	Personal attitude of strangers (barrier)	1,922
e425_II	Personal attitude of acquaintances (barrier)	1,723
e325_II	Acquaintances, friends, colleagues, society members (barrier)	1,585
d760_I	Family relationships (performance)	1,519
e110_I	Products or substances for personal use (facilitation)	1,519
d410	Changing basic body positions (performance and capacity)	1,436
e310_I	The closest family (facilitation)	1,430
d420_II	Moving (capacity)	1,364
d760_II	Family relationships (capacity)	1,353
d770_I	Intimate relationships (performance)	1,292
d415	Keeping posture (performance and capacity)	1,237
d450_II	Walking (capacity)	1,232
s760	Structure of trunk	1,204
b735	Muscle tone function	1,193
d420_I	Moving (performance)	1,165
d770_II	Intimate relationships (capacity)	1,165
e315_I	Wider family (facilitation)	1,165
e140_I	Products and technology for culture (facilitation)	1,149
b710	Joint motility function	1,116
d450_I	Walking (performance)	1,049
s720	Structure of the shoulder area	1,038
e580_I	Medical systems and management principles (facilitation)	1,027

RESULTS

Results: 121 out of all analyzed codes (265) had different than zero qualifier value. 26 in physical function components (b), 12 in physical structure components (s), 23 in activity and participation components (d), the performance qualifier (dI) and capacity qualifier (dII) values differed for seven codes, 24 in environment facilitating factor components (eI) and 11 in barrier environment factor components (eII).

For all codes with more significant average values of qualifiers (higher than 1), more detailed analysis of distribution values were made for these qualifiers.

Mutual dependencies between the qualifier values and individual demographic data (sex, age, address, level of ankylosing spondylitis (AS) were analyzed for all codes of activity and participation components (d) and environment factors (e) where a different than a zero qualifier value was established.

The total number of these codes was 65. The total number of chi-square test analysis of variable dependence was 260. A significantly important dependence of monitored values from all analyzed codes was established for twenty codes.

The final value of the chi-square test for these twenty codes was always lower than the selected critical value of the importance value α (0.05) and it was possible to reject the zero hypothesis of mutual independence of variables for 95% of the importance level. For five codes it was even smaller that the importance level of α = 0.01, this shows high, significantly important statistic dependency.

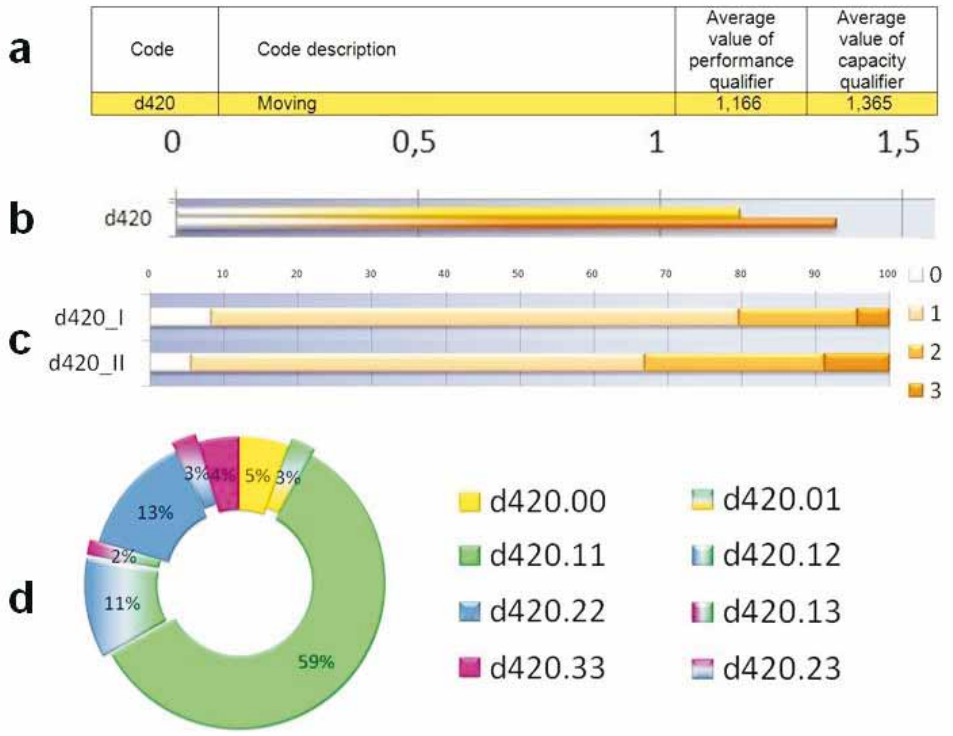
Table 2. Overview of all codes with established significantly important dependency on individual demographic data, in ascending order (based on the established value of the chi-square test)

Code	Code description	Dependent variable	Chi-square test value
d770_I	Intimate relationships (performance)	Sex	**0.000000**
d770_II	Intimate relationships (capacity)	Sex	**0.000000**
e320_I	Friends (facilitation)	Age	**0.000023**
e145_I	Products and technology for religion (facilitation)	Age	**0.000140**
e225_II	Climate (barrier)	Age	**0.000669**
d530	Use of toilet (performance and capacity)	Sex	0.001412
e150_I	Appearance of buildings for the public (facilititation)	AS level	0.014639
d475_I	Driving (performance)	Address	0.018229
e455_II	Personal attitudes of medical staff (facilitation)	Sex	0.021715
e135_I	Products and technology for employment (facilitation)	Sex	0.027792
e570_I	Social security services (facilitation)	Age	0.030968
d450_II	Walking (capacity)	Address	0.031794
e155_II	Appearance of buildings for private purposes (barrier)	Sex	0.034405
e455_I	Personal attitudes of medical staff (facilitation)	Sex	0.034405
e120_I	Products for personal mobility in a flat (facilitation)	Sex	0.034957
d240	Managing difficulties (performance and capacity)	Age	0.042901
e445_II	Personal attitudes of strangers (barrier)	Age	0.043277
e165_I	Tangible values, property (facilitation)	Age	0.043344
e155_II	Appearance of buildings for private purposes (barrier)	Address	0.043455
e145_I	Products and technology for religion (facilitation)	Sex	0.045057

DISCUSSION

Nowadays, the issue of using the International classification of functioning, disability and health (ICF) is more than topical as by agreement of the Czech Statistics Office and the Ministry of Health the advice no. 431/2009 Coll was adopted and as of 1. 7. 2010 this classification came into operation in the Czech Republic.

The aim of this paper was to evaluate the pool of respondents with ankylosing spondylitis based on the International classification of functioning, disability and health (ICF) and to establish in which areas of their life (for which codes) these respondents experienced the biggest restriction of their functions. The qualifier value is the indicator of the scope of restriction of functioning abilities. Qualifiers are allocated from a five-grade spectrum, which is further specified by percentage division of each grade (Stucki et al. 2007). Individual qualifier categories (0 to 4) can not be regarded as numeric characters, in view of the fact that their scope is not equally divided on the scale from 0–100%, and therefore these are ordinal characters (it would be incorrect to use these for calculating arithmetic average), nevertheless, the average qualifier values were calculated for each individual code as the easiest tool for establishing the level of restriction of functioning. More valid information on specific characteristics of restricted functioning is provided for individual codes in histograms, or percentage graphs which are even clearer. Probably the most complex method of presenting the established results is the group ring graph showing percentage scopes of individual combinations of the stated performance qualifier and capacity.



Graph 1
Example of depicting the qualifier values for code d420 – **a, b:** the average value of per-formance and capacity qualifier, on graph "b" the performance qualifier is shown in yellow, the capacity qualifier in orange; **c:** percentage graph: representation of individually alloca-ted qualifiers for given code (d420_I for performance qualifier, d420_II for capacity qualifier); **d:** group ring graph

The scope of restriction of functioning of respondents for the given code is expressed in the group ring graph (see graph 1 – d) and it covers the entire variability of the pool at a maximum level. In particular, the ratio of respondents, who stated a different value for the performance and capacity qualifiers, and respondents who stated the same value (respondent groups with different qualifier values are marked as transitional and they are taken out of the basic ring graph). Furthermore, it is possible to evaluate in more detail the level of positive and negative environment effect. In this case the environment has a clearly positive effect, it decreases the value of the performance qualifier (decreases the scope of restriction of functioning), the performance qualifier is always lower in this case than capacity qualifier. The biggest respondent group with different qualifier value (11%) shows a decrease in the value of the performance qualifier by one degree compared with the capacity qualifier value, from grade 2 to grade 1.

The other aim of the research work was to establish if there was a statistically significant dependence between the established qualifier values for individual codes and sex, age, address and the level of impairment caused by ankylosing spondylitis. The mutual dependency was examined for all codes of activity and participation components (d) and environment factors (e) with established qualifier value other than zero based on the chi-square test. Out of all analyzed codes a significantly important dependence of monitored values was established for twenty codes.

For eight codes it was established that the qualifier value showed dependence on sex, in seven cases it showed dependence on age, in four cases dependence on address and for one code it showed dependence on the level of impairment caused by ankylosing spondylitis.

The interpretation of results can prove rather difficult. For example for code d770 (intimate relationships) we have established that men experience much more restriction in intimate relationships (given by a higher percentage of higher qualifier values) than women. The final value of the chi-square test of dependence of the sex variable and the qualifier is smaller than the selected critical value of the importance level α (0.05), it is even smaller than α (0.01), therefore, we can refuse the zero hypothesis of independence of both values and we declare that these values are statistically significantly dependent. Therefore, it is assumed, also based on the scope of percentage distribution of individual qualifier values, that for men the restriction of functioning will be higher in this area than for women. The problem is that the established significant importance dependency does not say much about the categories of variables between which the dependence was established, and therefore it is important to interpret the final results carefully.

CONCLUSION

When individuals with health disadvantages meet environmental barriers, this results in disability, or in other words this results in a decrease of functioning of individuals based on the ICF terminology. This functional restriction affects not only the physical, but also emotional and social activities of humans. The medical view of disability emphasizes the causes of problems in deficiencies of body structures and functions which can be removed or mitigated by suitable treatment (Boonen et al. 2010). The social view does not see disability as characteristics of a certain individual but more as a set of conditions determined by the environment (Leonardi et al. 2006). The ICF classification represents a connection of both stated views within the holistic and also bio-psycho-social approach.

The use of this classification enables the most objective method of evaluation of health condition ever. The only problem lies in the fact that this classification is not used in practice, which is unfortunately also caused by its insufficient promotion from the departments of the Ministry of Health, Work and Social Affairs (Bruthansová et al. 2009).

Within the context of reasserting a concept of wider multi-disciplinarian team work, involving various specialists, it is more than necessary to increase the awareness of the ICF classification, also on the very basic level, i.e. teaching the classification at universities offering medical and social studies subjects. The only way of how to use the classification efficiently and how to fulfil its philosophy is

its fastest possible distribution in a simple and understandable format across the whole spectrum of medical and social areas and to initiate a wide social discussion about the most suitable ways and possibilities of how to apply the classification in practice.

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